GENERAL DESCRIPTION
The PFM - Plant Floor Marquee series are multi-color LED displays designed to provide vital process and production information to personnel at a glance. The PFM must be used in tandem with Red Lion's G3 series of HMIs, Data Station Plus or Modular Controller series. This affords the PFM the unique ability to display information gathered by its host. The aforementioned host devices can collect information from virtually any device equipped with a serial or Ethernet port.

Four different sizes are available - The smallest is suitable to provide data at the machine level, while the largest can be used to communicate information across an entire factory floor at distances up to 600 feet (182 meters) away. The PFM displays are controlled via the RS-485 port of a G3 HMI, or Data Station Plus/GT models of the Data Station and Modular Controller series. Acting as a slave to these products allows the PFM to display data from multiple industrial devices including PLCs, motor drives, barcode scanners, etc. The RS-485 connection allows the displays to be multi-dropped for applications requiring more than one display.

The PFMs are graphic-based (versus text-based), which allows the series to display items such as bargraphs and custom symbols and graphics. The 7.62 mm (0.3 inch) pitch LED design allows the use of a wide range of font styles and sizes to suit any application. The display is housed in an extruded aluminum and plastic housing designed for indoor use. Brackets are provided to allow the PFM to be mounted from an overhead support.

The PFM is powered by 110 or 220 VAC source. The RS-485 signal connects to the display via an RJ modular plug.

SAFETY SUMMARY
All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFM</td>
<td>Tricolor display 16x80, 110V</td>
<td>PFM1608A</td>
</tr>
<tr>
<td></td>
<td>Tricolor display 16x80, 220V</td>
<td>PFM1608B</td>
</tr>
<tr>
<td></td>
<td>Tricolor display 24x120, 110V</td>
<td>PFM2412A</td>
</tr>
<tr>
<td></td>
<td>Tricolor display 24x120, 220V</td>
<td>PFM2412B</td>
</tr>
<tr>
<td></td>
<td>Tricolor display 32x120, 110V</td>
<td>PFM3212A</td>
</tr>
<tr>
<td></td>
<td>Tricolor display 32x120, 220V</td>
<td>PFM3212B</td>
</tr>
<tr>
<td></td>
<td>Tricolor display 64x120, 110V</td>
<td>PFM6412A</td>
</tr>
<tr>
<td></td>
<td>Tricolor display 64x120, 220V</td>
<td>PFM6412B</td>
</tr>
<tr>
<td>CBL</td>
<td>CBL G3/DSP/MC TO PFM</td>
<td>CBLPFM00</td>
</tr>
</tbody>
</table>

CONTENT OF PACKAGE
- PFM display.
- Hardware kit including mounting brackets
- IEC 320 C22 power cable.
- Hex key wrench (models that require it)
**SPECIFICATIONS**

1. **POWER:**
   - PFM1608A: 105-115 V AC, 50/60 Hz @ 75 W max.
   - PFM2412A: 105-115 V AC, 50/60 Hz @ 155 W max.
   - PFM3212A: 105-115 V AC, 50/60 Hz @ 185 W max.
   - PFM6412A: 105-115 V AC, 50/60 Hz @ 267 W max.
   - PFM1608B: 210-230 V AC, 50/60 Hz @ 75 W max.
   - PFM2412B: 210-230 V AC, 50/60 Hz @ 155 W max.
   - PFM3212B: 210-230 V AC, 50/60 Hz @ 185 W max.
   - PFM6412B: 210-230 V AC, 50/60 Hz @ 267 W max.

2. **DISPLAY:** 7.62 mm (0.3 inch) pitch LED (red/amber/green)

   Resolutions:
   - PFM1608x: 16H x 80W
   - PFM2412x: 24H x 120W
   - PFM3212x: 32H x 120W
   - PFM6412x: 64H x 120W

   Maximum Viewing Distance:
   - PFM1608x: 150 ft (45.72 m)
   - PFM2412x: 200 ft (60.96 m)
   - PFM3212x: 450 ft (137.16 m)
   - PFM6412x: 600 ft (182.88 m)

3. **COMMUNICATIONS:** Connects to the host G3, Data Station or Modular Controller (SX or GT models only) via RS-485.

4. **ENVIRONMENTAL CONDITIONS:**
   - Operating Temperature: 0 to 50°C.
   - Storage Temperature: -10 to 60°C.
   - Operating and Storage Humidity: 80% maximum relative humidity (non-condensing from 0 to 50°C).

5. **CERTIFICATIONS AND COMPLIANCES:**
   - Contact your Red Lion Controls distributor for more information.

6. **CONNECTOR:** IEC 320 C22 style; 5 ft. power cord included (US connector)

7. **CONSTRUCTION:** Extruded aluminum enclosure with ABS endcaps.

8. **MOUNTING REQUIREMENTS:** Suspend from overhead truss or other suitable structure. See “Mounting Instructions” for more info. Refer to local safety codes for additional requirements.

9. **DIMENSIONS:**
   - PFM1608x: 26” x 6.6” x 2.4” (660 x 168 x 61 mm)
   - PFM2412x: 38.5” x 8.8” x 3.4” (978 x 224 x 86 mm)
   - PFM3212x: 38.8” x 10.9” x 3.4” (986 x 277 x 86 mm)
   - PFM6412x: 39.3” x 22.6” x 3.4” (998 x 572 x 86 mm)

10. **WEIGHT:**
    - PFM1608x: 6.8 lbs. (3.1 Kg)
    - PFM2412x: 14.1 lbs. (6.4 Kg)
    - PFM3212x: 17.0 lbs. (7.7 Kg)
    - PFM6412x: 28.7 lbs. (13.0 Kg)

---

**INSTALLING THE PFM**

**MOUNTING INSRTUCTIONS**

**PFM1608x, PFM2412x, & PFM3212x**

The PFM16, PFM24, & PFM32 displays are designed to be mounted directly to a wall, the ceiling or other suitable structure capable of supporting the PFM. Extreme caution should be exercised when hanging the PFM6412x display to provide for the safety of personnel.

The hardware kit includes mounting brackets, washers, & screws. These are installed into the threaded inserts that are on the sides of the PFM.

**PFM6412x**

The PFM64 display is designed to be mounted directly to the wall, suspended from a ceiling truss or other suitable structure capable of supporting it. Extreme caution should be exercised when hanging the PFM6412x display to provide for the safety of personnel.

---

**Mounting bracket:**

1. Remove one of the screws in the top of the PFM.
2. Slide both of the mounting brackets into the rail.
**POWERING THE PFM**

The PFM is fitted with an IEC 320 C22 connector. A five foot long, grounded three-prong connector cable is included with each unit. The PFM is powered by 110 V AC, 50/60 Hz or 220 V AC, 50/60 Hz depending on the model chosen.

**COMMUNICATING WITH THE PFM**

The PFM requires a host product in the form of a G3, Data Station Plus or Modular Controller. Further, only models that have a User Interface may be used as a host. This excludes products such as the DSPLE and CSMSTRLE. See the relevant product bulletins for more information.

The CBLPFM00 may be used to connect the RS-485 port of the host product to the RS-485 port of the PFM.
LIMITED WARRANTY

The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company’s liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company’s option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.

The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.

No warranties expressed or implied are created with respect to The Company’s products except those expressly contained herein. The Customer acknowledges the disclaimers and limitations contained herein and relies on no other warranties or affirmations.
GENERAL DESCRIPTION

The 4.3-inch G3 Kadet was designed for applications in which available mounting space is at a premium. Though diminutive in size, the Kadet boasts a bright TFT display with full 256-color support. With a resolution of 480 x 272, the Kadet's 4.3-inch display has a higher resolution and better image clarity than most 6-inch HMIs.

The G3 Kadet range of HMIs is programmed with Red Lion's free Crimson 2.0 software. Crimson 2.0 offers easy to use drag and drop communications configuration, while the embedded image library allows the programmer to create intuitive screens and prompts for the operator.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use the controller to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the unit.

CONTENTS OF PACKAGE

- G304K Operator Interface.
- Hardware packet for mounting unit into panel.
- Terminal block for connecting power.
- Spare fuse.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>G304K</td>
<td>4.3&quot; TFT Operator Interface</td>
<td>G304K000</td>
</tr>
<tr>
<td>SFCRM2</td>
<td>Crimson 2.0</td>
<td>SFCRM200</td>
</tr>
<tr>
<td>CBL</td>
<td>USB to RS-232 Adaptor, includes &quot;y&quot; cable</td>
<td>CBLSK000</td>
</tr>
<tr>
<td></td>
<td>Communications Cables and Adaptor</td>
<td>CBLxxxxx</td>
</tr>
<tr>
<td>G3FILM</td>
<td>Protective Film</td>
<td>G3FILM4K</td>
</tr>
<tr>
<td>Fuse</td>
<td></td>
<td>G3FUSE60</td>
</tr>
</tbody>
</table>

1 Use this part number to purchase the Crimson software on CD with a printed manual and cables for the G3 and Kadet series HMIs. Otherwise, download for free from www.redlion.net.

2 Contact your Red Lion distributor or visit our website for selection of adapters and cables.
1. **POWER REQUIREMENTS:**
   - Must use Class 2 or SELV rated power supply.
   - Power connection via removable three position terminal block.
   - Supply Voltage: 12-28 VDC, Class 2
   - Maximum Power: 3.6 W; Start up current may be as high as 700 mA
   - Fused: Fast-blow 800mA, 5x20mm

2. **LCD DISPLAY:**
   - Size: 4.3-inch
   - Type: TFT
   - Colors: 256
   - Pixels: 480 x 272
   - Brightness: 300 cd/m²
   - Backlight Type: LED
   - Backlight Life: 50,000 HR TYP.

3. **TOUCHSCREEN:** Four-wire resistive analog
4. **MEMORY:** 2MB of non-volatile flash memory
5. **COMMUNICATIONS:** Two Serial Ports - One RS-232 port, one RS-232/422/485
   - Serial Ports: Format and Baud Rates for each port are individually software programmable up to 115,200 baud.

6. **ENVIRONMENTAL CONDITIONS:**
   - Operating Temperature Range: 0 to 45°C
   - Operating and Storage Humidity: 10-90% relative humidity (non-condensing) from 0 to 45°C.
   - Vibration: Operational 10 to 25 Hz in X, Y, Z direction for 30 minutes, 2 g’s.

7. **CERTIFICATIONS AND COMPLIANCES:**
   - SAFETY
     - UL Listed, File #E302106, UL508, CSA-C22.2 No. 142
     - LISTED by Und. Lab. Inc. to U.S. and Canadian safety standards
     - UL Type 4 Indoor Use Only Enclosure rating (Face only), UL50
     - IP65 Enclosure rating (Face only), IEC 529
   - ELECTROMAGNETIC COMPATIBILITY
     - Consult factory for EMC specifications

8. **CONNECTIONS:** Compression cage-clamp terminal block.
   - Wire Gage: 12-28 AWG copper wire
   - Communications: DB9M connection

9. **CONSTRUCTION:** Plastic enclosure with NEMA 4/IP65 front panel when properly installed.

10. **WEIGHT:** 9.4 oz (270 g)

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**DIMENSIONS In inches (mm)**

```
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>4.3-inch</td>
</tr>
<tr>
<td>Type</td>
<td>TFT</td>
</tr>
<tr>
<td>Colors</td>
<td>256</td>
</tr>
<tr>
<td>Pixels</td>
<td>480 X 272</td>
</tr>
<tr>
<td>Brightness</td>
<td>300 cd/m²</td>
</tr>
<tr>
<td>Backlight Type</td>
<td>LED</td>
</tr>
<tr>
<td>Backlight Life</td>
<td>50,000 HR TYP.</td>
</tr>
</tbody>
</table>
```

---

**INSTALLING AND POWERING THE G304K**

**MOUNTING INSTRUCTIONS**

The unit can be mounted into enclosures with a depth of 4". It is recommended that the unit be mounted on the front panel of a steel enclosure. Allow clearance of 1" around the sides of the unit for the mounting hardware.

Place the unit in the panel cutout. Slide clamps into the four holes provided at the top and bottom of the case. Tighten the clamping screws in an even pattern until the unit is secured in the panel. Caution: Do not over tighten the clamps. To seal to NEMA4 specifications, all supplied mounting clamps must be used. The panel must not flex more than 0.010".
POWER SUPPLY REQUIREMENTS
The G304K requires a 12-28 VDC power supply. Please take care to observe the following points:
- The wire used to connect the operator interface’s power supply should be at least 22-gage wire. If a longer cable run is used, a heavier gage wire should be used. The routing of the cable should be kept away from large contactors, inverters, and other devices which may generate significant electrical noise.
- A power supply with a Class 2 or SELV rating is to be used. A Class 2 or SELV power supply provides isolation to accessible circuits from hazardous voltage levels generated by a mains power supply due to single faults. SELV is an acronym for “safety extra-low voltage.” Safety extra-low voltage circuits shall exhibit voltages safe to touch both under normal operating conditions and after a single fault, such as a breakdown of a layer of basic insulation or after the failure of a single component has occurred.

COMMUNICATING WITH THE G304K
The G304K has two serial ports combined into a single DB9-M connector.

<table>
<thead>
<tr>
<th>PIN</th>
<th>SYMBOL</th>
<th>PLC (RS-485) 4 wire</th>
<th>PLC (RS-485) 2 wire</th>
<th>PLC (RS-232)</th>
<th>PC (RS-232)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rx-</td>
<td>Rx-</td>
<td>Data-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Rx+</td>
<td>Rx+</td>
<td>Data+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Tx-</td>
<td>Tx-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Tx+</td>
<td>Tx+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>Signal Ground</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>TxD</td>
<td></td>
<td>Transmit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>TxD</td>
<td></td>
<td>Transmit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>RxD</td>
<td></td>
<td>Receive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>RxD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PC CONNECTION
Configuration files are downloaded to the Kadet via the PC port, which can be connected to a computer via various cables.

USB to Serial
PT# CBLUSB23 (includes CBLSK000)


**SETTING THE SWITCHES**

Normal mode.

Lowers the intensity of the backlight.

Cycle power or press reset button with the switches as shown in order to display the Clear Database prompt. Touch the left side of the display to clear the database; touch the right side to continue in normal mode.

**SOFTWARE/UNIT OPERATION**

**CRIMSON SOFTWARE**

Crimson software is available as a free download from Red Lion’s website or it can be purchased on a CD, see “Ordering Information” for part number. The latest version of the software is always available from the website, and updating your copy is free.

**FRONT PANEL LEDS**

There are three front panel LEDs. Shown below is the default status of the LEDs.

<table>
<thead>
<tr>
<th>LED</th>
<th>INDICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED (ALM)</td>
<td>Tag is in an alarm condition and not acknowledged</td>
</tr>
<tr>
<td>FLASHING</td>
<td>Acknowledged alarm exists.</td>
</tr>
<tr>
<td>STEADY</td>
<td>In conjunction with green com LED while unit is in bootloader</td>
</tr>
<tr>
<td>GREEN (COM)</td>
<td>Communications not established</td>
</tr>
<tr>
<td>STEADY</td>
<td>No communication errors are present</td>
</tr>
<tr>
<td>FLASHING</td>
<td>In conjunction with the red ALM LED while the unit is in bootloader</td>
</tr>
<tr>
<td>FLICKERING</td>
<td>Communication error exists</td>
</tr>
<tr>
<td>ORANGE (PWR)</td>
<td>Power is applied.</td>
</tr>
</tbody>
</table>

**TOUCHSCREEN**

This operator interface utilizes a resistive analog touchscreen for user input. The unit will only produce an audible tone (beep) when a touch on an active touchscreen cell is sensed. The touchscreen is fully functional as soon as the operator interface is initialized, and can be operated with gloved hands.

**TROUBLESHOOTING YOUR G304K**

If for any reason you have trouble operating, connecting, or simply have questions concerning your new G304K, contact Red Lion’s technical support. For contact information, refer to the front page of this bulletin for phone and fax numbers.

EMAIL: techsupport@redlion.net
Web Site: http://www.redlion.net

**CAUTION:** The circuit board contains static sensitive components. Before handling the operator interface without the rear cover attached, discharge static charges from your body by touching a grounded bare metal object. Ideally, handle the operator interface at a static controlled clean workstation. Also, do not touch the surface areas of the circuit board. Dirt, oil, or other contaminants may adversely affect circuit operation.
GENERAL DESCRIPTION

The G306K is the perfect solution for applications that require the operator to monitor and control more than just a single device. With three serial ports and an Ethernet port, the 5.6" Kadet can connect to multiple serial and Ethernet devices simultaneously, including PLCs, motor drives, bar code scanners, etc.

The G306K performs the functions of a multiple protocol converter, using three high-speed RS-232/422/485 communications ports and a 10 Base-T Ethernet port. The Ethernet port supports up to four protocols simultaneously, allowing dissimilar Ethernet based products to communicate with one another.

The CompactFlash slot can be used to load the unit's configuration file, allowing configuration changes to be made and saved to the card for later transfer.

The G3 Kadet range of HMIs is programmed with Red Lion's free Crimson 2.0 software. Crimson 2.0 offers easy to use drag and drop communications configuration, while the embedded image library allows the programmer to create intuitive screens and prompts for the operator.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use the controller to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the unit.

CONTENTS OF PACKAGE

- G306K Operator Interface.
- Hardware packet for mounting unit into panel.
- Terminal block for connecting power.
- Spare fuse.

ORDERING INFORMATION

1 Use this part number to purchase the Crimson® software on CD with a printed manual and cables for the G3 and Kadet series HMIs. Otherwise, download for free from www.redlion.net.
2 Contact your Red Lion distributor or visit our website for selection of adapters and cables.
3 Battery type is lithium coin type CR2032.
4 Industrial grade two million write cycles.

CONFIGURED USING CRIMSON® 2.0 SOFTWARE

THREE SERIAL COMMUNICATIONS PORTS
(1 RS-232 AND 2 RS-232/422/485 PORTS)

10 BASE-T ETHERNET PORT COMMUNICATES WITH UP TO FOUR PROTOCOLS SIMULTANEOUSLY

UNIT'S CONFIGURATION IS STORED IN NON-VOLATILE FLASH MEMORY

COMPACTFLASH® SOCKET FOR LOADING DATABASE IN FIELD

5.6-INCH TFT ACTIVE MATRIX 256 COLOR QVGA 320 X 234 PIXEL DISPLAY

NEMA 4/IP65 FRONT PANEL

THREE FRONT PANEL LED INDICATORS

POWER UNIT FROM 12 - 24 VDC

RESISTIVE ANALOG TOUCHSCREEN
**POWER REQUIREMENTS:**
Must use Class 2 or SELV rated power supply.
Power connection via removable three position terminal block.
Supply Voltage: 12 - 24 VDC, Class 2
Maximum Power: 200 mA @ 24 VDC
Fuse: Fast-blow 800mA, 5x20mm

**BATTERY:** Lithium coin cell. Typical lifetime of 10 years.

**LCD DISPLAY:**

<table>
<thead>
<tr>
<th>Size</th>
<th>5.6-inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>TFT</td>
</tr>
<tr>
<td>Colors</td>
<td>256</td>
</tr>
<tr>
<td>Pixels</td>
<td>320 X 234</td>
</tr>
<tr>
<td>Brightness</td>
<td>300 cd/m²</td>
</tr>
<tr>
<td>Backlight Type</td>
<td>LED</td>
</tr>
<tr>
<td>Backlight Life</td>
<td>30,000 HR TYP.</td>
</tr>
</tbody>
</table>

**TOUCHSCREEN:** Four-wire resistive analog

**MEMORY:**

On Board User Memory: 2 Mbyte of non-volatile Flash memory.

Memory Card: CompactFlash Type II slot for Type I and Type II CompactFlash cards.

Note: For reliable operation in all of our products, Red Lion recommends the use of SanDisk® and SimpleTech brands of CompactFlash cards. Industrial grade versions that provide up to two million write/erase cycles minimum are available from Red Lion.

**COMMUNICATIONS:** Three Serial Ports - One RS-232 port, two RS-232/422/485: One Ethernet Port
Serial Ports: Format and Baud Rates for each port are individually software programmable up to 115,200 baud.
Ethernet Port: 10 Mbps

**ENVIRONMENTAL CONDITIONS:**
Operating Temperature Range: 0 to 45°C
Operating and Storage Humidity: 10-90% relative humidity (non-condensing) from 0 to 45°C.
Vibration: Operational 10 to 25 Hz, in X, Y, Z direction, 30 minutes, 2 g/s.

**CERTIFICATIONS AND COMPLIANCES:**

**SAFETY**
UL Listed, File #E302106, UL508, CSA-C22.2 No. 142
LISTED by Und. Lab. Inc. to U.S. and Canadian safety standards
UL Type 4 Indoor Use Only Enclosure rating (Face only), UL50
IP65 Enclosure rating (Face only), IEC 529

**ELECTROMAGNETIC COMPATIBILITY**
Consult factory for EMC specifications

**CONNECTIONS:**
Compression cage-clamp terminal block.
Communications: DB9 connectors

**CONSTRUCTION:** Plastic enclosure with NEMA 4/IP65 front panel when properly installed.

**WEIGHT:** 30 oz. (850 g)

**DIMENSIONS In inches (mm)**

- **Size:** 8.03 (204)
- **Type:** TFT
- **Colors:** 256
- **Pixels:** 320 x 234
- **Brightness:** 300 cd/m²
- **Backlight Life:** 30,000 HR TYP.

**INSTALLING AND POWERING THE G306K**

**MOUNTING INSTRUCTIONS**

The unit can be mounted into enclosures with a depth of 4". It is recommended that the unit be mounted on the front panel of a steel enclosure. Allow clearance of 1" around the sides of the unit for the mounting hardware.

Place the unit in the panel cutout. Slide clamps into the four holes provided at the top and bottom of the case. Tighten the clamping screws in an even pattern until the unit is secured in the panel. Caution: Do not over tighten the clamps.

To seal to NEMA4 specifications, all supplied mounting clamps must be used. The panel must not flex more than 0.010".

---

**D I M E N S I O N S  I n  i n c h e s  ( m m )**

- **Size:** 8.03 (204)
- **Type:** TFT
- **Colors:** 256
- **Pixels:** 320 x 234
- **Brightness:** 300 cd/m²
- **Backlight Life:** 30,000 HR TYP.

**I N S T A L L I N G  A N D  P O W E R I N G  T H E  G 3 0 6 K**

**MOUNTING INSTRUCTIONS**

The unit can be mounted into enclosures with a depth of 4". It is recommended that the unit be mounted on the front panel of a steel enclosure. Allow clearance of 1" around the sides of the unit for the mounting hardware.

Place the unit in the panel cutout. Slide clamps into the four holes provided at the top and bottom of the case. Tighten the clamping screws in an even pattern until the unit is secured in the panel. Caution: Do not over tighten the clamps.

To seal to NEMA4 specifications, all supplied mounting clamps must be used. The panel must not flex more than 0.010".
**COMMUNICATING WITH THE G306K**

The G306K has three serial ports, as well as an Ethernet port. The serial ports are exposed via one DB9 male, and one DB9 female connector. You may assign one unique protocol to each of the Programming, Comms and Auxiliary ports for a total of three different serial protocols.

- **Note:** If you assign a protocol to the Programming Port, you will no longer be able to download. You should create a means to call the StopSystem() function from the HMI touchscreen, such that the Programming Port activity can be halted on command. Alternatively, the HMI’s memory can be cleared to restore download functionality.

The Ethernet port can be programmed to communicate via four protocols simultaneously. For more information on protocol support, please refer to the Crimson 2.0 programming software.

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**CONNECTING POWER**

The G306K requires a 12-24 VDC power supply. Please take care to observe the following points:

- The wire used to connect the operator interface’s power supply should be at least 22-gage wire. If a longer cable run is used, a heavier gage wire should be used. The routing of the cable should be kept away from large contactors, inverters, and other devices which may generate significant electrical noise.

- A power supply with a Class 2 or SELV rating is to be used. A Class 2 or SELV power supply provides isolation to accessible circuits from hazardous voltage levels generated by a mains power supply due to single faults. SELV is an acronym for “safety extra-low voltage.” Safety extra-low voltage circuits shall exhibit voltages safe to touch both under normal operating conditions and after a single fault, such as a breakdown of a layer of basic insulation or after the failure of a single component has occurred.

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**PC CONNECTION**

Configuration files are downloaded to the Kadet via the PC port, which can be connected to a computer via various cables.
**DEVICE COMMUNICATIONS**

Several adapters are available which allow direct connection via Red Lion communications cables. For a list of adapters and cables, please visit [http://www.redlion.net/support/downloads.html](http://www.redlion.net/support/downloads.html).

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**SETTING THE SWITCHES**

Cycle power with the switches as shown in order to display the Clear Database prompt. Touch the left side of the display to clear the database; touch the right side to continue in normal mode.

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**SOFTWARE/UNIT OPERATION**

**CRIMSON SOFTWARE**

Crimson software is available as a free download from Red Lion’s website or it can be purchased on a CD, see “Ordering Information” for part number. The latest version of the software is always available from the website, and updating your copy is free.

**TOUCHSCREEN**

This operator interface utilizes a resistive analog touchscreen for user input. The unit will only produce an audible tone (beep) when a touch on an active touchscreen cell is sensed. The touchscreen is fully functional as soon as the operator interface is initialized, and can be operated with gloved hands.

**FRONT PANEL LEDS**

There are three front panel LEDs. Shown below is the default status of the LEDs.

<table>
<thead>
<tr>
<th>LED</th>
<th>INDICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED (ALM)</td>
<td>Tag is in alarm condition and not acknowledged</td>
</tr>
<tr>
<td>FLASHING</td>
<td>Acknowledged alarms exist</td>
</tr>
<tr>
<td>SOLID</td>
<td>No alarms present</td>
</tr>
<tr>
<td>OFF</td>
<td>In conjunction with Green COM LED when unit is in boot loader</td>
</tr>
<tr>
<td>GREEN (COM)</td>
<td>No communications errors are present</td>
</tr>
<tr>
<td>STEADY</td>
<td>Comms are not established</td>
</tr>
<tr>
<td>FLICKERING</td>
<td>Comm error exists</td>
</tr>
<tr>
<td>FLASHES</td>
<td>In conjunction with Red COM LED when unit is in boot loader</td>
</tr>
<tr>
<td>RAPIDLY</td>
<td></td>
</tr>
<tr>
<td>ORANGE (PWR)</td>
<td>Power is applied</td>
</tr>
</tbody>
</table>

**TROUBLESHOOTING YOUR G306K**

If for any reason you have trouble operating, connecting, or simply have questions concerning your new G306K, contact Red Lion’s technical support. For contact information, refer to the front page of this bulletin for phone and fax numbers.

EMAIL: techsupport@redlion.net
Web Site: [http://www.redlion.net](http://www.redlion.net)

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**BATTERY REPLACEMENT**

The G306K uses one CR2032 coin type lithium battery to maintain the RTC (real-time clock) and for proper Ethernet download operation. To change the battery, remove power, cabling, and then the rear cover of the unit. Remove the old battery from the holder and replace with a new battery*. Replace the rear cover, cables, and re-apply power. Set the RTC to the proper date and time.

* Please note that the old battery must be disposed of in a manner that complies with your local waste regulations. Also, the battery must not be disposed of in fire, or in a manner whereby it may be damaged and its contents come into contact with human skin.

---

**CAUTION**: The circuit board contains static sensitive components. Before handling the operator interface without the rear cover attached, discharge static charges from your body by touching a grounded bare metal object. Ideally, handle the operator interface at a static controlled clean workstation. Also, do not touch the surface areas of the circuit board. Dirt, oil, or other contaminants may adversely affect circuit operation.

**CAUTION**: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer’s instructions.
**GENERAL DESCRIPTION**

The G308K is the perfect solution for applications that require the operator to monitor and control more than just a single device. With three serial ports and an Ethernet port, the 8" Kadet can connect to multiple serial and Ethernet devices simultaneously, including PLCs, motor drives, bar code scanners, etc.

The G308K performs the functions of a multiple protocol converter, using three high-speed RS-232/422/485 communications ports and a 10 Base-T Ethernet port. The Ethernet port supports up to four protocols simultaneously, allowing dissimilar Ethernet based products to communicate with one another.

The CompactFlash slot can be used to load the unit's configuration file, allowing configuration changes to be made and saved to the card for later transfer.

The G3 Kadet range of HMIs is programmed with Red Lion's free Crimson 2.0 software. Crimson 2.0 offers easy to use drag and drop communications configuration, while the embedded image library allows the programmer to create intuitive screens and prompts for the operator.

**SAFETY SUMMARY**

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use the controller to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the unit.

**CONTENTS OF PACKAGE**

- G308K Operator Interface.
- Hardware packet for mounting unit into panel.
- Spare fuse

**ORDERING INFORMATION**

1 Use this part number to purchase the Crimson® software on CD with a printed manual and cables for the G3 and Kadet series HMIs. Otherwise, download for free from www.redlion.net.

2 Contact your Red Lion distributor or visit our website for selection of adapters and cables.

3 Battery type is lithium coin type CR2032.

4 Industrial grade two million write cycles.

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**CompactFlash** is a registered trademark of CompactFlash Association.
POWER REQUIREMENTS:
Must use Class 2 or SELV rated power supply.
Power connection three position terminal block.
Supply Voltage: 24 VDC ± 5%, Class 2
Maximum Power: 440 mA @ 24 VDC
Fuse: Fast-blow 800mA, 5x20mm

BATTERY: Lithium coin cell. Typical lifetime of 10 years.

LCD DISPLAY:

<table>
<thead>
<tr>
<th>SIZE</th>
<th>8-inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE</td>
<td>TFT</td>
</tr>
<tr>
<td>COLORS</td>
<td>256</td>
</tr>
<tr>
<td>PIXELS</td>
<td>640 x 480</td>
</tr>
<tr>
<td>BRIGHTNESS</td>
<td>400 cd/m²</td>
</tr>
<tr>
<td>BACKLIGHT TYPE</td>
<td>CCFL</td>
</tr>
<tr>
<td>BACKLIGHT LIFE</td>
<td>50,000 HR TYP.</td>
</tr>
</tbody>
</table>

TOUCHSCREEN: Four-wire resistive analog

MEMORY:
On Board User Memory: 4 Mbyte of onboard non-volatile Flash memory.
Memory Card: CompactFlash Type II slot for Type I and Type II CompactFlash cards.

Note: For reliable operation in all of our products, Red Lion recommends the use of SanDisk® and SimpleTech brands of CompactFlash cards.
Industrial grade versions that provide up to two million write/erase cycles minimum are available from Red Lion.

COMMUNICATIONS: Three Serial Ports - One RS-232 port, two RS-232/422/485: One Ethernet Port
Serial Ports: Format and Baud Rates for each port are individually software programmable up to 115,200 baud.
Ethernet Port: 10 Mbps

ENVIRONMENTAL CONDITIONS:
Operating Temperature Range: 0 to 45°C
Operating and Storage Humidity: 10-90% relative humidity (non-condensing) from 0 to 45°C.
Vibration: Operational 10 to 25 Hz, in X, Y, Z direction for 30 minutes, 2 g’s.

CERTIFICATIONS AND COMPLIANCES:
SAFETY
UL Listed, File #E302106, UL508, CSA-C22.2 No. 142
LISTED by Und. Lab. Inc. to U.S. and Canadian safety standards
UL Type 4 Indoor Use Only Enclosure rating (Face only), UL50
IP65 Enclosure rating (Face only), IEC 529

ELECTROMAGNETIC COMPATIBILITY
Consult factory for EMC specifications

CONNECTIONS:
Screw terminal block.
Wire Gage: 12-28 AWG copper wire
Communications: DB9 Connectors

CONSTRUCTION: Plastic enclosure with NEMA 4/IP65 front panel when properly installed

WEIGHT: 42.4 oz (1.2 g)

DIMENSIONS In inches (mm)

8.70 (221) 6.57 (167) 2.17 (55) 1.85 (47)

Installing and Powering the G308K

MOUNTING INSTRUCTIONS
The unit can be mounted into enclosures with a depth of 4". It is recommended that the unit be mounted on the front panel of a steel enclosure. Allow clearance of 1" around the sides of the unit for the mounting hardware.
Place the unit in the panel cutout. Slide clamps into the four holes provided at the top and bottom of the case. Tighten the clamping screws in an even pattern until the unit is secured in the panel. Caution: Do not over tighten the clamps.
To seal to NEMA4 specifications, all supplied mounting clamps must be used.
The panel must not flex more than 0.010".
COMMUNICATING WITH THE G308K

The G308K has three serial ports, as well as an Ethernet port. The serial ports are exposed via one DB9 male, and one DB9 female connector. You may assign one unique protocol to each of the Programming, Comm and Auxiliary ports for a total of three different serial protocols.

Note: If you assign a protocol to the Programming Port, you will no longer be able to download. You should create a means to call the StopSystem() function from the HMI touchscreen, such that the Programming Port activity can be halted on command. Alternatively, the HMI’s memory can be cleared to restore download functionality.

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Configuration files are downloaded to the Kadet via the PC port, which can be connected to a computer via various cables.
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SOFTWARE/UNIT OPERATION

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FRONT PANEL LEDS
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<thead>
<tr>
<th>LED</th>
<th>INDICATION</th>
</tr>
</thead>
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<tr>
<td>RED (ALM)</td>
<td>flashing Tag is in alarm condition and not acknowledged</td>
</tr>
<tr>
<td></td>
<td>solid Acknowledged alarms exist</td>
</tr>
<tr>
<td></td>
<td>off No alarms present</td>
</tr>
<tr>
<td></td>
<td>flashes rapidly In conjunction with Green COM LED when unit is in boot loader</td>
</tr>
<tr>
<td>GREEN (COM)</td>
<td>steady No communications errors are present</td>
</tr>
<tr>
<td></td>
<td>off Comms are not established</td>
</tr>
<tr>
<td></td>
<td>flickering Comm error exists</td>
</tr>
<tr>
<td></td>
<td>flashes rapidly In conjunction with Red COM LED when unit is in boot loader</td>
</tr>
<tr>
<td>ORANGE (PWR)</td>
<td>steady Power is applied</td>
</tr>
</tbody>
</table>

TOUCHSCREEN
This operator interface utilizes a resistive analog touchscreen for user input. The unit will only produce an audible tone (beep) when a touch on an active touchscreen cell is sensed. The touchscreen is fully functional as soon as the operator interface is initialized, and can be operated with gloved hands.

TROUBLESHOOTING YOUR G308K
If for any reason you have trouble operating, connecting, or simply have questions concerning your new G308K, contact Red Lion’s technical support. For contact information, refer to the front page of this bulletin for phone and fax numbers.

BATTERY REPLACEMENT
The G308K uses one CR2032 coin type lithium battery to maintain the RTC (real-time clock) and for proper Ethernet download operation. To change the battery, remove power, cabling, and then the rear cover of the unit. Remove the old battery from the holder and replace with a new battery*. Replace the rear cover, cables, and re-apply power. Set the RTC to the proper date and time.

* Please note that the old battery must be disposed of in a manner that complies with your local waste regulations. Also, the battery must not be disposed of in fire, or in a manner whereby it may be damaged and its contents come into contact with human skin.

CAUTION: RISK OF ELECTRIC SHOCK
The inverter board, attached to the mounting plate, supplies the high voltage to operate the backlight. Touching the inverter board may result in injury to personnel.

CAUTION: The circuit board contains static sensitive components. Before handling the operator interface without the rear cover attached, discharge static charges from your body by touching a grounded bare metal object. Ideally, handle the operator interface at a static controlled clean workstation. Also, do not touch the surface areas of the circuit board. Dirt, oil, or other contaminants may adversely affect circuit operation.

CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer’s instructions.
# Important Product Obsolescence Notice

The time has come to discontinue a few of our older products due to part availability. The recommended alternative product will offer the customer a better solution than the existing product. Certain products have no listed replacements due to technological advancements. The actual discontinuation date is controlled by raw material inventories and future sales. If you have a customer using any of these products, please contact and advise them of the situation. As always, Red Lion will assist the customer as much as possible in the changeover process.

<table>
<thead>
<tr>
<th>DISCONTINUED PART/MODEL NUMBERS</th>
<th>DESCRIPTION</th>
<th>STATUS</th>
<th>ALTERNATIVE PRODUCT OFFERINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFCx0000</td>
<td>Current to Frequency Converter</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>CL1000x0</td>
<td>2 x 20 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>CL2000x0</td>
</tr>
<tr>
<td>CUBID001</td>
<td>CUB2 DC Current Meter, 5 VDC</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>CUBID002</td>
<td>CUB2 DC Current Meter, 7 to 28 VDC</td>
<td>Discontinued as parts are depleted</td>
<td>CUB4000</td>
</tr>
<tr>
<td>CUBVD001</td>
<td>CUB2 DC Volt Meter, 5 VDC</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>CUBVD002</td>
<td>CUB2 DC Volt Meter, 7 to 28 VDC</td>
<td>Discontinued as parts are depleted</td>
<td>CUB4V000</td>
</tr>
<tr>
<td>CX1000x0</td>
<td>2 x 20 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G305x000</td>
</tr>
<tr>
<td>CX1500x0</td>
<td>2 x 40 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G305x000</td>
</tr>
<tr>
<td>GL3000x0</td>
<td>256 x 128 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G306C000</td>
</tr>
<tr>
<td>GL300TX0</td>
<td>256 x 128 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G306C000</td>
</tr>
<tr>
<td>GL3500x0</td>
<td>256 x 128 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G306C000</td>
</tr>
<tr>
<td>LPP10000</td>
<td>Loop Powered Process Meter</td>
<td>Discontinued as parts are depleted.</td>
<td>CUB4LP00</td>
</tr>
<tr>
<td>VFCx0000</td>
<td>Voltage to Frequency Converter</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>VX500S00</td>
<td>640 x 480 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G308C000</td>
</tr>
<tr>
<td>VX500TS0</td>
<td>640 x 480 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G308C000</td>
</tr>
<tr>
<td>VX550S00</td>
<td>640 x 480 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G308C000</td>
</tr>
</tbody>
</table>

G306C000 Operator Interface for indoor applications  

G306A000
MODEL CL01 - PARADIGM 2 X 20 LCD OPERATOR INTERFACE TERMINAL

DESCRIPTION
The Paradigm operator interface Model CL01 was designed to meet the industrial demands of application power, versatility, reliability, and ease of use. The CL01 has provisions, common to all Paradigm Family products, allowing for future product upgrades as new options and capabilities are developed.

SAFETY SUMMARY
All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so, can be potentially harmful to persons or equipment in the event of a fault to the unit.

WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2 / CLASS II, DIVISION 2 / CLASS III, DIVISION 2

ORDERING INFORMATION

SPECIFICATIONS
1. POWER REQUIREMENTS: 11 to 30 VDC @ 2.5 W
2. DISPLAY: 2 lines of 20 characters, 0.197” (5 mm) high liquid crystal display with bright LED backlight.
3. KEYPAD: 3 screen legendable soft keys, numeric pad with raise, lower, next, previous, enter, exit, alarms and mute keys.
4. MEMORY: 128 K (64 K user) battery backed RAM (Battery life expectancy 7 years 50/50 on/off cycle) Optional factory fit expansion to 512 K (448 K user).
5. PHYSICAL DIMENSIONS: L = 6.69” (170 mm), H = 5.12” (130 mm), D = 2.2” (56 mm.)
6. CONSTRUCTION: Steel rear metal enclosure with NEMA 4/IP65 aluminum front plate when correctly fitted with the gasket provided. This unit is rated for NEMA 4/IP65 indoor use. Installation Category I, Pollution Degree 2.

CAUTION: Read complete instructions prior to installation and operation of the unit.

Tolerance: ±0.01” (±0.25mm)
7. MOUNTING REQUIREMENTS: Max. panel thickness is 0.375" (9.5 mm). For NEMA 4/IP65 sealing, a steel panel with a minimum thickness of 0.125" (3.175 mm) is recommended.

8. CERTIFICATIONS AND COMPLIANCES:

SAFETY
UL Recognized Component, File #E179259, UL3101-1, CSA 22.2 No.1010-1
Recognized to U.S. and Canadian requirements under the Component Recognition Program of Underwriters Laboratories, Inc.
UL Listed, File #E211967, UL3101-1, UL1604, CSA 22.2 No. 1010.1, CSA 22.2 No. 213-M1987
LISTED by Und. Lab. Inc. to U.S. and Canadian safety standards
Type 4 Enclosure rating (Face only), UL50
IECCE CB Scheme Test Certificate #UL2795A-179259/USA
CB Scheme Test Report #98ME60993-000098
Issued by Underwriters Laboratories Inc.
IEC 1010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and Laboratory use, Part 1
IP65 Enclosure rating (face only), IEC 529

ELECTROMAGNETIC COMPATIBILITY
Generic Emission Standard
Part 2 : Industrial Environment
EN 50082-2 : 1994 Electromagnetic Compatibility Directive
Generic Immunity Standard
Part 2 : Industrial Environment
EN 55022-B : 1995
EN 50082-2 : 1994
EN 50081-2 : 1994

9. ENVIRONMENTAL CONDITIONS:
Operating Temperature: 0 to 40°C
Storage Temperature: -20 to 80°C
Operating and Storage Humidity: 80% max. relative humidity (non-condensing) from 0°C to 40°C.
Altitude: Up to 2000 meters
Weight: 1.6 lbs. (0.72 Kg)

INPUT/OUTPUT COMMUNICATIONS SPECS
1. SERIAL PORTS: Data Format and Baud Rates for each port is individually software programmable up to 19200 baud.
   Port 1: Programming Port - RS-232 on an RJ-11 jack.
   Port 2: RS-232 Port on a Plug-In Screw Terminal Block
   Port 3: RS-485 Port on a Plug-In Screw Terminal Block
   (Up to 29 Units can be connected and individually addressed.)
   Note: LED Indicators show communications status on Ports 2 & 3

2. COMMUNICATION MODES: Any of the three ports can be used to communicate with Serial Devices.
   Model - (CL01) only one of Ports 1, 2, and 3 may be configured.
   Exception Red Lion Controls Instrument, simple ASCII Printer, PC Link Network, Program Through, External Keyboards, and Roll-Your-Own
   Protocols can be used with other protocols on Port 1.

COMMON FEATURES FOR CHARACTER BASED OPERATOR TERMINALS

PROGRAMMABILITY
Event Driven Configuration Tool
Edict 97, an extremely powerful Windows 98/95/3.11 based software program, provides for the intuitive configuration of every aspect of the operator interface’s behavior. The requirement for time consuming PLC ladder logic is drastically reduced by the unique event driven approach of EDICT 97. The capability of this program, in conjunction with the PLC and the Paradigm operator interface unit, ensures a great deal of advanced functionality for your system. This powerful PLC/Paradigm system provides many of the capabilities and features normally associated with the more complicated and costly PC/SCADA systems. Display pages are easily generated, including PLC and internal variables, text strings, or bar charts. All dynamic elements are also available as alarms, recipes, triggers, and reports, for the run time software.

After completion of the programming, the program is directly downloaded to the operator interface from your PC, without any compiling or saving requirement. When you require a change in your program, EDICT 97 loads only the change, not the entire program, saving valuable on-line time.

DYNAMIC DISPLAY PAGE ELEMENTS
Each display page has provisions to show static and dynamic information, including data variables, text messages, time, and date.

Data Variables can be either PLC derived or internally generated, either in data entry or display only mode. The Paradigm unit has an extremely powerful math capability, allowing the operator to manipulate the variables to meet the specific application’s demands. If required, the display can be formatted to BCD, binary, hex, floating point, and string. Upper and lower limits of data entry variables are fully supported and able to be password protected.

Text Message Animation enables several different types of animated text from a local or global message table to be displayed. The message displayed is dependent on the condition of the particular controlling expression. The controlling expression may be a PLC bit level, a timer value, preset counter condition, or any one of a wide variety of message triggers.

Time and Date in the Paradigm unit has the capability to display in any combination of year, month, day, hours, minutes, and seconds.

Bar Graphs in horizontal format are easily attached to data variables. The partial or full length bar graph displays can be scaled and offset to optimize the required display effect.

SECURITY
The password protection scheme provides the ultimate in tamper-proof capability. Access can be limited on a unit, page, recipe, or even individual data entries.

ALARMS
The Paradigm unit can monitor and log from 100 to 500 alarms, depending on model. Such triggers as a simple bit level transition, a PLC coil activation, or a complex application algorithm can activate an alarm. The alarms can be time and date stamped, with an automatic screen display and/or downloading to a printer for hard copy recording purposes.

REAL TIME SCHEDULE
Real time schedule allows for repetitive or one time task to take place in the system. Typically a schedule action similar to...At 1:55 PM on Monday, Wednesday, and Friday, print the production report...is required in the application. In conjunction with the recipe capabilities, a downloading of a special recipe can be requested by the real time schedule feature.

USER PROGRAMS
This feature offers the user the ability to incorporate custom application requirements via a powerful program language. For example, a program designated “Calculate Volume” which determines the amount of fluid in a round tank at specific temperatures could be created. This program would be triggered to run and display each time the page denoted as “Volume Now” is requested.

The ability to customize to your application’s specialized needs is easily solved with the user program capability.

KEYBOARD EDITING
All the interface keys can be programmed to perform virtually unlimited functions with each key, having multiple actions assigned to three types of key events: key pressed, key held down (auto repeat), and key released. Typical key actions would be Go to page, set value, load recipe, view alarms, print report, and many more.

COMMUNICATIONS
With over 70 communication drivers available, the Paradigm operator interface offers a wide range of connectivity including: PLCs, Variable Speed Drives, Temperature Controllers, Bar Code Readers, etc. Utilizing real PLC data references, the automatic comms configuration optimizes the system’s communication performance. In the event that your specific driver does not appear on the Paradigm drivers list, let us know, as this list is always being expanded to meet our customers’ needs.
HARDWARE INFORMATION

This bulletin contains a variety of information related to the installation and operation of the Operator Interface supplied. Ideally, you should read this document thoroughly before attempting to use the equipment. For information about the software aspects of the terminal, please consult other documentation.

CONTENTS OF PACKAGE

The Operator Interface is supplied in a packaging box containing the following:

- The interface terminal itself.
- A NEMA 4/IP65 rated mounting gasket.
- A bag containing panel hardware.
- This hardware bulletin.
- If any of these items are missing, please contact your supplier immediately.

ALL NONINCENDIVE CIRCUITS MUST BE WIRED USING DIVISION 2 WIRING METHODS AS SPECIFIED IN ARTICLE 501-4 (b), 502-4 (b), AND 503-3 (b) OF THE NATIONAL ELECTRICAL CODE, NFPA 70 FOR INSTALLATION WITHIN THE UNITED STATES, OR AS SPECIFIED IN SECTION 19-152 OF CANADIAN ELECTRICAL CODE FOR INSTALLATION IN CANADA.

POWER SUPPLY REQUIREMENTS

The Operator Interface requires an 11 to 30 VDC power supply rated at 2.5 W unless otherwise stated on the label.

- The terminal may take as little as 100 mA in certain circumstances, so be sure that the chosen power supply can operate correctly with this load. Large switch-mode supplies tend to need a certain minimum load before they will operate correctly.

In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. A very high proportion of reported problems are caused by incorrect power supply installation, so please take care to observe the following points:

- The power supply must be mounted close to the unit, with usually not more than 6 feet of cable between the supply and the Operator Interface. Ideally, as short a length as is possible should be used.
- The wire used to connect the Operator Interface’s power supply should be of at least 22 gage wire. If a longer cable run is used, you should use heavier gage wire. The routing of the cable should be kept away from large contactors, inverters and other devices which may generate significant electrical noise.

BATTERY BACKUP ISSUES

The Operator Interface is supplied with a Lithium Battery designed to maintain the internal memory and real-time clock during power outages. Assuming the operator interface terminal is powered up for 50% of the time, this battery should last over 4 years. A “Battery Low” system variable is available so that the programmer can choose specific action(s) to occur when this battery should last over 4 years. A “Battery Low” system variable is available so that the programmer can choose specific action(s) to occur when the battery voltage drops below its nominal voltage.

It is possible to replace the battery without losing the contents of the Operator Interface’s memory, but this does not reduce the importance of ensuring that a copy of the terminal’s configuration is kept readily at hand to allow the terminal to be re-loaded in the case of mishaps. Please remember that although an image of the database contents can be uploaded, this file is not editable, so the importance of keeping a copy on disk cannot be overstressed.

CHANGING THE BATTERY

To change the internal battery, follow these steps:

- The battery is located in a holder on the main circuit board. This should be clearly visible. Remove the battery from its holder.
- Place the new battery in the holder. The terminal’s power supply can now be disconnected, if you re-applied power in the step above.
- Replace the lid, screws and connector by following the above procedure in reverse. You may like to make a note of the date the battery was replaced to allow planned maintenance to be carried out.
- If you did not keep the unit powered-up during battery replacement, hold down the EXIT and MUTE keys on the keyboard and cycle power. Release the keys and follow the menu guides to clear the memory. The unit is now ready for a configuration database to be reloaded.

Please note that the old battery must be disposed of in a manner which complies with your local waste regulations. Also, the battery must not be disposed of in fire or in a manner whereby it may be damaged and its contents come into contact with human skin.

INSTALLATION & CONNECTIONS

The unit meets NEMA 4/IP65 requirements for indoor use, when properly installed. The units are intended to be mounted into an enclosed panel.

Installation Environment

The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

Continuous exposure to direct sunlight may accelerate the aging process of the bezel. The bezel should be cleaned only with a soft cloth and neutral soap product. Do NOT use solvents.

Do not use tools of any kind (screwdrivers, pens, pencils, etc.) to operate the keypad of the unit.

Mounting Instructions

The Operator Interfaces are designed for through-panel mounting. A neoprene gasket is provided, to enable sealing to NEMA 4/IP65 specification. The panel cut-out diagram for the model supplied is provided. All mounting holes should be drilled for 0.14” (3.5 mm) clearance. Care should be taken to remove any loose material from the mounting hole to avoid such metal falling into the Operator Interface itself during installation.

Connecting to a PLC

The Operator Interface is designed to operate with a PLC. A serial communication connection must be made between the operator interface terminal and PLC, and the details of this connection vary according to which PLC is used.

The following section lists the connection details for the PLC to be used.

PLC Type

Details on how to connect to most PLCs are available on request from RLC.

Connecting to an IBM® PC/AT

The Operator Interface is programmed via software running on an IBM PC/AT or a compatible computer. The connection between the PC/AT and the operator interface terminal is made via a custom cable provided with the EDICT Developer’s Kit. The cable is designed for a 9-way serial port. Please contact your supplier if you require a 25-way version.

WARNING - EXPLOSION HAZARD - THE AREA MUST BE KNOWN TO BE NON-HAZARDOUS BEFORE SERVICING/REPLACING THE UNIT AND BEFORE INSTALLING OR REMOVING I/O WIRING AND BATTERY.
**PROGRAMMING PORT PIN OUT**

The Operator Interface’s programming port is sometimes used to connect other RS-232 devices, such as printers. The following illustration and table gives the pin-out of this port to enable such connections to be made.

<table>
<thead>
<tr>
<th>PIN</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RTS</td>
</tr>
<tr>
<td>2</td>
<td>Tx</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>Rx</td>
</tr>
<tr>
<td>6</td>
<td>CTS</td>
</tr>
</tbody>
</table>

The above table denotes the pin names of the programming port. When connecting, the pin name at the programming port is connected to the opposite of that pin name at the destination device.

---

**TROUBLESHOOTING**

For further technical assistance, contact technical support at the appropriate company numbers listed.

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The customer, in applying the products and software described herein, accepts that the products are wholly or partly programmable electronic systems that are inherently complex and which cannot thus be guaranteed to be free of errors. In doing so, the customer accepts the responsibility to ensure that the products are correctly programmed, configured, installed, commissioned, operated and maintained by competent and suitably trained staff and according to any instructions or safety instructions provided and as dictated by good engineering practices.

This documentation, and the software and products described herein, is subject to continuous development and improvement. All information is given in good faith, but RLC shall not be liable for any omissions or errors herein or within the software herein described.
MODEL CL05 - PARADIGM 2 X 20 LCD OPERATOR INTERFACE TERMINAL

DESCRIPTION
The Paradigm operator interface Model CL05 was designed to meet the industrial demands of application power, versatility, reliability, and ease of use. The CL05 has provision, common to all Paradigm Family products, allowing for future product upgrades as new options and capabilities are developed.

SAFETY SUMMARY
All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so, can be potentially harmful to persons or equipment in the event of a fault to the unit.

WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2 / CLASS II, DIVISION 2 / CLASS III, DIVISION 2

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL05</td>
<td>LCD, 2 X 20, 3 Soft keys, 128 K memory</td>
<td>CL050000</td>
</tr>
<tr>
<td>LCLCD20</td>
<td>LCD, 2 X 20, 3 Soft keys, 512 K memory</td>
<td>CL050010</td>
</tr>
<tr>
<td>Battery Replacement</td>
<td>BAL3R004</td>
<td></td>
</tr>
<tr>
<td>EDICT-97 Development Kit</td>
<td>Includes Software, Manual and 9-pin RS232 Programming cables</td>
<td>SFEDT</td>
</tr>
<tr>
<td>Communication Cables</td>
<td>P895xxxZ</td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS In inches (mm)

Tolerance: ±.010” (±.25mm)

CAUTION: Read complete instructions prior to installation and operation of the unit.

FOR USE IN HAZARDOUS LOCATIONS:
Class I, Division 2, Groups A, B, C, and D
Class II, Division 2, Groups F and G
Class III, Division 2

SPECIFICATIONS
1. POWER REQUIREMENTS: 11 to 30 VDC @ 2.5 W
   Power Up Current: 2.5 A for 1 msec max.
   Must use a Class 2 or SELV rated power supply.
2. DISPLAY: 2 lines of 20 characters, 0.197” (5 mm) high liquid crystal display with bright LED backlight
3. KEYPAD: 3 screen legendable soft keys, numeric pad with raise, lower, next, previous, enter, delete, exit, alarms and mute keys.
4. MEMORY: 128 K (64 K user) battery backed RAM (Battery life expectancy 7 years 50/50 on/off cycle) Optional factory fit expansion to 512 K (448 K user).
5. PHYSICAL DIMENSIONS: L = 6.69” (170 mm), H = 5.12” (130 mm), D = 2.2” (56 mm.)
6. CONSTRUCTION: Steel rear metal enclosure with NEMA 4/IP65 aluminum front plate when correctly fitted with the gasket provided. This unit is rated for NEMA 4/IP65 indoor use. Installation Category 1, Pollution Degree 2.
7. MOUNTING REQUIREMENTS: Max. panel thickness is 0.375” (9.5 mm). For NEMA 4/IP65 sealing, a steel panel with a minimum thickness of 0.125” (3.175 mm) is recommended

- 2 LINE X 20 CHARACTER LIQUID CRYSTAL DISPLAY WITH LED BACKLIGHT
- 100 ALARM POINT LOGGER
- RECIPE HANDLING
- UNLIMITED PASSWORD PROTECTION
- REAL TIME CLOCK, BATTERY BACKED
- EXPRESSION EVALUATION
- 32-BIT MATH (CL050000), 32 BIT / FLOATING POINT MATH (CL050010)
- DIRECT PLC COMMUNICATION
- NEMA 4/IP65

 Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
8. CERTIFICATIONS AND COMPLIANCES:

SAFETY
UL Recognized Component, File # E179259, UL3101-1, CSA 22.2 No. 1010-1
Recognized to U.S. and Canadian requirements under the Component
Recognition Program of Underwriters Laboratories, Inc.
UL Listed, File # E211967, UL3101-1, UL1604, CSA 22.2 No. 1010.1,
CSA 22.2 No. 213-M1987
LISTED by Und. Lab. Inc. to U.S. and Canadian safety standards
Type 4 Enclosure rating (face only), UL50
IEC 1010-1, EN 61010-1: Safety requirements for electrical equipment
for measurement, control, and laboratory use, Part 1.
IP65 Enclosure rating (face only), IEC 529

ELECTROMAGNETIC COMPATIBILITY

Immunity to EN 50082-2
Electrostatic discharge EN 61000-4-2 Level 2; 4 Kv contact
Electromagnetic RF fields EN 61000-4-3 Level 3; 8 Kv air
Fast transients (burst) EN 61000-4-4 Level 3; 10 V/m
RF conducted interference EN 61000-4-6 Level 3; 2 Kv power
Emissions to EN 50081-2
RF interference EN 55011 Level 3; 10 V/m^2
Enclosure class B

COMMUNICATIONS

COMMUNICATION MODES
Any of the three ports can be used to communicate with Serial Devices.
Model - (CL050000) only one of Ports 1, 2, and 3 may be configured.
Exception Red Lion Controls Instrument, simple ASCII Printer, PC Link
Network, Program Through, External Keyboards, and Roll-Your-Own
Protocols can be used with other protocols on all Ports.
Model - (CL050010) may communicate in Master mode with a different
device protocol on each port (See Note & Exception).
However, only one of the Ports 2 and 3 may be configured, if either is
selected as a Slave Protocol.
Note: Ports 2 and 3 may be configured as different device protocols in
Master mode and Port 1 may be used simultaneously in Slave mode for
a third device protocol.
Exception: If Allen Bradley DH485 is selected on either Port 2 or 3, only
Port 1 will be available for a separate device protocol.

9. ENVIRONMENTAL CONDITIONS:

Operating Temperature: 0 to 40°C
Storage Temperature: -20 to 80°C
Operating and Storage Humidity: 80% max. relative humidity
(non-condensing) from 0°C to 40°C.
Altitude: Up to 2000 meters
WEIGHT: 1.6 lbs. (0.72 Kg)

INPUT/OUTPUT COMMUNICATIONS SPECS

1. SERIAL PORTS: Data Format and Baud Rates for each port is individually
software programmable up to 115200 baud.
Port 1: Programming Port - RS-232 on an RJ-11 jack.
Port 2: RS-232 Port on a Plug-In Screw Terminal Block
Port 3: RS-485 Port on a Plug-In Screw Terminal Block
(Up to 29 Units can be connected and individually addressed.)
Note: LED Indicators show communications status on Ports 2 & 3

2. COMMUNICATIONS MEDIATORS:
Any of the three ports can be used to communicate with Serial Devices.
Model - (CL050000) only one of Ports 1, 2, and 3 may be configured.
Exception Red Lion Controls Instrument, simple ASCII Printer, PC Link
Network, Program Through, External Keyboards, and Roll-Your-Own
Protocols can be used with other protocols on all Ports.
Model - (CL050010) may communicate in Master mode with a different
device protocol on each port (See Note & Exception).
However, only one of the Ports 2 and 3 may be configured, if either is
selected as a Slave Protocol.
Note: Ports 2 and 3 may be configured as different device protocols in
Master mode and Port 1 may be used simultaneously in Slave mode for
a third device protocol.
Exception: If Allen Bradley DH485 is selected on either Port 2 or 3, only
Port 1 will be available for a separate device protocol.

COMMON FEATURES FOR CHARACTER BASED OPERATOR TERMINALS

PROGRAMMABILITY
Event Driven Configuration Tool
Edict 97, an extremely powerful Windows 95/3.11 based software program,
provides for the intuitive configuration of every aspect of the operator
interface's behavior. The requirement for time consuming PLC ladder logic
is drastically reduced by the unique event driven approach of EDICT 97.
The capability of this program, in conjunction with the PLC and the Paradigm
operator interface unit, ensures a great deal of advanced functionality for your
system. This powerful PLC/Paradigm system provides many of the capabilities
and features normally associated with the more complicated and costly
PC/SCADA systems. Display pages are easily generated, including PLC and
internal variables, text messages, time, and date. All dynamic elements are also
available as alarms, reports, triggers, and reports, for the run time software.
After completion of the programming, the program is directly downloaded to
the operator interface from your PC, without any compiling or saving
requirement. When you require a change in your program, EDICT 97 loads only
the change, not the entire program, saving valuable on-line time.

DYNAMIC DISPLAY PAGE ELEMENTS

Each display page has provisions to show static and dynamic information,
including data variables, text messages, time, and date.

Data Variables can be either PLC derived or internally generated, either in
data entry or display only mode. The Paradigm unit has an extremely powerful
math capability, allowing the operator to manipulate the variables to meet the
specific application’s demands. If required, the display can be formatted to
BCD, binary, hex, floating point, and string. Upper and lower limits of data
specific application’s demands. If required, the display can be formatted to
BCD, binary, hex, floating point, and string. Upper and lower limits of data

Text Message Animation enables several different types of animated text from
a local or global message table to be displayed. The message displayed is
dependent on the condition of the particular controlling expression. The
controlling expression may be a PLC bit level, a timer value, preset counter
condition, or any one of a wide variety of message triggers.

Time and Date in the Paradigm unit has the capability to display in any
combination of year, month, day, hours, minutes, and seconds.

Bar Graphs in horizontal format are easily attached to data variables. The
partial or full length bar graph displays can be scaled and offset to optimize
the required display effect.

SECURITY
The password protection scheme provides the ultimate in tamper-proof
capability. Access can be limited on a unit, page, recipe, or even individual data
entries.
**HARDWARE INFORMATION**

This bulletin contains a variety of information related to the installation and operation of the Operator Interface supplied. Ideally, you should read this document thoroughly before attempting to use the equipment. For information about the software aspects of the terminal, please consult software documentation.

**CONTENTS OF PACKAGE**

The Operator Interface is supplied in a packaging box containing the following...
- The interface terminal itself.
- A NEMA 4/IP65 rated mounting gasket.
- A bag containing panel hardware.
- This hardware bulletin.
- If any of these items are missing, please contact your supplier immediately.

**POWER SUPPLY REQUIREMENTS**

The Operator Interface requires an 11 to 30 VDC power supply rated at 2.5 W unless otherwise stated on the label.
- The terminal may take as little as 100 mA in certain circumstances, so be sure that the chosen power supply can operate correctly with this load. Large switch-mode supplies tend to need a certain minimum load before they will operate correctly.
- In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. A very high proportion of reported problems are caused by incorrect power supply installation, so please take care to observe the following points...
- The power supply must be mounted close to the unit, with usually not more than 6 feet of cable between the supply and the Operator Interface. Ideally, as short a length as is possible should be used.
- The wire used to connect the Operator Interface’s power supply should be at least 22 gage wire. If a longer cable run is used, you should use heavier gage wire. The routing of the cable should be kept away from large contactors, inverters and other devices which may generate significant electrical noise.

**BATTERY BACKUP ISSUES**

The Operator Interface is supplied with a Lithium Battery designed to maintain the internal memory and real-time clock during power outages. Assuming the operator interface terminal is powered up for 50% of the time, this battery should last over 4 years. A “Battery Low” system variable is maintained to indicate the need to replace the battery if it has been in service for this long.

The terminal may take as little as 100 mA in certain circumstances, so be sure that the chosen power supply can operate correctly with this load. Large switch-mode supplies tend to need a certain minimum load before they will operate correctly.

In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. A very high proportion of reported problems are caused by incorrect power supply installation, so please take care to observe the following points...
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- The wire used to connect the Operator Interface’s power supply should be at least 22 gage wire. If a longer cable run is used, you should use heavier gage wire. The routing of the cable should be kept away from large contactors, inverters and other devices which may generate significant electrical noise.

**INSTALLATION & CONNECTIONS**

The unit meets NEMA 4/IP65 requirements for indoor use, when properly installed. The unit is intended to be mounted into an enclosed panel.

**Installation Environment**

The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

Continuous exposure to direct sunlight may accelerate the aging process of the bezel. The bezel should be cleaned only with a soft cloth and neutral soap product. Do NOT use solvents.

Do not use tools of any kind (screwdrivers, pens, pencils, etc.) to operate the keypad of the unit.

**MOUNTING INSTRUCTIONS**

The Operator Interfaces are designed for through-panel mounting. A neoprene gasket is provided, to enable sealing to NEMA 4/IP65 specification. The panel cut-out diagram for the model supplied is provided. All mounting holes should be drilled for 0.14" (3.5 mm) clearance. Care should be taken to remove any loose material from the mounting hole to avoid such metal falling into the Operator Interface itself during installation.

**CONNECTING TO A PLC**

The Operator Interface is designed to operate with a PLC. A serial communication connection must be made between the operator interface terminal and PLC, and the details of this connection vary according to which PLC is used.

The following section lists the connection details for the PLC to be used.

**PLC TYPE**

Details on how to connect to most PLCs are available on request from RLC.

**CONNECTING TO AN IBM® PC/AT**

The Operator Interface is programmed via software running on an IBM PC/AT or a compatible computer. The connection between the PC/AT and the operator interface terminal is made via a custom cable provided with the EDICT Developer’s Kit. The cable is designed for a 9-way serial port. Please contact your supplier if you require a 25-way version.

**CHANGING THE BATTERY**

To change the internal battery, follow these steps...
- Remove the power and PLC communications connector from the unit.
- Remove the four screws from the rear-cover and remove the cover.
- If you wish to avoid losing the terminal’s configuration, reconnect the power connector and re-apply power. Note that this will require the panel to be powered-up and, as such, only suitably qualified staff should carry out this procedure.
- The battery is located in a holder on the main circuit board. This should be clearly visible. Remove the battery from its holder.
- Replace the lid, screws and connector by following the above procedure in reverse. You may like to make a note of the date the battery was replaced to allow planned maintenance to be carried out.
- If you did not keep the unit powered-up during battery replacement, hold down the EXIT and MUTE keys on the keyboard and cycle power.
- Release the keys and follow the menu guides to clear the memory. The unit is now ready for a configuration database to be reloaded.

**WARNING**

- EXPLOSION HAZARD - THE AREA MUST BE KNOWN TO BE NON-HAZARDOUS BEFORE SERVICING/REPLACING THE UNIT AND BEFORE INSTALLING OR REMOVING I/O WIRING AND BATTERY.

**WARNING**

- EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN DISCONNECTED AND THE AREA IS KNOWN TO BE NON-HAZARDOUS.
PROGRAMMING PORT PIN OUT

The Operator Interface’s programming port is sometimes used to connect other RS-232 devices, such as printers. The following illustration and table gives the pin-out of this port to enable such connections to be made.

<table>
<thead>
<tr>
<th>PIN</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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</tr>
<tr>
<td>6</td>
<td>CTS</td>
</tr>
</tbody>
</table>

The above table denotes the pin names of the programming port. When connecting, the pin name at the programming port is connected to the opposite of that pin name at the destination device.

TROUBLESHOOTING

For further technical assistance, contact technical support at the appropriate company numbers listed.

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RLC does not warrant any of its software products to be free from error or to be fit for any particular purpose. Neither is the software guaranteed to provide operation without interruption. The customer's sole remedy in case of failure is the refund of the purchase price of the software.

The customer, in applying the products and software described herein, accepts that the products are wholly or partly programmable electronic systems that are inherently complex and which cannot thus be guaranteed to be free of errors. In doing so, the customer accepts the responsibility to ensure that the products are correctly programmed, configured, installed, commissioned, operated and maintained by competent and suitably trained staff and according to any instructions or safety instructions provided and as dictated by good engineering practices.

This documentation, and the software and products described herein, is subject to continuous development and improvement. All information is given in good faith, but RLC shall not be liable for any omissions or errors herein or within the software herein described.
GENERAL DESCRIPTION

The Model CL20 Operator Interface Terminal combines unique capabilities normally expected only from high-end units, at a very affordable price. The CL20 is configured using the same powerful EDICT97 Software as all Red Lion Paradigm Operator Interfaces. The result is savings in time to get challenging applications up and running, and frequent savings in hardware costs due to replacing many functions usually performed in separate expensive devices.

CL20 is robustly constructed for an industrial environment. With a metal enclosure and a non-corroding NEMA 4/IP65 front panel.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so, can be potentially harmful to persons or equipment in the event of a fault to the unit.

FOR USE IN HAZARDOUS LOCATIONS:
Class I, Division 2, Groups A, B, C, and D
Class II, Division 2, Groups F and G
Class III, Division 2

SPECIFICATIONS

1. POWER REQUIREMENT: 11 to 30 VDC @ 3.0 W
   Power Up Current: 3.0 A for 1 msec. max.
   Must use a Class 2 or SELV rated power supply.
2. DISPLAY: 4 lines of 20 characters, 0.197” (5 mm) high liquid crystal display with bright LED backlight.
3. KEYPAD: 3 screen legendable soft keys, 8 User re-legendable function keys, numeric pad with raise, lower, next, previous, enter, delete, exit, alarms and mute keys, all with Tactile feedback.
4. MEMORY: 128 K (64 K user) battery backed RAM (Battery life expectancy 7 years 50/50 on/off cycle). Optional factory fit expansion to 512 K (448 K user).
5. PHYSICAL DIMENSIONS: L = 8.11” (206 mm), H = 6.38” (162 mm), D = 2.22” (56.5 mm).
6. CONSTRUCTION: Steel rear metal enclosure with NEMA 4/IP65 aluminum front plate when correctly fitted with the gasket provided. This unit is rated for NEMA 4/IP65 indoor use. Installation Category I, Pollution Degree 2.
7. MOUNTING REQUIREMENTS: Max. panel thickness is 0.375” (9.5 mm). For NEMA 4/IP65 sealing, a steel panel with a minimum thickness of 0.125” (3.175 mm) is recommended.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL20</td>
<td>LCD, 4 X 20, 8 Function, 3 Soft keys, 128 K memory</td>
<td>CL200000</td>
</tr>
<tr>
<td>CL20</td>
<td>LCD, 4 X 20, 8 Function, 3 Soft keys, 512 K memory</td>
<td>CL200010</td>
</tr>
<tr>
<td>Battery Replacement</td>
<td>BAL3R004</td>
<td></td>
</tr>
<tr>
<td>EDICT-97 Development Kit. Includes Software, Manual and 9-pin RS232 Programming Cables</td>
<td>SFEDT</td>
<td></td>
</tr>
<tr>
<td>Communication Cables</td>
<td>P895xxxZ</td>
<td></td>
</tr>
</tbody>
</table>

CAUTION: Read complete instructions prior to installation and operation of the unit.

DIMENSIONS In inches (mm)

Tolerance: ±0.01” (±0.25mm)
8. CERTIFICATIONS AND COMPLIANCES:

SAFETY
UL Recognized Component, File # E179259, UL3101-1, CSA 22.2 No. 1010-1
Recognized to U.S. and Canadian requirements under the Component Recognition Program of Underwriters Laboratories, Inc.

UL Listed, File # E211967, UL3101-1, UL1604, CSA 22.2 No. 1010.1, CSA 22.2 No. 213-M1987
LISTED by Und. Lab. Inc. to U.S. and Canadian safety standards

Type 4 Enclosure rating (Face only), UL50

IEC 1010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1.

IP65 Enclosure rating (face only), IEC 529

ELECTROMAGNETIC COMPATIBILITY

Immunity to EN 50082-2
Electrostatic discharge EN 61000-4-2 Level 2; 4 Kv contact
Level 3; 8 Kv air
Electromagnetic RF fields EN 61000-4-3 Level 3; 10 V/m
80 MHz - 1 GHz
Fast transients (burst) EN 61000-4-4 Level 4; 2 Kv I/O
Level 3; 2 Kv power
RF conducted interference EN 61000-4-6 Level 3; 10 V/m²
150 KHz - 80 MHz
Emissions to EN 50081-2
RF interference EN 55011 Enclosure class B

1. Self-recoverable loss of performance during EMI disturbance at 10 Vrms:
Communications error may occur during EMI disturbance.

For operation without loss of performance:
I/O cables are routed in metal conduit connected to earth ground.

9. ENVIRONMENTAL CONDITIONS:

Operating Temperature: 0 to 40°C
Storage Temperature: -20 to 80°C
Operating and Storage Humidity: 80% max. relative humidity
(non-condensing) from 0°C to 40°C.

Altitude: Up to 2000 meters

WEIGHT: 2.1 lb. (0.95 Kg)

INPUT/OUTPUT COMMUNICATIONS SPECS

1. SERIAL PORTS: Data Format and Baud Rates for each port is individually software programmable up to 19200 baud.
Port 1: Programming Port - RS-232 on an RJ-11 jack.
Port 2: RS-232 Port on a Plug-In Screw Terminal Block
Port 3: RS-485 Port on a Plug-In Screw Terminal Block

(Up to 29 units can be connected and individually addressed.)

2. COMMUNICATION MODES: Any of the three ports can be used to communicate with Serial Devices.
Model - (CL200000) only one of Ports 1, 2, and 3 may be configured.

Exception Red Lion Controls Instrument, simple ASCII Printer, PC Link Network, Program Through, External Keyboards, and Roll-Your-Own Protocols can be used with other protocols on all Ports.
Model - (CL200010) may communicate in Master mode with a different device protocol on each port (See Note & Exception).
However, only one of the Ports 2 and 3 may be configured, if either is selected as a Slave Protocol.

Note: Ports 2 and 3 may be configured as different device protocols in Master mode and Port 1 may be used simultaneously in Slave mode for a third device protocol.

Exception: If Allen Bradley DH485 is selected on either Port 2 or 3, only Port 1 will be available for a separate device protocol.

COMMON FEATURES FOR CHARACTER BASED OPERATOR TERMINALS

PROGRAMMABILITY

Event Driven Configuration Tool
Edict 97, an extremely powerful Windows 95/3.11 based software program, provides for the intuitive configuration of every aspect of the operator interface’s behavior. The requirement for time consuming PLC ladder logic is drastically reduced by the unique event driven approach of EDICT 97. The capability of this program, in conjunction with the PLC and the Paradigm operator interface unit, ensures a great deal of advanced functionality for your system. This powerful PLC/Paradigm system provides many of the capabilities and features normally associated with the more complicated and costly PC/SCADA systems. Display pages are easily generated, including PLC and internal variables, text strings, or bar charts. All dynamic elements are also available as alarms, recipes, triggers, and reports, for the run time software.

After completion of the programming, the program is directly downloaded to the operator interface from your PC, without any compiling or saving requirement. When you require a change in your program, EDICT 97 loads only the change, not the entire program, saving valuable on-line time.

DYNAMIC DISPLAY PAGE ELEMENTS

Each display page has provisions to show static and dynamic information, including data variables, text messages, time, and date.

Data Variables can be either PLC derived or internally generated, either in data entry or display only mode. The Paradigm unit has an extremely powerful math capability, allowing the operator to manipulate the variables to meet the specific application’s demands. If required, the display can be formatted to BCD, binary, hex, floating point, and string. Upper and lower limits of data entry variables are fully supported and able to be password protected.

Text Message Animation enables several different types of animated text from a local or global message table to be displayed. The message displayed is dependent on the condition of the particular controlling expression. The controlling expression may be a PLC bit level, a timer value, preset counter condition, or any one of a wide variety of message triggers.

Time and Date in the Paradigm unit has the capability to display in any combination of year, month, day, hours, minutes, and seconds.

Bar Graphs in horizontal format are easily attached to data variables. The partial or full length bar graph displays can be scaled and offset to optimize the required display effect.

SECURITY

The password protection scheme provides the ultimate in tamper-proof capability. Access can be limited on a unit, page, recipe, or even individual data entries.

ALARMS

The Paradigm unit can monitor and log from 100 to 500 alarms, depending on model. Such triggers as a simple bit level transition, a PLC coil activation, or a complex application algorithm can activate an alarm. The alarms can be time and date stamped, with an automatic screen display and/or downloading to a printer for hard copy recording purposes.

REAL TIME SCHEDULE

Real time schedule allows for repetitive or one time task to take place in the system. Typically a schedule action similar to...At 1:55 PM on Monday, Wednesday, and Friday, print the production report...is required in the application. In conjunction with the recipe capabilities, a downloading of a special recipe can be requested by the real time schedule feature.

USER PROGRAMS

This feature offers the user the ability to incorporate custom application requirements via a powerful program language. For example, a program designated “Calculate Volume” which determines the amount of fluid in a round tank at specific temperatures could be created. This program would be triggered to run and display each time the page denoted as “Volume Now” is requested.

The ability to customize to your application’s specialized needs is easily solved with the user program capability.

KEYBOARD EDITING

All the interface keys can be programmed to perform virtually unlimited functions with each key, having multiple actions assigned to three types of key events: key pressed, key held down (auto repeat), and key released. Typical key actions would be Go to page, set value, load recipe, view alarms, print report, and many more.

COMMUNICATIONS

With over 70 communication drivers available, the Paradigm operator interface offers a wide range of connectivity including: PLCs, Variable Speed Drives, Temperature Controllers, Bar Code Readers, etc.

Utilizing real PLC data references, the automatic comms configuration optimizes the system’s communication performance. In the event that your specific driver does not appear on the Paradigm drivers list, let us know, as this list is always being expanded to meet our customers’ needs.
HARDWARE INFORMATION

This bulletin contains a variety of information related to the installation and operation of the Operator Interface supplied. Ideally, you should read this document thoroughly before attempting to use the equipment. For information about the software aspects of the terminal, please consult other documentation.

CONTENTS OF PACKAGE

The Operator Interface is supplied in a packaging box containing the following...

- The interface terminal itself.
- A NEMA 4/IP65 rated mounting gasket.
- A bag containing panel hardware.
- This hardware bulletin.
- If any of these items are missing, please contact your supplier immediately.

POWER SUPPLY REQUIREMENTS

The Operator Interface requires an 11 to 30 VDC power supply rated at 3 W unless otherwise stated on the label.

- The terminal may take as little as 100 mA in certain circumstances, so be sure that the chosen power supply can operate correctly with this load. Large switch-mode supplies tend to need a certain minimum load before they will operate correctly.

In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. A very high proportion of reported problems are caused by incorrect power supply installation, so please take care to observe the following points...

- The power supply must be mounted close to the unit, with usually not more than 6 feet of cable between the supply and the Operator Interface. Ideally, as short a length as is possible should be used.
- The wire used to connect the Operator Interface’s power supply should be of at least 22 gauge wire. If a longer cable run is used, you should use heavier gauge wire. The routing of the cable should be kept away from large contactors, inverters and other devices which may generate significant electrical noise.

BATTERY BACKUP ISSUES

The Operator Interface is supplied with a Lithium Battery designed to maintain the internal memory and real-time clock during power outages. Assuming the operator interface terminal is powered up for 50% of the time, this battery should last over 4 years. A “Battery Low” system variable is set when the battery voltage drops below its nominal voltage.

It is possible to replace the battery without losing the contents of the Operator Interface’s memory, but this does not reduce the importance of ensuring that a copy of the terminal’s configuration is kept readily at hand to allow the terminal to be re-loaded in the case of mishaps. Please remember that although an image copy of the terminal’s configuration is kept readily at hand to allow the terminal to be re-loaded, this file is not editable, so the importance of keeping a copy on disk cannot be overstressed.

The battery is located in a holder on the main circuit board. This should be clearly visible. Remove the battery from its holder.

Place the new battery in the holder. The terminal’s power supply can now be disconnected, if you re-applied power in the step above.

Replace the lid, screws and connector by following the above procedure in reverse. You may like to make a note of the date the battery was replaced to allow planned maintenance to be carried out.

If you did not keep the unit powered-up during battery replacement, hold down the EXIT and MUTE keys on the keyboard and cycle power. Release the keys and follow the menu guides to clear the internal memory. The unit is now ready for a suitable configuration database to be re-loaded.

Please note that the old battery must be disposed of in a manner which complies with your local waste regulations. Also, the battery must not be disposed of in fire or in a manner whereby it may be damaged and its contents come into contact with human skin.

INSTALLATION & CONNECTIONS

The unit meets NEMA 4/IP65 requirements for indoor use, when properly installed. The units are intended to be mounted into an enclosed panel.

Installation Environment

The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

Continuous exposure to direct sunlight may accelerate the aging process of the bezel. The bezel should be cleaned only with a soft cloth and neutral soap product. Do NOT use solvents.

Do not use tools of any kind (screwdrivers, pens, pencils, etc.) to operate the keypad of the unit.

MOUNTING INSTRUCTIONS

The Operator Interfaces are designed for through-panel mounting. A neoprene gasket is provided, to enable sealing to NEMA 4/IP65 specification. The panel cut-out diagram for the model supplied is provided. All mounting holes should be drilled for 0.14” (3.5 mm) clearance. Care should be taken to remove any loose material from the mounting hole to avoid such metal falling into the Operator Interface itself during installation.

CONNECTING TO A PLC

The Operator Interface is designed to operate with a PLC. A serial communication connection must be made between the operator interface terminal and PLC, and the details of this connection vary according to which PLC is used.

The following section lists the connection details for the PLC to be used.

PLC TYPE

Details on how to connect to most PLCs are available on request from RLC.

CONNECTING TO AN IBM ® PC/AT

The Operator Interface is programmed via software running on an IBM PC/AT or a compatible computer. The connection between the PC/AT and the operator interface terminal is made via a custom cable provided with the EDICT Developer’s Kit. The cable is designed for a 9-way serial port. Please contact your supplier if you require a 25-way version.
**PROGRAMMING PORT PIN OUT**

The Operator Interface’s programming port is sometimes used to connect other RS-232 devices, such as printers. The following illustration and table gives the pin-out of this port to enable such connections to be made.

<table>
<thead>
<tr>
<th>PIN</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RTS</td>
</tr>
<tr>
<td>2</td>
<td>Tx</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>RX</td>
</tr>
<tr>
<td>6</td>
<td>CTS</td>
</tr>
</tbody>
</table>

The above table denotes the pin names of the programming port. When connecting, the pin name at the programming port is connected to the opposite of that pin name at the destination device.

**FUNCTION KEY STRIPS**

The function keys on the CL20 have clear windows that permit the user to insert labels appropriate to the process. A formatted page is supplied upon which the user can enter function names (e.g. RUN, PRINT, etc.). These strips are inserted from the rear of the panel through slots below the function keys located underneath the gasket.

Take care that the ink applied will not rub off of the paper, or else blemishes will be left on the inside of the window. Laminated paper or plastic film can prove easier to insert than normal photocopier paper. It also helps if the starting edge of the paper has about 0.25 inches (6.4 mm) of its corners cut off at a 45 degree angle.

*Note: Add an additional 1.5" to label length to allow for easier insertion and removal.*

**TROUBLESHOOTING**

For further technical assistance, contact technical support at the appropriate company numbers listed.
MODEL CL40 - PARADIGM 2 X 40 LCD OPERATOR INTERFACE TERMINAL

GENERAL DESCRIPTION
The Model CL40 Operator Interface Terminal combines unique capabilities normally expected only from high-end units, at a very affordable price. The CL40 is configured using the same powerful EDICT97 Software as all Red Lion Paradigm Operator Interfaces. The result is savings in time to get challenging applications up and running, and frequent savings in hardware costs due to replacing many functions usually performed in separate expensive devices.

CL40 is robustly constructed for an industrial environment. With a metal enclosure and a non-corroding NEMA 4/IP65 front panel.

SAFETY SUMMARY
All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so, can be potentially harmful to persons or equipment in the event of a fault to the unit.

SPECIFICATIONS
1. POWER REQUIREMENT: 11 min. to 30 max. VDC @ 3.0 W
   Power Up Current: 3.0 A for 1 msec. max.
   Must use a Class 2 or SELV rated power supply.
2. DISPLAY: 2 lines of 40 characters, 0.197” (5 mm) high liquid crystal display with bright LED backlight
3. KEYPAD: 5 screen legendable soft keys, numeric pad with raise, lower, next, previous, enter, delete, exit, menu, alarms and mute keys, all with Tactile feedback.
4. MEMORY: 128 K (64 K user) battery backed RAM (Battery life expectancy 10 years). Optional factory fit expansion to 256 K (192 user).
5. PHYSICAL DIMENSIONS: L = 9.45” (240 mm), H = 4.17” (106 mm), D = 2.03” (51.6 mm).
6. CONSTRUCTION: Steel rear metal enclosure with NEMA 4/IP65 aluminum front plate when correctly fitted with the gasket provided. This unit is rated for NEMA 4/IP65 indoor use. Installation Category I, Pollution Degree 2.
7. MOUNTING REQUIREMENTS: Max. panel thickness is 0.375” (9.5 mm). For NEMA 4/IP65 sealing, a steel panel with a minimum thickness of 0.125” (3.175 mm) is recommended
8. FIELD CONNECTION: Removable screw terminal blocks.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL40</td>
<td>LCD, 2 X 40, 5 Soft keys, 128 K memory</td>
<td>CL400000</td>
</tr>
<tr>
<td>CL40</td>
<td>LCD, 2 X 40, 5 Soft keys, 256 K memory</td>
<td>CL400010</td>
</tr>
<tr>
<td></td>
<td>Battery Replacement</td>
<td>BAL3R004</td>
</tr>
<tr>
<td></td>
<td>EDICT-97 Development Kit. Includes Software, Manual and 9-pin RS232 Programming cables</td>
<td>SFEDT</td>
</tr>
<tr>
<td></td>
<td>Communications Cable</td>
<td>P895xxxZ</td>
</tr>
</tbody>
</table>

DIMENSIONS In inches (mm)

Tolerance: ±.010” (±0.25mm)

CAUTION: Read complete instructions prior to installation and operation of the unit.
9. CERTIFICATIONS AND COMPLIANCES:

ELECTRICAL SAFETY
EN 61010-1, IEC 1010-1
Safety requirements for electrical equipment for measurement, control, and Laboratory use, Part 1

ELECTROMAGNETIC COMPATIBILITY

Immunity to EN 50082-2
Electrostatic discharge EN 61000-4-2 Level 2; 4 kV contact
Electromagnetic RF fields EN 61000-4-3 Level 3; 8 kV air
Fast transients (burst) EN 61000-4-4 Level 4; 2 kV I/O
RF conducted interference EN 61000-4-6 Level 3; 2 kV power
Emissions to EN 50081-1 Level 3; 10 V/m

Note:
1. Self-recoverable loss of performance during EMI disturbance at 10 Vrms:
   Communications error may occur during EMI disturbance.
   For operation without loss of performance:
   I/O cables are routed in metal conduit connected to earth ground.

10. ENVIRONMENTAL CONDITIONS:
Operating Temperature: 0 to 40°C
Storage Temperature: -20 to 80°C
Operating and Storage Humidity: 80% max. relative humidity
   (non-condensing) from 0°C to 40°C.
Altitude: Up to 2000 meters
11. WEIGHT: 2.1 lb. (0.95 Kg)

COMMON FEATURES FOR CHARACTER BASED OPERATOR TERMINALS

PROGRAMMABILITY
Event Driven Configuration Tool
Edict 97, an extremely powerful Windows 95/3.11 based software program, provides for the intuitive configuration of every aspect of the operator interface’s behavior. The requirement for time consuming PLC ladder logic is drastically reduced by the unique event driven approach of EDICT 97. The capability of this program, in conjunction with the PLC and the Paradigm operator interface unit, ensures a great deal of advanced functionality for your system. This powerful PLC/Paradigm system provides many of the capabilities and features normally associated with the more complicated and costly PC/SCADA systems. Display pages are easily generated, including PLC and internal variables, text strings, or bar charts. All dynamic elements are also available as alarms, triggers, reports, and graphs, for the run time software. After completion of the programming, the program is directly downloaded to the operator interface from your PC, without any compiling or saving requirement. When you require a change in your program, EDICT 97 loads only the change, not the entire program, saving valuable on-line time.

DYNAMIC DISPLAY PAGE ELEMENTS
Each display page has provisions to show static and dynamic information, including data variables, text messages, time, and date.

Data Variables can be either PLC derived or internally generated, either in data entry or display only mode. The Paradigm unit has an extremely powerful math capability, allowing the operator to manipulate the variables to meet the specific application’s demands. If required, the display can be formatted to BCD, binary, hex, floating point, and string. Upper and lower limits of data entry variables are fully supported and able to be password protected.

Text Message Animation enables several different types of animated text from a local or global message table to be displayed. The message displayed is dependent on the condition of the particular controlling expression. The controlling expression may be a PLC bit level, a timer value, preset counter condition, or any one of a wide variety of message triggers.

Time and Date in the Paradigm unit has the capability to display in any combination of year, month, day, hours, minutes, and seconds.

Bar Graphs in horizontal format are easily attached to data variables. The partial or full length bar graph displays can be scaled and offset to optimize the required display effect.

SECURITY
The password protection scheme provides the ultimate in tamper-proof capability. Access can be limited on a unit, page, recipe, or even individual data entries.

INPUT/OUTPUT COMMUNICATIONS SPECS
1. SERIAL PORTS: Data Format and Baud Rates for each port is individually software programmable up to 19200 baud.
   Port 1: Programming Port - RS-232 on an RJ-11 jack
   Port 2: RS-232 Port on a Plug-In Screw Terminal Block
   Port 3: RS-485 Port on a Plug-In Screw Terminal Block
   (Up to 29 Units can be connected and individually addressed.)
   Note: LED Indicators show communications status on Ports 2 & 3

2. COMMUNICATION MODES: Any of the three ports can be used to communicate with Serial Devices.
   Model - (CL400000) only one of Ports 1, 2, and 3 may be configured.
   Exception: Red Lion Controls Instrument, simple ASCII Printer, PC Link Network, Program Through, External Keyboards, and Roll-Your-Own Protocols can be used with other protocols on all Ports.
   Model - (CL400010) may communicate in Master mode with a different device protocol on each port (See Note & Exception). However, only one of the Ports 2 and 3 may be configured, if either is selected as a Slave Protocol.
   Note: Ports 2 and 3 may be configured as different device protocols in Master mode and Port 1 may be used simultaneously in Slave mode for a third device protocol.
   Exception: If Allen Bradley DH485 is selected on either Port 2 or 3, only Port 1 will be available for a separate device protocol.

ALARMS
The Paradigm unit can monitor and log from 100 to 500 alarms, depending on model. Such triggers as a simple bit level transition, a PLC coil activation, or a complex application algorithm can activate an alarm. The alarms can be time and date stamped, with an automatic screen display and/or downloading to a printer for hard copy recording purposes.

REAL TIME SCHEDULE
Real time schedule allows for repetitive or one time task to take place in the system. Typically a schedule action similar to...At 1:55 PM on Monday, Wednesday, and Friday, print the production report...is required in the application. In conjunction with the recipe capabilities, a downloading of a special recipe can be requested by the real time schedule feature.

USER PROGRAMS
This feature offers the user the ability to incorporate custom application requirements via a powerful program language. For example, a program designated “Calculate Volume” which determines the amount of fluid in a round tank at specific temperatures could be created. This program would be triggered to run and display each time the page denoted as “Volume Now” is requested.

The ability to customize to your application’s specialized needs is easily solved with the user program capability.

KEYBOARD EDITING
All the interface keys can be programmed to perform virtually unlimited functions with each key, having multiple actions assigned to three types of key events: key pressed, key held down (auto repeat), and key released. Typical key actions would be Go to page, set value, load recipe, view alarms, print report, and many more.

COMMUNICATIONS
With over 70 communication drivers available, the Paradigm operator interface offers a wide range of connectivity including: PLCs, Variable Speed Drives, Temperature Controllers, Bar Code Readers, etc. Utilizing real PLC data references, the automatic comms configuration optimizes the system’s communication performance. In the event that your specific driver does not appear on the Paradigm drivers list, let us know, as this list is always being expanded to meet our customers’ needs.
HARDWARE INFORMATION
This bulletin contains a variety of information related to the installation and operation of the Operator Interface supplied. Ideally, you should read this document thoroughly before attempting to use the equipment. For information about the software aspects of the terminal, please consult other documentation.

CONTENTS OF PACKAGE
The Operator Interface is supplied in a packaging box containing the following...

- The interface terminal itself.
- A NEMA 4/IP65 rated mounting gasket.
- A bag containing panel hardware.
- This hardware bulletin.
- If any of these items is missing, please contact your supplier immediately.

POWER SUPPLY REQUIREMENTS
The Operator Interface requires an 11 to 30 VDC power supply rated at 3.0 W unless otherwise stated on the label.

- The terminal may take as little as 100 mA in certain circumstances, so be sure that the chosen power supply can operate correctly with this load.
- Large switch-mode supplies tend to need a certain minimum load before they will operate correctly.

In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. A very high proportion of reported problems are caused by incorrect power supply installation, so please take care to observe the following points...

- The power supply must be mounted close to the unit, with usually not more than 6 feet of cable between the supply and the Operator Interface.
- Ideally, as short a length as is possible should be used.
- The wire used to connect the Operator Interface’s power supply should be of at least 22 gage wire. If a longer cable run is used, you should use heavier gage wire. The routing of the cable should be kept away from large contactors, inverters and other devices which may generate significant electrical noise.

BATTERY BACKUP ISSUES
The Operator Interface is supplied with a Lithium Battery designed to maintain the internal memory and real-time clock during power outages. Assuming the operator interface terminal is powered up for 50% of the time, this battery should last over 4 years. A “Battery Low” system variable is available to allow planned maintenance to be carried out.

It is possible to replace the battery without losing the contents of the Operator Interface’s memory, but this does not reduce the importance of ensuring that a copy of the terminal’s configuration is kept readily at hand to allow the terminal to be re-loaded in the case of mishaps. Please remember that although an image copy of the terminal’s configuration is kept readily at hand to allow the terminal to be re-loaded in the case of mishaps. Please remember that although an image copy of the terminal’s configuration is kept readily at hand to allow the terminal to be re-loaded in the case of mishaps.

CHANGING THE BATTERY
To change the internal battery, follow these steps...

- Remove the power and PLC communications connector from the unit.
- Remove the four screws from the rear-cover and remove the cover.
- If you wish to avoid losing the terminal’s configuration, reconnect the power connector and re-apply power. Note that this will require the panel not to be powered-up and, as such, only suitably qualified staff should carry out this procedure.
- Place the new battery in the holder. The terminal’s power supply can now be disconnected, if you re-applied power in the step above.
- Replace the lid, screws and connector by following the above procedure in reverse. You may like to make a note of the date the battery was replaced to allow planned maintenance to be carried out.
- If you did not keep the unit powered-up during battery replacement, hold down the EXIT and MUTE keys on the keyboard and cycle power.
- If you wish to avoid losing the terminal’s configuration, reconnect the power connector and re-apply power. Note that this will require the panel not to be powered-up and, as such, only suitably qualified staff should carry out this procedure.

The above table denotes the pin names of the programming port. When connecting, the pin name at the programming port is connected to the opposite of that pin name at the destination device.

MTUNI INSTALLATION INSTRUCTIONS
The Operator Interfaces are designed for through-panel mounting. A neoprene gasket is provided, to enable sealing to NEMA 4/IP65 specification. The panel cut-out diagram for the model supplied is provided. All mounting holes should be drilled for 0.14” (3.5 mm) clearance. Care should be taken to remove any loose material from the mounting hole to avoid such metal falling into the Operator Interface itself during installation.

Troubleshooting
For further technical assistance, contact technical support at the appropriate company numbers listed.

Connecting to a PLC
The Operator Interface is designed to operate with a PLC. A serial communication connection must be made between the operator interface terminal and PLC, and the details of this connection vary according to which PLC is used.

The following section lists the connection details for the PLC to be used.

PLC TYPE
Details on how to connect to most PLCs are available on request from RLC.

Connecting to an IBM® PC/AT
The Operator Interface is programmed via software running on an IBM PC/AT or a compatible computer. The connection between the PC/AT and the operator interface terminal is made via a custom cable provided with the EDICT Developer’s Kit. The cable is designed for a 9-way serial port. Please contact your supplier if you require a 25-way version.

PROGRAMMING PORT PIN OUT
The Operator Interface’s programming port is sometimes used to connect other RS-232 devices, such as printers. The following illustration and table gives the pin-out of this port to enable such connections to be made.
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The customer, in applying the products and software described herein, accepts that the products are wholly or partly programmable electronic systems that are inherently complex and which cannot thus be guaranteed to be free of errors. In doing so, the customer accepts the responsibility to ensure that the products are correctly programmed, configured, installed, commissioned, operated and maintained by competent and suitably trained staff and according to any instructions or safety instructions provided and as dictated by good engineering practices.

This documentation, and the software and products described herein, is subject to continuous development and improvement. All information is given in good faith, but RLC shall not be liable for any omissions or errors herein or within the software herein described.
MODEL CX200 - PARADIGM 4 X 20 VFD OPERATOR TERMINAL

DESCRIPTION
The CX200 from the Paradigm Range of operator interfaces meets the ever increasing demands of industry for powerful easy-to-use terminals. Both hardware and software are designed to allow the user to easily upgrade and take full advantage of our continuing development and improvements to our products.

SAFETY SUMMARY
All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so, can be potentially harmful to persons or equipment in the event of a fault to the unit.

SPECIFICATIONS
1. POWER REQUIREMENTS: 11 to 30 VDC @ 3.2 W
   Power Up Current: 2.5 A for 7 msec. max.
   Must use a Class 2 or SELV rated power supply.
2. DISPLAY: 4 lines of 20 characters, 5 mm high Vacuum Fluorescent display
3. KEYPAD: 3 screen legendable soft keys, 8 User re-legendable function keys, numeric pad with raise, lower, next, previous, enter, delete, exit, alarms and mute keys, all embossed with Tactile feedback.
4. MEMORY: 128 K (64 K user) battery backed RAM (Typical battery life 7 years 50/50 on/off cycle). Optional factory fit expansion to 256 K (192 K user).
5. CONSTRUCTION: Steel rear metal enclosure with NEMA 4/IP65 aluminum front plate when correctly fitted with the gasket provided. This unit is rated for NEMA 4/IP65 indoor use. Installation Category I, Pollution Degree 2
6. PHYSICAL DIMENSIONS: L = 8.11” (206 mm), H = 6.89” (175 mm), D = 2.03” (51.6 mm).

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CX-200</td>
<td>VFD, 4 X 20, 8 Function keys, 128 K memory</td>
<td>CX2000000</td>
</tr>
<tr>
<td></td>
<td>VFD, 4 X 20, 8 Function keys, 256 K memory</td>
<td>CX200010</td>
</tr>
<tr>
<td></td>
<td>Battery Replacement</td>
<td>BAL3R004</td>
</tr>
<tr>
<td></td>
<td>EDICT-97 Development Kit, Includes Software,</td>
<td>SFEDT</td>
</tr>
<tr>
<td></td>
<td>Manual and 9-pin RS232 Programming Cables</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Communication Cables</td>
<td>P805xxxZ</td>
</tr>
</tbody>
</table>

DIMENSIONS  In inches (mm)

| Tolerance: ±.01” (±.25mm) | 8.11 (206.0) | 6.89 (175.0) |

PANEL CUT-OUT

| BX 4.14 (43.5) | 3.86 (98.0) | 7.72 (196.0) |
| 6.56 (166.5)   | 6.16 (156.5) | 7.32 (186.4) |
| 2.03 (51.6)    | 2.0 (51.0)   | 3.28 (83.3)  |

CAUTION: Read complete instructions prior to installation and operation of the unit.
7. **SERIAL PORTS:** Data Format and Baud Rates for each port is individually
software programmable up to 19200 baud. 
Port 1: Programming Port - RS-232 on an RJ-11 jack.
Port 2: RS-232 Port on a Plug-In Screw Terminal Block
Port 3: RS-485 Port on a Plug-In Screw Terminal Block
(Up to 29 units can be connected and individually addressed. Can be used as a three port device for multiple protocol applications.)

8. **COMMUNICATION MODES:** Any of the three ports can be used to communicate with Serial Devices. 
Model - (CX100) may communicate in Master mode with a different device protocol on each port. (See Note & Exception). However, only one of Ports 2 and 3 may be configured, if either is selected as a Slave protocol. 
Note: Ports 2 and 3 may be configured as different device protocols in Master mode and Port 1 may be used simultaneously in Slave mode for a third device protocol.

9. **MOUNTING REQUIREMENTS:** Max. panel thickness is 0.375” (9.5 mm).
For NEMA 4/IP65 sealing, a steel panel with a minimum thickness of 0.125” (3.175 mm) is recommended.

10. **ENVIROMENTAL CONDITIONS:**
- **Operating Temperature:** 0 to 40°C
- **Storage Temperature:** -20 to 80°C
- **Operating and Storage Humidity:** 80% max. relative humidity (non-condensing) from 0°C to 40°C.
- **Altitude:** Up to 2000 meters
- **Altitude:** Up to 2000 meters

---

**COMMON FEATURES FOR CHARACTER BASED OPERATOR TERMINALS**

**PROGRAMMABILITY**

Event Driven Configuration Tool

Edict 97, an extremely powerful Windows 95/3.11 based software program, provides for the intuitive configuration of every aspect of the operator interface’s behavior. The requirement for time consuming PLC ladder logic is drastically reduced by the unique event driven approach of EDICT 97. The capability of this program, in conjunction with the PLC and the Paradigm operator interface unit, ensures a great deal of advanced functionality for your system. This powerful PLC/Paradigm system provides many of the capabilities and features normally associated with the more complicated and costly PC/SCADA systems. Display pages are easily generated, including PLC and internal variables, text strings, or bar charts. All dynamic elements are also available as alarms, recipes, triggers, and reports, for the run time software.

After completion of the programming, the program is directly downloaded to the operator interface from your PC, without any compiling or saving requirement. When you require a change in your program, EDICT 97 loads only the change, not the entire program, saving valuable on-line time.

**DYNAMIC DISPLAY PAGE ELEMENTS**

Each display page has provisions to show static and dynamic information, including data variables, text messages, time, and date.

- **Data Variables** can be either PLC derived or internally generated, either in data entry or display only mode. The Paradigm unit has an extremely powerful math capability, allowing the operator to manipulate the variables to meet the specific application’s demands. If required, the display can be formatted to BCD, binary, hex, floating point, and string. Upper and lower limits of data entry variables are fully supported and able to be password protected.

- **Text Message Animation** enables several different types of animated text from a local or global message table to be displayed. The message displayed is dependent on the condition of the particular controlling expression. The controlling expression may be a PLC bit level, a timer value, preset counter condition, or any one of a wide variety of message triggers.

- **Time and Date** in the Paradigm unit has the capability to display in any combination of year, month, day, hours, minutes, and seconds.

- **Bar Graphs** in horizontal format are easily attached to data variables. The partial or full length bar graph displays can be scaled and offset to optimize the required display effect.

**SECURITY**

The password protection scheme provides the ultimate in tamper-proof capability. Access can be limited on a unit, page, recipe, or even individual data entries.

**ALARMS**

The Paradigm unit can monitor and log from 100 to 500 alarms, depending on model. Such triggers as a simple bit level transition, a PLC coil activation, or a complex application algorithm can activate an alarm. The alarms can be time and date stamped, with an automatic screen display and/or downloading to a printer for hard copy recording purposes.

**REAL TIME SCHEDULE**

Real time schedule allows for repetitive or one time task to take place in the system. Typically a schedule action similar to...At 1:55 PM on Monday, Wednesday, and Friday, print the production report...is required in the application. In conjunction with the recipe capabilities, a downloading of a special recipe can be requested by the real time schedule feature.

**USER PROGRAMS**

This feature offers the user the ability to incorporate custom application requirements via a powerful program language. For example, a program designated “Calculate Volume” which determines the amount of fluid in a round tank at specific temperatures could be created. This program would be triggered to run and display each time the page denoted as “Volume Now” is requested. This feature allows the user to tailor the display to suit their specific needs.

**KEYBOARD EDITING**

All the interface keys can be programmed to perform virtually unlimited functions with each key, having multiple actions assigned to three types of key events: key pressed, key held down (auto repeat), and key released. Typical key actions would be Go to page, set value, load recipe, view alarms, print report, and many more.

**COMMUNICATIONS**

With over 70 communication drivers available, the Paradigm operator interface offers a wide range of connectivity including: PLCs, Variable Speed Drives, Temperature Controllers, Bar Code Readers, etc. Utilizing real PLC data references, the automatic comms configuration optimizes the system’s communication performance. In the event that your specific driver does not appear on the Paradigm drivers list, let us know, as this list is always being expanded to meet our customers’ needs.

---

**CERTIFICATIONS AND COMPLIANCES: ELECTROMAGNETIC COMPATIBILITY**

- **Immunity to EN 50082-2**
  - Electrostatic discharge: EN 61000-4-2
  - Level 2: 4 Kv contact
  - Level 3: 8 Kv air
  - Electromagnetic RF fields: EN 61000-4-3
  - Level 3: 10 V/m
  - 80 MHz - 1 GHz
  - Fast transients (burst): EN 61000-4-4
  - Level 4: 2 Kv I/O
  - Level 3: 2 Kv power
  - RF conducted interference: EN 61000-4-6
  - Level 3: 10 V/m
  - 150 KHz - 80 MHz

- **Emissions to EN 50081-1**
  - RF interference: EN 55022
  - Enclosure class B
  - 1. Self-recoverable loss of performance during EMI disturbance at 10 Vrms:
  - Communications error may occur during EMI disturbance.
  - For operation without loss of performance:
  - I/O cables are routed in metal conduit connected to earth ground.

12. **WEIGHT:** 2.3 lbs. (0.1 Kg)
HARDWARE INFORMATION
This bulletin contains a variety of information related to the installation and operation of the Operator Interface supplied. Ideally, you should read this document thoroughly before attempting to use the equipment. For information about the software aspects of the terminal, please consult other documentation.

CONTENTS OF PACKAGE
The Operator Interface is supplied in a packaging box containing the following...
◆ The interface terminal itself.
◆ A NEMA 4/IP65 rated mounting gasket.
◆ A bag containing panel hardware.
◆ This hardware bulletin.
◆ If any of these items are missing, please contact your supplier immediately.

POWER SUPPLY REQUIREMENTS
The Operator Interface requires an 11 to 30 VDC power supply rated at 2.5 W unless otherwise stated on the label.
◆ The terminal may take as little as 100 mA in certain circumstances, so be sure that the chosen power supply can operate correctly with this load. Large switch-mode supplies tend to need a certain minimum load before they will operate correctly.
In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. A very high proportion of reported problems are caused by incorrect power supply installation, so please take care to observe the following points...
◆ The power supply must be mounted close to the unit, with usually not more than 6 feet of cable between the supply and the Operator Interface. Ideally, as short a length as is possible should be used.
◆ The wire used to connect the Operator Interface’s power supply should be of at least 22 gage wire. If a longer cable run is used, you should use heavier gage wire. The routing of the cable should be kept away from large contactors, inverters and other devices which may generate significant electrical noise.

BATTERY BACKUP ISSUES
The Operator Interface is supplied with a Lithium Battery designed to maintain the internal memory and real-time clock during power outages. Assuming the operator interface terminal is powered up for 50% of the time, this battery should last over 4 years. A “Battery Low” system variable is available so that the programmer can choose specific action(s) to occur when the battery voltage drops below its nominal voltage. It is possible to replace the battery without losing the contents of the Operator Interface’s memory, but this does not reduce the importance of ensuring that a copy of the terminal’s configuration is kept readily at hand to allow the terminal to be re-loaded in the case of mishaps. Please remember that although an image of the database contents can be uploaded, this file is not editable, so the importance of keeping a copy on disk cannot be over stressed.

CHANGING THE BATTERY
To change the internal battery, follow these steps...
◆ Remove the power and PLC communications connector from the unit.
◆ Remove the four screws from the rear-cover and remove the rear cover.
◆ If you wish to avoid losing the terminal’s configuration, reconnect the power connector and re-apply power. Note that this will require the panel to be powered-up and, as such, only suitably qualified staff should carry out this procedure.
◆ The battery is located in a holder on the main circuit board. This should be clearly visible. Remove the battery from its holder.
◆ Place the new battery in the holder. The terminal’s power supply can now be disconnected, if you re-applied power in the step above.
◆ Replace the lid, screws and connector by following the above procedure in reverse. You may like to make a note of the date the battery was changed to allow planned maintenance to be carried out.
◆ If you did not keep the unit powered-up during battery replacement, hold the keys and follow the menu guides to clear the memory. The unit is now ready for a configuration database to be reloaded.
Please note that the old battery must be disposed of in a manner which complies with your local waste regulations. Also, the battery must not be disposed of in fire or in a manner whereby it may be damaged and its contents come into contact with human skin.

INSTALLATION & CONNECTIONS
The unit meets NEMA 4/IP65 requirements for indoor use, when properly installed. The units are intended to be mounted into an enclosed panel.

Installation Environment
The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.
Continuous exposure to direct sunlight may accelerate the aging process of the bezel. The bezel should be cleaned only with a soft cloth and neutral soap product. Do NOT use solvents.
Do not use tools of any kind (screwdrivers, pens, pencils, etc.) to operate the keypad of the unit.

CONNECTING TO A PLC
The Operator Interface is designed to operate with a PLC. A serial communication connection must be made between the operator interface terminal and PLC, and the details of this connection vary according to which PLC is used.
The following section lists the connection details for the PLC to be used.

PLC TYPE
Details on how to connect to most PLCs are available on request from RLC.

CONNECTING TO AN IBM® PC/AT
The Operator Interface is programmed via software running on an IBM PC/AT or a compatible computer. The connection between the PC/AT and the operator interface terminal is made via a custom cable provided with the EDICT Developer’s Kit. The cable is designed for a 9-way serial port. Please contact your supplier if you require a 25-way version.

PROGRAMMING PORT PIN OUT
The Operator Interface’s programming port is sometimes used to connect other RS-232 devices, such as printers. The following illustration and table gives the pin-out of this port to enable such connections to be made.

<table>
<thead>
<tr>
<th>PIN</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RTS</td>
</tr>
<tr>
<td>2</td>
<td>Tx</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>Rx</td>
</tr>
<tr>
<td>6</td>
<td>CTS</td>
</tr>
</tbody>
</table>

The above table denotes the pin names of the programming port. When connecting, the pin name at the programming port is connected to the opposite of that pin name at the destination device.

MOUNTING INSTRUCTIONS
The Operator Interfaces are designed for through-panel mounting. A neoprene gasket is provided, to enable sealing to NEMA 4/IP65 specification. The panel cut-out diagram for the model supplied is provided. All mounting holes should be drilled for 0.14” (3.5 mm) clearance. Care should be taken to remove any loose material from the mounting hole to avoid such metal falling into the Operator Interface itself during installation.

Rear View of Unit
FUNCTION KEY STRIPS
The function keys on the CX200 have clear windows that permit the user to insert labels appropriate to the process. A formatted page is supplied upon which the user can enter function names (e.g. RUN, PRINT, etc.). These strips are inserted from the rear of the panel through slots below the function keys located underneath the gasket.

Take care that the ink applied will not rub off of the paper, or else blemishes will be left on the inside of the window. Laminated paper or plastic film can prove easier to insert than normal photocopier paper. It also helps if the starting edge of the paper has about 0.25 inches of its corners cut off at a 45 degree angle.

Note: Add an additional 1.5” to label length to allow for easier insertion and removal.

TROUBLESHOOTING
For further technical assistance, contact technical support at the appropriate company numbers listed.

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This documentation, and the software and products described herein, is subject to continuous development and improvement. All information is given in good faith, but RLC shall not be liable for any omissions or errors herein or within the software herein described.
## MODEL MDI - MESSAGE DISPLAY INTELLIGENT UNIT

- **2x20 OR 1x10 TRANSMISSIVE LCD, NEGATIVE IMAGE WITH RED BACKLIGHTING, NEGATIVE IMAGE WITH TRI-COLOR BACKLIGHTING (Red, Orange, Yellow-Green) OR POSITIVE OR NEGATIVE IMAGE WITH YELLOW/GREEN LED BACKLIGHTING**
- **153 DIFFERENT DISPLAYABLE CHARACTERS (Including 96 Standard ASCII Characters)**
- **SCROLLING AND/OR BLINKING CHARACTERS**
- **PERIODIC AND/OR CHAINED MESSAGES**
- **PRIORITIZED MESSAGES**
- **TIME AND DATE FUNCTIONS**
- **256 MESSAGE CAPACITY**
- **REAL TIME CLOCK/CALENDAR**
- **MESSAGE QUEUE (Holds Up To Thirty-Two Requested Messages)**
- **SERIAL COMMUNICATIONS (Isolated 20 mA Current Loop)**
- **OUTPUT/BUSY TERMINAL (NPN Open Collector Output)**
- **PARALLEL COMMUNICATIONS**
- **EMBEDDED DATA**
- **ELAPSED TIMERS**
- **BAUD RATES UP TO 19.2 K**
- **COMBINED MESSAGE AND DATA MEMORY, 32 K**
- **SIMPLE PUSH-BUTTON AND CONTACT CLOSURE MESSAGE REQUESTS**
- **AC VERSION: SWITCH SELECTABLE 115/230 VAC**
- **DC VERSION: TERMINAL SELECTABLE 12/24 VDC**
- **NEMA 4/IP65 SEALED FRONT METAL BEZEL**
- **IBM® COMPATIBLE SOFTWARE FOR PROGRAMMING (sold separately)**

### DESCRIPTION

The Message Display Intelligent (MDI) unit is a simple-to-use, yet versatile and powerful alphanumeric message center. The broad flexibility and functionality of the MDI make it particularly adaptable to a wide variety of applications, including:

- **Display and Monitoring of Measured Values**
- **Indication of Warning, Error, and Alarm Conditions**
- **Monitoring of Manufacturing Processes**
- **Display of Machine Start-Up and Operation Procedures**

The MDI is capable of storing and displaying up to 256 separate messages. A message can contain up to 250 characters of text and can display any of the 153 customizable characters, including the standard 96 character ASCII set. Individual lines of the message text can be programmed to scroll in a block or character fashion. Individual characters, blocks, and lines of text can be programmed to blink.

The MDI can assemble and transmit message text to one or more Message Display Slave (MDS) units for remote display of messages. For interfacing with serial printers and ASCII terminals, the message text can be assembled and transmitted in any format the user desires. In this case, the appropriate lower ASCII control characters can be inserted in the message text where necessary.

Messages can also display the Current Time and Date and any of the MDI’s sixteen Elapsed Timer values. A message can also collect and display multiple Embedded Data items.

Messages can be requested via the MDI’s Serial and Parallel ports, which the user can configure to meet the needs of most applications. The Parallel Port can also be configured to issue Automatic Message Requests based on changing port values.

The MDI contains functions for requesting messages on a Periodic basis, and for processing requests based on Elapsed Time and Embedded Data values, as well as for executing Chained and Linked message lists.

Any programmed message can be designated for automatic request on Unit Power-Up and Reset. A separate message can be designated for display when the MDI’s Display is blank.

RLC offers IBM® compatible software for configuring and programming the MDI. The Message Display User software (SFMD), with its easy-to-use menus, extensive prompts, on-line Help functions, message simulator, and terminal emulator, greatly assists the user in fitting the MDI to the application at hand.

The user can easily create and save multiple Configuration, Character, and Message files with the SFMD software. Extensive file handling features are included, such as uploading, downloading, and printing of files. Message simulation and terminal emulation functions also come with the software.

### DIMENSIONS In inches (mm)

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>3.80 (96.5)</td>
</tr>
<tr>
<td>Height</td>
<td>1.95 (49.5)</td>
</tr>
<tr>
<td>Width</td>
<td>1.75 (44.5)</td>
</tr>
<tr>
<td>Height</td>
<td>1.59 (40.5)</td>
</tr>
<tr>
<td>Panel width</td>
<td>4.50 (114.3)</td>
</tr>
</tbody>
</table>

Note: Recommended minimum clearance (behind the panel) for mounting clip installation is 2.1" (53.3) H x 5.5" (140) W.

### PANEL CUT-OUT

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>3.62±.03</td>
</tr>
<tr>
<td>Height</td>
<td>1.77±.00</td>
</tr>
<tr>
<td>Width</td>
<td>48±4.8</td>
</tr>
<tr>
<td>Height</td>
<td>40±4.8</td>
</tr>
</tbody>
</table>

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
DESCRIPTION (Cont’d)

A powerful feature of the MDI is the Message Queue. With the Queue function disabled, the MDI processes messages on a first-come, first-served basis. However, with the Queue function enabled, the MDI processes message requests on a prioritized basis. High priority messages are placed on the Display while lower priority messages are placed on the Queue for later processing in priority order.

The metal front bezel of the MDI meets NEMA 4/IP65 requirements, allowing for washdown when properly installed. Modern surface-mount technology and extensive testing make the unit extremely reliable in industrial environments. Connections are made on removable terminal blocks, simplifying installation.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

SPECIFICATIONS

1. POWER: (See Ordering Information)
   AC Version:
   115/230 VAC ±10%, 50/60 Hz, 8 VA, switch selectable.
   DC Version:
   12/24 VDC ±10%, 300 mA max., terminal selectable. Power supplies must be Class 2 or SELV rated.

2. DISPLAY: (available in various configurations)
   2x20: 0.2" (5 mm) high characters.
   1x10: 0.35" (9 mm) high characters.

3. PARALLEL COMMUNICATIONS:
   Message Format:
   Binary: 4 or 8 bits.
   BCD: 4, 8, or 9 bits.
   Embedded Data Format:
   Binary: 4 or 8 bits.
   BCD: 4 or 8 bits.
   ASCII: 4 or 8 bits.

PARALLEL PORT INPUTS:
   Data Inputs (D0 - D7) & Control Inputs (Strobe & Message/Data):
   VIH = 8 VDC min., VIL = 4 VDC max., VMAX = 30 VDC
   Data SNK/SRC: Sink or Source, switch selectable.
   Control SNK/SRC: Sink or Source, switch selectable.
   Data Logic Level: Positive or Negative, switch selectable.
   Control Logic Level: Positive or Negative, switch selectable.
   Current Sinking: Internal 10 KΩ pull-up, IMAX = 1.2 mA.
   Current Source: Internal 10 KΩ pull-down, ISRC = 31 mA @ 30 VDC.
   Debounce Time: 0.01 to 2.5 seconds (programmable).
   Strobe Time: 3 to 255 msec (programmable).

4. SERIAL COMMUNICATIONS: 20 mA current loop, full-duplex.
   Data Format: Four types available, switch selectable.
   11 bits: 1 start bit, 8 data bits, 1 parity bit, 1 stop bit.
   10 bits: 1 start bit, 8 data bits, 1 stop bit.
   9 bits: 1 start bit, 7 data bits, 1 parity bit, 1 stop bit.
   Note: Can power up to 6 units in a loop.

   Data Code: ASCII
   Unit Address: Programmable from 0 to 99. (The number of units in a single loop is limited by the hardware specifications.)
   Baud Rate: 300 to 19200, switch selectable.
   Parity: Enable or Disabled, switch selectable.
   Even/Odd: Selects parity type, switch selectable.
   7/8 BIT: Data Bits, switch selectable.
   Serial Hardware: Terminal TBA.
   +20 mA SRC: Provides 20 mA @ 12 VDC.
   +20 mA SRC: Loop return for +20 mA SRC.
   SO/Output Transistor Rating: VMAX = 30 VDC, VSAT = 1 VDC @ 20 mA.
   Note: Transistor rating allows for up to 28 units in a loop.
   SI/Input Diode Rating: VIF = 1.25 VDC max., 5 VDC max ≤ 20 mA.
   Note: The compliance voltage rating of the source must be greater than the sum of the diode voltage drops across the loop. Typically a 30 VDC source (with adequate current capability) is capable of operating between 18 and 22 units in a loop.

5. OUTPUT/BUSY PIN:
   Solid State: NPN open collector, current sinking. VMAX = 30 VDC, ISAT = 100 mA, VSAFE = 1.5 VMAX @ 100 mA.
   Busy Mode: Indicates the Ready/Busy status of the unit.
   Output Mode: Output is activated from a Command or Message for a specified time out value.
   Time Out: 10 msec to 63 mins or Latched.

6. REAL-TIME CLOCK: Non-volatile Date and Time, accurate to ±1 minute/month.

7. MEMORY: Non-volatile memory retains all programmed Configuration, Message, and Character settings when power is removed or interrupted.
   32K: Provides space for 256 Messages of 100 bytes each while capable of storing 4 K bytes of Embedded Data.

8. ENVIRONMENTAL CONDITIONS:
   Operating Temperature: 0 to 50°C
   Storage Temperature: -20 to 60°C
   Operating and Storage Humidity: 85% max, relative humidity (non-condensing) from 0°C to 50°C
   Altitude: Up to 2000 meters

9. CERTIFICATIONS AND COMPLIANCES:
   UL Recognized Component, File#E171375
   Recognized to U.S. and Canadian requirements under the Component Recognition Program of Underwriters Laboratories, Inc.
   ELECTROMAGNETIC COMPATIBILITY
   Immunity to EN 50082-2
   Electrostatic discharge EN 61000-4-2 Level 2; 4 Kvat contact
   EN 61000-4-3 Level 3; 8 Kvat air
   Fast transients (burst) EN 61000-4-4 Level 4; 2 K VIO
   RF conducted interference EN 61000-4-6 Level 3; 10 V RMS
   Simulation of cordless telephone ENV 50924 150 KHz - 80 MHz
   Level 3; 10 V RMS
   900 MHz ± 5 MHz
   200 Hz, 50% duty cycle
   Emisions to EN 50081-2
   RF interference EN 55011 Enclosure class A
   Power mains class A

Notes:
1. Metal bezel of unit connected with ground lead from rear bezel screw to metal mounting panel.
2. For operation without loss of performance:
   I/O cables are routed in metal conduit connected to earth ground.
3. For operation without loss of performance:
   Install power line filter; RLC#FL10000 or equivalent.
   Refer to the EMC Installation Guidelines for additional information.

10. CONSTRUCTION: Metal front bezel meets NEMA 4/IP65 specifications for indoor use when properly installed. Installation Category II, Pollution Degree 2. Case is black high impact plastic (panel gasket, mounting clips and screws included).

11. CONNECTIONS: Removable terminal blocks.

12. WEIGHT: 1.1 lbs (0.5 Kg).

BASIC OPERATION

The MDI performs two basic functions: it processes Messages and executes Commands. The MDI begins processing a Message in response to a request for that Message. In processing the Message, the MDI performs the functions the user has specified for that Message. A Message may specify any combination of the following functions:

1) Display Text Locally: The MDI displays the Message Text, which can include the Current Time and Date, Elapsed Timer values, and Embedded Data items.

2) Display Text Remotely: The MDI transmits the Message Text to an RLC Message Display Slave (MDS) unit for Display.

3) Transmit Text: The MDI transmits the Message Text, which can also include ASCII control codes, over the serial port to a computer, serial printer, or ASCII terminal.

4) Configure Elapsed Timers: The Message can access one or more of the MDI’s sixteen Elapsed Timers.

5) Collect Embedded Data: The Message can collect up to fifteen Embedded Data items.

6) Configure the Output Pin: The Message can access the MDI’s Output Pin function. See the Message section for descriptions of the Message features.

A full set of Commands is available for configuring the MDI to the user’s application. Two methods are available to the user for issuing Commands to the MDI. A Command string can be issued directly over the Serial Port, or a Message can be programmed containing the desired Command string (Command Message). In this case, the MDI executes the Command when the Message containing the Command is requested.

See the Command section for descriptions of the available Commands.
Several sources are available to the user for requesting Messages. The MDI constantly monitors the following sources for pending Message requests:

1) The Serial Port: A computer, ASCII terminal, or PLC issues the request over the Serial Port.
2) The Parallel Port: A PLC, thumb-wheel switch, push-button, or relay contact issues the request over the Parallel Port.
3) A Chained Message List: The requested Message is part of a programmed Message sequence.
4) The Link Function: The requested Command Message is linked to any other Message.
5) The Periodic Function: The Message is designated for request on a regular interval.
6) The Reset Function: The Message is designated for request on Unit Power-Up or Reset.
7) The Default Function: The Message is designated for request when there is no other pending message request.
8) The Queue Function: The Message was previously requested, and placed on the Queue because a higher Priority Message was on the Display at that time.
9) An Elapsed Timer: The Message is designated for request at a predetermined Elapsed Timer value.
10) A Test Condition: The Message request is generated based on the results of an Index Embedded Data Item comparison.

PARALLEL PORT

The MDI hardware includes a Parallel Port consisting of eight Data lines and two Control lines; the Message/Data line and the Strobe line. The Message/Data line indicates whether a Message number or Embedded Data value is present on the Data lines. The Strobe line signals the MDI to read the Parallel Port.

Among the devices that can be connected to the Parallel Port are:
- Programmable Logic Controllers (PLC’s)
- BCD and Binary Thumb-wheel Switches
- Push Buttons
- Transducers w/Logic Level Outputs
- Electro-mechanical and Solid State Relays

The Parallel Port can be configured for 4, 8, or 9 bit BCD and 4 or 8 bit binary Message requests. Embedded Data can be presented in 4 or 8 bit ASCII, BCD, and binary formats. The Parallel Port Data and Control line inputs are separately DIP switch selectable for either positive or negative logic and current sinking or sourcing inputs.

The Parallel Port interface protocol is straight-forward:

1) Set the Data lines and the Message/Data line to the appropriate values.
2) Apply a Strobe pulse (programmable from 3-250 msec).
3) Allow the debounce time to expire (programmable from 10 to 2500 msec).
4) Repeat as required by the chosen Parallel Port configuration.

The Parallel Port can be configured for one of two Automatic Message Request (AMR) operation modes. Either of these modes issue automatic message requests, without need for a Strobe pulse, when the value on the Parallel Port changes.

In AMR Mode 1, Message requests are edge-triggered, based on the individual Data line values. A pair of Messages is assigned to each Parallel Port Data line. One Message is requested when its associated Data line goes to the active state, the other is executed when the Data line goes to the inactive state. In AMR Mode 2, the eight Data lines represent a Message number. The appropriate Message is requested when the 8-bit value on the Data lines changes. In either AMR mode, the Message/Data line can be used to enable and disable Automatic Message Requests. In addition, the Strobe and Debounce times can be programmed to set the noise immunity level and message request rate. A Default Message can be designated for request on any unused data lines or “don’t care” conditions. If the Default Message function is disabled, all unprogrammed combinations are ignored.

SERIAL PORT

The MDI hardware includes a full duplex Serial Port implemented as an isolated, two-way 20 mA current loop. Some typical devices that can be connected to the serial port are:
- ASCII Terminals
- Programmable Logic Controllers with Serial Communications
- Host Computers
- RLC and other Products with Serial Communications
- Serial Printers

Communication between devices must conform to identical Data Bit, Baud Rate, and Parity settings. The following operations can be performed over the Serial Port:
- Uploading and Downloading Files
- Receiving and Transmitting Message Text
- Receiving and Transmitting Commands
- Collecting and Transmitting Embedded Data
- Transmitting Error Codes

A serial hardware loop-back test can easily be performed to verify proper operation of the MDI’s Serial Port.

CONNECTING THE MDI TO AN IBM® COMPATIBLE COMPUTER

In order for the user to program Messages in the MDI, the MDI must be connected to an IBM® compatible computer running the Message Display User Software (SFMD). User-friendly menus with numerous prompts and on-line Help functions assist the user in interfacing with and programming the MDI. The SFMD software allows the user to program Configuration, Character, and Message files for the MDI and save them to disk. The user can then download these files, as needed, from the computer’s serial port to one or more MDI units on the communications loop.

The SFMD software also includes utilities for message simulation and terminal emulation.

System Requirements:
- IBM® compatible PC-AT (286 or greater) with:
  - RS232 serial port,
  - 640 K RAM, 550 K FREE
  - DOS 3.0 or later,
  - Monitor with MDA, CGA, EGA, or VGA graphics card.
  - Note: The SFMD software will not run on a PC-XT computer.

Cabling:
- RLC Model MCCA cable for programming a single unit only,
  OR
- RLC GCM232 Serial Converter Module for programming multiple units (RS232/20 mA Current Loop),
  - Serial communications cable (straight through),
  - RLC Model APS supply or equivalent (12 VDC power supply).

Message Display User Software (SFMD):
- Available on 3.5” floppy disks.
  - Note: Setup may only be performed via the serial port.

With the Message Simulator, the user can verify the proper operation of a Message or Message file on the computer screen without having to download the Message file to the MDI.

The Terminal Emulator can assist the user in verifying and testing the operation of the downloaded Message file. It can also be used to monitor and trouble-shoot serial port communications.
OUTPUT/BUSY PIN
The MDI hardware includes one NPN open-collector output pin which can be configured for positive or negative logic. The pin can be set to operate in one of two modes, the Busy Mode or the Output Mode.

Busy Mode: The MDI uses the pin in the Busy Mode to acknowledge Message requests and reception of data items. The pin is in the active state during the Busy time (while the MDI is processing a Message request or collecting Embedded Data).

Output Mode: With the pin in the Output Mode, a Message or Command can change the status of any of the following Output Pin settings:

Lock or Unlock: The MDI only accepts changes to the pin settings while the pin is Unlocked.

On, Off, or Toggle: The MDI sets the Output pin to the specified state. In the case of Toggle, the MDI switches the current state, from On to Off, or Off to On.

Set, Halt, Run Time Out: When the Output Time Out expires, the MDI automatically sets the pin to the inactive state. The Time Out can be Halted at any time. It can be resumed at a later time, or started from one of the following values:

1) 10-1260 msec.
2) 1 to 63 secs.
3) 1 to 63 mins.
4) Latched On.
5) Configuration File value.

MESSAGES
Messages make up the heart of the MDI. The user can program a Message to perform many functions. A Message can simply display text. In addition, the user can choose to have the Message collect Embedded Data, configure one or more Elapsed Timers, access the Output Pin, transmit character strings and/or text to remote locations, and display the Current Time, Elapsed Time, and more Elapsed Timers, access the Output Pin, transmit character strings and/or perform many functions. A Message can simply display text. In addition, the Message can also be programmed to perform any of the MDI’s Command functions.

MESSAGE FEATURES

<table>
<thead>
<tr>
<th>Message Destination:</th>
<th>Display</th>
<th>MDS Unit</th>
<th>Transmit</th>
<th>Display &amp; MDS Unit</th>
<th>Display &amp; Transmit</th>
<th>Command Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Time Out:</td>
<td>Immediate Time Out (0 secs)</td>
<td>10 to 1260 msecs</td>
<td>1 to 63 secs</td>
<td>1 to 63 mins</td>
<td>No time out</td>
<td></td>
</tr>
<tr>
<td>Message Priority:</td>
<td>1 to 255</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queue Message:</td>
<td>Can select Message for Queue Message Chain: Can Chain up to 32 Messages</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output Pin:</td>
<td>Access the Output Pin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Periodic Message:</td>
<td>Can designate the Message for Periodic request</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MESSAGE TEXT

| Elapsed Timers: Can access up to 16 timers |
| Embedded Data: Can collect up to 15 items |
| Update Data: Continuous Update | 10 to 1260 msecs | 1 to 63 secs | 1 to 63 mins | No Update |
| Data Types: | Local Item: Only the collecting Message can access the item. Index Item: Any Message can access the item, and Commands can operate on the item (increment, decrement, test). |
| Data Sources: | Serial Port | Parallel Port |
| Internal: any combination of the following | Elapsed Time: Capture an Elapsed Timer Value | Current Time: Capture the Current Time value |
| Indexed Item: Capture an INDEX value |
| Text: Any Text Character |

MESSAGE DESTINATION
The destination of a Message determines the manner in which the MDI processes a request for that Message. The following Message Destinations are available to the user:

Display: The MDI processes the Message and then places the Message Text on its own Display.

MDS Unit: The MDI processes the Message and then transmits the Message Text to an RLC Message Display Slave (MDS) unit.

Transmit: The MDI processes the Message and then transmits the Message Text via the Serial Port in a user definable format.

Display and MDS Unit: The MDI performs both the Display and MDS Unit functions.

Display and Transmit: The MDI performs both the Display and Transmit functions.

Command Message: The MDI executes the Command specified in the Message.

Only Messages destined for the Display can be assigned a Priority, placed on the Queue, and specify a Chained Message List. Also, a Message must be destined for the Display and/or a MDS unit in order for it to have a Time Out value.

MESSAGE TEXT

The user specifies the text format for a Message in the text area of the SFMD Message menu. In addition to any of the characters in the MDI’s character set, Message Text can include the Current Time and Date, Elapsed Timer values, and the lower ASCII control codes, such as CR and LF.

The user can select among several different scrolling techniques for each line of the text. The text can be displayed statically or can be scrolled horizontally across the screen. The user can break the text into blocks, which are displayed one after another. Also, the user can designate individual characters, blocks, and whole lines of text for blinking.

DISPLAYABLE CHARACTER SET

The MDI can display 153 different characters. The standard ASCII character set, from 20h to 7Fh comprises the first 96 characters. The remainder of the character set, from 80h to B8h, includes many European and special characters. The SFMD software allows the user to customize all 153 characters.

CURRENT DATE/TIME AND ELAPSED TIME

The Real Time Clock (RTC) in the MDI maintains the current Date and Time whether or not power is applied to the unit. The user can insert the Current Time and/or Date in the Message Text in any desired format. Also any of the Elapsed Timers can have their time fields included in the Message Text. The MDI automatically updates all currently displayed values.

Date Formats:
- Day of the Week: Full (ie. MONDAY) or Abbreviated (ie. MON).
- Day of the Month: Numeric (ie. 1-31).
- Month: Full (ie. JANUARY) or Numeric (ie. 1 = January).
- Year: Full (ie. 1993) or Abbreviated (ie. 93).

Current Time Formats:
- Civilian (12 Hour) Clock: Any combination of Hours, Minutes, Seconds, Tenths and Hundredths of seconds. The AM or PM designator may be included (ie. 4:30:50 PM).
- Military (24 Hour) Clock: Any combination of Hours, Minutes, Seconds, Tenths and Hundredths of seconds (ie. 16:30:50).
- Elapsed Time Formats: Any combination of Hours, Minutes, Seconds, Tenths and Hundredths of seconds. (ie. 97:31:25).
- Field Separators: Any character NOT used in the Date and Time fields can be used to separate the fields (ie. "- : ").

Format examples: Monday, April 26, 1993 4:30 PM
26Apr93 16:30:7
MESSAGE SCROLLING AND BLINKING

The user can designate individual lines of text for various forms of scrolling. A Message programmed for a 2x20 unit can specify separate scrolling methods for each line of the Display. The Message designates whether to scroll the text for a line, while the appropriate Configuration setting determines the rate at which the MDI scrolls the text. The user can specify separate scroll rates for the top and bottom lines of a 2x20 unit.

Character Scrolling: A line of text designated for Character scrolling repeatedly moves across the Display from right to left at the rate specified by that line's Character Scroll setting. The user can also choose to separate the text into blocks, which would then scroll across the Display separately, one after another. In this case, the user specifies the size of the blocks by inserting control codes at the desired locations in the Message Text. The MDI processes Messages for display based on their Destination, Priority, Time Out value, and type of Message request.

Message Time Out: The Message Time Out value specifies how long the MDI should display the Message. The MDI automatically cancels a Message after its remaining display time reaches zero. Messages placed on the Queue have their remaining display time frozen. The MDI resumes the Message Time Out when the Message is placed from the Queue to the Display. Messages can be set for No Time Out, in which case the Message does not Time Out. To remove the Message from the Display, it must be cancelled, or replaced by an equal or higher Priority Message.

Message Priority: The user can assign a Priority of 1 (highest) to 255 (lowest) to a Message. If the user does not require a Prioritized Message scheme, the SFMD software automatically assigns each programmed Message a default Priority of 1, and the MDI processes all Messages on an equal basis. The MDI compares the Priority of the newly requested Message with that of the Message on the Display to determine which Message to display. In this scheme, the MDI always places an equal or higher Priority requested Message on the Display. If the Message Queue function is enabled and the lower Priority Message is designated for the Queue, the MDI positions the Message on the Queue based on its Priority. Otherwise, the MDI discards the Message. (See the Message Queue section).

Immediate Message Request: A user can request any Message while overriding its programmed Priority. In this case, the MDI immediately places the requested Message on the Display. The Message, however, reverts to its assigned Priority once having been placed on the Display.

Temporary Message Request: It is also possible to place a Temporary Message on the Display. In this case, the actual Message text is transmitted to the MDI via the Serial Port, and the MDI immediately places the Message Text on the Display. A Temporary Message has no Priority and the MDI replaces the Temporary Message with any subsequently requested Message destined for the Display.

MESSAGE CHAINING

The user can specify up to thirty-two Messages in a Chained Message list. When processing a Message Chain, the MDI automatically requests the next Message in the Chain list after the previous Message expires or is cancelled. The Priority of a Message Chain is the Priority of the Message specifying the Chain. Message Chains are useful for performing programmed sequences of Message and Commands. Message Chains can also loop back to any point in the Message Chain list, providing the user with a means for programming a repetitive sequence or loop of Messages and Commands.

EMBEDDED DATA FEATURES

A Message can collect up to fifteen Embedded Data (ED) Items. An ED Item can originate from any of the following sources:

The Serial Port: The data is received as an ASCII character string over the Serial Port.

The Parallel Port: The data is received in ASCII, BCD, or Binary formats, as specified by the user, over the Parallel Port.

MDI Internal Data: The data consists of any combination of the Current Time/Date, Elapsed Timer values, Indexed Data Items, and/or character strings, as specified by the user. On the SDI, data can be selected from any one of the following ED types:

Local: Only the Message collecting a Local ED item can display that item. The MDI deletes the data when the Message Times Out or when the Message is removed from the Queue.

Indexed: The MDI stores the data in one of 96 Indexed locations, as specified by the user. Any Message can then update and/or display the data. In addition, Indexed data items can be incremented, decremented, and have comparison tests performed upon them, resulting in conditional message requests (See the Commands and Command Messages section).

Data can be collected from any combination of sources and both Local and Indexed items can be collected in the same Message. The user specifies the order in which the MDI should collect the data. The MDI collects all Local and Indexed items before collecting any Indexed items.

Serial Port Embedded Data Features:

- Transmit Request: The MDI issues the programmed character string (up to 127 characters) before collecting the data. This feature is useful for requesting data transmissions from serial units.
- Data Length: Up to 128 characters, including the string terminator.
- Data Time Out: The time the MDI waits to receive the data.
- Immediate: The MDI does not wait for any data.
- 1 to 254 secs: In 1 second increments.
- Indefinite: The MDI waits indefinitely until it receives data.
- Data Terminator: The character indicating the end of the data.
- 0 to 7, 9 to 26, 28 to 255 decimal.
- Leading Zero Blanking or Suppression.
- Data Formatting: Any combination of characters can be kept or deleted after the data is collected.

Update Data: Each item can be updated while on the Display.
- Continuous: The MDI updates the data as fast as possible.
- 10 to 1260 msecs: In 10 millisecond increments.
- 1 to 63 seconds: In 1 second increments.
- 1 to 63 minutes: In 1 minute increments.
- No Update: The MDI does not update the data.

Parallel Port Embedded Data Features:

- Transmit Request: The MDI issues the programmed character string (up to 127 characters) before collecting the data. This feature is useful for logging unit activity on a serial printer or ASCII terminal.
- Data Type and Length:
  - ASCII: Up to 23 characters.
  - BCD: Up to 22 digits.
  - Binary: Up to two bytes (16 bits, max value 65535).
- Data Time Out: The time the MDI waits to receive the data.
- Immediate: The MDI does not wait for any data.
- 1 to 254 secs: In 1 second increments.
- Indefinite: The MDI waits indefinitely until it receives data.
- Leading Zero Blanking or Suppression.
- Data Formatting: Any combination of characters can be kept or deleted after the data is collected.

Update Data: Each item can be updated while on the Display.
- Continuous: The MDI updates the data as fast as possible.
- 10 to 1260 msecs: In 10 millisecond increments.
- 1 to 63 seconds: In 1 second increments.
- 1 to 63 minutes: In 1 minute increments.
- No Update: The MDI does not update the data.
ELAPSED TIMERS

The MDI has sixteen independent Elapsed Timers. The Elapsed Timer functions can be accessed through both Messages and Commands. The MDI configures the designated Elapsed Timers to the settings of the requested Message. Commands and Command Messages can also be issued to access any of the Elapsed Timer functions.

The user can display the value of an Elapsed Timer in any desired format. The MDI constantly updates all displayed Elapsed Timer values.

The following features are available for the Elapsed Timers:

**Disposition:**
- On every unit Power-Up and Reset, the MDI configures each Elapsed Timer based on the Timer’s Disposition setting.

**Save:**
- The MDI maintains the timer configuration on Power-Down or Reset (i.e., if the Timer was running when the MDI powered-down, the timer will continue to run when power is restored to the unit).

**Clear:**
- The MDI resets the Timer configuration to the default settings on Power-Down or Reset (i.e., the MDI halts and clears the timer on Power-Up).

**Timer Status:**
- Each Timer can be individually running or halted.

**Timer Direction:**
- Each Timer can run Up or Down. The direction of the Timer can be changed without stopping or resetting the Timer.

**Timer Value:**
- The Timer can be set to any value within the range from 0000:00:00:00:00:00 to 9999:59:59:99.

**Timer Overflow/Underflow:**
- The Timer value rolls-over on Overflow or Underflow. A user resettable flag indicates the event.

**Trigger Status:**
- Enables and disables the Trigger function for a Timer. With the Trigger function enabled, the MDI automatically requests the assigned Trigger Message when the Timer reaches its Trigger value.

**Trigger Type:**
- **One-Shot:** With the Trigger enabled, once the Timer reaches its Trigger value, the MDI requests the Trigger Message and then disables the Trigger function. The Timer continues to run and the Timer value is unaffected.

**Retrigger:**
- With the Trigger enabled, once the Timer reaches its Trigger value, the MDI requests the Trigger Message, resets the Timer value to zero, and re-enables the Trigger function. The Timer continues to run. This feature is useful for generating automatic Message requests on a repetitive basis.

**Trigger Value:**
- The Trigger value can be set to any value in the range from 0000:00:00:00:00:00 to 9999:59:59:99.

**Trigger Message:**
- With the Trigger function enabled, the MDI requests the Trigger Message when the Timer value reaches the Trigger value. The Trigger Message can be any programmed Message.

PERIODIC MESSAGE FUNCTION

The Periodic function enables the user to specify up to 32 Messages for automatic request on a Periodic basis. Any programmed Message can be assigned to the Periodic function. The user can enable or disable the Periodic function in the Configuration file. Also, individual Periodic entries can be enabled, disabled, turned On, and turned Off.

The MDI monitors two parameters when processing the Periodic function: the Activation Time and the Periodic Interval. The Activation Time of a Periodic entry indicates the next time the MDI should request the Message for that entry. The Periodic Interval specifies how frequently the MDI should request the Message. Once the Current Time reaches the Activation Time, the MDI requests the Message and then advances the Activation Time by one Interval.

The Activation Time is specified as a Time and Date and can be set to any time in the future with one minute precision. The available Interval types are listed below:

- Seconds: 1 to 5, 10, 15, 20, or 30
- Minutes: 1 to 99
- Hours: 1 to 99
- Days: 1 to 99 (weeks 1 to 14)
- Months: 1 to 99 (years 1 to 8)
- Semi-Monthly: 15th and 30th/31st of the month
- Day-of-Month: 1st, 2nd, 3rd, 4th, Last Sunday to Saturday of month
- End-of-Month: 28, 29, 30, or 31
- End-of-Quarter: 28, 29, 30, or 31
- One Time Activation

MESSAGE QUEUE FUNCTION

The Message Queue is a holding area for requested Messages while the Display is occupied with a higher Priority Message. When enabled, the Queue function causes the MDI to keep a lower Priority requested Message. It can hold up to 32 requested Messages.

The configuration setting enables and disables the Message Queue function. With the function enabled, an equal or higher Priority requested Message is always displayed, while a lower Priority Message is always discarded. If a prioritized Message scheme is not desired, the user should simply allow the SFMD software to assign the default Priority of 1 to all the programmed Messages. In this case, the most recently requested Message is always placed on the Display.

The user can select individual Messages for placement on the Queue. Messages so designated are positioned on the Queue based on their individual Priorities. Messages not designated for the Queue are discarded when they can not be displayed.

Messages destined for an MDS Unit or transmission via the Serial Port are processed when requested and then discarded. These Messages have no Priority or Time Out value assigned and are never placed on the Display or the Queue.

DEFAULT MESSAGE FUNCTION

The user can designate any programmed Message as the Default Message. With the Default function enabled, the MDI automatically requests the Default Message when the Display is empty.

RESET MESSAGE FUNCTION

The user can designate any programmed Message as the Reset Message. With the Reset Message function enabled, the MDI automatically requests the Reset Message on unit Power-Up and Reset. The Reset Message function is useful for performing customized start-up and initialization procedures.
COMANDS AND COMMAND MESSAGES

A full set of Commands is available to the user for both configuring and interrogating the MDI. It is possible for the user to program any Command string as a Message, resulting in a Command Message. The MDI executes the specified Command when the command message is requested. A Command Message can be executed from any of the Message request sources. A Command string must be transmitted to the MDI over the serial port.

Commands are available for changing the configuration settings of the MDI on-line. Consequently, the MDI can be programmed to adapt itself to changing system requirements and demands. Commands can also cause the MDI to transmit any of its current configuration settings over the serial port in an easy to read mnemonic format.

Commands are provided for configuring and interrogating the Elapsed Timers and the Output Pin. Indexed data items can be programmed, interrogated, incremented, decremented, and tested using commands.

Certain Commands can request specific Messages on the Queue to be displayed, transmitted, or cancelled based on their Priority, Message number, or Queue position. Commands can also transmit Temporary Message text to the MDI as well as cause the MDI to transmit the text of any Message on its Display or in its Queue.

It is possible to communicate with other units downstream of the MDI and to have the MDI automatically configure other units on the loop with the appropriate Commands.

SELF-TEST FEATURES

With the appropriate DIP-switch settings applied at unit Power-Up, the user can have the MDI perform any of the following functions:

- Display the Hardware Configuration Setup
- Display the Configuration Parameter Settings
- Display the Parallel Port Configuration and Pin Values
- Perform a Serial Loop-Back Test
- Perform a Memory Self Test
- Perform a Real Time Clock Self-Test
- Restore the Default Factory Settings

CONFIGURATION SETTINGS

The various Configuration settings of the MDI determine the method in which the unit processes and displays Messages. These Configuration settings include the Function settings for the unit, its communications parameters for the Serial Port and the Parallel Port, and the Output/Busy pin and Display settings.

APPLICATION #1

A customer is installing a system and would like to display Messages for the operator when certain conditions exist, within a PLC based system. An MDI unit is installed in the system to satisfy the need. The PLC is wired to the MDI to request specific Messages which aid the operator in system operation.

The parallel port of the MDI is wired to the PLC. The parallel port is configured to accept data in BCD format. When the PLC detects a certain condition, it requests a specific Message for that condition via the parallel port.

Messages can be programmed to time out, be placed on the Queue for later review, or start a Chain Message if desired. The Message priority feature can be used to assure that the most important Messages are put on the display and processed by the MDI.

All Messages and Configuration Settings are programmed on an IBM compatible computer using the Message Display User Software (SFMD). The Configuration settings can be programmed in the Configuration menu of the Message Display User Software. A programmed Configuration file can be downloaded to one or more MDI’s over the serial port. It is also possible to change individual settings in an MDI through the use of Commands or Command Messages. The Terminal Emulator mode of the SFMD software can be used to issue commands to an MDI.

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Messages can be programmed to time out, be placed on the Queue for later review, or start a Chain Message if desired. The Message priority feature can be used to assure that the most important Messages are put on the display and processed by the MDI.

All Messages and Configuration Settings are programmed on an IBM compatible computer using the Message Display User Software (SFMD). The Message and Configuration files are then downloaded to the MDI via the serial port. The link between the computer and the MDI is conveniently established using the MCCA programming cable. After the files are downloaded, the MDI is ready to interface to the PLC via the parallel port.
A customer would like to monitor several process variables at one location. At various stages of the process, the MDI will display the process data for the operator. If a critical condition develops, the MDI will display that condition, as well as the suspected cause.

A TCU is used to monitor and control the heating of the process. An IMH is used to monitor the status of the heating element and an IMI to monitor the speed of the process.

Messages will display the information that is pertinent during the start-up of the process. Messages are programmed to take into account all the various conditions the process may incur. The parallel port is configured for AMR Mode 1 for Message requests over the parallel port.

The TCU, IMH, and IMI are set-up to activate their alarm outputs in the event of an error condition. Each output is tied to a separate data pin on the parallel port of the MDI. The MDI will automatically request a specific Message from the parallel port when a level change occurs.

**EXAMPLE:** The TCU’s alarm output 1 is tied to data line 1. In the event of a high temperature condition, alarm output 1 closes. The MDI monitors Data line 1 for a logic level change. Data line 1 has two message numbers attached to it, Message #1 for the Active logic level and Message #11 for the Inactive logic level. The MDI requests Message #1 when the Data line undergoes an Inactive-to-Active transition and informs the operator of a high temperature condition and the time it occurred. Message #11 is requested when the Data line undergoes an Active-to-Inactive transition and indicates that the temperature condition was corrected and the time of correction.

When the operator presses a switch to start the process, the start-up Messages are requested. This switch is connected to one of the MDI’s parallel port data lines. Messages can also be requested and monitored via the serial port, which is connected to the office computer.

All Messages and Configuration Settings are programmed on an IBM® compatible computer using the Message Display Software SFMD. The Message and Configuration files are then downloaded to the MDI via the serial port. The serial link between the computer and the MDI is conveniently established using the MCCA programming cable. After the files are downloaded, the MDI is ready to interface with the system.

---

**ORDERING INFORMATION MDI**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBERS FOR AVAILABLE SUPPLY VOLTAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDI</td>
<td>1X10 Red, Negative Image</td>
<td>12/24 VDC: MDI1R11D, 115/230 VAC: MDI1R11A</td>
</tr>
<tr>
<td>MDI</td>
<td>1X10 Yel-Grn, Negative Image</td>
<td>12/24 VDC: MDI1Y11D, 115/230 VAC: MDI1Y11A</td>
</tr>
<tr>
<td>MDI</td>
<td>1X10 Yel-Grn, Positive Image</td>
<td>12/24 VDC: MDI3Y11D, 115/230 VAC: MDI3Y11A</td>
</tr>
<tr>
<td>MDI</td>
<td>2X20 Red, Negative Image</td>
<td>12/24 VDC: MDI2R11D, 115/230 VAC: MDI2R11A</td>
</tr>
<tr>
<td>MDI</td>
<td>2X20 Yel-Grn, Negative Image</td>
<td>12/24 VDC: MDI2Y11D, 115/230 VAC: MDI2Y11A</td>
</tr>
<tr>
<td>MDI</td>
<td>2X20 Tri-Color, Negative Image</td>
<td>12/24 VDC: MDI2T11D, 115/230 VAC: MDI2T11A</td>
</tr>
</tbody>
</table>

* Check availability with factory.

For more information on Pricing, Enclosures & Panel Mount Kits refer to the RLC Catalog or contact your local RLC distributor.

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**ORDERING INFORMATION FOR MESSAGE DISPLAY ACCESSORIES**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFMD</td>
<td>Apollo Message Display User Software (3 1/2&quot;, 1.44 M)</td>
<td>SFMD0</td>
</tr>
<tr>
<td>APS01</td>
<td>+12 VDC Unregulated Power Supply, 115 VAC</td>
<td>APS01000</td>
</tr>
<tr>
<td>APS02</td>
<td>+12 VDC Unregulated Power Supply, 230 VAC</td>
<td>APS02000</td>
</tr>
<tr>
<td>MCCA</td>
<td>AC Communications Adapter</td>
<td>MCCA0000</td>
</tr>
<tr>
<td>MCCA</td>
<td>DC Communications Adapter</td>
<td>MCCA1000</td>
</tr>
<tr>
<td>GCM232</td>
<td>Serial Converter Module RS-232</td>
<td>GCM23201</td>
</tr>
</tbody>
</table>

*Note: Only one copy of software is required for multiple units.*
IMPORTANT PRODUCT OBSOLESCENCE NOTICE

The time has come to discontinue a few of our older products due to part availability. The recommended alternative product will offer the customer a better solution than the existing product. Certain products have no listed replacements due to technological advancements. The actual discontinuation date is controlled by raw material inventories and future sales. If you have a customer using any of these products, please contact and advise them of the situation. As always, Red Lion will assist the customer as much as possible in the changeover process.

<table>
<thead>
<tr>
<th>DISCONTINUED PART/MODEL NUMBERS</th>
<th>DESCRIPTION</th>
<th>STATUS</th>
<th>ALTERNATIVE PRODUCT OFFERINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFCx0000</td>
<td>Current to Frequency Converter</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>CL1000x0</td>
<td>2 x 20 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>CL2000x0</td>
</tr>
<tr>
<td>CUBID001</td>
<td>CUB2 DC Current Meter, 5 VDC</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>CUBID002</td>
<td>CUB2 DC Current Meter, 7 to 28 VDC</td>
<td>Discontinued as parts are depleted</td>
<td>CUB40000</td>
</tr>
<tr>
<td>CUBVD001</td>
<td>CUB2 DC Volt Meter, 5 VDC</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>CUBVD002</td>
<td>CUB2 DC Volt Meter, 7 to 28 VDC</td>
<td>Discontinued as parts are depleted.</td>
<td>CUB4Y0000</td>
</tr>
<tr>
<td>CX1000x0</td>
<td>2 x 20 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G303x000</td>
</tr>
<tr>
<td>CX1500x0</td>
<td>2 x 40 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G303x000</td>
</tr>
<tr>
<td>GL3000x0</td>
<td>256 x 128 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G306C000</td>
</tr>
<tr>
<td>GL3000x0</td>
<td>256 x 128 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G306C000</td>
</tr>
<tr>
<td>LPP10000</td>
<td>Loop Powered Process Meter</td>
<td>Discontinued as parts are depleted.</td>
<td>CUB4LP00</td>
</tr>
<tr>
<td>VFCx0000</td>
<td>Voltage to Frequency Converter</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>VX500S00</td>
<td>640 x 480 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G308C000</td>
</tr>
<tr>
<td>VX500T50</td>
<td>640 x 480 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G308C000</td>
</tr>
<tr>
<td>VX550S00</td>
<td>640 x 480 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G308C000</td>
</tr>
</tbody>
</table>
**DESCRIPTION**

The Paradigm operator interface Model GL300 was designed to meet the industrial demands of application power, versatility, reliability, and ease of use. The GL300 has provision, common to all Paradigm Family products, allowing for future product upgrades as new options and capabilities are developed.

**SAFETY SUMMARY**

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so, can be potentially harmful to persons or equipment in the event of a fault to the unit.

The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

**SPECIFICATIONS**

1. **POWER REQUIREMENTS:** 11 to 30 VDC @ 4.8 W
   Power Up Current: 2.5 A for 1 msec max.
   Must use a Class 2 or SELV rated power supply.
2. **DISPLAY:** 256 x 128 pixel monochrome display with cold cathode backlight.
   Automatic temperature compensation. Text formats up to 16 x 40 characters.
3. **KEYPAD:** 4 screen legendable soft keys, raise, lower, next, previous, exit, menu, alarms and mute keys are all embossed and have tactile feedback.
4. **MEMORY:** 256K (192K user) battery backed RAM (Battery life expectancy 3 years 50/50 on/off cycle). Optional expansion to 768K (704K user).
5. **ENVIRONMENTAL CONDITIONS:**
   - Operating Temperature: 0 to 40°C
   - Storage Temperature: -20 to 80°C
   - Operating and Storage Humidity: 20 to 80% max. RH (non-condensing) from 0°C to 40°C.
   - Altitude: Up to 2000 meters
6. **PHYSICAL DIMENSIONS:** L = 8.11” (206 mm), H = 6.38” (162 mm), D = 2.64” (67 mm).
7. **CONSTRUCTION:** Steel rear metal enclosure with NEMA 4/IP65 aluminum front plate when correctly fitted with the gasket provided. This unit is rated for NEMA 4/IP65 indoor use. Installation Category II, Pollution Degree 2
8. **MOUNTING REQUIREMENTS:** Max. panel thickness is 0.375” (9.5 mm)
   For NEMA 4/IP65 scaling, a steel panel with a minimum thickness of 0.125” (3.175 mm) is recommended.

**DIMENSIONS In inches (mm)**

![Dimension Diagram]
COMMON FEATURES FOR GRAPHIC BASED OPERATOR TERMINALS

PROGRAMMABILITY
Event Driven Configuration Tool
Edict 97, an extremely powerful Windows 95/3.11 based software program, provides for the intuitive configuration of every aspect of the operator interface’s behavior. The requirement for time consuming PLC ladder logic is drastically reduced by the unique event driven approach of EDICT 97. The capability of this program, in conjunction with the PLC and the Paradigm operator interface unit, ensures a great deal of advanced functionality for your system. This powerful PLC/Paradigm system provides many of the capabilities and features normally associated with the more complicated and costly PC/SCADA systems. Display pages are easily generated, including PLC and internal variables, text strings, or bar charts. All dynamic elements are available as alarms, recipes, triggers, and reports for the run time software. After completion of the programming, the program is directly downloaded to the operator interface from your PC, without any compiling or saving requirement.

For operation without loss of performance:
I/O cables are routed in metal conduit connected to earth ground.

DYNAMIC DISPLAY PAGE ELEMENTS
Each display page has provisions to show static and dynamic information, including data variables, text messages, time, and date.

Data Variables can be either PLC derived or internally generated, either in data entry or display only mode. The Paradigm unit has an extremely powerful math capability, allowing the operator to manipulate the variables to meet the specific application’s demands. If required, the display can be formatted to BCD, binary, hex, floating point, and string. Upper and lower limits of data entry variables are fully supported and password protected.

Text Message Animation enables several different types of animated text from a local or global message table to be displayed. The message displayed is dependent on the condition of the particular controlling expression. The controlling expression may be a PLC bit level, a timer value, preset counter condition, or any one of a wide variety of message triggers.

Time and Date in the Paradigm unit has the capability to display in any combination of year, month, day, hours, minutes, and seconds.

Bar Graphs in horizontal format are easily attached to data variables. The partial or full length bar graph displays can be scaled and offset to optimize the required display effect.

SECURITY
The password protection scheme provides the ultimate in tamper-proof capability. Access can be limited on a unit, page, recipe, or even individual data entries.

ALARMS
The Paradigm unit can monitor and log up to 500 alarms. Such triggers as a simple bit level transition, a PLC coil activation, or a complex application algorithm can activate an alarm. The alarms can be time and date stamped, with an automatic screen display and/or downloading to a printer for hard copy recording purposes.

RECIPE HANDLING
Recipe handling in the Paradigm Operator Interfaces can be tailored to your requirements. Using the “Data Files” section of Named Data, one can set up arrays with meaningful titles, and select, edit, and maintain, recipe data up to 8000 elements per file. In conjunction with User Programs, and the flexible data displays, the operator can select desired recipe, by number or by title, and either upload from, or download to, the target system. All the functions of EDICT97 are available, so the programmer can password protect the editing of the recipes and allow for the transfer of data from a host system.

REAL TIME SCHEDULE
Real time schedule allows for repetitive or one time task to take place in the system. Typically a schedule action similar to...At 1:55 PM on Monday, Wednesday, and Friday print the production report...is required in the application. In conjunction with the recipe capabilities, a downloading of a special recipe can be requested by the real time schedule feature.

USER PROGRAMS
This feature offers the user the ability to incorporate custom application requirements via a powerful program language. For example, a program designated “Calculate Volume” which determines the amount of fluid in a round tank at specific temperatures could be created. This program would be triggered to run and display each time the page denoted as “Volume Now” is requested. The ability to customize to your applications specialized needs is easily solved with the user program capability.

KEYBOARD EDITING
All the interface keys can be programmed to perform virtually unlimited functions with each key, having multiple actions assigned to three types of key events: key pressed, key held down (auto repeat), and key released. Typical key actions would be Gotopage, set value, load recipe, view alarms, print report, and many more.
COMMUNICATIONS
With over 70 communication drivers available, the Paradigm operator interface offers a wide range of connectivity including: PLCs, Variable Speed Drives, Temperature Controllers, Bar Code Readers, etc. Utilizing real PLC data references, the automatic connms configuration optimizes the system’s communication performance. In the event that your specific driver does not appear on the Paradigm drivers list, let us know, as this list is always being expanded to meet our customers’ needs.

GRAPHIC UNITS
In addition to all the features of the character-based units, the GL and GX will provide exceptional value in displaying trend graphs, process schematics and flow, and others, limited only by the imagination of the designer. The programmer can use the built-in standard symbols, or construct them. A sequence of graphical symbols can be assigned to a PLC location, and the powerful software will step through the sequence without the necessity of programming multiple expressions for each bitmap. Some of the inherent features of the Graphical Display units:

- Data Logging
- Process symbols, such as tanks, valves, etc.
- Extraordinary color displays on the VX-500 and VX-550.
- Memory expansion is field-upgradeable.
- Plus all the functions available in EDICT 97, the powerful event driven configuration tool that allows one to configure a system to do what is needed.

ANIMATED GRAPHICS
Graphical pages are constructed using both bitmaps and object graphics. Animation items such as tending, tank filling, horizontal and vertical bar graphs, valves, etc., make your display pages aesthetically pleasing as well as informative to the operator.

HARDWARE INFORMATION
This bulletin contains a variety of information related to the installation and operation of the Operator Interface supplied. Ideally, you should read this document thoroughly before attempting to use the equipment. For information about the software aspects of the terminal, please consult other documentation.

CONTENTS OF PACKAGE
The Operator Interface is supplied in a packaging box containing the following...
- The interface terminal itself.
- A NEMA 4/IP65 rated mounting gasket.
- A bag containing panel hardware.
- This hardware bulletin.
- If any of these items is missing, please contact your supplier immediately.

POWER SUPPLY REQUIREMENTS
The Operator Interface requires a 11-30 VDC power supply rated at 4.8 W unless otherwise stated on the label.
- The terminal may take as little as 100 mA in certain circumstances, so be sure that the chosen power supply can operate correctly with this load. Large switch-mode supplies tend to need a certain minimum load before they will operate correctly.
- In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. A very high proportion of reported problems are caused by incorrect power supply installation, so please take care to observe the following points...
- The power supply must be mounted close to the unit, with usually not more than 6 feet of cable between the supply and the Operator Interface. Ideally, as short a length as is possible should be used.
- The wire used to connect the Operator Interface’s power supply should be of at least 22 gage wire. If a longer cable run is used, you should use heavier gage wire. The routing of the cable should be kept away from large contacts, inverters and other devices which may generate significant electrical noise.

BATTERY BACKUP ISSUES
The Operator Interface is supplied with a Lithium Battery designed to maintain the internal memory and real-time clock during power outages. Assuming the operator interface terminal is powered up for 50% of the time, this battery should last over 4 years. A “Battery Low” system variable is available so that the programmer can choose specific action(s) to occur when the battery voltage drops below its nominal voltage.

It is possible to replace the battery without losing the contents of the Operator Interface’s memory, but this does not reduce the importance of ensuring that a copy of the terminal’s configuration is kept readily at hand to allow the terminal to be re-loaded in the case of mishaps. Please remember that although an image of the database contents can be uploaded, this file is not editable, so the importance of keeping a copy on disk cannot be over stressed.

CHANGING THE BATTERY
To change the internal battery, follow these steps...
- Remove the power and PLC communications connector from the unit.
- Remove the four screws from the rear-cover, and remove the rear cover.
- If you wish to avoid losing the terminal’s configuration, reconnect the power connector and re-apply power. Note that this will require the panel to be powered-up and, as such, only suitably qualified staff should carry out this procedure.
- The battery is located in a holder on the main circuit board. This should be clearly visible. Remove the battery from its holder.
- Place the new battery in the holder. The terminal’s power supply can now be disconnected, if you re-applied power in the step above.
- Replace the lid, screws and connector by following the above procedure in reverse. You may like to make a note of the date the battery was replaced to allow planned maintenance to be carried out.
- If you did not keep the unit powered-up during battery replacement, hold down theEXIT and MUTE keys on the keyboard and cycle power. Release the keys and follow the menu guides to clear the memory. This unit is now ready for a configuration database to be reloaded.

Please note that the old battery must be disposed of in a manner which complies with your local waste regulations. Also, the battery must not be disposed of in fire or in a manner whereby it may be damaged and its contents come into contact with human skin.
INSTALLATION & CONNECTIONS

The unit meets NEMA 4/IP65 requirements for indoor use, when properly installed. The units are intended to be mounted into an enclosed panel.

![Attention](image)

The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

INSTALLATION ENVIRONMENT

The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

Continuous exposure to direct sunlight may accelerate the aging process of the bezel. The bezel should be cleaned only with a soft cloth and neutral soap product. Do NOT use solvents.

Do not use tools of any kind (screwdrivers, pens, pencils, etc.) to operate the keypad of the unit.

MOUNTING INSTRUCTIONS

The Operator Interfaces are designed for through-panel mounting. A neoprene gasket is provided, to enable sealing to NEMA 4/IP65 specification. The panel cut-out diagram for the model supplied is provided. All mounting holes should be drilled for 0.14" (3.5 mm) clearance. Care should be taken to remove any loose material from the mounting hole to avoid such metal falling into the Operator Interface itself during installation.

CONNECTING TO A PLC

The Operator Interface is designed to operate with a PLC. A serial communication connection must be made between the operator interface terminal and PLC, and the details of this connection vary according to which PLC is used.

The following section lists the connection details for the PLC to be used.

PLC TYPE

Details on how to connect to most PLCs are available on request from RLC.

CONNECTING TO AN IBM® PC/AT

The Operator Interface is programmed via software running on an IBM PC/AT or a compatible computer. The connection between the PC/AT and the operator interface terminal is made via a custom cable provided with the EDICT Developer’s Kit. The cable is designed for a 9-way serial port. Please contact your supplier if you require a 25-way version.

PROGRAMMING PORT PIN OUT

The Operator Interface’s programming port is sometimes used to connect other RS-232 devices, such as printers. The following illustration and table gives the pin-out of this port to enable such connections to be made.

<table>
<thead>
<tr>
<th>RJ11 FEMALE</th>
<th>PIN</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RTS</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Tx</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Rx</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>CTS</td>
<td></td>
</tr>
</tbody>
</table>

The above table denotes the pin names of the programming port. When connecting, the pin name at the programming port is connected to the opposite of that pin name at the destination device.

TROUBLESHOOTING

For further technical assistance, contact technical support at the appropriate company numbers listed.
## Important Product Obsolescence Notice

The time has come to discontinue a few of our older products due to part availability. The recommended alternative product will offer the customer a better solution than the existing product. Certain products have no listed replacements due to technological advancements. The actual discontinuation date is controlled by raw material inventories and future sales. If you have a customer using any of these products, please contact and advise them of the situation. As always, Red Lion will assist the customer as much as possible in the changeover process.

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<tr>
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<th>DESCRIPTION</th>
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</tr>
</thead>
<tbody>
<tr>
<td>CFCx0000</td>
<td>Current to Frequency Converter</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>CL1000x0</td>
<td>2 x 20 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>CL2000x0</td>
</tr>
<tr>
<td>CUBID001</td>
<td>CUB2 DC Current Meter, 5 VDC</td>
<td>Discontinued as parts are depleted</td>
<td>None</td>
</tr>
<tr>
<td>CUBID002</td>
<td>CUB2 DC Current Meter, 7 to 28 VDC</td>
<td>Discontinued as parts are depleted</td>
<td>CUB40000</td>
</tr>
<tr>
<td>CUBVD001</td>
<td>CUB2 DC Volt Meter, 5 VDC</td>
<td>Discontinued as parts are depleted</td>
<td>None</td>
</tr>
<tr>
<td>CUBVD002</td>
<td>CUB2 DC Volt Meter, 7 to 28 VDC</td>
<td>Discontinued as parts are depleted</td>
<td>CUB4V000</td>
</tr>
<tr>
<td>CX1000x0</td>
<td>2 x 20 Operator Interface</td>
<td>Discontinued as parts are depleted</td>
<td>G305x000</td>
</tr>
<tr>
<td>CX1500x0</td>
<td>2 x 40 Operator Interface</td>
<td>Discontinued as parts are depleted</td>
<td>G305x000</td>
</tr>
<tr>
<td>GL3000x0</td>
<td>256 x 128 Operator Interface</td>
<td>Discontinued as parts are depleted</td>
<td>G305C000</td>
</tr>
<tr>
<td>GL300T0x</td>
<td>256 x 128 Operator Interface</td>
<td>Discontinued as parts are depleted</td>
<td>G306C000</td>
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<td>GL3500x0</td>
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<tr>
<td>LPP10000</td>
<td>Loop Powered Process Meter</td>
<td>Discontinued as parts are depleted</td>
<td>CUB4LP000</td>
</tr>
<tr>
<td>VFCx0000</td>
<td>Voltage to Frequency Converter</td>
<td>Discontinued as parts are depleted</td>
<td>None</td>
</tr>
<tr>
<td>VX500S00</td>
<td>640 x 480 Operator Interface</td>
<td>Discontinued as parts are depleted</td>
<td>G308C000</td>
</tr>
<tr>
<td>VX500TS0</td>
<td>640 x 480 Operator Interface</td>
<td>Discontinued as parts are depleted</td>
<td>G308C000</td>
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<tr>
<td>VX550S00</td>
<td>640 x 480 Operator Interface</td>
<td>Discontinued as parts are depleted</td>
<td>G308C000</td>
</tr>
</tbody>
</table>
MODEL GL300T - MONOCHROME TOUCHSCREEN OPERATOR INTERFACE

DESCRIPTION
Model GL300T Operator Terminal combines unique capabilities normally expected only from expensive SCADA packages, with dramatic ease of use. The GL300T is configured using the same powerful EDICT 97 Software as all Red Lion Paradigm Operator Interfaces. The results are savings in time to get challenging applications up and running, and frequent savings in hardware costs due to replacing many functions usually performed in separate expensive devices.

SAFETY SUMMARY
All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the unit.

GENERAL SPECIFICATIONS
1. POWER REQUIREMENTS: 11 to 30 VDC @ 5.25 W
   Power Up Current: 2.5 A for 1 msec max.
   Must use a Class 2 or SELV rated power supply.
2. DISPLAY: 256 x 128 pixel full graphic display with cold cathode backlight.
   Text formats up to 16 x 40 characters.
3. MEMORY: 768K (704K user) battery backed RAM (Battery life expectancy 3 years 50/50 on/off cycle).
4. TOUCHSCREEN: Continuous resistive touch screen interface specified for up to 5 million operations. 200 X 200 touch cells
5. ENVIRONMENTAL CONDITIONS:
   Operating Temperature: 0 to 50°C
   Storage Temperature: -20 to 60°C
   Operating and Storage Humidity: 20 to 80% max. RH (non-condensing) from 0°C to 50°C.
   Altitude: Up to 2000 meters
6. MOUNTING REQUIREMENTS: Max. panel thickness is 0.375” (9.5 mm).
   For NEMA 4/IP65 sealing, a steel panel with a minimum thickness of 0.125” (3.175 mm) is recommended

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>GL300T00</td>
<td>GL300T</td>
<td>256 X 128 CCFL, w/touchscreen, 768 K memory</td>
</tr>
<tr>
<td>SFEDT</td>
<td>EDICT-97 Development Kit. Includes Software, Manual and 9-pin RS232 Programming cables</td>
<td></td>
</tr>
<tr>
<td>P895xxxxZ</td>
<td>Communication Cables</td>
<td></td>
</tr>
<tr>
<td>BAL3R0D4</td>
<td>Battery Replacement</td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS In inches (mm)

CAUTION: Read complete instructions prior to installation and operation of the unit.
**PROGRAMMABILITY**

Event Driven Configuration Tool

Edict 97, an extremely powerful Windows® 95/3.11 based software program, provides for the intuitive configuration of every aspect of the operator interface’s behavior. The requirement for time consuming PLC ladder logic is drastically reduced by the unique event driven approach of EDICT 97. The capability of this program, in conjunction with the PLC and the Paradigm operator interface unit, ensures a great deal of advanced functionality for your system. This powerful PLC/Paradigm system provides many of the capabilities and features normally associated with the more complicated and costly PC/SCADA systems. Display pages are easily generated, including PLC and internal variables, text strings, or bar charts. All dynamic elements are also available as alarms, recipes, triggers, and reports for the run time software. After completion of the programming, the program is directly downloaded to the operator interface from your PC, without any compiling or saving requirement. When you require a change in your program, EDICT 97 loads only the change, not the entire program, saving valuable on-line time.

**DYNAMIC DISPLAY PAGE ELEMENTS**

Each display page has provisions to show static and dynamic information, including data variables, text messages, time, and date.

*Data Variables* can be either PLC derived or internally generated, either in data entry or display only mode. The Paradigm unit has an extremely powerful math capability, allowing the operator to manipulate the variables to meet the specific application’s demands. If required, the display can be formatted to BCD, binary, hex, floating point, and string. Upper and lower limits of data entry variables are fully supported and password protected.

*Text Message Animation* enables several different types of animated text from a local or global message table to be displayed. The message displayed is dependent on the condition of the particular controlling expression. The controlling expression may be a PLC bit level, a timer value, preset counter condition, or any one of a wide variety of message triggers.

*Time and Date* in the Paradigm unit has the capability to display in any combination of year, month, day, hours, minutes, and seconds.

*Bar Graphs* in horizontal format are easily attached to data variables. The partial or full length bar graph displays can be scaled and offset to optimize the required display effect.

**SECURITY**

The password protection scheme provides the ultimate in tamper-proof capability. Access can be limited on a unit, page, recipe, or even individual data entries.

**COMMON FEATURES FOR TOUCHSCREEN OPERATOR TERMINALS**

- **PROGRAMMABILITY**
  - Event Driven Configuration Tool

  Edict 97, an extremely powerful Windows® 95/3.11 based software program, provides for the intuitive configuration of every aspect of the operator interface’s behavior. The requirement for time consuming PLC ladder logic is drastically reduced by the unique event driven approach of EDICT 97. The capability of this program, in conjunction with the PLC and the Paradigm operator interface unit, ensures a great deal of advanced functionality for your system. This powerful PLC/Paradigm system provides many of the capabilities and features normally associated with the more complicated and costly PC/SCADA systems. Display pages are easily generated, including PLC and internal variables, text strings, or bar charts. All dynamic elements are also available as alarms, recipes, triggers, and reports for the run time software. After completion of the programming, the program is directly downloaded to the operator interface from your PC, without any compiling or saving requirement. When you require a change in your program, EDICT 97 loads only the change, not the entire program, saving valuable on-line time.

- **DYNAMIC DISPLAY PAGE ELEMENTS**
  - Each display page has provisions to show static and dynamic information, including data variables, text messages, time, and date.

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  *Text Message Animation* enables several different types of animated text from a local or global message table to be displayed. The message displayed is dependent on the condition of the particular controlling expression. The controlling expression may be a PLC bit level, a timer value, preset counter condition, or any one of a wide variety of message triggers.

  *Time and Date* in the Paradigm unit has the capability to display in any combination of year, month, day, hours, minutes, and seconds.

  *Bar Graphs* in horizontal format are easily attached to data variables. The partial or full length bar graph displays can be scaled and offset to optimize the required display effect.

**SECURITY**

The password protection scheme provides the ultimate in tamper-proof capability. Access can be limited on a unit, page, recipe, or even individual data entries.

**INPUT/OUTPUT COMMUNICATIONS SPECIFICATIONS**

1. **SERIAL PORTS: Data Format and Baud Rates for each port are individually software programmable up to 19200 baud.**
   - Port 1: Programming Port - RS-232 on an RJ-11 jack.
   - Port 2: RS-232 Port on a Plug-In Screw Terminal Block
   - Port 3: RS-485 Port on a Plug-In Screw Terminal Block
   - (Up to 29 units can be connected and individually addressed.)

   **Note:** LED Indicators show communications status on Ports 2 & 3

2. **COMMUNICATION MACHINES:** Any of the three ports can be used to communicate with Serial Devices.

   Model - GL300T may communicate in Master mode with a different device protocol on each port (See Note & Exception).

   However, only one of the Ports 2 and 3 may be configured, if either is selected as a Slave Protocol.

   **Note:** Ports 2 and 3 may be configured as different device protocols in Master mode and Port 1 may be used simultaneously in Slave mode for a third device protocol.

   **Exception:** If Allen Bradley DH485 is selected on either Port 2 or 3, only Port 1 will be available for a separate device protocol.

**PHYSICAL DIMENSIONS**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>194.0 mm</td>
</tr>
<tr>
<td>H</td>
<td>144.3 mm</td>
</tr>
<tr>
<td>D</td>
<td>67.0 mm</td>
</tr>
</tbody>
</table>

**Emissions to EN 50081-1**

- RF conducted interference
- Environments to EN 50081-1
- Fast transients (burst)
- Electrostatic discharge
- Electromagnetic RF fields
- Electromagnetic RF fields
- Electrostatic discharge
- Immunity to EN 50082-2

**SAFETY SPECIFICATIONS**

- EN 61000-4-2
- Enclosure class B
- Level 2; 4 Kv contact
- Level 4; 2 Kv I/O
- Level 3; 2 Kv power
- Level 3; 10 Vrms

**SECURITY**

The password protection scheme provides the ultimate in tamper-proof capability. Access can be limited on a unit, page, recipe, or even individual data entries.
TOUCH KEY EDITING

All the interface keys can be programmed to perform virtually unlimited functions with each key, having multiple actions assigned to three types of key events: key pressed, key held down (auto repeat), and key released. Typical key actions would be Gotopage, set value, load recipe, view alarms, print report, and many more. GL300T keys can be defined flexibly as touch sensitive objects anywhere on a display page.

COMMUNICATIONS

With over 80 communication drivers available, the Paradigm operator interface offers a wide range of connectivity, including PLCs, Variable Speed Drives, Temperature Controllers, Bar Code Readers, etc. Utilizing real PLC data references, the automatic comms configuration optimizes the system’s communication performance. In the event that your specific driver does not appear on the Paradigm drivers list, let us know, as this list is always being expanded to meet our customers’ needs.

GRAPHIC UNITS

In addition to all the features of the character-based units, the GL will provide exceptional value in displaying trend graphs, process schematics and flow, and others, limited only by the imagination of the designer. The programmer can use the built-in standard symbols, or construct them. A sequence of graphical symbols can be assigned to a PLC location, and the powerful software will step through the sequence without the necessity of programming multiple expressions for each bitmap. Some of the inherent features of the Graphical Display units:

- Data Logging
- Process symbols, such as tanks, valves, etc.
- Memory expansion is field-upgradeable.
- Plus all the functions available in EDICT 97, the powerful event driven configuration tool that allows one to configure a system to do what is needed.

ANIMATED GRAPHICS

Graphical pages are constructed using both bitmaps and object graphics. Animation items such as trending, tank filling, horizontal and vertical bar graphs, valves, etc., make your display pages aesthetically pleasing as well as informative to the operator.

TOUCH-SCREEN

The GL300T is fitted with a continuous resolution resistive touch-screen, providing an effective resolution of over 200 by 200 cells. This allows touch-sensitive objects to be placed anywhere on the screen, without restricting your designs to the coarse grid employed by competitive products. The touch-screen is fully operable with gloved hands and is specified for up to 5 million operations.

HARDWARE INFORMATION

This bulletin contains a variety of information related to the installation and operation of the Operator Interface supplied. Ideally, you should read this document thoroughly before attempting to use the equipment. For information about the software aspects of the terminal, please consult other documentation.

CONTENTS OF PACKAGE

The Operator Interface is supplied in a packaging box containing the following...

- The interface terminal itself.
- A NEMA 4/IP65 rated mounting gasket.
- A bag containing panel hardware.
- This hardware bulletin.
- If any of these items are missing, please contact your supplier immediately.

POWER SUPPLY REQUIREMENTS

The Operator Interface requires a regulated 11 to 30 VDC power supply rated at 5.25 W or greater unless otherwise stated on the label.

- The terminal may take as little as 300 mA in certain circumstances, so be sure that the chosen power supply can operate correctly with this load.
- Large switch-mode supplies tend to need a certain minimum load before they will operate correctly.

In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. A very high proportion of reported problems are caused by incorrect power supply installation, so please take care to observe the following points:

- The power supply must be mounted close to the unit, with usually not more than 6 feet of cable between the supply and the Operator Interface. Ideally, as short a length as is possible should be used.
- The wire used to connect the Operator Interface’s power supply should be of at least 22 gage wire. If a longer cable run is used, you should use heavier gage wire. The routing of the cable should be kept away from large contactors, inverters and other devices which may generate significant electrical noise.

BATTERY BACKUP ISSUES

The Operator Interface is supplied with a Lithium Battery designed to maintain the internal memory and real-time clock during power outages. Assuming the operator interface terminal is powered up for 50% of the time, this battery should last over 4 years. A “Battery Low” system variable is available so that the programmer can choose specific action(s) to occur when the battery voltage drops below its nominal voltage.

It is possible to replace the battery without losing the contents of the Operator Interface’s memory, but this does not reduce the importance of ensuring that a copy of the terminal’s configuration is kept readily at hand to allow the terminal to be re-loaded in the case of mishaps. Please remember that although an image of the database contents can be uploaded, this file is not editable, so the importance of keeping a copy on disk cannot be overstressed.

CHANGING THE BATTERY

To change the internal battery, follow these steps...

- Remove the power and PLC communications connector from the unit.
- Remove the four screws from the rear-cover and remove the cover.
- If you wish to avoid losing the terminal’s configuration, reconnect the power connector and re-apply power. Note that this will require the panel to be powered-up and, as such, only suitably qualified service personnel should carry out this procedure.

CAUTION: RISK OF ELECTRIC SHOCK

The inverter board, attached to the bottom of the main board, supplies the high voltage to operate the backlight. Touching the inverter board or connections in that area may result in injury to personnel.

- The battery is located in a holder on the main circuit board. This should be clearly visible. Remove the battery from its holder.
- Place the new battery in the holder. The terminal’s power supply can now be disconnected, if you re-applied power in the step above.
- Replace the lid, screws and connector by following the above procedure in reverse. You may like to make a note of the date the battery was replaced to allow planned maintenance to be carried out.
- If you did not keep the unit powered-up during battery replacement, hold down the EXIT and MUTE keys on the keyboard and cycle power. Release the keys and follow the menu guides to clear the memory. The unit is now ready for a configuration database to be reloaded.

Please note that the old battery must be disposed of in a manner which complies with your local waste regulations. Also, the battery must not be disposed of in fire or in a manner whereby it may be damaged and its contents come into contact with human skin.
INSTALLATION & CONNECTIONS
The unit meets NEMA 4/IP65 requirements for indoor use, when properly installed. The units are intended to be mounted into an enclosed panel.

INSTALLATION ENVIRONMENT
The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

Continuous exposure to direct sunlight may accelerate the aging process of the bezel. The bezel should be cleaned only with a soft cloth and neutral soap product. Do NOT use solvents.

Do not use tools of any kind (screwdrivers, pens, pencils, etc.) to operate the keypad or touchscreen of the unit.

MOUNTING INSTRUCTIONS
The Operator Interfaces are designed for through-panel mounting. A neoprene gasket is provided, to enable sealing to NEMA 4/IP65 specification. The panel cut-out diagram for the model supplied is provided. All mounting holes should be drilled for 0.14” (3.5 mm) clearance. Care should be taken to remove any loose material from the mounting hole to avoid such material falling into the Operator Interface itself during installation.

CONNECTING TO A PLC
The Operator Interface is designed to operate with a PLC. A serial communication connection must be made between the operator interface terminal and PLC, and the details of this connection vary according to which PLC is used.

The following section lists the connection details for the PLC to be used.

PLC TYPE
Details on how to connect to most PLCs are available on request from RLC.

CONNECTING TO AN IBM® PC/AT
The Operator Interface is programmed via software running on an IBM PC/AT or a compatible computer. The connection between the PC/AT and the operator interface terminal is made via a custom cable provided with the EDICT Development Kit. The cable is designed for a 9-pin serial port. Please contact your supplier if you require a 25-pin version.

PROGRAMMING PORT PIN OUT
The Operator Interface’s programming port is sometimes used to connect other RS-232 devices, such as printers. The following illustration and table gives the pin-out of this port to enable such connections to be made.

<table>
<thead>
<tr>
<th>RJ11 FEMALE</th>
<th>PIN</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RTS</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Tx</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Rx</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>CTS</td>
<td></td>
</tr>
</tbody>
</table>

Rear View of Unit

The above table denotes the pin names of the programming port. When connecting, the pin name at the programming port is connected to the opposite of that pin name at the destination device.

TROUBLESHOOTING
For further technical assistance, contact technical support.
**IMPORTANT PRODUCT OBSOLESCENCE NOTICE**

The time has come to discontinue a few of our older products due to part availability. The recommended alternative product will offer the customer a better solution than the existing product. Certain products have no listed replacements due to technological advancements. The actual discontinuation date is controlled by raw material inventories and future sales. If you have a customer using any of these products, please contact and advise them of the situation. As always, Red Lion will assist the customer as much as possible in the changeover process.

<table>
<thead>
<tr>
<th>DISCONTINUED PART/MODEL NUMBERS</th>
<th>DESCRIPTION</th>
<th>STATUS</th>
<th>ALTERNATIVE PRODUCT OFFERINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFCx0000</td>
<td>Current to Frequency Converter</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>CL1000x0</td>
<td>2 x 20 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>CL2000x0</td>
</tr>
<tr>
<td>CUBID001</td>
<td>CUB2 DC Current Meter, 5 VDC</td>
<td>Discontinued as parts are depleted</td>
<td>None</td>
</tr>
<tr>
<td>CUBID002</td>
<td>CUB2 DC Current Meter, 7 to 28 VDC</td>
<td>Discontinued as parts are depleted</td>
<td>CUB40000</td>
</tr>
<tr>
<td>CUBVDO01</td>
<td>CUB2 DC Volt Meter, 5 VDC</td>
<td>Discontinued as parts are depleted</td>
<td>None</td>
</tr>
<tr>
<td>CUBVD002</td>
<td>CUB2 DC Volt Meter, 7 to 28 VDC</td>
<td>Discontinued as parts are depleted</td>
<td>CUB4V000</td>
</tr>
<tr>
<td>CX1000x0</td>
<td>2 x 20 Operator Interface</td>
<td>Discontinued as parts are depleted</td>
<td>G305x000</td>
</tr>
<tr>
<td>CX1500x0</td>
<td>2 x 40 Operator Interface</td>
<td>Discontinued as parts are depleted</td>
<td>G305x000</td>
</tr>
<tr>
<td>GL3000x0</td>
<td>256 x 128 Operator Interface</td>
<td>Discontinued as parts are depleted</td>
<td>G305C000</td>
</tr>
<tr>
<td>GL300T0</td>
<td>256 x 128 Operator Interface</td>
<td>Discontinued as parts are depleted</td>
<td>G305C000</td>
</tr>
<tr>
<td>GL3500x0</td>
<td>256 x 128 Operator Interface</td>
<td>Discontinued as parts are depleted</td>
<td>G306C000</td>
</tr>
<tr>
<td>LPP10000</td>
<td>Loop Powered Process Meter</td>
<td>Discontinued as parts are depleted</td>
<td>CUB4LP00</td>
</tr>
<tr>
<td>VFCx0000</td>
<td>Voltage to Frequency Converter</td>
<td>Discontinued as parts are depleted</td>
<td>None</td>
</tr>
<tr>
<td>VX500S00</td>
<td>640 x 480 Operator Interface</td>
<td>Discontinued as parts are depleted</td>
<td>G308C000</td>
</tr>
<tr>
<td>VX500TS0</td>
<td>640 x 480 Operator Interface</td>
<td>Discontinued as parts are depleted</td>
<td>G308C000</td>
</tr>
<tr>
<td>VX550S00</td>
<td>640 x 480 Operator Interface</td>
<td>Discontinued as parts are depleted</td>
<td>G308C000</td>
</tr>
</tbody>
</table>
MODELS VX550 - COLOR GRAPHICAL OPERATOR TERMINALS

DESCRIPTION
The VX550 from the Paradigm Range of operator interfaces meets the ever increasing demands of industry for powerful easy-to-use terminals. Both hardware and software are designed to allow the user to easily upgrade and take full advantage of our continuing development and improvements to our products.

SAFETY SUMMARY
All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the unit.

The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

DIMENSIONS  In inches (mm)

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>VX550</td>
<td>640 X 480 CCFL, Full VGA Color, 40 X 30, 16 Legendable Function keys, 6 Soft keys, 736 K memory (672 K user)</td>
<td>VX550S00</td>
</tr>
<tr>
<td>EDICT-97 Development Kit. Includes Software, Manual and 9-pin RS232 Programming cables</td>
<td>SFEDT</td>
<td></td>
</tr>
<tr>
<td>Communication Cables</td>
<td>P895xxxZ</td>
<td></td>
</tr>
<tr>
<td>Replacement Battery</td>
<td>BAL3R004</td>
<td></td>
</tr>
</tbody>
</table>

SPECIFICATIONS
1. POWER REQUIREMENTS: 15 VDC min. to 30 VDC max. @ 9.75 W
Power Up Current: 2.5 A for 4 msec max.
Must use a Class 2 or SELV rated power supply.
2. DISPLAY: 640 x 480 pixels (7.75 inch diagonal) CCFL Liquid Crystal DSTN color full VGA display. Text formats up to 40 x 30 characters.
3. KEYPAD: 6 screen legendable soft keys, 16 User-legendable Function keys, raise, lower, next, previous, exit, menu, alarms and mute keys are all embossed and have tactile feedback.
4. MEMORY: 736K (672K user) battery backed RAM (Battery life expectancy 3 years 50/50 on/off cycle).
5. RELAY OUTPUT: Form C relay output 1 A @ 120 VAC, 1 A @ 28 VDC
6. CERTIFICATIONS AND COMPLIANCES:
   SAFETY
   UL Recognized Component, File # E179259, UL3101-1, CSA 22.2 No. 1010-1
   Recognized to U.S. and Canadian requirements under the Component
   Recognition Program of Underwriters Laboratories, Inc.
   Type 4 Enclosure rating (Face only), UL50
   IEC/EN 60601-1, EN60601-1: Safety requirements for electrical equipment for
   measurement, control, and laboratory use, Part 1.
   IP65 Enclosure rating (Face only), IEC 529
   EPH Magnetic Compatibility
   Emissions and Immunity to EN 61326: Electrical Equipment for
   Measurement, Control and Laboratory use.
   Immunity to Industrial Locations:
   Electrostatic discharge EN 61000-4-2 Criterion A
   4 kV contact discharge
   8 kV air discharge
   Electromagnetic RF fields EN 61000-4-3 Criterion A
   10 V/m
   Fast transients (burst) EN 61000-4-4 Criterion A
   2 kV power
   2 kV signal
   Surge EN 61000-4-5 Criterion A
   .5 kV L-L,
   1 kV L-N-E power 2
   1 kV signal
   RF conducted interference EN 61000-4-6 Criterion A
   3 V/rms
   Power frequency magnetic fields EN 61000-4-8 Criterion A
   30 A/m
   Emissions: EN 55011 Class A
   Notes:
   2. Surge: unit meets criteria A to 1 kV L-L and 2 kV L-N-E with a power
   line filter installed, RLC #LFIL0000 (Schaffner FN110) or equivalent.

7. MOUNTING REQUIREMENTS:
   Max. panel thickness is 0.375° (9.5 mm)
   For NEMA 4/IP65 sealing, a steel rear panel with a minimum thickness of
   0.125° (3.175 mm) is recommended.
8. ENVIRONMENTAL CONDITIONS:
   OPERATING TEMPERATURE: 0 to 40°C
   STORAGE TEMPERATURE: -20 to 80°C
   OPERATING AND STORAGE HUMIDITY: 20 to 80% max. RH (non-condensing)
   from 0°C to 40°C.
   Altitude: Up to 2000 meters
   PHYSICAL DIMENSIONS: L = 11.27” (286.2 mm), H = 7.94” (201.7 mm),
   W = 2.13” (54.1 mm).
   CONSTRUCTION: Steel rear metal enclosure with NEMA 4/IP65 aluminum front plate when correctly fitted with the gasket provided.
   This unit is rated for NEMA 4/IP65 indoor use. Installation Category II, Pollution
   Degree 2.
   WEIGHT: 3.20 lb. (1.45 Kg.)

INPUT/OUTPUT COMMUNICATIONS SPECS

1. SERIAL PORTS: Data Format and Baud Rates for each port are individually
   programmable up to 19200 baud.
   Port 1: Programming Port - RS-232 on an RJ-11 jack
   Port 2: RS-232 Port on a Plug-In Screw Terminal Block
   Port 3: RS-485 Port on a Plug-In Screw Terminal Block
   (Up to 29 units can be connected and individually addressed.)
   Note: LED Indicators show communications status on Ports 2 & 3.
2. COMMUNICATION MODES: Any of the three ports can be used to
   communicate with Serial Devices.
   - Model - (VX550) may communicate in Master mode with a different device
     protocol on each port (See Note & Exception).
   However, only one of Ports 2 and 3 may be configured, if either is selected
   as a Slave Protocol.
   - Note: Ports 2 and 3 may be configured as different device protocols in Master
     mode and Port 1 may be used simultaneously in Slave mode for a third
     device protocol.
   - Exception: If Allen Bradley DH485 is selected on either Port 2 or 3, only
     Port 1 will be available for a separate device protocol.

COMMON FEATURES FOR GRAPHIC BASED OPERATOR TERMINALS

PROGRAMMABILITY
Event Driven Configuration Tool
Edict 97, an extremely powerful Windows® 95/3.11 based software program,
provides for the intuitive configuration of every aspect of the operator
interface’s behavior. The requirement for time consuming PLC ladder logic is
drastically reduced by the unique event driven approach of EDICT 97. The
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internal variables, text strings, or bar charts. All dynamic elements are also
available as alarms, recipes, triggers, and reports for the run time software.
After completion of the programming, the program is directly downloaded to the
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When you require a change in your program, EDICT 97 loads only the change,
not the entire program, saving valuable on-line time.

DYNAMIC DISPLAY PAGE ELEMENTS
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including data variables, text messages, time, and date.

Data Variables can be either PLC derived or internally generated, either in data
entry or display only mode. The Paradigm unit has an extremely powerful
math capability, allowing the operator to manipulate the variables to meet the
specific application’s demands. If required, the display can be formatted to
BCD, binary, hex, floating point, and string. Upper and lower limits of data
entry variables are fully supported and password protected.

Text Message Animation enables several different types of animated text from
a local or global message table to be displayed. The message displayed is
dependent on the condition of the particular controlling expression. The
controlling expression may be a PLC bit level, a timer value, preset counter
condition, or any one of a wide variety of message triggers.

Time and Date in the Paradigm unit has the capability to display in any
combination of year, month, day, hours, minutes, and seconds.

Bar Graphs in horizontal format are easily attached to data variables. The
partial or full length bar graph displays can be scaled and offset to optimize
the required display effect.

SECURITY
The password protection scheme provides the ultimate in tamper-proof
capability. Access can be limited on a unit, page, recipe, or even individual data
entries.

ALARMS
The Paradigm unit can monitor and log up to 500 alarms. Such triggers as a
simple bit level transition, a PLC coil activation, or a complex application
algorithm can activate an alarm. The alarms can be time and date stamped, with
an automatic screen display and/or downloading to a printer for hard copy
recording purposes.

RECIPE HANDLING
Recipe handling in the Paradigm Operator Interfaces can be tailored to your
requirements. Using the “Data Files” section of Named Data, one can set up
arrays with meaningful titles, and select, edit, and maintain, recipe data up to
8000 elements per file. In conjunction with User Programs, and the flexible data
stores, the operator can select desired recipe, by number or by title, and either
upload from, or download to, the target system. All the functions of EDICT97
are available, so the programmer can password protect the editing of the recipes
and allow for the transfer of data from a host system.

REAL TIME SCHEDULE
Real time schedule allows for repetitive or one time tasks to take place in the
system.
MULTIPLE LANGUAGE SUPPORT
This powerful feature allows users to program the text in their databases in up to 8 different languages. A system variable entry makes it easy for end users to select one of the preprogrammed languages. EDICT-97 features powerful language editing tools for easy implementation.

USER PROGRAMS
This feature offers the user the ability to incorporate custom application requirements via a powerful program language.

KEYBOARD EDITING
All the interface keys can be programmed to perform virtually unlimited functions with each key, having multiple actions assigned to three types of key events: key pressed, key held down (auto repeat), and key released. Typical key actions would be Gototpage, set value, load recipe, view alarms, print report, and many more.

COMMUNICATIONS
With over 80 communication drivers available, the Paradigm operator interface offers a wide range of connectivity including: PLCs, Variable Speed Drives, Temperature Controllers, Bar Code Readers, etc. Utilizing real PLC data references, the automatic commns configuration optimizes the system’s communication performance. In the event that your specific device does not appear on the Paradigm drivers list, let us know, as this list is always being expanded to meet our customers’ needs.

COLOR GRAPHIC UNITS
In addition to all the features of the character-based units, the VX will provide exceptional value in displaying trend graphs, process schematics and flow, and others, limited only by the imagination of the designer. The programmer can use the built-in standard symbols, or construct them. A sequence of graphical symbols can be assigned to a PLC location, and the powerful software will step through the sequence without the necessity of programming multiple expressions for each bitmap. Some of the inherent features of the Graphical Display units:

- Data Logging
- Process symbols, such as tanks, valves, etc.

ANIMATED GRAPHICS
Graphical pages are constructed using both bitmaps and object graphics. Animation items such as tending, tank filling, horizontal and vertical bar graphs, valves, etc., make your display pages aesthetically pleasing as well as informative to the operator.

HARDWARE INFORMATION
This bulletin contains a variety of information related to the installation and operation of the Operator Interface supplied. Ideally, you should read this document thoroughly before attempting to use the equipment. For information about the software aspects of the terminal, please consult other documentation.

CONTENTS OF PACKAGE
The Operator Interface is supplied in a packaging box containing the following...

- The interface terminal itself.
- A NEMA 4/IP65 rated mounting gasket.
- A bag containing panel hardware.
- This hardware bulletin.
- If any of these items are missing, please contact your supplier immediately.

POWER SUPPLY REQUIREMENTS
The Operator Interface requires a regulated 15 to 30 VDC power supply rated at 9.75 W or greater unless otherwise stated on the label.

- The terminal may take as little as 300 mA in certain circumstances, so be sure that the chosen power supply can operate correctly with this load. Large switch-mode supplies tend to need a certain minimum load before they will operate correctly.
- In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. A very high proportion of reported problems are caused by incorrect power supply installation, so please take care to observe the following points...

- The power supply must be mounted close to the unit, with usually not more than 6 feet of cable between the supply and the Operator Interface. Ideally, as short a length as is possible should be used.
- The wire used to connect the Operator Interface’s power supply should be of at least 22 gage wire. If a longer cable run is used, you should use heavier gage wire. The routing of the cable should be kept away from large contactors, inverters and other devices which may generate significant electrical noise.

BATTERY BACKUP ISSUES
The Operator Interface is supplied with a Lithium Battery designed to maintain the internal memory and real-time clock during power outages. Assuming the operator interface terminal is powered up for 50% of the time, this battery should last over 3 years. A “Battery Low” system variable is available so that the programmer can choose specific action(s) to occur when the battery voltage drops below its nominal voltage.

It is possible to replace the battery without losing the contents of the Operator Interface’s memory, but this does not reduce the importance of ensuring that a copy of the terminal’s configuration is kept readily at hand to allow the terminal to be re-loaded in the case of mishaps. Please remember that although an image of the database contents can be uploaded, this file is not editable, so the importance of keeping a copy on disk cannot be over stressed.

CHANGING THE BATTERY

To change the internal battery, follow these steps...

- Remove the power and PLC communications connector from the unit.
- Remove the four screws from the rear cover and remove cover.
- If you wish to avoid losing the terminal’s configuration, reconnect the power connector and re-apply power. Note that this will require the panel to be powered-up and, as such, only suitably qualified service personnel should carry out this procedure.

CAUTION: RISK OF ELECTRIC SHOCK
The inverter board, attached to the bottom of the main board, supplies the high voltage to operate the backlight. Touching the inverter board may result in injury to personnel.

- The battery is located in a holder on the main circuit board. This should be clearly visible. Remove the battery from its holder.
- Place the new battery in the holder. The terminal’s power supply can now be disconnected, if you re-applied power in the step above.
- Replace the lid, screws and connector by following the above procedure in reverse. You may like to make a note of the date the battery was replaced to allow planned maintenance to be carried out.
- If you did not keep the unit powered-up during battery replacement, hold down the EXIT and MUTE keys on the keyboard and cycle power. Release the keys and follow the menu guides to clear the memory. The unit is now ready for a configuration database to be reloaded.

Please note that the old battery must be disposed of in a manner which complies with your local waste regulations. Also, the battery must not be disposed of in fire or in a manner whereby it may be damaged and its contents come into contact with human skin.
**INSTALLATION & CONNECTIONS**

The unit meets NEMA 4/IP65 requirements for indoor use, when properly installed. The units are intended to be mounted into an enclosed panel.

The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

**INSTALLATION ENVIRONMENT**

The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

Continuous exposure to direct sunlight may accelerate the aging process of the bezel. The bezel should be cleaned only with a soft cloth and neutral soap product. Do NOT use solvents.

Do not use tools of any kind (screwdrivers, pens, pencils, etc.) to operate the keypad of the unit.

**MOUNTING INSTRUCTIONS**

The Operator Interfaces are designed for through-panel mounting. A neoprene gasket is provided, to enable sealing to NEMA 4X/IP65 specification. The panel cut-out diagram for the model supplied is provided. All mounting holes should be drilled for 0.14” (3.55 mm) clearance. Care should be taken to remove any loose material from the mounting hole to avoid such metal falling into the Operator Interface itself during installation.

**CONNECTING TO A PLC**

The Operator Interface is designed to operate with a PLC. A serial communication connection must be made between the operator interface terminal and PLC, and the details of this connection vary according to which PLC is used.

**PLC TYPE**

Details on how to connect to most PLCs are available on request from RLC.

**CONNECTING TO AN IBM® PC/AT**

The Operator Interface is programmed via software running on an IBM PC/AT or a compatible computer. The connection between the PC/AT and the operator interface terminal is made via a custom cable provided with the EDICT Development Kit. The cable is designed for a 9-pin serial port. Please contact your supplier if you require a 25-pin version.

**PROGRAMMING PORT PIN OUT**

The Operator Interface’s programming port is sometimes used to connect other RS-232 devices, such as printers. The following illustration and table gives the pin-out of this port to enable such connections to be made.

<table>
<thead>
<tr>
<th>RJ11 FEMALE</th>
<th>PIN</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RTS</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1x</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Rx</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>CTS</td>
<td></td>
</tr>
</tbody>
</table>

The above table denotes the pin names of the programming port. When connecting, the pin name at the programming port is connected to the opposite of that pin name at the destination device.

**TROUBLESHOOTING**

For further technical assistance, contact technical support at the appropriate company numbers listed.
**IMPORTANT PRODUCT OBSOLESCENCE NOTICE**

The time has come to discontinue a few of our older products due to part availability. The recommended alternative product will offer the customer a better solution than the existing product. Certain products have no listed replacements due to technological advancements. The actual discontinuation date is controlled by raw material inventories and future sales. If you have a customer using any of these products, please contact and advise them of the situation. As always, Red Lion will assist the customer as much as possible in the changeover process.

<table>
<thead>
<tr>
<th>DISCONTINUED PART/MODEL NUMBERS</th>
<th>DESCRIPTION</th>
<th>STATUS</th>
<th>ALTERNATIVE PRODUCT OFFERINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFCx0000</td>
<td>Current to Frequency Converter</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>CL1000x0</td>
<td>2 x 20 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>CL2000x0</td>
</tr>
<tr>
<td>CUBID001</td>
<td>CUB2 DC Current Meter, 5 VDC</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>CUBID002</td>
<td>CUB2 DC Current Meter, 7 to 28 VDC</td>
<td>Discontinued as parts are depleted.</td>
<td>CUB4000</td>
</tr>
<tr>
<td>CUBVD001</td>
<td>CUB2 DC Volt Meter, 5 VDC</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>CUBVD002</td>
<td>CUB2 DC Volt Meter, 7 to 28 VDC</td>
<td>Discontinued as parts are depleted.</td>
<td>CUB4V000</td>
</tr>
<tr>
<td>CX1000x0</td>
<td>2 x 20 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G305x000</td>
</tr>
<tr>
<td>CX1500x0</td>
<td>2 x 40 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G305x000</td>
</tr>
<tr>
<td>GL3000x0</td>
<td>256 x 128 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G306C000</td>
</tr>
<tr>
<td>GL300T0x0</td>
<td>256 x 128 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G306C000</td>
</tr>
<tr>
<td>GL3500x0</td>
<td>256 x 128 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G306C000</td>
</tr>
<tr>
<td>LPP10000</td>
<td>Loop Powered Process Meter</td>
<td>Discontinued as parts are depleted.</td>
<td>CUB4LP00</td>
</tr>
<tr>
<td>VFCx0000</td>
<td>Voltage to Frequency Converter</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>VX500S00</td>
<td>640 x 480 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G308C000</td>
</tr>
<tr>
<td>VX500TS0</td>
<td>640 x 480 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G308C000</td>
</tr>
<tr>
<td>VX550S00</td>
<td>640 x 480 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G308C000</td>
</tr>
</tbody>
</table>
Operator Interface Terminals

MODEL CX-100
2 X 20 VFD OPERATOR TERMINAL

- 2 LINE X 20 CHARACTER VACUUM FLUORESCENT DISPLAY
- 500 ALARM POINT LOGGER
- RECIPE HANDLING
- COMPREHENSIVE REPORT GENERATION
- UNLIMITED PASSWORD PROTECTION
- REAL TIME CLOCK, BATTERY BACKED
- EXPRESSION EVALUATION
- 32 BIT / FLOATING POINT MATH
- DIRECT, NETWORK (Including Multiple protocol) OR MODEM LINK TO PLC
- NEMA 4/IP65 STEEL ENCLOSURE
- CE COMPLIANT

DESCRIPTION
The CX-100 from the Paradigm Range of operator interfaces meets the ever increasing demands of industry for powerful easy-to-use terminals. Both hardware and software are designed to allow the user to easily upgrade and take full advantage of continuing development and improvements to our products.

SPECIFICATIONS
1. POWER REQUIREMENTS: 11 min. to 30 max. VDC @ 3.0 W
   Power Up Current: 2.75 A for 3.5 msec. max.
   Must use a Class 2 or SELV rated power supply.
2. DISPLAY: 2 lines of 20 characters, 5 mm high Vacuum Fluorescent display
3. KEYPAD: 3 screen legendable soft keys, 8 User re-legendable function keys, numeric pad with raise, lower, next, previous, enter, delete, exit, alarms and mute keys, all with Tactile feedback.
4. MEMORY: 128 K (64 K user) battery backed RAM (Battery life expectancy 10 years). Optional factory fit expansion to 256 K (192 K user).
5. SERIAL PORTS: One RS-232 for PC or printer connections, one RS232 and one RS485 for PLC connection up to 19200 Baud. (Can be used as a three port device for multiple protocol applications)
6. PHYSICAL DIMENSIONS: L = 206 mm, H = 162 mm, D = 57 mm.
7. CONSTRUCTION: Metal enclosure with NEMA 4/IP65 front plate when correctly fitted with the gasket provided. This unit is rated for NEMA 4/IP65 indoor use. Installation Category I, Pollution Degree 2
8. FIELD CONNECTIONS: Removable screw terminal blocks.
9. ENVIRONMENTAL CONDITIONS:
   Operating Temperature: 0 to 40°C
   Storage Temperature: -20 to 80°C
   Operating and Storage Humidity: 80% max. relative humidity (non-condensing) from 0°C to 40°C.
   Altitude: Up to 2000 meters
10. WEIGHT: 2.1 lbs. (0.95 Kg)

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CX-100</td>
<td>VFD, 2 X 20, 8 Function keys, 128 K memory</td>
<td>CX100000</td>
</tr>
<tr>
<td></td>
<td>VFD, 2 X 20, 8 Function keys, 256 K memory</td>
<td>CX100010</td>
</tr>
</tbody>
</table>

DIMENSIONS “In inches (mm)”

PANEL CUT-OUT

Obsolete

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
SAFETY SUMMARY
All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so, can be potentially harmful to persons or equipment in the event of a fault to the unit.

CAUTION: Read complete instructions prior to installation and operation of the unit.

COMMON FEATURES FOR CHARACTER BASED OPERATOR TERMINALS

PROGRAMMABILITY
Event Driven Configuration Tool
Edict 97, an extremely powerful Windows 95/3.11 based software program, provides for the intuitive configuration of every aspect of the operator interface’s behavior. The requirement for time consuming PLC ladder logic is drastically reduced by the unique event driven approach of EDICT 97. The capability of this program, in conjunction with the PLC and the Paradigm operator interface unit, ensures a great deal of advanced functionality for your system. This powerful PLC/Paradigm system provides many of the capabilities and features normally associated with the more complicated and costly PC/SCADA systems. Display pages are easily generated, including PLC and internal variables, text strings, or bar charts. All dynamic elements are also available as alarms, recipes, triggers, and reports, for the run time software. After completion of the programming, the program is directly downloaded to the operator interface from your PC, without any compiling or saving requirement. When you require a change in your program, EDICT 97 loads only the change, not the entire program, saving valuable on-line time.

DYNAMIC DISPLAY PAGE ELEMENTS
Each display page has provisions to show static and dynamic information, including data variables, text messages, time, and date.

Data Variables can be either PLC derived or internally generated, either in data entry or display only mode. The Paradigm unit has an extremely powerful math capability, allowing the operator to manipulate the variables to meet the specific application’s demands. If required, the display can be formatted to BCD, binary, hex, floating point, and string. Upper and lower limits of data entry variables are fully supported and able to be password protected.

Text Message Animation enables several different types of animated text from a local or global message table to be displayed. The message displayed is dependent on the condition of the particular controlling expression. The controlling expression may be a PLC bit level, a timer value, preset counter condition, or any one of a wide variety of message triggers.

Time and Date in the Paradigm unit has the capability to display in any combination of year, month, day, hours, minutes, and seconds.

Bar Graphs in horizontal format are easily attached to data variables. The partial or full length bar graph displays can be scaled and offset to optimize the required display effect.

SECURITY
The password protection scheme provides the ultimate in tamper-proof capability. Access can be limited on a unit, page, recipe, or even individual data entries.

ALARMS
The Paradigm unit can monitor and log from 100 to 500 alarms, depending on model. Such triggers as a simple bit level transition, a PLC coil activation, or a complex application algorithm can activate an alarm. The alarms can be time and date stamped, with an automatic screen display and/or downloading to a printer for hard copy recording purposes.

REAL TIME SCHEDULE
Real time schedule allows for repetitive or one time task to take place in the system. Typically a schedule action similar to...At 1:55 PM on Monday, Wednesday, and Friday, print the production report...is required in the application. In conjunction with the recipe capabilities, a downloading of a special recipe can be requested by the real time schedule feature.

USER PROGRAMS
This feature offers the user the ability to incorporate custom application requirements via a powerful program language. For example, a program designated “Calculate Volume” which determines the amount of fluid in a round tank at specific temperatures could be created. This program would be triggered to run and display each time the page denoted as “Volume Now” is requested.

The ability to customize to your application’s specialized needs is easily solved with the user program capability.

KEYBOARD EDITING
All the interface keys can be programmed to perform virtually unlimited functions with each key, having multiple actions assigned to three types of key events: key pressed, key held down (auto repeat), and key released. Typical key actions would be Go to page, set value, load recipe, view alarms, print report, and many more.

COMMUNICATIONS
With over 70 communication drivers available, the Paradigm operator interface offers a wide range of connectivity including: PLCs, Variable Speed Drives, Temperature Controllers, Bar Code Readers, etc. Utilizing real PLC data references, the automatic comms configuration optimizes the system’s communication performance. In the event that your specific driver does not appear on the Paradigm drivers list, let us know, as this list is always being expanded to meet our customers’ needs.
HARDWARE INFORMATION

This bulletin contains a variety of information related to the installation and operation of the Operator Interface supplied. Ideally, you should read this document thoroughly before attempting to use the equipment. For information about the software aspects of the terminal, please consult other documentation.

CONTENTS OF PACKAGE

The Operator Interface is supplied in a packaging box containing the following...

- The interface terminal itself.
- A NEMA 4/IP65 rated mounting gasket.
- A bag containing panel hardware.
- This hardware bulletin.
- If any of these items is missing, please contact your supplier immediately.

POWER SUPPLY REQUIREMENTS

The Operator Interface requires a 24 V power supply rated at 0.5 A unless otherwise stated on the label.

- The Operator Interface requires a power supply capable of supplying a current of 500 mA at a regulated voltage of 24 V. Supplies providing between 18 V and 30 V are also suitable.
- The terminal may take as little as 100 mA in certain circumstances, so be sure that the chosen power supply can operate correctly with this load. Large switch-mode supplies tend to need a certain minimum load before they will operate correctly.

In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. A very high proportion of reported problems are caused by incorrect power supply installation, so please take care to observe the following points...

- The power supply must be mounted close to the unit, with usually not more than 6 feet of cable between the supply and the Operator Interface. Ideally, as short a length as is possible should be used. In particular, the power supply should not be mounted on the back of the panel when the Operator Interface is installed in the panel door unless a short cable run can be achieved.
- The wire used to connect the Operator Interface’s power supply should be of at least 22 gauge wire. If a longer cable run is used, you should use even thicker cable. The routing of the cable should be kept away from large contactors, inverters and other devices which may generate significant electrical noise.

BATTERY BACKUP ISSUES

The Operator Interface is supplied with a Lithium Battery designed to maintain the internal memory and real-time clock during power outages. Assuming the operator interface terminal is powered up for 50% of the time, this battery should last over 4 years. A “Battery Low” system variable is available so that the programmer can choose specific action(s) to occur when the battery voltage drops below its nominal voltage.

It is possible to replace the battery without losing the contents of the Operator Interface’s memory, but this does not reduce the importance of ensuring that a new battery is installed. The unit may take as little as 100 mA in certain circumstances, so be sure that the chosen power supply can operate correctly with this load. Large switch-mode supplies tend to need a certain minimum load before they will operate correctly.

In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. A very high proportion of reported problems are caused by incorrect power supply installation, so please take care to observe the following points...

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- The wire used to connect the Operator Interface’s power supply should be of at least 22 gauge wire. If a longer cable run is used, you should use even thicker cable. The routing of the cable should be kept away from large contactors, inverters and other devices which may generate significant electrical noise.

CHANGING THE BATTERY

To change the internal battery, follow these steps...

- Remove the power and PLC communications connector from the unit.
- Remove the four screws from the rear-cover.
- Remove the cover, ensuring that the right-hand edge is raised first to avoid fouling the earth stud. You may have to pivot the cover to an angle of about 30°to achieve this.
- If you wish to avoid losing the terminal’s configuration, reconnect the power connector and re-apply power. Note that this will require the panel to be powered-up and, as such, only suitably qualified staff should carry out this procedure.
- The battery is located in a holder on the main circuit board. This should be clearly visible. Remove the battery from its holder.
- Place the new battery in the holder. The terminal’s power supply can now be disconnected, if you re-applied power in the step above.
- Replace the lid, screws and connector by following the above procedure in reverse. You may like to make a note of the date the battery was fitted.
- If you did not keep the unit powered-up during battery replacement, hold down the EXIT and MUTE keys on the keyboard and remove and then re-apply power. This will clear the internal memory and thus the suitable configuration database should then be re-loaded.

Please note that the old battery must be disposed of in a manner which complies with your local waste regulations. Also, the battery must not be disposed of in fire or in a manner whereby it may be damaged and its contents come into contact with human skin.

INSTALLATION & CONNECTIONS

The unit meets NEMA 4/IP65 requirements for indoor use, when properly installed. The units are intended to be mounted into an enclosed panel.

Installation Environment

The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

Continuous exposure to direct sunlight may accelerate the aging process of the bezel. The bezel should be cleaned only with a soft cloth and neutral soap product. Do NOT use solvents.

Do not use tools of any kind (screwdrivers, pens, pencils, etc.) to operate the keypad of the unit.

CONNECTING TO A PLC

The Operator Interface is designed to operate with a PLC. A serial communication connection must be made between the operator interface terminal and PLC, and the details of this connection vary according to which PLC is used.

The following section lists the connection details for the PLC to be used.

PLC TYPE

Details on how to connect to most PLCs are available on request from RLC.

CONNECTING TO AN IBM PC/AT

The Operator Interface is programmed via software running on an IBM PC/AT or a compatible computer. The connection between the PC/AT and the operator interface terminal is made via a custom cable provided with the EDICT Developer’s Kit. The cable is designed for a 9-way serial port. Please contact your supplier if you require a 25-way version.

PROGRAMMING PORT PIN OUT

The Operator Interface’s programming port is sometimes used to connect other RS-232 devices, such as printers. The following illustration and table gives the pin-out of this port to enable such connections to be made.

<table>
<thead>
<tr>
<th>PIN</th>
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<tr>
<td>6</td>
<td>CTS</td>
</tr>
</tbody>
</table>

The above table denotes the pin names of the programming port. When connecting, the pin name at the programming port is connected to the opposite of that pin name at the destination device.

MOUNTING INSTRUCTIONS

The Operator Interfaces are designed for through-panel mounting. A neoprene gasket is provided, to enable sealing to NEMA 4/IP65 specification. The panel cut-out diagram for the model supplied is provided. All mounting holes should be drilled for 0.14” clearance. Care should be taken to remove any loose material from the mounting hole to avoid such metal falling into the Operator Interface itself during installation.

FUNCTION KEY STRIPS

The function keys on the Models CL-10, CL-20, CX-100, and CX-200, have clear windows that permit the user to insert labels appropriate to the process. A formatted page is supplied upon which the user can enter function names (e.g. RUN, PRINT, etc.). These strips are inserted from the rear of the panel through slots below the function keys located underneath the gasket.

Take care that the ink applied will not rub off of the paper, or else blemishes will be left on the inside of the window. Laminated paper or plastic film can prove easier to insert than normal photocopier paper. It also helps if the starting edge of the paper has about 0.25 inches of its corners cut off at a 45 degree angle.

Note: Add an additional 1.5” to label length to allow for easier insertion and removal.
### IMPORTANT PRODUCT OBSOLESCENCE NOTICE

The time has come to discontinue a few of our older products due to part availability. The recommended alternative product will offer the customer a better solution than the existing product. Certain products have no listed replacements due to technological advancements. The actual discontinuation date is controlled by raw material inventories and future sales. If you have a customer using any of these products, please contact and advise them of the situation. As always, Red Lion will assist the customer as much as possible in the changeover process.

<table>
<thead>
<tr>
<th>DISCONTINUED PART/MODEL NUMBERS</th>
<th>DESCRIPTION</th>
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</tr>
</thead>
<tbody>
<tr>
<td>CFCx0000</td>
<td>Current to Frequency Converter</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>CL1000x0</td>
<td>2 x 20 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>CL2000x0</td>
</tr>
<tr>
<td>CUBID001</td>
<td>CUB2 DC Current Meter, 5 VDC</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>CUBID002</td>
<td>CUB2 DC Current Meter, 7 to 28 VDC</td>
<td>Discontinued as parts are depleted.</td>
<td>CUB4000</td>
</tr>
<tr>
<td>CUBVD001</td>
<td>CUB2 DC Volt Meter, 5 VDC</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>CUBVD002</td>
<td>CUB2 DC Volt Meter, 7 to 28 VDC</td>
<td>Discontinued as parts are depleted.</td>
<td>CUB4Y000</td>
</tr>
<tr>
<td>CX1000x0</td>
<td>2 x 20 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G305x000</td>
</tr>
<tr>
<td>CX1500x0</td>
<td>2 x 40 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G305x000</td>
</tr>
<tr>
<td>GL3000x0</td>
<td>256 x 128 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G306C000</td>
</tr>
<tr>
<td>GL300T0</td>
<td>256 x 128 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
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<td>GL3500x0</td>
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<td>Discontinued as parts are depleted.</td>
<td>G306C000</td>
</tr>
<tr>
<td>LLP10000</td>
<td>Loop Powered Process Meter</td>
<td>Discontinued as parts are depleted.</td>
<td>CUB4LP00</td>
</tr>
<tr>
<td>VFCx0000</td>
<td>Voltage to Frequency Converter</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>VX500S00</td>
<td>640 x 480 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G308C000</td>
</tr>
<tr>
<td>VX500TS0</td>
<td>640 x 480 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G308C000</td>
</tr>
<tr>
<td>VX550S00</td>
<td>640 x 480 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G308C000</td>
</tr>
</tbody>
</table>
Operator Interface Terminals

MODEL CX-150
2 X 40 VFD OPERATOR TERMINAL

- 2 LINE X 40 CHARACTER VACUUM FLUORESCENT DISPLAY
- 500 ALARM POINT LOGGER
- RECIPE HANDLING
- COMPREHENSIVE REPORT GENERATION
- UNLIMITED PASSWORD PROTECTION
- REAL TIME CLOCK, BATTERY BACKED
- EXPRESSION EVALUATION
- 32 BIT / FLOATING POINT MATH
- DIRECT, NETWORK (Including Multiple protocols) OR MODEM LINK TO PLC
- NEMA 4/IP65 STEEL ENCLOSURE
- CE COMPLIANT

DESCRIPTION

The CX-150 from the Paradigm Range of operator interfaces meets the ever increasing demands of industry for powerful easy-to-use terminals. Both hardware and software are designed to allow the user to easily upgrade and take full advantage of our continuing development and improvements to our products.

SPECIFICATIONS

1. POWER REQUIREMENTS: 11 min. to 30 max. VDC @ 4.7 W
   Power Up Current: 2.5 A for 25 msec. max.
   Must use a Class 2 or SELV rated power supply.
2. DISPLAY: 2 lines of 40 characters, 5 mm high Vacuum Fluorescent display
3. KEYPAD: 5 screen legendable soft keys, raise, lower, next, previous, exit, menu, alarms and mute keys, all with Tactile feedback.
4. MEMORY: 128 K (64 K user) battery backed RAM (Battery life expectancy 10 years). Optional factory fit expansion to 256 K (192 K user).
5. SERIAL PORTS: One RS-232 for PC or printer connection, one RS232 and one RS485 for PLC connection up to 19200 Baud. (Can be used as a three port device for multiple protocol applications)
6. PHYSICAL DIMENSIONS: L = 285 mm, H = 106 mm, D = 57 mm.
7. CONSTRUCTION: Metal enclosure with NEMA 4/IP65 front plate when correctly fitted with the gasket provided. This unit is rated for NEMA 4/IP65 indoor use. Installation Category I, Pollution Degree 2
8. FIELD CONNECTIONS: Removable screw terminal blocks.
9. ENVIRONMENTAL CONDITIONS:
   Operating Temperature: 0 to 40°C
   Storage Temperature: -20 to 80°C
   Operating and Storage Humidity: 80% max. relative humidity (non-condensing) from 0°C to 40°C.
   Altitude: Up to 2000 meters
10. WEIGHT: 2.1 lbs. (0.95 Kg)

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CX-150</td>
<td>VFD, 4 X 20, 8 Function keys, 128 K memory</td>
<td>CX150000</td>
</tr>
<tr>
<td></td>
<td>VFD, 4 X 20, 8 Function keys, 256 K memory</td>
<td>CX150010</td>
</tr>
</tbody>
</table>

DIMENSIONS “In inches (mm)”

PANEL CUT-OUT

Obsolete

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so, can be potentially harmful to persons or equipment in the event of a fault to the unit.

CAUTION: Read complete instructions prior to installation and operation of the unit.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL-05</td>
<td>LCD, 2 X 20, 3 Soft keys, 128 K memory</td>
<td>CL005000</td>
</tr>
<tr>
<td>CL-10</td>
<td>LCD, 2 X 20, 8 Function, 3 Soft keys, 128 K memory</td>
<td>CL100000</td>
</tr>
<tr>
<td>CL-15</td>
<td>LCD, 2 X 20, 8 Function, 3 Soft keys, 256 K memory</td>
<td>CL100010</td>
</tr>
<tr>
<td>CL-20</td>
<td>LCD, 2 X 20, 8 Function, 3 Soft keys, 128 K memory</td>
<td>CL200000</td>
</tr>
<tr>
<td>CX-100</td>
<td>VFD, 2 X 20, 8 Function keys, 128 K memory</td>
<td>CX100000</td>
</tr>
<tr>
<td>CX-150</td>
<td>VFD, 2 X 40, 5 Soft keys, 128 K memory</td>
<td>CX150000</td>
</tr>
<tr>
<td>CX-200</td>
<td>VFD, 4 X 20, 8 Function keys, 128 K memory</td>
<td>CX200000</td>
</tr>
<tr>
<td>EDICT-97 Development Kit Includes Software, Manual and 9-pin RS232 Programming cables</td>
<td>SFEDT</td>
<td></td>
</tr>
<tr>
<td>Communication Cables</td>
<td>P895xxxZ</td>
<td></td>
</tr>
</tbody>
</table>

TROUBLESHOOTING

For further technical assistance, contact technical support at the appropriate company numbers listed.

COMMON FEATURES FOR CHARACTER BASED OPERATOR TERMINALS

PROGRAMMABILITY

Event Driven Configuration Tool

Edict 97, an extremely powerful Windows 95/3.11 based software program, provides for the intuitive configuration of every aspect of the operator interface’s behavior. The requirement for time consuming PLC ladder logic is drastically reduced by the unique event driven approach of EDICT 97. The capability of this program, in conjunction with the PLC and the Paradigm operator interface unit, ensures a great deal of advanced functionality for your system. This powerful PLC/Paradigm system provides many of the capabilities and features normally associated with the more complicated and costly PC/SCADA systems. Display pages are easily generated, including PLC and internal variables, text strings, or bar charts. All dynamic elements are also available as alarms, recipes, triggers, and reports, for the run time software. After completion of the programming, the program is directly downloaded to the operator interface from your PC, without any compiling or saving requirement. When you require a change in your program, EDICT 97 loads only the change, not the entire program, saving valuable on-line time.

DYNAMIC DISPLAY PAGE ELEMENTS

Each display page has provisions to show static and dynamic information, including data variables, text messages, time, and date.

Data Variables can be either PLC derived or internally generated, either in data entry or display only mode. The Paradigm unit has an extremely powerful math capability, allowing the operator to manipulate the variables to meet the specific application’s demands. If required, the display can be formatted to BCD, binary, hex, floating point, and string. Upper and lower limits of data entry variables are fully supported and able to be password protected.

Text Message Animation enables several different types of animated text from a local or global message table to be displayed. The message displayed is dependent on the condition of the particular controlling expression. The controlling expression may be a PLC bit level, a timer value, preset counter condition, or any one of a wide variety of message triggers.

Time and Date in the Paradigm unit has the capability to display in any combination of year, month, day, hours, minutes, and seconds.

Bar Graphs in horizontal format are easily attached to data variables. The partial or full length bar graph displays can be scaled and offset to optimize the required display effect.

SECURITY

The password protection scheme provides the ultimate in tamper-proof capability. Access can be limited on a unit, page, recipe, or even individual data entries.

ALARMS

The Paradigm unit can monitor and log from 100 to 500 alarms, depending on model. Such triggers as a simple bit level transition, a PLC coil activation, or a complex application algorithm can activate an alarm. The alarms can be time and date stamped, with an automatic screen display and/or downloading to a printer for hard copy recording purposes.

REAL TIME SCHEDULE

Real time schedule allows for repetitive or one time task to take place in the system. Typically a schedule action similar to...At 1:55 PM on Monday, Wednesday, and Friday, print the production report...is required in the application. In conjunction with the recipe capabilities, a downloading of a special recipe can be requested by the real time schedule feature.

USER PROGRAMS

This feature offers the user the ability to incorporate custom application requirements via a powerful program language. For example, a program designated “Calculate Volume” which determines the amount of fluid in a round tank at specific temperatures could be created. This program would be triggered to run and display each time the page denoted as “Volume Now” is requested.

The ability to customize to your application’s specialized needs is easily solved with the user program capability.

KEYBOARD EDITING

All the interface keys can be programmed to perform virtually unlimited functions with each key, having multiple actions assigned to three types of key events: key pressed, key held down (auto repeat), and key released. Typical key actions would be Go to page, set value, load recipe, view alarms, print report, and many more.

COMMUNICATIONS

With over 70 communication drivers available, the Paradigm operator interface offers a wide range of connectivity including: PLCs, Variable Speed Drives, Temperature Controllers, Bar Code Readers, etc. Utilizing real PLC data references, the automatic comms configuration optimizes the system’s communication performance. In the event that your specific driver does not appear on the Paradigm drivers list, let us know, as this list is always being expanded to meet our customers’ needs.
HARDWARE INFORMATION

This bulletin contains a variety of information related to the installation and operation of the Operator Interface supplied. Ideally, you should read this document thoroughly before attempting to use the equipment. For information about the software aspects of the terminal, please consult other documentation.

CONTENTS OF PACKAGE

The Operator Interface is supplied in a packaging box containing the following...

- The interface terminal itself.
- A NEMA 4/IP65 rated mounting gasket.
- A bag containing panel hardware.
- This hardware bulletin.
- If any of these items is missing, please contact your supplier immediately.

POWER SUPPLY REQUIREMENTS

The Operator Interface requires a 24 V power supply rated at 0.5 A unless otherwise stated on the label.

- The Operator Interface requires a power supply capable of supplying a current of 500 mA at a regulated voltage of 24 V. Supplies providing between 18 V and 30 V are also suitable.
- The terminal may take as little as 100 mA in certain circumstances, so be sure that the chosen power supply can operate correctly with this load. Large switch-mode supplies tend to need a certain minimum load before they will operate correctly.

In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. A very high proportion of reported problems are caused by incorrect power supply installation, so please take care to observe the following points...

- The power supply must be mounted close to the unit, with usually not more than 6 feet of cable between the supply and the Operator Interface. Ideally, as short a length as is possible should be used. In particular, the power supply should not be mounted on the back of the panel when the Operator Interface is installed in the panel door unless a short cable run can be achieved.
- The wire used to connect the Operator Interface’s power supply should be of at least 22 gage wire. If a longer cable run is used, you should use even thicker cable. The routing of the cable should be kept away from large contactors, inverters and other devices which may generate significant electrical noise.

BATTERY BACKUP ISSUES

The Operator Interface is supplied with a Lithium Battery designed to maintain the internal memory and real-time clock during power outages. Assuming the operator interface terminal is powered up for 50% of the time, this battery should last over 4 years. A “Battery Low” system variable is replaced to allow planned maintenance to be carried out.

If any of these items is missing, please contact your supplier immediately.

To change the internal battery, follow these steps...

- Remove the power and PLC communications connector from the unit.
- Remove the four screws from the rear-cover.
- Remove the cover, ensuring that the right-hand edge is raised first to avoid fouling the earth stud. You may have to pivot the cover to an angle of about 30° to achieve this.
- If you wish to avoid losing the terminal’s configuration, reconnect the power connector and re-apply power. Note that this will require the panel to be powered-up and, as such, only suitably qualified staff should carry out this procedure.
- The battery is located in a holder on the main circuit board. This should be clearly visible. Remove the battery from its holder.
- Place the new battery in the holder. The terminal’s power supply can now be disconnected, if you re-applied power in the step above.
- Replace the lid, screws and connector by following the above procedure in reverse. You may like to make a note of the date the battery was fitted.
- Take care that the ink applied will not rub off of the paper, or else blemishes will be left on the inside of the window. Laminated paper or plastic film can prove easier to insert than normal photocopier paper. It also helps if the starting edge of the paper has about 0.25 inches of its corners cut off at a 45 degree angle.

Please note that the old battery must be disposed of in a manner which complies with your local waste regulations. Also, the battery must not be disposed of in fire or in a manner whereby it may be damaged and its contents come into contact with human skin.

INSTALLATION & CONNECTIONS

The unit meets NEMA 4/IP65 requirements for indoor use, when properly installed. The units are intended to be mounted into an enclosed panel.

Installation Environment

The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

Continuous exposure to direct sunlight may accelerate the aging process of the bezel. The bezel should be cleaned only with a soft cloth and neutral soap product. Do NOT use solvents.

Do not use tools of any kind (screwdrivers, pens, pencils, etc.) to operate the keypad of the unit.

CONNECTING TO A PLC

The Operator Interface is designed to operate with a PLC. A serial communication connection must be made between the operator interface terminal and PLC, and the details of this connection vary according to which PLC is used.

The following section lists the connection details for the PLC to be used.

PLC TYPE

Details on how to connect to most PLCs are available on request from RLC.

CONNECTING TO AN IBM PC/AT

The Operator Interface is programmed via software running on an IBM PC/AT or a compatible computer. The connection between the PC/AT and the operator interface terminal is made via a custom cable provided with the EIDICT Developer’s Kit. The cable is designed for a 9-way serial port. Please contact your supplier if you require a 25-way version.

PROGRAMMING PORT PIN OUT

The Operator Interface’s programming port is sometimes used to connect other RS-232 devices, such as printers. The following illustration and table gives the pin-out of this port to enable such connections to be made.

<table>
<thead>
<tr>
<th>RJ11 FEMALE</th>
<th>PIN</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>RTS</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Tx</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Rx</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>CTS</td>
</tr>
</tbody>
</table>

The above table denotes the pin names of the programming port. When connecting, the pin name at the programming port is connected to the opposite of that pin name at the destination device.

MOUNTING INSTRUCTIONS

The Operator Interfaces are designed for through-panel mounting. A neoprene gasket is provided, to enable sealing to NEMA 4/IP65 specification. The panel cut-out diagram for the model supplied is provided. All mounting holes should be drilled for 0.14” clearance. Care should be taken to remove any loose material from the mounting hole to avoid such metal falling into the Operator Interface itself during installation.

FUNCTION KEY STRIPS

The function keys on the Models CL-10, CL-20, CX-100, and CX-200, have clear windows that permit the user to insert labels appropriate to the process. A formatted page is supplied upon which the user can enter function names (e.g. RUN, PRINT, etc.). These strips are inserted from the rear of the panel through slots below the function keys located underneath the gasket.

Take care that the ink applied will not rub off of the paper, or else blemishes will be left on the inside of the window. Laminated paper or plastic film can prove easier to insert than normal photocopier paper. It also helps if the starting edge of the paper has about 0.25 inches of its corners cut off at a 45 degree angle.

Note: Add an additional 1.5” to label length to allow for easier insertion and removal.
# IMPORTANT PRODUCT OBSOLESCENCE NOTICE

The time has come to discontinue a few of our older products due to part availability. The recommended alternative product will offer the customer a better solution than the existing product. Certain products have no listed replacements due to technological advancements. The actual discontinuation date is controlled by raw material inventories and future sales. If you have a customer using any of these products, please contact and advise them of the situation. As always, Red Lion will assist the customer as much as possible in the changeover process.

<table>
<thead>
<tr>
<th>DISCONTINUED PART/MODEL NUMBERS</th>
<th>DESCRIPTION</th>
<th>STATUS</th>
<th>ALTERNATIVE PRODUCT OFFERINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFCx0000</td>
<td>Current to Frequency Converter</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>CL1000x0</td>
<td>2 x 20 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>CL2000x0</td>
</tr>
<tr>
<td>CUBID001</td>
<td>CUB2 DC Current Meter, 5 VDC</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>CUBID002</td>
<td>CUB2 DC Current Meter, 7 to 28 VDC</td>
<td>Discontinued as parts are depleted.</td>
<td>CUB40000</td>
</tr>
<tr>
<td>CUBVD001</td>
<td>CUB2 DC Volt Meter, 5 VDC</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>CUBVD002</td>
<td>CUB2 DC Volt Meter, 7 to 28 VDC</td>
<td>Discontinued as parts are depleted.</td>
<td>CUB4Y000</td>
</tr>
<tr>
<td>CX1000x0</td>
<td>2 x 20 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G305x000</td>
</tr>
<tr>
<td>CX1500x0</td>
<td>2 x 40 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G305x000</td>
</tr>
<tr>
<td>GL3000x0</td>
<td>256 x 128 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G306C000</td>
</tr>
<tr>
<td>GL300T0</td>
<td>256 x 128 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G306C000</td>
</tr>
<tr>
<td>GL3500x0</td>
<td>256 x 128 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G306C000</td>
</tr>
<tr>
<td>LPP10000</td>
<td>Loop Powered Process Meter</td>
<td>Discontinued as parts are depleted.</td>
<td>CUB4LP00</td>
</tr>
<tr>
<td>VFCx0000</td>
<td>Voltage to Frequency Converter</td>
<td>Discontinued as parts are depleted.</td>
<td>None</td>
</tr>
<tr>
<td>VX500S00</td>
<td>640 x 480 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G308C000</td>
</tr>
<tr>
<td>VX500TS0</td>
<td>640 x 480 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G308C000</td>
</tr>
<tr>
<td>VX550S00</td>
<td>640 x 480 Operator Interface</td>
<td>Discontinued as parts are depleted.</td>
<td>G308C000</td>
</tr>
</tbody>
</table>
DESCRIPTION

The CL-10 from the Paradigm Range of operator interfaces meets the ever increasing demands of industry for powerful easy-to-use terminals. Both hardware and software are designed to allow the user to easily upgrade and take full advantage of our continuing development and improvements to our products.

SPECIFICATIONS

1. POWER REQUIREMENTS: 11 min to 30 max. VDC @ 2.5 W
   Power Up Current: 3.0A for 1 mese. max.
   Must use a Class 2 or SELV rated power supply.
2. DISPLAY: 2 lines of 20 characters, 5 mm high liquid crystal display with bright LED backlight (with on/off software control)
3. KEYPAD: 3 screen legendable soft keys, 8 User re-legendable function keys, numeric pad with raise, lower, next, previous, enter, delete, exit, alarms and mute keys, all with Tactile feedback.
4. MEMORY: 128 K (64 K user) battery backed RAM (Battery life expectancy 10 years). Optional factory fit expansion to 256 K (192 K user).
5. SERIAL PORTS: One RS-232 for PC or printer connections, one RS232 and one RS485 for PLC connection up to 19200 Baud.
6. PHYSICAL DIMENSIONS: L = 206 mm, H = 162 mm, D = 57 mm.
7. CONSTRUCTION: Metal enclosure with NEMA 4/IP65 front plate when correctly fitted with the gasket provided. This unit is rated for NEMA 4/IP65 indoor use. Installation Category I, Pollution Degree 2
8. FIELD CONNECTIONS: Removable screw terminal blocks.
9. ENVIRONMENTAL CONDITIONS:
   Operating Temperature: 0 to 40°C
   Storage Temperature: -20 to 80°C
   Operating and Storage Humidity: 80% max. relative humidity (non-condensing) from 0°C to 40°C.
   Altitude: Up to 2000 meters
10. WEIGHT: 2 lbs. (0.9 Kg)

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL-10</td>
<td>LCD, 2 X 20, 8 Function, 3 Soft keys, 128 K memory</td>
<td>CL100000</td>
</tr>
<tr>
<td>CL-10</td>
<td>LCD, 2 X 20, 8 Function, 3 Soft keys, 256 K memory</td>
<td>CL100010</td>
</tr>
</tbody>
</table>

DIMENSIONS “In inches (mm)”

Panel Cut-Out

8.11 (206.0)  6.38 (162.0)  7.4 (188.0)  2.99 (76.0)  3.86 (98.0)

5.67 (144.0)  2.22 (56.5)  3.7 (94.0)  0.14 (#3.5)  2.83 (72.0)
**SAFETY SUMMARY**

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so, can be potentially harmful to persons or equipment in the event of a fault to the unit.

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<th>PART NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL-05</td>
<td>LCD, 2 X 20, 3 Soft keys, 128 K memory</td>
<td>CL050000</td>
</tr>
<tr>
<td>CL-10</td>
<td>LCD, 2 X 20, 8 Function, 3 Soft keys, 128 K memory</td>
<td>CL100000</td>
</tr>
<tr>
<td>CL-15</td>
<td>LCD, 2 X 20, 8 Function, 3 Soft keys, 256 K memory</td>
<td>CL100010</td>
</tr>
<tr>
<td>CL-20</td>
<td>LCD, 4 X 20, 8 Function, 3 Soft keys, 128 K memory</td>
<td>CL200000</td>
</tr>
<tr>
<td>CL-25</td>
<td>LCD, 4 X 20, 8 Function, 3 Soft keys, 256 K memory</td>
<td>CL200010</td>
</tr>
<tr>
<td>CX-100</td>
<td>VFD, 2 X 20, 8 Function keys, 128 K memory</td>
<td>CX100000</td>
</tr>
<tr>
<td>CX-150</td>
<td>VFD, 2 X 20, 8 Function keys, 256 K memory</td>
<td>CX150000</td>
</tr>
<tr>
<td>CX-200</td>
<td>VFD, 4 X 20, 8 Function keys, 128 K memory</td>
<td>CX200000</td>
</tr>
<tr>
<td></td>
<td>VFD, 4 X 20, 8 Function keys, 256 K memory</td>
<td>CX200010</td>
</tr>
<tr>
<td></td>
<td>EDICT-97 Development Kit</td>
<td>SFEDT</td>
</tr>
<tr>
<td></td>
<td>Includes Software, Manual and 9-pin RS232 Programming cables</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Communication Cables</td>
<td>PB95xxxZ</td>
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</tbody>
</table>

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**COMMON FEATURES FOR CHARACTER BASED OPERATOR TERMINALS**

**PROGRAMMABILITY**

**Event Driven Configuration Tool**

Edict 97, an extremely powerful Windows 95/3.11 based software program, provides for the intuitive configuration of every aspect of the operator interface’s behavior. The requirement for time consuming PLC ladder logic is drastically reduced by the unique event driven approach of EDICT 97. The capability of this program, in conjunction with the PLC and the Paradigm operator interface unit, ensures a great deal of advanced functionality for your system. This powerful PLC/Paradigm system provides many of the capabilities and features normally associated with the more complicated and costly PC/SCADA systems. Display pages are easily generated, including PLC and internal variables, text strings, or bar charts. All dynamic elements are also available as alarms, recipes, triggers, and reports, for the run time software.

After completion of the programming, the program is directly downloaded to the operator interface from your PC, without any compiling or saving requirement. When you require a change in your program, EDICT 97 loads only the change, not the entire program, saving valuable on-line time.

**DYNAMIC DISPLAY PAGE ELEMENTS**

Each display page has provisions to show static and dynamic information, including data variables, text messages, time, and date.

**Data Variables** can be either PLC derived or internally generated, either in data entry or display only mode. The Paradigm unit has an extremely powerful math capability, allowing the operator to manipulate the variables to meet the specific application’s demands. If required, the display can be formatted to BCD, binary, hex, floating point, and string. Upper and lower limits of data entry variables are fully supported and able to be password protected.

**Text Message Animation** enables several different types of animated text from a local or global message table to be displayed. The message displayed is dependent on the condition of the particular controlling expression. The controlling expression may be a PLC bit level, a timer value, preset counter condition, or any one of a wide variety of message triggers.

**Time and Date** in the Paradigm unit has the capability to display in any combination of year, month, day, hours, minutes, and seconds.

**Bar Graphs** in horizontal format are easily attached to data variables. The partial or full length bar graph displays can be scaled and offset to optimize the required display effect.

**SECURITY**

The password protection scheme provides the ultimate in tamper-proof capability. Access can be limited on a unit, page, recipe, or even individual data entries.

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**ALARMS**

The Paradigm unit can monitor and log from 100 to 500 alarms, depending on model. Such triggers as a simple bit level transition, a PLC coil activation, or a complex application algorithm can activate an alarm. The alarms can be time and date stamped, with an automatic screen display and/or downloading to a printer for hard copy recording purposes.

**REAL TIME SCHEDULE**

Real time schedule allows for repetitive or one time task to take place in the system. Typically a schedule action similar to...At 1:55 PM on Monday, Wednesday, and Friday, print the production report...is required in the application. In conjunction with the recipe capabilities, a downloading of a special recipe can be requested by the real time schedule feature.

**USER PROGRAMS**

This feature offers the user the ability to incorporate custom application requirements via a powerful program language. For example, a program designated “Calculate Volume” which determines the amount of fluid in a round tank at specific temperatures could be created. This program would be triggered to run and display each time the page denoted as “Volume Now” is requested.

The ability to customize to your application’s specialized needs is easily solved with the user program capability.

**KEYBOARD EDITING**

All the interface keys can be programmed to perform virtually unlimited functions with each key, having multiple actions assigned to three types of key events: key pressed, key held down (auto repeat), and key released. Typical key actions would be Go to page, set value, load recipe, view alarms, print report, and many more.

**COMMUNICATIONS**

With over 70 communication drivers available, the Paradigm operator interface offers a wide range of connectivity including: PLCs, Variable Speed Drives, Temperature Controllers, Bar Code Readers, etc. Utilizing real PLC data references, the automatic comms configuration optimizes the system’s communication performance. In the event that your specific driver does not appear on the Paradigm drivers list, let us know, as this list is always being expanded to meet our customers’ needs.
HARDWARE INFORMATION

This bulletin contains a variety of information related to the installation and operation of the Operator Interface supplied. Ideally, you should read this document thoroughly before attempting to use the equipment. For information about the software aspects of the terminal, please consult other documentation.

CONTENTS OF PACKAGE

The Operator Interface is supplied in a packaging box containing the following...

- The interface terminal itself.
- A NEMA 4/IP65 rated mounting gasket.
- A bag containing panel hardware.
- This hardware bulletin.
- If any of these items is missing, please contact your supplier immediately.

POWER SUPPLY REQUIREMENTS

The Operator Interface requires a 24 V power supply rated at 0.5 A unless otherwise stated on the label.

- The Operator Interface requires a power supply capable of supplying a current of 500 mA at a regulated voltage of 24 V. Supplies providing between 18 V and 30 V are also suitable.
- The terminal may take as little as 100 mA in certain circumstances, so be sure that the chosen power supply can operate correctly with this load. Large switch-mode supplies tend to need a certain minimum load before they will operate correctly.

In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. A very high proportion of reported problems are caused by incorrect power supply installation, so please take care to observe the following points...

- The power supply must be mounted close to the unit, with usually not more than 6 feet of cable between the supply and the Operator Interface. Ideally, as short a length as is possible should be used. In particular, the power supply should not be mounted on the back of the panel when the Operator Interface is installed in the panel door unless a short cable run can be achieved.
- The wire used to connect the Operator Interface’s power supply should be of at least 22 gauge wire. If a longer cable run is used, you should use even thicker cable. The routing of the cable should be kept away from large contactors, inverters and other devices which may generate significant electrical noise.

BATTERY BACKUP ISSUES

The Operator Interface is supplied with a Lithium Battery designed to maintain the internal memory and real-time clock during power outages. Assuming the operator interface terminal is powered up for 50% of the time, this battery should last over 4 years. A “Battery Low” system variable is used to indicate that the battery should be replaced.

Assuming the software configuration database should then be re-loaded.

Please note that the old battery must be disposed of in a manner which complies with your local waste regulations. Also, the battery must not be disposed of in fire or in a manner whereby it may be damaged and its contents come into contact with human skin.

INSTALLATION & CONNECTIONS

The unit meets NEMA 4/IP65 requirements for indoor use, when properly installed. The units are intended to be mounted into an enclosed panel.

Installation Environment

The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

Continuous exposure to direct sunlight may accelerate the aging process of the bezel. The bezel should be cleaned only with a soft cloth and neutral soap product. Do NOT use solvents.

Do not use tools of any kind (screwdrivers, pens, pencils, etc.) to operate the keypad of the unit.

CONNECTING TO A PLC

The Operator Interface is designed to operate with a PLC. A serial communication connection must be made between the operator interface terminal and PLC, and the details of this connection vary according to which PLC is used.

The following section lists the connection details for the PLC to be used.

PLC TYPE

Details on how to connect to most PLCs are available on request from RLC.

CONNECTING TO AN IBM PC/AT

The Operator Interface is programmed via software running on an IBM PC/AT or a compatible computer. The connection between the PC/AT and the operator interface terminal is made via a custom cable provided with the EDICT Developer’s Kit. The cable is designed for a 9-way serial port. Please contact your supplier if you require a 25-way version.

PROGRAMMING PORT PIN OUT

The Operator Interface’s programming port is sometimes used to connect other RS-232 devices, such as printers. The following illustration and table gives the pin-out of this port to enable such connections to be made.

<table>
<thead>
<tr>
<th>RJ11 FEMALE</th>
<th>PIN</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RTS</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Tx</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Rx</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>CTS</td>
<td></td>
</tr>
</tbody>
</table>

The above table denotes the pin names of the programming port. When connecting, the pin name at the programming port is connected to the opposite of that pin name at the destination device.

MOUNTING INSTRUCTIONS

The Operator Interfaces are designed for through-panel mounting. A neoprene gasket is provided, to enable sealing to NEMA 4/IP65 specification. The panel cut-out diagram for the model supplied is provided. All mounting holes should be drilled for 0.14” clearance. Care should be taken to remove any loose material from the mounting hole to avoid such metal falling into the Operator Interface itself during installation.

FUNCTION KEY STRIPS

The function keys on the Models CL-10, CL-20, CX-100, and CX-200, have clear windows that permit the user to insert labels appropriate to the process. A formatted page is supplied upon which the user can enter function names (e.g. RUN, PRINT, etc.). These strips are inserted from the rear of the panel through slots below the function keys located underneath the gasket.

Take care that the ink applied will not rub off of the paper, or else blemishes will be left on the inside of the window. Laminated paper or plastic film can prove easier to insert than normal photocopier paper. It also helps if the starting edge of the paper has about 0.25 inches of its corners cut off at a 45 degree angle.

Note: Add an additional 1.5” to label length to allow for easier insertion and removal.

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Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
DESCRIPTION
The CL-15 from the Paradigm Range of operator interfaces meets the ever increasing demands of industry for powerful easy-to-use terminals. Both hardware and software are designed to allow the user to easily upgrade and take full advantage of our continuing development and improvements to our products.

SPECIFICATIONS
1. POWER REQUIREMENTS: 11 min. to 30 max. VDC @ 3.0 W
   Power Up Current: 2.5 A for 1 msec. max.
   Must use a Class 2 or SELV rated power supply.
2. DISPLAY: 2 lines of 40 characters, 5 mm high liquid crystal display with bright LED backlight (with on/off software control)
3. KEYPAD: 5 screen legendable soft keys, raise, lower, next, previous, exit, menu, alarms and mute keys, all with Tactile feedback.
4. MEMORY: 128 K (64 K user) battery backed RAM (Battery life expectancy 10 years). Optional factory fit expansion to 256 K (192 K user).
5. SERIAL PORTS: One RS-232 for PC or printer connection, one RS232 and one RS485 for PLC connection up to 19200 Baud.
6. PHYSICAL DIMENSIONS: L = 240 mm, H = 160 mm, D = 55 mm
7. CONSTRUCTION: Metal enclosure with NEMA 4/IP65 front plate when correctly fitted with the gasket provided. This unit is rated for NEMA 4/IP65 indoor use. Installation Category I, Pollution Degree 2
8. FIELD CONNECTIONS: Removable screw terminal blocks.
9. ENVIRONMENTAL CONDITIONS:
   Operating Temperature: 0 to 40°C
   Storage Temperature: -20 to 80°C
   Operating and Storage Humidity: 80% max. relative humidity (non-condensing) from 0°C to 40°C.
   Altitude: Up to 2000 meters
10. WEIGHT: 1.6 lbs. (0.72 Kg)

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL-15</td>
<td>LCD, 2 X 40, 5 Soft keys, 128 K memory</td>
<td>CL150000</td>
</tr>
<tr>
<td>LCD, 2 X 40, 5 Soft keys, 256 K memory</td>
<td>CL150010</td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS “In inches (mm)”

PANEL CUT-OUT

Obsolet
SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so, can be potentially harmful to persons or equipment in the event of a fault to the unit.

CAUTION: Read complete instructions prior to installation and operation of the unit.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL-05</td>
<td>LCD, 2 X 20, 3 Soft keys, 128 K memory</td>
<td>CL050000</td>
</tr>
<tr>
<td>CL-10</td>
<td>LCD, 2 X 20, 8 Function, 3 Soft keys, 128 K memory</td>
<td>CL100000</td>
</tr>
<tr>
<td>CL-15</td>
<td>LCD, 2 X 20, 8 Function, 3 Soft keys, 256 K memory</td>
<td>CL150000</td>
</tr>
<tr>
<td>CL-20</td>
<td>LCD, 2 X 20, 8 Function, 3 Soft keys, 128 K memory</td>
<td>CL200000</td>
</tr>
<tr>
<td>CX-100</td>
<td>VFD, 2 X 20, 8 Function keys, 128 K memory</td>
<td>CX100000</td>
</tr>
<tr>
<td>CX-150</td>
<td>VFD, 2 X 40, 5 Soft keys, 128 K memory</td>
<td>CX150000</td>
</tr>
<tr>
<td>CX-200</td>
<td>VFD, 2 X 40, 8 Function keys, 128 K memory</td>
<td>CX200000</td>
</tr>
<tr>
<td></td>
<td>EDICT-97 Development Kit Includes Software, Manual and 9-pin RS232 Programming cables</td>
<td>SFEDT</td>
</tr>
<tr>
<td></td>
<td>Communication Cables</td>
<td>P995xxX</td>
</tr>
</tbody>
</table>

TROUBLESHOOTING

For further technical assistance, contact technical support at the appropriate company numbers listed.

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It is possible to replace the battery without losing the contents of the Operator Interface’s memory, but this does not reduce the importance of ensuring that a copy of the terminal’s configuration is kept readily at hand to allow the terminal to be re-loaded in the case of mishaps. Please remember that it is not possible to extract the contents of a terminal for subsequent re-loading, so the importance of keeping a copy on disk cannot be over stressed.

CHANGING THE BATTERY
To change the internal battery, follow these steps...

- Remove the power and PLC communications connector from the unit.
- Remove the two screws from the rear-cover.
- Remove the cover, ensuring that the right-hand edge is raised first to avoid fouling the earth stud. You may have to pivot the cover to an angle of about 30°to achieve this.
- If you wish to avoid losing the terminal’s configuration, reconnect the power connector and re-apply power. Note that this will require the panel to be powered-up and, as such, only suitably qualified staff should carry out this procedure.
- If you did not keep the unit powered-up during battery replacement, hold down the EXIT and MUTE keys on the keyboard and remove and then re-apply power. This will clear the internal memory and thus the suitable configuration database should then be re-loaded.

Please note that the old battery must be disposed of in a manner which complies with your local waste regulations. Also, the battery must not be disposed of in fire or in a manner whereby it may be damaged and its contents come into contact with human skin.

INSTALLATION & CONNECTIONS
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Note: Add an additional 1.5” to label length to allow for easier insertion and removal.
MODEL G308 - GRAPHIC LCD OPERATOR INTERFACE TERMINAL WITH VGA DISPLAY AND TOUCHSCREEN

- Configured using Crimson software (version 2.0 or later)
- Up to 5 RS-232/422/485 communications ports
  (2 RS-232 and 1 RS-422/485 on board, 1 RS-232 and 1 RS422/485 on optional communications card)
- 10 Base T/100 Base-TX Ethernet Port to network units and host web pages
- USB Port to download the unit's configuration from a PC or for data transfers to a PC
- Unit's configuration is stored in non-volatile memory (8Mbyte Flash)
- CompactFlash® Socket to increase memory capacity
- 7.7-inch DSTN Passive Matrix 256 Color VGA 640x480 pixel LCD module
- 7-button keypad for on-screen menus
- Three front panel LEDs
- Power unit from 24VDC ±20% supply
- Resistive Analog Touchscreen

GENERAL DESCRIPTION

The G308 Operator Interface Terminal combines unique capabilities normally expected from high-end units with a very affordable price. It is built around a high performance core with integrated functionality. This core allows the G308 to perform many of the normal features of the Paradigm range of Operator Interfaces while improving and adding new features.

The G308 is able to communicate with many different types of hardware using high-speed RS232/422/485 communications ports and Ethernet 10 Base T/100 Base-TX communications. In addition, the G308 features USB for fast downloads of configuration files and access to trending and data logging. A CompactFlash socket is provided so that Flash cards can be used to collect your trending and data logging information as well as to store larger configuration files.

In addition to accessing and controlling of external resources, the G308 allows a user to easily view and enter information. Users can enter data through the touchscreen or front panel 7-button keypad.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to the equipment or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use the controller to directly command motors, valves, or other actuators not equipped with safeguards. Do so can be potentially harmful to persons or equipment in the event of a fault to the controller.

The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2/CLASS II, DIVISION 2/CLASS III, DIVISION 2

![UL Listed Laboratory Equipment](image)

FOR USE IN HAZARDOUS LOCATIONS:
- Class I, Division 2, Groups A, B, C, and D
- Class II, Division 2, Groups F and G
- Class III, Division 2

CONTENTs OF PACKAGE

- G308 Operator Interface.
- Panel gasket.
- This hardware bulletin.
- Template for panel cutout.
- Hardware packet for mounting unit into panel.
- Terminal block for connecting power.
- Template for panel cutout.
- Unit’s configuration is stored in non-volatile memory.
- CompactFlash® Socket.
- Resistive Analog Touchscreen.
- USB Port.
- 10 Base T/100 Base-TX Ethernet Port
- USB Port to download the unit’s configuration from a PC or for data transfers to a PC
- Unit’s configuration is stored in non-volatile memory (8Mbyte Flash)
- CompactFlash® Socket to increase memory capacity
- 7.7-inch DSTN Passive Matrix 256 Color VGA 640x480 pixel LCD module
- 7-button keypad for on-screen menus
- Three front panel LEDs
- Power unit from 24VDC ±20% supply
- Resistive Analog Touchscreen

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>G308</td>
<td>Operator Interface for indoor applications, textured finish with embossed keys</td>
<td>G308C000</td>
</tr>
<tr>
<td>G3CF</td>
<td>64 MB CompactFlash Card</td>
<td>G3CF064M</td>
</tr>
<tr>
<td></td>
<td>256 MB CompactFlash Card</td>
<td>G3CF256M</td>
</tr>
<tr>
<td></td>
<td>512 MB CompactFlash Card</td>
<td>G3CF512M</td>
</tr>
<tr>
<td>G3RS</td>
<td>RS232/485 Optional Communications Cards</td>
<td>G3RS0000</td>
</tr>
<tr>
<td>G3CN</td>
<td>CANopen Optional Communications Cards</td>
<td>G3CN0000</td>
</tr>
<tr>
<td>PSDLR</td>
<td>DIN Rail Power Supply</td>
<td>PSDL7000</td>
</tr>
<tr>
<td>SFCRM2</td>
<td>Crimson 2.0</td>
<td>SFCRM200</td>
</tr>
<tr>
<td>CBL</td>
<td>RS-232 Programming Cable</td>
<td>CBLRPROG0</td>
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<td></td>
<td>USB Cable</td>
<td>CBLUSB00</td>
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</tr>
<tr>
<td></td>
<td>Replacement Battery</td>
<td>BAL3R004</td>
</tr>
<tr>
<td>G3FILM</td>
<td>Protective Films</td>
<td>G3FILM08</td>
</tr>
</tbody>
</table>

1 Contact your Red Lion distributor or visit our website for complete details.
2 Use this part number to purchase Crimson on CD with a printed manual, USB cable, and RS-232 cable. Otherwise, download for free from www.redlion.net.
3 Red Lion offers RJ modular jack adapters. Refer to the DR literature for complete details.
4 Battery type is lithium coin type CR2025. Industrial grade 2 million write cycles.
5 Industrial grade two million write cycles.

CompactFlash is a registered trademark of CompactFlash Association.
1. **POWER REQUIREMENTS:**
+24 VDC ±20% @ 24 W maximum. Must use Class 2 or SELV rated power supply.

Power connection via removable three position terminal block.

**Notes:**
1. The front panel PWR LED indicates power.
2. The G308’s circuit common is not connected to the enclosure of the unit. See “Connecting to Earth Ground” in the section “Installing and Powering the G308.”

2. **BATTERY:** Lithium coin cell. Typical lifetime of 10 years.

3. **LCD MODULE DISPLAYS:**
   - Lifetime at room temperature. Refer to “Display” in “Software/Unit Operation”

4. **7-KEY KEYPAD:** for on-screen menus.

5. **TOUCHSCREEN:** Resistive analog

6. **MEMORY:**
   - On Board User Memory: 8 Mbyte of onboard non-volatile Flash memory.
   - Memory Card: CompactFlash Type II slot for Type I and Type II CompactFlash cards.

7. **COMMUNICATIONS:**
   - **USB Port:** Adheres to USB specification 1.1. Device only using Type B connection.
   - **Serial Ports:** Format and Baud Rates for each port are individually software programmable up to 115,200 baud.
   - **PGM Port:** RS232 port via RJ12.
   - **COMMS Ports:** RS422/485 port via RJ45, and RS232 port via RJ12.
   - **DH485 TXEN:** Transmit enable; open collector, VOH = 15 VDC, VOL = 0.5 V @ 25 mA max.
   - **Ethernet Port:** 10 BASE-T / 100 BASE-TX

8. **ENVIRONMENTAL CONDITIONS:**
   - **Operating Temperature Range:** 0 to 50°C
   - **Storage Temperature Range:** -25 to 60°C
   - **Operating and Storage Humidity:** 80% maximum relative humidity (non-condensing) from 0 to 50°C.
   - **Altitude:** Up to 2000 meters.

9. **CERTIFICATIONS AND COMPLIANCES:**
   - **SAFETY**
     - UL Recognized Component, File #E179259, UL61010-1, CSA 22.2 No. 61010-1
     - Recognized to U.S. and Canadian requirements under the Component Recognition Program of Underwriters Laboratories, Inc
     - UL Listed, File #E211967, UL61010-1, UL1604, CSA 22.2 No. 61010.1, CSA 22.2 No. 213-M1987
     - LISTED by Und. Lab. Inc. to U.S. and Canadian safety standards
     - Type 4X Enclosure rating (Face only), UL50
     - IEEECB Scheme Test Certificate #US/9737/UL
     - CB Scheme Test Report #E179259-V01-S04
     - Issued by Underwriters Laboratories Inc.
   - **IEC 61010-1, EN 61010-1:** Safety requirements for electrical equipment for measurement, control, and laboratory use, Part I
   - **IP66 Enclosure rating (Face only), IEC 529**
   - **Electromagnetic Compatibility**
     - Emissions and Immunity to EN 61326: Electrical Equipment for Measurement, Control and Laboratory use.

   **Immunity to Industrial Locations:**
   - **Electrostatic discharge** EN 61000-4-2 Criterion A
   - **4 kV contact discharge** 8 kV air discharge
   - **Electromagnetic RF fields** EN 61000-4-3 Criterion A
   - **10 V/m**
   - **Fast transients (burst)** EN 61000-4-4 Criterion A
   - **2 kV power** 1 kV signal
   - **Surge** EN 61000-4-5 Criterion A
   - **1 kV L-L, 1 kV L-N**
   - **2 kV L-N-L power** 3 V/rms
   - **RF conducted interference** EN 61000-4-6 Criterion B
   - **3 Vrms**

   **Emissions:**
   - **EN 55011** Class A
   - **EN 55011** Class A
   - **EN 55011** Class A
   - **EN 55011** Class A
   - **EN 55011** Class A
   - **EN 55011** Class A
   - **EN 55011** Class A
   - **EN 55011** Class A
   - **EN 55011** Class A
   - **EN 55011** Class A

**Notes:**
1. **Criterion A:** Normal operation within specified limits.
2. **Criterion B:** Temporary loss of performance from which the unit self-recover.

10. **CONSTRUCTION:** Steel rear metal enclosure with NEMA 4X/IP66 aluminum front plate for indoor use only when correctly fitted with the gasket provided. Installation Category II, Pollution Degree 2.

11. **MOUNTING REQUIREMENTS:**
   - Maximum panel thickness is 0.25" (6.3 mm).
   - For NEMA 4X/IP66 sealing, a steel panel with a minimum thickness of 0.125" (3.17 mm) is recommended.

12. **WEIGHT:** 3.84 lbs (1.74 Kg)

---

**DIMENSIONS** In inches (mm)

![DIMENSIONS Diagram]
Installing and Powering the G308

Mounting Instructions
This operator interface is designed for through-panel mounting. A panel cut-out diagram and a template are provided. Care should be taken to remove any loose material from the mounting cut-out to prevent that material from falling into the operator interface during installation. A gasket is provided to enable sealing to NEMA 4X/IP66 specification. Install the ten kep nuts provided and tighten evenly for uniform gasket compression.

Note: Tightening the kep nuts beyond a maximum of 17 inch-pounds (1.92 N·m) may cause damage to the front panel.

Power Supply Requirements
The G308 requires a 24 VDC power supply rated at 24 W. Your unit may draw considerably less than 24 W depending upon the options being used. As additional features are used your unit will draw increasing amounts of power. Items that could cause increases in current are additional communications, optional communications card, CompactFlash card, and other features programmed through Crimson.

In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. Please take care to observe the following points:
- The power supply must be mounted close to the unit, with usually not more than 6 feet (1.8 m) of cable between the supply and the operator interface. Ideally, the shortest length possible should be used.
- The wire used to connect the operator interface’s power supply should be at least 22-gage wire. If a longer cable run is used, a heavier gage wire should be used. The routing of the cable should be kept away from large contactors, inverters, and other devices which may generate significant electrical noise.
- A power supply with a Class 2 or SELV rating is to be used. A Class 2 or SELV power supply provides isolation to accessible circuits from hazardous voltage levels generated by mains power supply due to single faults. SELV is an acronym for “safety extra-low voltage.” Safety extra-low voltage circuits shall exhibit voltages safe to touch both under normal operating conditions and after a single fault, such as a breakdown of a layer of basic insulation or after the failure of a single component has occurred.

Connecting to Earth Ground
Each G308 has a chassis ground terminal on the back of the unit. Your unit should be connected to earth ground (protective earth).

Communicating With the G308

Configuring a G308
The G308 is configured using Crimson software. Crimson is available as a free download from Red Lion’s website, or it can be purchased on CD. Updates to Crimson for new features and drivers are posted on the website as they become available. By configuring the G308 using the latest version of Crimson, you are assured that your unit has the most up to date feature set. Crimson software can configure the G308 through the RS232 PGM port, USB port, or CompactFlash.

The USB port is connected using a standard USB cable with a Type B connector. The USB port is connected using a standard USB cable with a Type B connector. The driver needed to use the USB port will be installed with Crimson.

In order to transfer data from the CompactFlash card via the USB port, a driver must be installed on your computer. This driver is installed with Crimson.

In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. Please take care to observe the following points:

Cables and Drivers
Red Lion has a wide range of cables and drivers for use with many different communication types. A list of these drivers and cables along with pin outs is available from Red Lion’s website. New cables and drivers are added on a regular basis. If making your own cable, refer to the “G308 Port Pin Outs” for wiring information.
ETHERNET COMMUNICATIONS

Ethernet communications can be established at either 10 BASE-T or 100 BASE-TX. The G308 unit’s RJ45 jack is wired as a NIC (Network Interface Card). For example, when wiring to a hub or switch use a straight-through cable, but when connecting to another NIC use a crossover cable.

RS232 PORTS

The G308 has two RS232 ports. There is the PGM port and the COMMS port. Although only one of these ports can be used for programming, both ports can be used for communications with a PLC.

The RS232 ports can be used for either master or slave protocols with any G308 configuration.

Examples of RS232 communications could involve another Red Lion product or a PC. By using a cable with RJ12 ends on it, and a twist in the cable, RS232 communications with another G3 product or the Modular Controller can be established. Red Lion part numbers for cables with a twist in them are CBLPROG0, CBLRLC01, or CBLRC02.

G3 RS232 to a PC

<table>
<thead>
<tr>
<th>Connections</th>
<th>G3: RJ12</th>
<th>PC: DB9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>4</td>
<td>COMM</td>
</tr>
<tr>
<td>Name</td>
<td>5</td>
<td>Tx</td>
</tr>
<tr>
<td>Name</td>
<td>2</td>
<td>Rx</td>
</tr>
<tr>
<td>Name</td>
<td>3</td>
<td>N/C</td>
</tr>
<tr>
<td>Name</td>
<td>1</td>
<td>COM</td>
</tr>
<tr>
<td>Name</td>
<td>6</td>
<td>CTS</td>
</tr>
<tr>
<td>Name</td>
<td>7</td>
<td>RTS</td>
</tr>
<tr>
<td>Name</td>
<td>8</td>
<td>DTR</td>
</tr>
<tr>
<td>Name</td>
<td>9</td>
<td>GND</td>
</tr>
</tbody>
</table>

1 CBLPROG0 can also be used to communicate with either a PC or an ICM5.
2 DB9 adapter not included, 1 foot long.
3 DB9 adapter not included, 10 feet long.

The Ethernet connector contains two LEDs. A yellow LED in the upper right, and a bi-color green/amber LED in the upper left. The LEDs represent the following statuses:

<table>
<thead>
<tr>
<th>LED COLOR</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>YELLOW solid</td>
<td>Link established.</td>
</tr>
<tr>
<td>YELLOW flashing</td>
<td>Data being transferred.</td>
</tr>
<tr>
<td>GREEN</td>
<td>10 BASE-T Communications</td>
</tr>
<tr>
<td>AMBER</td>
<td>100 BASE-TX Communications</td>
</tr>
</tbody>
</table>

The Crimson manual contains additional information on Ethernet communications.

CONNECTING A G308 OPERATOR INTERFACE TO AN ICM5

G308 PORT PIN OUTS

POWER CONNECTOR

RS232

COMMS PORT

COMMS PORT

ETHERNET (NIC)

USB TYPE B

PGM PORT

PROTECTIVE EARTH GROUND

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
RS422/485 COMMS PORT
The G308 has one RS422/485 port. This port can be configured to act as either RS422 or RS485.

RS422/485 4-WIRE CONNECTIONS

RS485 2-WIRE CONNECTIONS

**Note:** All Red Lion devices connect A to A and B to B, except for Paradigm devices. Refer to [www.redlion.net](http://www.redlion.net) for additional information.

Examples of RS485 2-Wire Connections

**G3 to Red Lion RJ11 (CBLRLC00)**

<table>
<thead>
<tr>
<th>G3: RJ45</th>
<th>Name</th>
<th>RLC: RJ11</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>TxEN</td>
<td>2</td>
<td>TxEN</td>
</tr>
<tr>
<td>6</td>
<td>COM</td>
<td>3</td>
<td>COM</td>
</tr>
<tr>
<td>1</td>
<td>TxB</td>
<td>5</td>
<td>B-</td>
</tr>
<tr>
<td>2</td>
<td>TxA</td>
<td>4</td>
<td>A+</td>
</tr>
</tbody>
</table>

**G3 to Modular Controller (CBLRLC05)**

<table>
<thead>
<tr>
<th>G3</th>
<th>Name</th>
<th>Modular Controller</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,4</td>
<td>TxB</td>
<td>1,4</td>
<td>TxB</td>
</tr>
<tr>
<td>4,1</td>
<td>RxB</td>
<td>4,1</td>
<td>RxB</td>
</tr>
<tr>
<td>2,3</td>
<td>TxA</td>
<td>2,3</td>
<td>TxA</td>
</tr>
<tr>
<td>3,2</td>
<td>RxA</td>
<td>3,2</td>
<td>RxA</td>
</tr>
<tr>
<td>5</td>
<td>TxEN</td>
<td>5</td>
<td>TxEN</td>
</tr>
<tr>
<td>6</td>
<td>COM</td>
<td>6</td>
<td>COM</td>
</tr>
<tr>
<td>7</td>
<td>TxB</td>
<td>7</td>
<td>TxB</td>
</tr>
<tr>
<td>8</td>
<td>TxA</td>
<td>8</td>
<td>TxA</td>
</tr>
</tbody>
</table>

DH485 COMMUNICATIONS
The G308's RS422/485 COMMS port can also be used for Allen Bradley DH485 communications.

**WARNING:** DO NOT use a standard DH485 cable to connect this port to Allen Bradley equipment. A cable and wiring diagram are available from Red Lion.

<table>
<thead>
<tr>
<th>G3 to AB SLC 500 (CLAB003)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Connections</strong></td>
</tr>
<tr>
<td>R4J5: RLC</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3, 8</td>
</tr>
<tr>
<td>4, 7</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>4, 7</td>
</tr>
<tr>
<td>3, 8</td>
</tr>
</tbody>
</table>
CRIMSON SOFTWARE
Crimson software is available as a free download from Red Lion’s website or it can be purchased on a CD, see “Ordering Information” for part number. The latest version of the software is always available from the website, and updating your copy is free.

DISPLAY
This operator interface uses a liquid crystal display (LCD) for displaying text and graphics. The display utilizes a cold cathode fluorescent tube (CCFL) for lighting the display. The CCFL tubes can be dimmed for low light conditions.

These CCFL tubes have a limited lifetime. Backlight lifetime is based upon the amount of time the display is turned on at full intensity. Turning the backlight off when the display is not in use can extend the lifetime of your backlight. This can be accomplished through the Crimson software when configuring your unit.

FRONT PANEL LEDS
There are three front panel LEDs. Shown below is the default status of the LEDs.

<table>
<thead>
<tr>
<th>LED</th>
<th>INDICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED (TOP, LABELED &quot;PWR&quot;)</td>
<td>FLASHING Unit is in the boot loader, no valid configuration is loaded.1</td>
</tr>
<tr>
<td>YELLOW (MIDDLE)</td>
<td>OFF No CompactFlash card is present.</td>
</tr>
<tr>
<td>FLICKERING Unit is writing to the CompactFlash, either because it is storing data, or because the PC connected via the USB port has locked the drive.2</td>
<td></td>
</tr>
<tr>
<td>GREEN (BOTTOM)</td>
<td>FLASHING A tag is in an alarm state.</td>
</tr>
</tbody>
</table>

1. The operator interface is shipped without a configuration. After downloading a configuration, if the light remains in the flashing state continuously, try cycling power. If the LED still continues to flash, try downloading a configuration again.

2. Do not turn off power to the unit while this light is flickering. The unit writes data in two minute intervals. Later Microsoft operating systems will not lock the drive unless they need to write data; Windows 98 may lock the drive any time it is mounted, thereby interfering with logging. Refer to “Mounting the CompactFlash” in the Crimson 2 User Manual.

TOUCHSCREEN
This operator interface utilizes a resistive analog touchscreen for user input. The unit will only produce an audible tone (beep) when a touch on an active touchscreen cell is sensed. The touchscreen is fully functional as soon as the operator interface is initialized, and can be operated with gloved hands.

KEYPAD
The G308 keypad consists of seven keys that can be used for on-screen menus.

TROUBLESHOOTING YOUR G308
If for any reason you have trouble operating, connecting, or simply have questions concerning your new G308, contact Red Lion’s technical support. For contact information, refer to the back page of this bulletin for phone and fax numbers.

EMAIL: techsupport@redlion.net
Web Site: http://www.redlion.net

1. Valid configuration is loaded and there are no alarms present.

2. A tag is in an alarm state.
A battery is used to keep time when the unit is without power. Typical accuracy of the G308 time keeping is less than one minute per month drift. The battery of a G308 unit does not affect the unit’s memory, all configurations and data is stored in non-volatile memory.

To change the battery of a G308, remove power, cabling, and then the rear cover of the unit. To remove the cover, remove the four screws designated by the arrows on the rear of the unit. Then, by lifting the top side, hinge the cover, thus providing clearance for the connectors on the bottom side of the PCB as shown in the illustration below. Install in the reverse manner.

Remove the old battery* from the holder and replace with the new battery. Replace the rear cover, cables, and re-apply power. Using Crimson or the unit’s keypad, enter the correct time and date.

* Please note that the old battery must be disposed of in a manner that complies with your local waste regulations. Also, the battery must not be disposed of in fire, or in a manner whereby it may be damaged and its contents come into contact with human skin.

The battery used by the G308 is a lithium type CR2025.
OPTIONAL FEATURES AND ACCESSORIES

OPTIONAL COMMUNICATION CARD
Red Lion offers optional communication cards for fieldbus communications. These communication cards will allow your G308 to communicate with many of the popular fieldbus protocols.
Red Lion is also offering a communications card for additional RS232 and RS422/485 communications. Visit Red Lion’s website for information and availability of these cards.

COMPACTFLASH SOCKET
CompactFlash socket is a Type II socket that can accept either Type I or II cards. Use cards with a minimum of 4Mbytes with the G308’s CompactFlash socket. Cards are available at most computer and office supply retailers.
CompactFlash can be used for configuration transfers, larger configurations, data logging, and trending.

Information stored on a CompactFlash card by a G308 can be read by a card reader attached to a PC. This information is stored in IBM (Windows®) PC compatible FAT16 file format.

NOTE
For reliable operation in all of our products, Red Lion recommends the use of SanDisk® and SimpleTech brands of CompactFlash cards.
Industrial grade versions that provide up to two million write/erase cycles minimum are available from Red Lion.

CUSTOM LOGO
Each G3 operator interface has an embossed area containing the Red Lion logo. Red Lion can provide custom logos to apply to this area. Contact your distributor for additional information and pricing.

LIMTED WARRANTY
The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions.
The Company’s liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company’s option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.
The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.
No warranties expressed or implied are created with respect to The Company’s products except those expressly contained herein. The Customer acknowledges the disclaimers and limitations contained herein and relies on no other warranties or affirmations.
GENERAL DESCRIPTION

The G308 Operator Interface Terminal combines unique capabilities normally expected from high-end units with a very affordable price. It is built around a high performance core with integrated functionality. This core allows the G308 to perform many of the normal features of the Paradigm range of Operator Interfaces while improving and adding new features.

The G308 is able to communicate with many different types of hardware using high-speed RS232/422/485 communications ports and Ethernet 10 Base T/100 Base-TX communications. In addition, the G308 features USB for fast downloads of configuration files and access to trending and data logging. A CompactFlash socket is provided so that Flash cards can be used to collect your trending and data logging information as well as to store larger configuration files.

In addition to accessing and controlling of external resources, the G308 allows a user to easily view and enter information. Users can enter data through the touchscreen or front panel 7-button keypad.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use the controller to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the controller.

The Protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

CAUTION: Risk of Danger
Read complete instructions prior to installation and operation of the unit.

CAUTION: Risk of electric shock.

CompactFlash is a registered trademark of CompactFlash Association.

CONTENTS OF PACKAGE

- G308 Operator Interface.
- Panel gasket.
- Template for panel cutout.
- Hardware packet for mounting unit into panel.
- Terminal block for connecting power.

ORDERING INFORMATION

1. Contact your Red Lion distributor or visit our website for complete selection.
2. Use this part number to purchase Crimson on CD with a printed manual, USB cable, and RS-232 cable. Otherwise, download from www.redlion.net.
3. Red Lion offers RJ modular jack adapters. Refer to the DR literature for complete details.
4. Battery type is lithium coin type CR2025.
5. Industrial grade two million write cycles.
**SPECIFICATIONS**

1. **POWER REQUIREMENTS:**
   +24 VDC ±20% @ 24 W maximum. Must use Class 2 or SELV rated power supply.
   Power connection via removable three position terminal block.
   Notes:
   1. The front panel PWR LED indicates power.
   2. The G308’s circuit common is not connected to the enclosure of the unit. See “Connecting to Earth Ground” in the section “Installing and Powering the G308.”

2. **BATTERY:** Lithium coin cell. Typical lifetime of 10 years.

3. **DISPLAY:**

<table>
<thead>
<tr>
<th></th>
<th>G308A</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIZE</td>
<td>8.4-inch</td>
</tr>
<tr>
<td>TYPE</td>
<td>TFT Active Matrix</td>
</tr>
<tr>
<td>COLORS</td>
<td>256</td>
</tr>
<tr>
<td>PIXELS</td>
<td>640 X 480 (VGA)</td>
</tr>
<tr>
<td>BRIGHTNESS</td>
<td>450 cd/m²</td>
</tr>
<tr>
<td>BACKLIGHT*</td>
<td>40,000 HR TYP.</td>
</tr>
</tbody>
</table>

*Lifetime at room temperature. Refer to “Display” in “Software/Unit Operation”

4. **7-KEY KEYPAD:** for on-screen menus.

5. **TOUCHSCREEN:** Resistive analog

6. **MEMORY:**
   - On Board User Memory: 8 Mbyte of onboard non-volatile Flash memory.
   - Memory Card: CompactFlash Type II slot for Type I and Type II CompactFlash cards.

7. **COMMUNICATIONS:**
   - **USB Port:** Adheres to USB specification 1.1. Device only using Type B connection.
   - **Serial Ports:** Format and Baud Rates for each port are individually software programmable up to 115,200 baud.
     - PGM Port: RS232 port via RJ12.
     - DH485 TXEN: Transmit enable; open collector, \( V_{OH} = 15 \) VDC, \( V_{OL} = 0.5 \) V @ 25 mA max.
   - **Note:** For additional information on the communications or signal common and connections to earth ground please see the “Connecting to Earth Ground” in the section “Installing and Powering the G308.”
   - **Ethernet Port:** 10 BASE-T / 100 BASE-TX
     - RJ45 jack is wired as a NIC (Network Interface Card).

8. **ENVIRONMENTAL CONDITIONS:**
   - **Operating Temperature Range:** 0 to 50°C
   - **Storage Temperature Range:** -20 to 60°C
   - **Operating and Storage Humidity:** 80% maximum relative humidity (non-condensing) from 0 to 50°C.
   - **Altitude:** Up to 2000 meters.

9. **CERTIFICATIONS AND COMPLIANCES:**
   - **SAFETY**
     - IEC 1010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1.
     - IP66 Enclosure rating (Face only), IEC 529
     - Type 4X Enclosure rating (Face only), UL50
   - **ELECTROMAGNETIC COMPATIBILITY**
     - Emissions and Immunity to EN 61326: Electrical Equipment for Measurement, Control and Laboratory use.
   - **Immunity to Industrial Locations:**
     - **Electrostatic discharge**
       - EN 61000-4-2: Criterion A
       - EN 61000-4-3: Criterion A
       - 4 kV contact discharge
       - 8 kV air discharge
     - **Electromagnetic RF fields**
       - EN 61000-4-4: Criterion A
       - 10 V/m
     - **Fast transients (burst)**
       - EN 61000-4-4: Criterion A
       - 2 kV power
       - 1 kV signal
     - **Surge**
       - EN 61000-4-5: Criterion A
       - 1 kV L-L,
       - 2 kV L&N-E power
     - **RF conducted interference**
       - EN 61000-4-6: Criterion B
       - 3 V/rms
   - **Emissions**
     - EN 55011: Class A
   - **Notes:**
     2. Criterion B: Temporary loss of performance from which the unit self-recovers.

10. **CONSTRUCTION:** Steel rear metal enclosure with NEMA 4X/IP66 aluminum front plate for indoor use only when correctly fitted with the gasket provided. Installation Category II, Pollution Degree 2.

11. **MOUNTING REQUIREMENTS:** Maximum panel thickness is 0.25” (6.3 mm). For NEMA 4X/IP66 sealing, a steel panel with a minimum thickness of 0.125” (3.17 mm) is recommended.

12. **WEIGHT:** 4.20 lbs (1.91 Kg)

**DIMENSIONS In inches (mm)**

![Dimensions Diagram](image-url)
INSTALLING AND POWERING THE G308

MOUNTING INSTRUCTIONS
This operator interface is designed for through-panel mounting. A panel cut-out diagram and a template are provided. Care should be taken to remove any loose material from the mounting cut-out to prevent that material from falling into the operator interface during installation. A gasket is provided to enable sealing to NEMA 4X/IP66 specification. Install the ten kep nuts provided and tighten evenly for uniform gasket compression.

Note: Tightening the kep nuts beyond a maximum of 17 inch-pounds (1.92 N-m) may cause damage to the front panel.

CONNECTING TO EARTH GROUND

The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

Each G308 has a chassis ground terminal on the back of the unit. Your unit should be connected to earth ground (protective earth).

CONFIGURING A G308
The G308 is configured using Crimson software. Crimson is available as a free download from Red Lion’s website, or it can be purchased on CD. Updates to Crimson for new features and drivers are posted on the website as they become available. By configuring the G308 using the latest version of Crimson, you are assured that your unit has the most up to date feature set. Crimson software can configure the G308 through the RS232 PGM port, USB port, or CompactFlash.

The USB port is connected using a standard USB cable with a Type B connector. The RS232 PGM port uses a programming cable made by Red Lion to connect to the DB9 COM port of your computer. If you choose to make your own cable, use the “G308 Port Pin Out Diagram” for wiring information.

The CompactFlash can be used to program a G3 by placing a configuration file and firmware on the CompactFlash card. The card is then inserted into the target G3 and powered. Refer to the Crimson literature for more information on the proper names and locations of the files.

CABLES AND DRIVERS
Red Lion has a wide range of cables and drivers for use with many different communication types. A list of these drivers and cables along with pin outs is available from Red Lion’s website. New cables and drivers are added on a regular basis. If making your own cable, refer to the “G308 Port Pin Outs” for wiring information.

The chassis ground is not connected to signal common of the unit. Maintaining isolation between earth ground and signal common is not required to operate your unit. But, other equipment connected to this unit may require isolation between signal common and earth ground. To maintain isolation between signal common and earth ground care must be taken when connections are made to the unit. For example, a power supply with isolation between its signal common and earth ground must be used. Also, plugging in a USB cable may connect signal common and earth ground.

1. USB’s shield may be connected to earth ground at the host. USB’s shield in turn may also be connected to signal common.

POWER SUPPLY REQUIREMENTS
The G308 requires a 24 VDC power supply rated at 24 W. Your unit may draw considerably less than 24 W depending upon the options being used. Additional features are used your unit will draw increasing amounts of power. Items that could cause increases in current are additional communications, optional communications card, CompactFlash card, and other features programmed through Crimson.

In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. Please take care to observe the following points:
- The power supply must be mounted close to the unit, with usually not more than 6 feet (1.8 m) of cable between the supply and the operator interface. Ideally, the shortest length possible should be used.
- The wire used to connect the operator interface’s power supply should be at least 22-gage wire. If a longer cable run is used, a heavier gage wire should be used. The routing of the cable should be kept away from large contactors, inverters, and other devices which may generate significant electrical noise.
- A power supply with a Class 2 or SELV rating is to be used. A Class 2 or SELV power supply provides isolation to accessible circuits from hazardous voltage levels generated by a mains power supply due to single faults. SELV is an acronym for “safety extra-low voltage.” Safety extra-low-voltage circuits shall exhibit voltages safe to touch both under normal operating conditions and after a single fault, such as a breakdown of a layer of basic insulation or after the failure of a single component has occurred.

USB, DATA TRANSFERS FROM THE COMPACTFLASH CARD
In order to transfer data from the CompactFlash card via the USB port, a driver must be installed on your computer. This driver is installed with Crimson and is located in the folder C:\Program Files\Red Lion Controls\Crimson 2.0\Device\ after Crimson is installed. This may have already been accomplished if your G308 was configured using the USB port.

Once the driver is installed, connect the G308 to your PC with a USB cable, and follow “Mounting the CompactFlash” instructions in the Crimson 2 user manual.

ETHERNET COMMUNICATIONS
Ethernet communications can be established at either 10 BASE-T or 100 BASE-TX. The G308 unit’s RJ45 jack is wired as a NIC (Network Interface Card). For example, when wiring to a hub or switch use a straight-through cable, but when connecting to another NIC use a crossover cable.

The Ethernet connector contains two LEDs. A yellow LED in the upper right, and a bi-color green/amber LED in the upper left. The LEDs represent the following statuses:

<table>
<thead>
<tr>
<th>LED COLOR</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>YELLOW solid</td>
<td>Link established.</td>
</tr>
<tr>
<td>YELLOW flashing</td>
<td>Data being transferred.</td>
</tr>
<tr>
<td>GREEN</td>
<td>10 BASE-T Communications</td>
</tr>
<tr>
<td>AMBER</td>
<td>100 BASE-TX Communications</td>
</tr>
</tbody>
</table>

The Crimson manual contains additional information on Ethernet communications.
RS232 PORTS

The G308 has two RS232 ports. There is the PGM port and the COMMS port. Although only one of these ports can be used for programming, both ports can be used for communications with a PLC.

The RS232 ports can be used for either master or slave protocols with any G308 configuration.

Examples of RS232 communications could involve another Red Lion product or a PC. By using a cable with RJ12 ends on it, and a twist in the cable, RS232 communications with another G3 product or the Modular Controller can be established. Red Lion part numbers for cables with a twist in them are CBLPROG0 1, CBLRLC01 2, or CBLRC02 3.

G3 RS232 to a PC

<table>
<thead>
<tr>
<th>Connections</th>
<th>G3: RJ12</th>
<th>Name</th>
<th>PC: DB9</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>COMM</td>
<td>1</td>
<td>DCD</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Tx</td>
<td>2</td>
<td>Rx</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Rx</td>
<td>3</td>
<td>Tx</td>
<td></td>
</tr>
<tr>
<td>N/C</td>
<td>4</td>
<td>DTR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>COM</td>
<td>5</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>N/C</td>
<td>6</td>
<td>DSR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CTS</td>
<td>7</td>
<td>RTS</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>RTS</td>
<td>8</td>
<td>CTS</td>
<td></td>
</tr>
<tr>
<td>N/C</td>
<td>9</td>
<td>RI</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 CBLPROG0 can also be used to communicate with either a PC or an ICM5.
2 DB9 adapter not included, 1 foot long.
3 DB9 adapter not included, 10 feet long.

G308 PORT PIN OUTS

G308 PORT PIN OUTS

CONNECTING A G308A OPERATOR INTERFACE TO AN ICM5

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
The G308 has one RS422/485 port. This port can be configured to act as either RS422 or RS485.

### RS422/485 COMMS PORT

Note: All Red Lion devices connect A to A and B to B, except for Paradigm devices. Refer to www.redlion.net for additional information.

### DH485 COMMUNICATIONS

The G308’s RS422/485 COMMS port can also be used for Allen Bradley DH485 communications.

**WARNING:** DO NOT use a standard DH485 cable to connect this port to Allen Bradley equipment. A cable and wiring diagram are available from Red Lion.

### Examples of RS485 2-Wire Connections

**G3 to Red Lion RJ11 (CBLRLC00)**

<table>
<thead>
<tr>
<th>Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3: RJ45</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
</tbody>
</table>

**G3 to Modular Controller (CBLRLC05)**

<table>
<thead>
<tr>
<th>Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3</td>
</tr>
<tr>
<td>1,4</td>
</tr>
<tr>
<td>4,1</td>
</tr>
<tr>
<td>2,3</td>
</tr>
<tr>
<td>3,2</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
</tbody>
</table>
SOFTWARE/UNIT OPERATION

CRIMSON SOFTWARE

Crimson software is available as a free download from Red Lion’s website or it can be purchased on a CD, see “Ordering Information” for part number. The latest version of the software is always available from the website, and updating your copy is free.

DISPLAY

This operator interface uses a liquid crystal display (LCD) for displaying text and graphics. The display utilizes a cold cathode fluorescent tube (CCFL) for lighting the display. The CCFL tubes can be dimmed for low light conditions.

These CCFL tubes have a limited lifetime. Backlight lifetime is based upon the amount of time the display is turned on at full intensity. Turning the backlight off when the display is not in use can extend the lifetime of your backlight. This can be accomplished through the Crimson software when configuring your unit.

FRONT PANEL LEDS

There are three front panel LEDs. Shown below is the default status of the LEDs.

<table>
<thead>
<tr>
<th>LED</th>
<th>INDICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED (TOP, LABELED “PWR”)</td>
<td>UNIT IN THE BOOT LOADER, NO VALID CONFIGURATION IS LOADED.(^1)</td>
</tr>
<tr>
<td>OFF</td>
<td>NO COMPACTFLASH CARD IS PRESENT.</td>
</tr>
<tr>
<td>STEADY</td>
<td>VALID COMPACTFLASH CARD PRESENT.</td>
</tr>
<tr>
<td>FLASHING</td>
<td>COMPACTFLASH CARD BEING CHECKED.</td>
</tr>
<tr>
<td>FLICKERING</td>
<td>UNIT IS WRITING TO THE COMPACTFLASH, EITHER BECAUSE IT IS STORING DATA, OR BECAUSE THE PC CONNECTED VIA THE USB PORT HAS LOCKED THE DRIVE.(^2)</td>
</tr>
<tr>
<td>FLASHING SLOWLY</td>
<td>INCORRECTLY FORMATTED COMPACTFLASH CARD PRESENT.</td>
</tr>
<tr>
<td>GREEN (BOTTOM)</td>
<td>A TAG IS IN AN ALARM STATE.</td>
</tr>
<tr>
<td>STEADY</td>
<td>VALID CONFIGURATION IS LOADED AND THERE ARE NO ALARMS PRESENT.</td>
</tr>
</tbody>
</table>

1. The operator interface is shipped without a configuration. After downloading a configuration, if the light remains in the flashing state continuously, try cycling power. If the LED still continues to flash, try downloading a configuration again.

2. Do not turn off power to the unit while this light is flickering. The unit writes data in two minute intervals. Later Microsoft operating systems will not lock the drive unless they need to write data; Windows 98 may lock the drive any time it is mounted, thereby interfering with logging. Refer to “Mounting the CompactFlash” in the Crimson 2 User Manual.

TOUCHSCREEN

This operator interface utilizes a resistive analog touchscreen for user input. The unit will only produce an audible tone (beep) when a touch on an active touchscreen cell is sensed. The touchscreen is fully functional as soon as the operator interface is initialized, and can be operated with gloved hands.

KEYPAD

The G308 keypad consists of seven keys that can be used for on-screen menus.

TROUBLESHOOTING YOUR G308

If for any reason you have trouble operating, connecting, or simply have questions concerning your new G308, contact Red Lion’s technical support. For contact information, refer to the back page of this bulletin for phone and fax numbers.

EMAIL: techsupport@redlion.net
Web Site: http://www.redlion.net

Valid configuration is loaded and there are no alarms present.

STEADY

A tag is in an alarm state.

FLASHING

Valid configuration is loaded and there are no alarms present.

STEADY

FLASHING

COMPACTFLASH CARD BEING CHECKED.

FLASHING RAPIDLY

COMPACTFLASH CARD BEING CHECKED.

FLICKERING

UNIT IS WRITING TO THE COMPACTFLASH, EITHER BECAUSE IT IS STORING DATA, OR BECAUSE THE PC CONNECTED VIA THE USB PORT HAS LOCKED THE DRIVE.

FLASHING SLOWLY

INCORRECTLY FORMATTED COMPACTFLASH CARD PRESENT.

GREEN (BOTTOM)

A TAG IS IN AN ALARM STATE.

STEADY

VALID CONFIGURATION IS LOADED AND THERE ARE NO ALARMS PRESENT.

1. The operator interface is shipped without a configuration. After downloading a configuration, if the light remains in the flashing state continuously, try cycling power. If the LED still continues to flash, try downloading a configuration again.

2. Do not turn off power to the unit while this light is flickering. The unit writes data in two minute intervals. Later Microsoft operating systems will not lock the drive unless they need to write data; Windows 98 may lock the drive any time it is mounted, thereby interfering with logging. Refer to “Mounting the CompactFlash” in the Crimson 2 User Manual.
**BATTERY & TIME KEEPING**

A battery is used to keep time when the unit is without power. Typical accuracy of the G308 time keeping is less than one minute per month drift. The battery of a G308 unit does not affect the unit’s memory, all configurations and data is stored in non-volatile memory.

**CAUTION: RISK OF ELECTRIC SHOCK**
The inverter board, attached to the mounting plate, supplies the high voltage to operate the backlight. Touching the inverter board may result in injury to personnel.

**CAUTION:** The circuit board contains static sensitive components. Before handling the operator interface without the rear cover attached, discharge static charges from your body by touching a grounded bare metal object. Ideally, handle the operator interface at a static controlled clean workstation. Also, do not touch the surface areas of the circuit board. Dirt, oil, or other contaminants may adversely affect circuit operation.

To change the battery of a G308, remove power, cabling, and then the rear cover of the unit. To remove the cover, remove the four screws designated by the arrows on the rear of the unit. Then, by lifting the top side, hinge the cover, thus providing clearance for the connectors on the bottom side of the PCB as shown in the illustration below. Install in the reverse manner.

Remove the old battery* from the holder and replace with the new battery. Replace the rear cover, cables, and re-apply power. Using Crimson or the unit’s keypad, enter the correct time and date.

* Please note that the old battery must be disposed of in a manner that complies with your local waste regulations. Also, the battery must not be disposed of in fire, or in a manner whereby it may be damaged and its contents come into contact with human skin.

The battery used by the G308 is a lithium type CR2025.
LIMITED WARRANTY

The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company’s liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company’s option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products. The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.

No warranties expressed or implied are created with respect to The Company’s products except those expressly contained herein. The Customer acknowledges the disclaimers and limitations contained herein and relies on no other warranties or affirmations.

OPTIONAL FEATURES AND ACCESSORIES

OPTIONAL COMMUNICATION CARD

Red Lion offers optional communication cards for fieldbus communications. These communication cards will allow your G308 to communicate with many of the popular fieldbus protocols. Red Lion is also offering a communications card for additional RS232 and RS422/485 communications. Visit Red Lion’s website for information and availability of these cards.

CUSTOM LOGO

Each G3 operator interface has an embossed area containing the Red Lion logo. Red Lion can provide custom logos to apply to this area. Contact your distributor for additional information and pricing.

COMPACTFLASH SOCKET

CompactFlash socket is a Type II socket that can accept either Type I or II cards. Use cards with a minimum of 4Mbytes with the G308's CompactFlash socket. Cards are available at most computer and office supply retailers. CompactFlash can be used for configuration transfers, larger configurations, data logging, and trending.

Information stored on a CompactFlash card by a G308 can be read by a card reader attached to a PC. This information is stored in IBM (Windows®) PC compatible FAT16 file format.

NOTE

For reliable operation in all of our products, Red Lion recommends the use of SanDisk® and SimpleTech brands of CompactFlash cards. Industrial grade versions that provide up to two million write/erase cycles minimum are available from Red Lion.

LIMITED WARRANTY

The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company’s liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company’s option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products. The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.

No warranties expressed or implied are created with respect to The Company’s products except those expressly contained herein. The Customer acknowledges the disclaimers and limitations contained herein and relies on no other warranties or affirmations.
MODEL G306 - GRAPHIC COLOR LCD OPERATOR INTERFACE TERMINAL WITH QVGA DISPLAY AND TOUCHSCREEN

GENERAL DESCRIPTION

The G306 Operator Interface Terminal combines unique capabilities normally expected from high-end units with a very affordable price. It is built around a high performance core with integrated functionality. This core allows the G306 to perform many of the normal features of the Paradigm range of Operator Interfaces while improving and adding new features.

The G306 is able to communicate with many different types of hardware using high-speed RS232/422/485 communications ports and Ethernet 10 Base T/100 Base-TX communications. In addition, the G306 features USB for fast downloads of configuration files and access to trending and data logging. A CompactFlash socket is provided so that Flash cards can be used to collect your trending and data logging information as well as to store larger configuration files.

In addition to accessing and controlling of external resources, the G306 allows a user to easily view and enter information. Users can enter data through the touchscreen and/or front panel 5-button keypad.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. Equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. Do not use the controller to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the controller.

The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2/CLASS II, DIVISION 2/CLASS III, DIVISION 2

CONTENTS OF PACKAGE

- G306 Operator Interface.
- Panel gasket.
- Template for panel cutout.
- G306 Operator Interface.
- Replacement Battery
- Communications Cables
- DIN Rail Mountable Adapter Products
- CANopen Optional Communications Cards
- USB Program Cable
- CANopen Optional Communications Cards

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>G306</td>
<td>Operator Interface for indoor applications, textured finish with embossed keys</td>
<td>G306C00</td>
</tr>
<tr>
<td>G3CF</td>
<td>64 MB CompactFlash Card</td>
<td>G3CF064M</td>
</tr>
<tr>
<td></td>
<td>256 MB CompactFlash Card</td>
<td>G3CF256M</td>
</tr>
<tr>
<td></td>
<td>512 MB CompactFlash Card</td>
<td>G3CF512M</td>
</tr>
<tr>
<td>G3RS</td>
<td>RS232/485 Optional Communications Cards</td>
<td>G3RS0000</td>
</tr>
<tr>
<td>G3CN</td>
<td>CANopen Optional Communications Cards</td>
<td>G3CN0000</td>
</tr>
<tr>
<td>PSDR7</td>
<td>DIN Rail Power Supply</td>
<td>PSDR7000</td>
</tr>
<tr>
<td>SFCRM2</td>
<td>Crimson 2.0</td>
<td>SFCRM200</td>
</tr>
<tr>
<td>CBL</td>
<td>RS-232 Programming Cable</td>
<td>CBLPRG0</td>
</tr>
<tr>
<td></td>
<td>USB Cable</td>
<td>CBLUSB00</td>
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<tr>
<td></td>
<td>Replacement Battery</td>
<td>BAL3R004</td>
</tr>
<tr>
<td>G3FILM</td>
<td>Protective Films</td>
<td>G3FILM06</td>
</tr>
</tbody>
</table>

1 Contact your Red Lion distributor or visit our website for complete selection.
2 Use this part number to purchase Crimson on CD with a printed manual, USB cable, and RS-232 cable. Otherwise, download for free from www.redlion.net.
3 Red Lion offers RJ modular jack adapters. Refer to the DR literature for complete details.
4 Battery type is lithium coin type CR2025.
5 Industrial grade two million write cycles.

Fabricated in USA by Red Lion Controls, Inc. 63YN

CAUTION: Risk Of Danger.
Read complete instructions prior to installation and operation of the unit.

CompactFlash is a registered trademark of CompactFlash Association.
**SPECIFICATIONS**

1. **POWER REQUIREMENTS:**
   - Must use Class 2 or SELV rated power supply.
   - Power connection via removable three position terminal block.
   - Supply Voltage: +24 VDC ±20%
   - Typical Power: 8 W
   - Maximum Power: 14 W
   - Notes:
     1. Typical power with +24 VDC, RS232/485 communications, Ethernet communications, CompactFlash card installed, and display at full brightness.
     2. Maximum power indicates the most power that can be drawn from the G306. Refer to “Power Supply Requirements” under “Installing and Powering the G306.”
     3. The G306’s circuit common is not connected to the enclosure of the unit. See “Connecting to Earth Ground” in the section “Installing and Powering the G306.”
     4. Read “Power Supply Requirements” in the section “Installing and Powering the G306” for additional power supply information.

2. **BATTERY:** Lithium coin cell. Typical lifetime of 10 years.

3. **LCD DISPLAY:**

<table>
<thead>
<tr>
<th>SIZE</th>
<th>5.7-inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE</td>
<td>STN</td>
</tr>
<tr>
<td>COLORS</td>
<td>256</td>
</tr>
<tr>
<td>PIXELS</td>
<td>320 X 240</td>
</tr>
<tr>
<td>BRIGHTNESS</td>
<td>165 cd/m²</td>
</tr>
<tr>
<td>BACKLIGHT*</td>
<td>20,000 HR TYP</td>
</tr>
</tbody>
</table>

*Lifetime at room temperature. Refer to “Display” in “Software/Unit Operation”

4. **5-KEY KEYPAD:** for on-screen menus.

5. **TOUCHSCREEN:** Resistive analog

6. **MEMORY:**
   - On Board User Memory: 4 Mbyte of non-volatile Flash memory.
   - Memory Card: CompactFlash Type II slot for Type I and Type II CompactFlash cards.

7. **COMMUNICATIONS:**
   - USB Port: Adheres to USB specification 1.1. Device only using Type B connection.

   **WARNING** - DO NOT CONNECT OR DISCONNECT CABLES WHILE POWER IS APPLIED UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS. USB PORT IS FOR SYSTEM SET-UP AND DIAGNOSTICS AND IS NOT INTENDED FOR PERMANENT CONNECTION.

   Serial Ports: Format and Baud Rates for each port are individually software programmable up to 115,200 baud.
   - PGM Port: RS232 port via RJ12.
   - DH485 TXEN: Transmit enable, open collector, V_OH = 15 VDC, V_OL = 0.5 V @ 25 mA max.
   - Note: For additional information on the communications or signal common and connections to earth ground please see the “Connecting to Earth Ground” in the section “Installing and Powering the G306.”
   - Ethernet Port: 10 BASE-T / 100 BASE-TX
     - RJ45 jack is wired as a NIC (Network Interface Card).
     - Isolation from Ethernet network to G3 operator interface: 1500 Vrms
     - Isolation from Ethernet network to G3 operator interface: 1500 Vrms
     - RJ45 jack is wired as a NIC (Network Interface Card).
     - Isolation from Ethernet network to G3 operator interface: 1500 Vrms
     - RJ45 jack is wired as a NIC (Network Interface Card).

8. **ENVIRONMENTAL CONDITIONS:**
   - Operating Temperature Range: 0 to 50°C
   - Storage Temperature Range: -20 to 70°C
   - Operating and Storage Humidity: 80% maximum relative humidity (non-condensing) from 0 to 50°C.
   - Vibration: Operational 5 to 8 Hz, 0.8” (p-p), 8 to 500 Hz, in X, Y, Z direction, duration: 1 hour, 3 g.
   - Shock: Operational 40 g, 9 msec in 3 directions.
   - Altitude: Up to 2000 meters.

9. **CERTIFICATIONS AND COMPLIANCES:**
   - **SAFETY**
     - UL Recognized Component, File #E179259, UL61010-1, CSA 22.2 No.61010-1
     - Recognized to U.S. and Canadian requirements under the Component Recognition Program of Underwriters Laboratories, Inc.
     - UL Listed, File #E211967, UL61010-1, UL604, CSA 22.2 No. 61010.1, CSA 22.2 No. 213-M1987
     - LISTED by Und. Lab. Inc. to U.S. and Canadian safety standards
     - Type 4X Enclosure rating (Face only), UL50
     - IEEE CB Scheme Test Certificate #US/9737/UL,
     - CB Scheme Test Report #E179259-V10-S04
     - Issued by Underwriters Laboratories Inc.
     - IEC 61010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1.
     - IP66 Enclosure rating (Face only), IEC 529
   - **ELECTROMAGNETIC COMPATIBILITY**
     - Emissions and Immunity to EN 61326: Electrical Equipment for Measurement, Control and Laboratory use.
   - **Immunity to Industrial Locations:**
     - Electrostatic discharge EN 61000-4-2 Criterion A
     - 4 kV contact discharge 8 kV air discharge
     - Electromagnetic RF fields EN 61000-4-3 Criterion A
     - 10 V/m
     - Fast transients (burst) EN 61000-4-4 Criterion A
     - 2 kV power 1 kV signal
     - Surge EN 61000-4-5 Criterion A
     - 1 kV L-N 2 kV L&E power
     - RF conducted interference EN 61000-4-6 Criterion A
     - 3 V/rms
   - **Emissions:**
     - Emissions EN 55011 Class A
     - Note:
     - 10. **CONSTRUCTION:** Steel rear metal enclosure with NEMA 4X/IP66 aluminum front plate for indoor use only when correctly fitted with the gasket provided. Installation Category II, Pollution Degree 2.
     - 11. **MOUNTING REQUIREMENTS:** Maximum panel thickness is 0.25” (6.3 mm). For NEMA 4X/IP66 sealing, a steel panel with a minimum thickness of 0.125” (3.17 mm) is recommended.
     - 12. **WEIGHT:** 3.0 lbs (1.36 Kg)

**DIMENSIONS In inches (mm)**

| Dimension | 8.83 (224.3) | 2.30 (58.4) | 7.08 (179.8) | 7.42 (188.5) | 5.67 (144) |

---

**Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com**
**INSTALLING AND POWERING THE G306**

**MOUNTING INSTRUCTIONS**

This operator interface is designed for through-panel mounting. A panel cut-out diagram and a template are provided. Care should be taken to remove any loose material from the mounting cut-out to prevent that material from falling into the operator interface during installation. A gasket is provided to enable sealing to NEMA 4X/IP66 specification. Install the ten kep nuts provided and tighten evenly for uniform gasket compression.

Note: Tightening the kep nuts beyond a maximum of 17 inch-pounds (1.92 N-m) may cause damage to the front panel.

**CONNECTING TO EARTH GROUND**

The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

Each G306 has a chassis ground terminal on the back of the unit. Your unit should be connected to earth ground (protection earth).

**COMMUNICATING WITH THE G306**

**CONFIGURING A G306**

The G306 is configured using Crimson software. Crimson is available as a free download from Red Lion’s website, or it can be purchased on CD. Updates to Crimson for new features and drivers are posted on the website as they become available. By configuring the G306 using the latest version of Crimson, you are assured that your unit has the most up to date feature set. Crimson software can configure the G306 through the RS232 PGM port, USB port, or CompactFlash.

The USB port is connected using a standard USB cable with a Type B connector. The driver needed to use the USB port will be installed with Crimson.

The RS232 PGM port uses a programming cable made by Red Lion to connect to the DB9 COM port of your computer. If you choose to make your own cable, use the “G306 Port Pin Out Diagram” for wiring information.

The CompactFlash can be used to program a G3 by placing a configuration file and firmware on the CompactFlash card. The card is then inserted into the target G3 and powered. Refer to the Crimson literature for more information on the proper names and locations of the files.

**CABLES AND DRIVERS**

Red Lion has a wide range of cables and drivers for use with many different communication types. A list of these drivers and cables along with pin outs is available from Red Lion’s website. New cables and drivers are added on a regular basis. If making your own cable, refer to the “G306 Port Pin Outs” for wiring information.

**ETHERNET COMMUNICATIONS**

Ethernet communications can be established at either 10 BASE-T or 100 BASE-TX. The G306 unit’s RJ45 jack is wired as a NIC (Network Interface Card). For example, when wiring to a hub or switch use a straight-through cable, but when connecting to another NIC use a crossover cable.

The Ethernet connector contains two LEDs. A yellow LED in the upper right, and a bi-color green/amber LED in the upper left. The LEDs represent the following statuses:

<table>
<thead>
<tr>
<th>LED COLOR</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>YELLOW solid</td>
<td>Link established.</td>
</tr>
<tr>
<td>YELLOW flashing</td>
<td>Data being transferred.</td>
</tr>
<tr>
<td>GREEN</td>
<td>10 BASE-T Communications</td>
</tr>
<tr>
<td>AMBER</td>
<td>100 BASE-TX Communications</td>
</tr>
</tbody>
</table>

On the rear of each unit is a unique 12-digit MAC address and a block for marking the unit with an IP address. Refer to the Crimson manual and Red Lion’s website for additional information on Ethernet communications.

**USB, DATA TRANSFERS FROM THE COMPACTFLASH CARD**

In order to transfer data from the CompactFlash card via the USB port, a driver must be installed on your computer. This driver is installed with Crimson and is located in the folder C:\Program Files\Red Lion Controls\Crimson 2.0\Device after Crimson is installed. This may have already been accomplished if your G306 was configured using the USB port.

Once the driver is installed, connect the G306 to your PC with a USB cable, and follow “Mounting the CompactFlash” instructions in the Crimson 2 user manual.
RS232 PORTS

The G306 has two RS232 ports. There is the PGM port and the COMMS port. Although only one of these ports can be used for programming, both ports can be used for communications with a PLC.

The RS232 ports can be used for either master or slave protocols with any G306 configuration.

Examples of RS232 communications could involve another Red Lion product or a PC. By using a cable with RJ12 ends on it, and a twist in the cable, RS232 communications with another G3 product or the Modular Controller can be established. Red Lion part numbers for cables with a twist in them are CBLPROG0 ¹, CBLRLC01 ², or CBLRC02 ³.

---

G3 RS232 to a PC

<table>
<thead>
<tr>
<th>Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3: RJ12</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>N/C</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>N/C</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>N/C</td>
</tr>
</tbody>
</table>

¹ CBLPROG0 can also be used to communicate with either a PC or an ICM5.
² DB9 adapter not included, 1 foot long.
³ DB9 adapter not included, 10 feet long.

---

G306 PORT PIN OUTS

---

![Diagram of G306 port pin outs]

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
RS422/485 COMMS PORT

The G306 has one RS422/485 port. This port can be configured to act as either RS422 or RS485.

**Note:** All Red Lion devices connect A to A and B to B, except for Paradigm devices. Refer to www.redlion.net for additional information.

Examples of RS485 2-Wire Connections

**G3 to Red Lion RJ11 (CBLRLC00)**
DLC, IAMS, ITMS, PAXCDC4C

<table>
<thead>
<tr>
<th>Connections</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>G3: RJ45</td>
<td>Name</td>
</tr>
<tr>
<td>5</td>
<td>TxEN</td>
</tr>
<tr>
<td>6</td>
<td>COM</td>
</tr>
<tr>
<td>1</td>
<td>TxB</td>
</tr>
<tr>
<td>2</td>
<td>TxA</td>
</tr>
</tbody>
</table>

**DH485 COMMUNICATIONS**

The G306’s RS422/485 COMMS port can also be used for Allen Bradley DH485 communications.

**WARNING:** DO NOT use a standard DH485 cable to connect this port to Allen Bradley equipment. A cable and wiring diagram are available from Red Lion.

**G3 to AB SLC 500 (CBLAB003)**

<table>
<thead>
<tr>
<th>Connections</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>RJ45: RLC</td>
<td>Name</td>
</tr>
<tr>
<td>1</td>
<td>TxB</td>
</tr>
<tr>
<td>2</td>
<td>TxA</td>
</tr>
<tr>
<td>3, 8</td>
<td>RxA</td>
</tr>
<tr>
<td>4, 7</td>
<td>RxB</td>
</tr>
<tr>
<td>5</td>
<td>TxEN</td>
</tr>
<tr>
<td>6</td>
<td>COMM</td>
</tr>
<tr>
<td>4, 7</td>
<td>TxB</td>
</tr>
<tr>
<td>3, 8</td>
<td>TxA</td>
</tr>
</tbody>
</table>

**G3 to Modular Controller (CBLRLC05)**

<table>
<thead>
<tr>
<th>Connections</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>G3</td>
<td>Name</td>
</tr>
<tr>
<td>1,4</td>
<td>TxB</td>
</tr>
<tr>
<td>4,1</td>
<td>RxB</td>
</tr>
<tr>
<td>2,3</td>
<td>TxA</td>
</tr>
<tr>
<td>3,2</td>
<td>RxA</td>
</tr>
<tr>
<td>5</td>
<td>TxEN</td>
</tr>
<tr>
<td>6</td>
<td>COM</td>
</tr>
<tr>
<td>7</td>
<td>TxB</td>
</tr>
<tr>
<td>8</td>
<td>TxA</td>
</tr>
</tbody>
</table>
SOFTWARE/UNIT OPERATION

CRIMSON SOFTWARE
Crimson software is available as a free download from Red Lion’s website or it can be purchased on a CD, see “Ordering Information” for part number. The latest version of the software is always available from the website, and updating your copy is free.

DISPLAY
This operator interface uses a liquid crystal display (LCD) for displaying text and graphics. The display utilizes a cold cathode fluorescent tube (CCFL) for lighting the display. The CCFL tubes can be dimmed for low light conditions.
These CCFL tubes have a limited lifetime. Backlight lifetime is based upon the amount of time the display is turned on at full intensity. Turning the backlight off when the display is not in use can extend the lifetime of your backlight. This can be accomplished through the Crimson software when configuring your unit.

FRONT PANEL LEDS
There are three front panel LEDs. Shown below is the default status of the LEDs.

<table>
<thead>
<tr>
<th>LED</th>
<th>INDICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED (TOP, LABELED “PWR”)</td>
<td>Unit is in the boot loader, no valid configuration is loaded.¹</td>
</tr>
<tr>
<td>STEADY</td>
<td>Unit is powered and running an application.</td>
</tr>
<tr>
<td>YELLOW (MIDDLE)</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td>No CompactFlash card is present.</td>
</tr>
<tr>
<td>STEADY</td>
<td>Valid CompactFlash card present.</td>
</tr>
<tr>
<td>FLASHING RAPIDLY</td>
<td>CompactFlash card being checked.</td>
</tr>
<tr>
<td>FLICKERING</td>
<td>Unit is writing to the CompactFlash, either because it is storing data, or because the PC connected via the USB port has locked the drive.²</td>
</tr>
<tr>
<td>FLASHING SLOWLY</td>
<td>Incorrectly formatted CompactFlash card present.</td>
</tr>
<tr>
<td>GREEN (BOTTOM)</td>
<td></td>
</tr>
<tr>
<td>FLASHING</td>
<td>A tag is in an alarm state.</td>
</tr>
<tr>
<td>STEADY</td>
<td>Valid configuration is loaded and there are no alarms present.</td>
</tr>
</tbody>
</table>

1. The operator interface is shipped without a configuration. After downloading a configuration, if the light remains in the flashing state continuously, try cycling power. If the LED still continues to flash, try downloading a configuration again.
2. Do not turn off power to the unit while this light is flickering. The unit writes data in two minute intervals. Later Microsoft operating systems will not lock the drive unless they need to write data; Windows 98 may lock the drive any time it is mounted, thereby interfering with logging. Refer to “Mounting the CompactFlash” in the Crimson 2 User Manual.

TOUCHSCREEN
This operator interface utilizes a resistive analog touchscreen for user input. The unit will only produce an audible tone (beep) when a touch on an active touchscreen cell is sensed. The touchscreen is fully functional as soon as the operator interface is initialized, and can be operated with gloved hands.

KEYPAD
The G306 keypad consists of five keys that can be used for on-screen menus.

TROUBLESHOOTING YOUR G306
If for any reason you have trouble operating, connecting, or simply have questions concerning your new G306, contact Red Lion’s technical support. For contact information, refer to the back page of this bulletin for phone and fax numbers.

EMAIL: techsupport@redlion.net
Web Site: http://www.redlion.net
A battery is used to keep time when the unit is without power. Typical accuracy of the G306 time keeping is less than one minute per month drift. The battery of a G306 unit does not affect the unit’s memory, all configurations and data is stored in non-volatile memory.

**CAUTION: RISK OF ELECTRIC SHOCK**

The inverter board, attached to the mounting plate, supplies the high voltage to operate the backlight. Touching the inverter board may result in injury to personnel.

**CAUTION:** The circuit board contains static sensitive components. Before handling the operator interface without the rear cover attached, discharge static charges from your body by touching a grounded bare metal object. Ideally, handle the operator interface at a static controlled clean workstation. Also, do not touch the surface areas of the circuit board. Dirt, oil, or other contaminants may adversely affect circuit operation.

To change the battery of a G306, remove power, cabling, and then the rear cover of the unit. To remove the cover, remove the four screws designated by the arrows on the rear of the unit. Then, by lifting the top side, hinge the cover, thus providing clearance for the connectors on the bottom side of the PCB as shown in the illustration below. Install in the reverse manner.

Remove the old battery* from the holder and replace with the new battery. Replace the rear cover, cables, and re-apply power. Using Crimson or the unit’s keypad, enter the correct time and date.

* Please note that the old battery must be disposed of in a manner that complies with your local waste regulations. Also, the battery must not be disposed of in fire, or in a manner whereby it may be damaged and its contents come into contact with human skin.

The battery used by the G306 is a lithium type CR2025.
OPTIONAL FEATURES AND ACCESSORIES

OPTIONAL COMMUNICATION CARD
Red Lion offers optional communication cards for fieldbus communications. These communication cards will allow your G306 to communicate with many of the popular fieldbus protocols. Red Lion is also offering a communications card for additional RS232 and RS422/485 communications. Visit Red Lion’s website for information and availability of these cards.

CUSTOM LOGO
Each G3 operator interface has an embossed area containing the Red Lion logo. Red Lion can provide custom logos to apply to this area. Contact your distributor for additional information and pricing.

COMPACTFLASH SOCKET
CompactFlash socket is a Type II socket that can accept either Type I or II cards. Use cards with a minimum of 4Mbytes with the G306’s CompactFlash socket. Cards are available at most computer and office supply retailers. CompactFlash can be used for configuration transfers, larger configurations, data logging, and trending.

Information stored on a CompactFlash card by a G306 can be read by a card reader attached to a PC. This information is stored in IBM (Windows®) PC compatible FAT16 file format.

Note: Do not remove or insert the CompactFlash card while power is applied. Refer to “Front Panel LEDs.”

NOTE
For reliable operation in all of our products, Red Lion recommends the use of SanDisk® and SimpleTech brands of CompactFlash cards. Industrial grade versions that provide up to two million write/erase cycles minimum are available from Red Lion.

LIMITED WARRANTY
The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company’s liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company’s option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products. The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation damages imposed by the Consumer Product Safety Act (P.L. 92-577) and liabilities imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.
No warranties expressed or implied are created with respect to The Company’s products except those expressly contained herein. The Customer acknowledges the disclaimers and limitations contained herein and relies on no other warranties or affirmations.

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Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
**MODEL G310 - GRAPHIC LCD OPERATOR INTERFACE TERMINAL WITH VGA DISPLAY AND TOUCHSCREEN**

- Configured using Crimson software (version 2.0 or later)
- Up to 5 RS-232/422/485 communications ports
  (2 RS-232 and 1 RS-422/485 on board, 1 RS-232 and 1 RS422/485 on optional communications card)
- 10 Base T/100 Base-TX Ethernet Port to network units and host web pages
- USB Port to download the unit's configuration from a PC or for data transfers to a PC
- Unit's configuration is stored in non-volatile memory (8Mbyte Flash)
- CompactFlash® Socket to increase memory capacity
- 10.4-inch TFT 256 Color VGA 640x480 pixel LCD
- Sunlight Visible Outdoor Unit with UV rated overlay available
- 8-button keypad for on-screen menus
- Three front panel LEDs
- Power unit from 24VDC ±20% supply
- Resistive Analog Touchscreen

**SAFETY SUMMARY**

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use the controller to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the controller.

The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

**CONTENT OF PACKAGE**

- G310 Operator Interface.
- Panel Gasket.
- This hardware bulletin.
- Template for panel cutout.
- Hardware packet for mounting unit into panel.
- Terminal block for connecting power.

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>G310C000</td>
<td>Operator Interface for indoor applications only, textured finish with embossed keys</td>
<td>G310C000</td>
</tr>
<tr>
<td>G310S000</td>
<td>Operator Interface for indoor or outdoor applications, glossy finish with UV rated overlay (keys are not embossed)</td>
<td>G310S000</td>
</tr>
<tr>
<td>G3CF064M</td>
<td>64 MB CompactFlash Card</td>
<td>G3CF064M</td>
</tr>
<tr>
<td>G3CF256M</td>
<td>256 MB CompactFlash Card</td>
<td>G3CF256M</td>
</tr>
<tr>
<td>G3CF512M</td>
<td>512 MB CompactFlash Card</td>
<td>G3CF512M</td>
</tr>
<tr>
<td>G3RS0000</td>
<td>RS 232/485 Optional Communication Card</td>
<td>G3RS0000</td>
</tr>
<tr>
<td>G3CN0000</td>
<td>CANopen Optional Communication Card</td>
<td>G3CN0000</td>
</tr>
<tr>
<td>G3PBD00</td>
<td>Profinet DP Optional Communication Card</td>
<td>G3PBD00</td>
</tr>
<tr>
<td>SFCRM2</td>
<td>Crimson</td>
<td>SFCRM2</td>
</tr>
<tr>
<td>CBLPROG0</td>
<td>RS-232 Programming Cable</td>
<td>CBLPROG0</td>
</tr>
<tr>
<td>CBLUSB00</td>
<td>USB Cable</td>
<td>CBLUSB00</td>
</tr>
<tr>
<td>CBLxxxxx</td>
<td>Communications Cables</td>
<td>CBLxxxxx</td>
</tr>
<tr>
<td>DRxxxxx</td>
<td>DIN Rail Mountable Adapter Products</td>
<td>DRxxxxx</td>
</tr>
<tr>
<td>BNL20000</td>
<td>Replacement Battery</td>
<td>BNL20000</td>
</tr>
<tr>
<td>G3BR10C0</td>
<td>G310C Backlight Replacement</td>
<td>G3BR10C0</td>
</tr>
<tr>
<td>G3BR10S0</td>
<td>G310S Backlight Replacement</td>
<td>G3BR10S0</td>
</tr>
<tr>
<td>G3FILM10</td>
<td>Protective Films</td>
<td>G3FILM10</td>
</tr>
</tbody>
</table>

1 Contact your Red Lion distributor or visit our website for complete selection.
2 Use this part number to purchase Crimson on CD with a printed manual, USB cable, and RS-232 cable. Otherwise, download for free from www.redlion.net.
3 Red Lion offers RJ modular jack adapters. Refer to the DR literature for complete details.
4 Battery type is lithium coin type CR2025.
5 Industrial grade two million write cycles.
6 For use in non-hazardous locations only.
**SPECIFICATIONS**

1. **POWER REQUIREMENTS:**
   - G310C: +24 VDC ±20% @ 33 W maximum.
   - G310S: +24 VDC ±20% @ 50 W maximum.
   Must use Class 2 or SELV rated power supply.
   - Power connection via removable three position terminal block.
   Notes:
     1. The front panel PWR LED indicates power.
     2. The G310’s circuit common is not connected to the enclosure of the unit. See “Connecting to Earth Ground” in the section “Installing and Powering the G310.”

2. **BATTERY:** Lithium coin cell. Typical lifetime of 10 years.

3. **LCD MODULE DISPLAYS:**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>G310C</th>
<th>G310S</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIZE</td>
<td>10.4-inch</td>
<td>10.4-inch</td>
</tr>
<tr>
<td>TYPE</td>
<td>TFT</td>
<td>TFT</td>
</tr>
<tr>
<td>COLORS</td>
<td>256 VGA</td>
<td>256 VGA</td>
</tr>
<tr>
<td>PIXELS</td>
<td>640 X 480</td>
<td>640 X 480</td>
</tr>
<tr>
<td>BRIGHTNESS</td>
<td>450 cd/m²</td>
<td>850 cd/m²</td>
</tr>
<tr>
<td>BACKLIGHT*</td>
<td>50,000 HR TYP.</td>
<td>20,000 HR TYP.</td>
</tr>
</tbody>
</table>

*Lifetime at room temperature. Refer to “Display” in the “Software/Unit Operation” section.

4. **8-KEY KEYPAD:** for on-screen menus.

5. **TOUCHSCREEN:** Resistive analog

6. **MEMORY:**
   - On Board User Memory: 8 Mbyte of onboard non-volatile Flash memory.
   - Memory Card: CompactFlash Type II slot for Type I and Type II CompactFlash cards.

7. **COMMUNICATIONS:**
   - USB Port: Adheres to USB specification 1.1. Device only using Type B connection.

   **WARNING - DO NOT CONNECT OR DISCONNECT CABLES WHILE POWER IS APPLIED UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS. USB PORT IS FOR SYSTEM SET-UP AND DIAGNOSTICS AND IS NOT INTENDED FOR PERMANENT CONNECTION.**

   **Serial Ports:** Format and Baud Rates for each port are individually software programmable up to 115,200 baud.
   - PGM Port: RS232 port via RJ12.
   - DH485 TXEN: Transmit enable; open collector, VOH = 15 VDC, VOL = 0.5 V @ 25 mA max.  
   - Temperature Range: -20° to 70°C
   - Storage Temperature Range: G310C: -20° to 70°C  
     G310S: -20° to 60°C
   - Operating and Storage Humidity: 80% maximum relative humidity (non-condensing) from 0 to 50°C.

8. **ENVIRONMENTAL CONDITIONS:**
   - Operating Temperature Range: 0 to 50°C
   - Storage Temperature Range: G310C: -20° to 70°C
   - Operating and Storage Humidity: 80% maximum relative humidity (non-condensing) from 0 to 50°C.

   **Electromagnetic RF fields**
   - Criterion A: Normal operation within specified limits.
   - Criterion B: Temporary loss of performance from which the unit self-recovers.

9. **CERTIFICATIONS AND COMPLIANCES:**
   - **SAFETY**
     - UL Recognized Component, File #E179259, UL61010-1, CSA 22.2 No.61010-1
     - Recognized to U.S. and Canadian requirements under the Component Recognition Program of Underwriters Laboratories, Inc.
     - UL Listed, File #E211967, UL61010-1, UL1604, CSA 22.2 No. 61010.1, CSA 22.2 No. 213-M1987
     - LISTED by Underwriters Laboratories Inc.
     - IEC 61010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1.
     - IP66 Enclosure rating (Face only), IEC 529

   - **ELECTROMAGNETIC COMPATIBILITY**
     - Immunity to Industrial Locations:
       - Electrostatic discharge: EN 61000-4-2  
       - EN 61000-4-2: Criterion A  
       - EN 61000-4-3: Criterion A  
       - Fast transients (burst): EN 61000-4-4  
       - EN 61000-4-4: Criterion A  
       - Surge: EN 61000-4-5  
       - EN 61000-4-5: Criterion A  
       - RF conducted interference: EN 61000-4-6  
       - EN 61000-4-6: Criterion B  
       - Emissions:
         - EN 61000-4-2: Criterion A  
         - EN 61000-4-3: Criterion A  
         - EN 61000-4-4: Criterion A  
         - EN 61000-4-5: Criterion A  
         - EN 61000-4-6: Criterion B  

   - **Vibration According to IEC 68-2-6:** 10 to 55 Hz, in X, Y, Z direction for 1.5 hours, 1 g
   - **Shock According to IEC 68-2-27:** Operational 30 g, 9 msec in 3 directions.

   - **Altitude:** Up to 2000 meters.

   - ** Shock According to IEC 68-2-27:** Operational 30 g, 9 msec in 3 directions.

10. **CONNECTIONS:** Compression cage-clamp terminal block.

11. **CONSTRUCTION:** Steel rear metal enclosure with NEMA 4X/IP66 aluminum front plate when correctly fitted with the gasket provided.

12. **Mounting Requirements:** Maximum panel thickness is 0.25” (6.3 mm). For NEMA 4X/IP66 sealing, a steel panel with a minimum thickness of 0.125” (3.17 mm) is recommended.

13. **Weight:** 5.53 lbs (2.51 Kg)

**DIMENSIONS In inches (mm)**

```
<table>
<thead>
<tr>
<th>Dimension (inches)</th>
<th>(mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>12.83 (325.8)</td>
</tr>
<tr>
<td>Height</td>
<td>9.50 (241.3)</td>
</tr>
<tr>
<td>Depth</td>
<td>2.2 (55)</td>
</tr>
<tr>
<td>Width</td>
<td>11.55 (293.3)</td>
</tr>
<tr>
<td>Height</td>
<td>8.27 (210.1)</td>
</tr>
</tbody>
</table>
```

---

 Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
INSTALLING AND POWERING THE G310

MOUNTING INSTRUCTIONS

This operator interface is designed for through-panel mounting. A panel cut-out diagram and a template are provided. Care should be taken to remove any loose material from the mounting cut-out to prevent that material from falling into the operator interface during installation. A gasket is provided to enable sealing to NEMA 4X/IP66 specification. Install the 14 kep nuts provided and tighten evenly for uniform gasket compression.

Note: Tightening the kep nuts beyond a maximum of 17 inch-pounds (1.92 N-m) may cause damage to the front panel.

![Diagram of G310 Mounting Instructions]

All tolerances ±0.010" (±0.25 mm).

CONNECTING TO EARTH GROUND

The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

Each G310 has a chassis ground terminal on the back of the unit. Your unit should be connected to earth ground (protective earth).

COMMUNICATING WITH THE G310

CONFIGURING A G310

The G310 is configured using Crimson software. Crimson is available as a free download from Red Lion’s website, or it can be purchased on CD. Updates to Crimson for new features and drivers are posted on the website as they become available. By configuring the G310 using the latest version of Crimson, you are assured that your unit has the most up to date feature set. Crimson software can configure the G310 through the RS232 PGM port, USB port, or CompactFlash.

The USB port is connected using a standard USB cable with a Type B connector. The driver needed to use the USB port will be installed with Crimson. The RS232 PGM port uses a programming cable made by Red Lion to connect to the DB9 COM port of your computer. If you choose to make your own cable, use the “G310 Port Pin Out Diagram” for wiring information.

The CompactFlash can be used to program a G3 by placing a configuration file and firmware on the CompactFlash card. The card is then inserted into the target G3 and powered. Refer to the Crimson literature for more information on the proper names and locations of the files.

CABLES AND DRIVERS

Red Lion has a wide range of cables and drivers for use with many different communication types. A list of these drivers and cables along with pin outs is available from Red Lion’s website. New cables and drivers are added on a regular basis. If making your own cable, refer to the “G310 Port Pin Outs” for wiring information.

USB, DATA TRANSFERS FROM THE COMPACTFLASH CARD

WARNING - DO NOT CONNECT OR DISCONNECT CABLES WHILE POWER IS APPLIED UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS. USB PORT IS FOR SYSTEM SET-UP AND DIAGNOSTICS AND IS NOT INTENDED FOR PERMANENT CONNECTION.

In order to transfer data from the CompactFlash card via the USB port, a driver must be installed on your computer. This driver is installed with Crimson and is located in the folder C:\Program Files\Red Lion Controls\Crimson 2.0\Device\ after Crimson is installed. This may have already been accomplished if your G310 was configured using the USB port.

Once the driver is installed, connect the G310 to your PC with a USB cable, and follow “Mounting the CompactFlash” instructions in the Crimson 2 user manual.

POWER SUPPLY REQUIREMENTS

The G310C requires a 24 VDC power supply rated at 33 W, and the G310S requires a 24 VDC power supply rated at 50 W. Your unit may draw considerably less the rated power depending upon the options being used. As additional features are used your unit will draw increasing amounts of power. Items that could cause increases in current are additional communications, optional communications card, CompactFlash card, and other features programmed through Crimson.

In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. Please take care to observe the following points:

- The power supply must be mounted close to the unit, with usually not more than 6 feet (1.8 m) of cable between the supply and the operator interface. Ideally, the shortest length possible should be used.
- The wire used to connect the operator interface’s power supply should be at least 22-gage wire. If a longer cable run is used, a heavier gage wire should be used. The routing of the cable should be kept away from large contacts, inverters, and other devices which may generate significant electrical noise.
- A power supply with a Class 2 or SELV rating is to be used. A Class 2 or SELV power supply provides isolation to accessible circuits from hazardous voltage levels generated by a mains power supply due to single faults. SELV is an acronym for “safety extra-low voltage.” Safety extra-low voltage circuits shall exhibit voltages safe to touch both under normal operating conditions and after a single fault, such as a breakdown of a layer of basic insulation or after the failure of a single component has occurred.
ETHERNET COMMUNICATIONS

Ethernet communications can be established at either 10 BASE-T or 100 BASE-TX. The G310 unit’s RJ45 jack is wired as a NIC (Network Interface Card). For example, when wiring to a hub or switch use a straight-through cable, but when connecting to another NIC use a crossover cable.

RS232 PORTS

The G310 has two RS232 ports. There is the PGM port and the COMMS port. Although only one of these ports can be used for programming, both ports can be used for communications with a PLC.

The RS232 PGM port can be used for either master or slave protocols with any G310 configuration.

Examples of RS232 communications could involve another Red Lion product or a PC. By using a cable with RJ12 ends on it, and a twist in the cable, RS232 communications with another G3 product or the Modular Controller can be established. Red Lion part numbers for cables with a twist in them are CBLPROG0 1, CBLRLC01 2, or CBLRC02 3.

The Ethernet connector contains two LEDs. A yellow LED in the upper right, and a bi-color green/amber LED in the upper left. The LEDs represent the following statuses.

<table>
<thead>
<tr>
<th>LED COLOR</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>YELLOW solid</td>
<td>Link established.</td>
</tr>
<tr>
<td>YELLOW flashing</td>
<td>Data being transferred.</td>
</tr>
<tr>
<td>GREEN</td>
<td>10 BASE-T Communications</td>
</tr>
<tr>
<td>AMBER</td>
<td>100 BASE-TX Communications</td>
</tr>
</tbody>
</table>

The Crimson manual contains additional information on Ethernet communications.

**G3 RS232 to a PC**

<table>
<thead>
<tr>
<th>Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3: RJ12</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>N/C</td>
</tr>
</tbody>
</table>

1 CBLPROG0 can also be used to communicate with either a PC or an ICM5.
2 DB9 adapter not included, 1 foot long.
3 DB9 adapter not included, 10 feet long.

CONNECTING A G310 OPERATOR INTERFACE TO AN ICM5

G310 PORT PIN OUTS

<table>
<thead>
<tr>
<th>Power Connector</th>
<th>1. COMMON</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. 24V ± 20%</td>
<td>3. N/C</td>
</tr>
<tr>
<td>RS485</td>
<td>COMMS PORT</td>
</tr>
<tr>
<td>COMMS PORT</td>
<td>1. COMMON</td>
</tr>
<tr>
<td>10BASE-T RX/TX</td>
<td>2. 24V ± 20%</td>
</tr>
<tr>
<td>3. N/C</td>
<td>4. COMMON</td>
</tr>
<tr>
<td>RS232</td>
<td>COMMS PORT</td>
</tr>
<tr>
<td>COMMS PORT</td>
<td>5. COMMON</td>
</tr>
<tr>
<td>6. 24V ± 20%</td>
<td>7. N/C</td>
</tr>
<tr>
<td>ETHERNET (NIC)</td>
<td>COMMS PORT</td>
</tr>
<tr>
<td>USB TYPE B</td>
<td>COMMS PORT</td>
</tr>
<tr>
<td>8. 24V ± 20%</td>
<td>9. N/C</td>
</tr>
<tr>
<td>RS232</td>
<td>COMMS PORT</td>
</tr>
<tr>
<td>COMMS PORT</td>
<td>10. COMMON</td>
</tr>
<tr>
<td>11. 24V ± 20%</td>
<td>12. N/C</td>
</tr>
<tr>
<td>ETHERNET (NIC)</td>
<td>COMMS PORT</td>
</tr>
<tr>
<td>USB TYPE B</td>
<td>COMMS PORT</td>
</tr>
<tr>
<td>13. 24V ± 20%</td>
<td>14. N/C</td>
</tr>
<tr>
<td>RS232</td>
<td>COMMS PORT</td>
</tr>
<tr>
<td>COMMS PORT</td>
<td>15. COMMON</td>
</tr>
</tbody>
</table>

PROTECTIVE EARTH GROUND
**RS422/485 COMMS PORT**

The G310 has one RS422/485 port. This port can be configured to act as either RS422 or RS485.

---

**Examples of RS485 2-Wire Connections**

**G3 to Red Lion RJ11 (CBLRLC00)**

DLC, IAMS, ITMS, PAXCDC4C

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**DH485 COMMUNICATIONS**

The G310’s RS422/485 COMMS port can also be used for Allen Bradley DH485 communications.

**WARNING:** DO NOT use a standard DH485 cable to connect this port to Allen Bradley equipment. A cable and wiring diagram are available from Red Lion.

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**G3 to AB SLC 500 (CBLAB003)**

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**Note:** All Red Lion devices connect A to A and B to B, except for Paradigm devices. Refer to www.redlion.net for additional information.
SOFTWARE/UNIT OPERATION

CRIMSON SOFTWARE
Crimson software is available as a free download from Red Lion’s website or it can be purchased on a CD, see “Ordering Information” for part number. The latest version of the software is always available from the website, and updating your copy is free.

DISPLAY
This operator interface uses a liquid crystal display (LCD) for displaying text and graphics. The display utilizes a cold cathode fluorescent tube (CCFL) for lighting the display. The CCFL tubes can be dimmed for low light conditions.
These CCFL tubes have a limited lifetime. Backlight lifetime is based upon the amount of time the display is turned on at full intensity. Turning the backlight off when the display is not in use can extend the lifetime of your backlight. This can be accomplished through the Crimson software when configuring your unit.

BACKLIGHT REPLACEMENT
CAUTION:
Backlight is not field replaceable for hazardous location applications. Unit must be returned to Red Lion Controls for repair.

The backlight assembly is field replaceable in non-hazardous locations only. Refer to the instructions included in the appropriate backlight replacement kit.

FRONT PANEL LEDS
There are three front panel LEDs. Shown below is the default status of the LEDs.

<table>
<thead>
<tr>
<th>LED</th>
<th>INDICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED (TOP, LABELED “PWR”)</td>
<td></td>
</tr>
<tr>
<td>FLASHING</td>
<td>Unit is in the boot loader, no valid configuration is loaded.</td>
</tr>
<tr>
<td>STEADY</td>
<td>Unit is powered and running an application.</td>
</tr>
<tr>
<td>YELLOW (MIDDLE)</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td>No CompactFlash card is present.</td>
</tr>
<tr>
<td>STEADY</td>
<td>Valid CompactFlash card present.</td>
</tr>
<tr>
<td>FLASHING RAPIDLY</td>
<td>CompactFlash card being checked.</td>
</tr>
<tr>
<td>FLICKERING</td>
<td>Unit is writing to the CompactFlash, either because it is storing data, or because the PC connected via the USB port has locked the drive.</td>
</tr>
<tr>
<td>FLASHING SLOWLY</td>
<td>Incorrectly formatted CompactFlash card present.</td>
</tr>
<tr>
<td>GREEN (BOTTOM)</td>
<td></td>
</tr>
<tr>
<td>FLASHING</td>
<td>A tag is in an alarm state.</td>
</tr>
<tr>
<td>STEADY</td>
<td>Valid configuration is loaded and there are no alarms present.</td>
</tr>
</tbody>
</table>

1. The operator interface is shipped without a configuration. After downloading a configuration, if the light remains in the flashing state continuously, try cycling power. If the LED still continues to flash, try downloading a configuration again.
2. Do not turn off power to the unit while this light is flickering. The unit writes data in two minute intervals. Later Microsoft operating systems will not lock the drive unless they need to write data; Windows 98 may lock the drive any time it is mounted, thereby interfering with logging. Refer to “Mounting the CompactFlash” in the Crimson 2 User Manual.

EMAIL: techsupport@redlion.net
Web Site: http://www.redlion.net

KEYPAD
The G310 keypad consists of eight keys for on-screen menus.

TOUCHSCREEN
This operator interface utilizes a resistive analog touchscreen for user input. The unit will only produce an audible tone (beep) when a touch on an active touchscreen cell is sensed. The touchscreen is fully functional as soon as the operator interface is initialized, and can be operated with gloved hands.

TROUBLESHOOTING YOUR G310
If for any reason you have trouble operating, connecting, or simply have questions concerning your new G310, contact Red Lion’s technical support. For contact information, refer to the back page of this bulletin for phone and fax numbers.
A battery is used to keep time when the unit is without power. Typical accuracy of the G310 time keeping is less than one minute per month drift. The battery of a G310 unit does not affect the unit’s memory, all configurations and data is stored in non-volatile memory.

**CAUTION: RISK OF ELECTRIC SHOCK**

The inverter board, attached to the mounting plate, supplies the high voltage to operate the backlight. Touching the inverter board may result in injury to personnel.

**CAUTION:** The circuit board contains static sensitive components. Before handling the operator interface without the rear cover attached, discharge static charges from your body by touching a grounded bare metal object. Ideally, handle the operator interface at a static controlled clean workstation. Also, do not touch the surface areas of the circuit board. Dirt, oil, or other contaminants may adversely affect circuit operation.

To change the battery of a G310, remove power, cabling, and then the rear cover of the unit. To remove the cover, remove the five screws designated by the arrows on the rear of the unit. Then, by lifting the top side, hinge the cover, thus providing clearance for the connectors on the bottom side of the PCB as shown in the illustration below. Install in the reverse manner.

Remove the old battery* from the holder and replace with the new battery. Replace the rear cover, cables, and re-apply power. Using Crimson or the unit’s keypad, enter the correct time and date.

*Please note that the old battery must be disposed of in a manner that complies with your local waste regulations. Also, the battery must not be disposed of in fire, or in a manner whereby it may be damaged and its contents come into contact with human skin.

The battery used by the G310 is a lithium type CR2025.
OPTIONAL FEATURES AND ACCESSORIES

INDOOR VERSUS OUTDOOR
Red Lion offers two versions of its G310 unit. The G310C000 uses an overlay with a textured finish and keys that are embossed. This overlay is not rated for outdoor use. The G310S000 uses an overlay with a glossy finish that uses UV rated material for outdoor use. The keys on this overlay are not embossed. The display is significantly brighter than the G310C000.

OPTIONAL COMMUNICATION CARD
Red Lion offers optional communication cards for fieldbus communications. These communication cards will allow your G310 to communicate with many of the popular fieldbus protocols.
Red Lion is also offering a communications card for additional RS232 and RS422/485 communications. Visit Red Lion’s website for information and availability of these cards.

CUSTOM LOGO
Each G3 operator interface has an embossed area containing the Red Lion logo. Red Lion can provide custom logos to apply to this area. Contact your distributor for additional information and pricing.

COMPACTFLASH SOCKET
CompactFlash socket is a Type II socket that can accept either Type I or II cards. Use cards with a minimum of 4 Mbytes and a maximum of 2 Gbytes with the G310’s CompactFlash socket. Cards are available at most computer and office supply retailers.
CompactFlash can be used for configuration transfers, larger configurations, data logging, and trending.

Note: Do not remove or insert the CompactFlash card while power is applied. Refer to “Front Panel LEDs.”

Information stored on a CompactFlash card by a G310 can be read by a card reader attached to a PC. This information is stored in IBM (Windows®) PC compatible FAT16 file format.

NOTE
For reliable operation in all of our products, Red Lion recommends the use of SanDisk® and SimpleTech brands of CompactFlash cards.
Industrial grade versions that provide up to two million write/erase cycles minimum are available from Red Lion.

LIMITED WARRANTY
The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company’s liability under this limited warranty shall extend only to the repair or replacement of a defective product, at the Company’s option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.
The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.
No warranties expressed or implied are created with respect to the Company’s products except those expressly contained herein. The Customer acknowledges the disclaimers and limitations contained herein and relies on no other warranties or affirmations.
MODEL GL350 GRAPHICAL OPERATOR TERMINAL

DESCRIPTION
The Paradigm operator interface Model GL350 was designed to meet the industrial demands of application power, versatility, reliability, and ease of use. The GL350 has provision, common to all Paradigm Family products, allowing for future product upgrades and new options and capabilities are developed.

SAFETY SUMMARY
All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so, can be potentially harmful to persons or equipment in the event of a fault to the unit.

The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

SPECIFICATIONS
1. POWER REQUIREMENTS: 11 to 30 VDC @ 4.8 W
   Power Up Current: 2.5 A for 1 msec. max.
   Must use a Class 2 or SELV rated power supply.
2. DISPLAY: 256 x 128 pixel full graphic display with cold cathode backlight.
   Automatic temperature compensation. Text formats upto 16 x 40 characters.
3. KEYPAD: 4 screen legendable soft keys, 12 User user-legendable function keys, numeric pad and raise, lower, next, previous, enter, delete, exit, alarms and mute keys all are embossed and have tactile feedback
4. MEMORY: 256K (192K user) battery backed RAM (Battery life expectancy 3 years 50/50 on/off cycle). Optional expansion to 768K (704K user).
5. ENVIRONMENTAL CONDITIONS:
   Operating Temperature: 0 to 40°C
   Storage Temperature: -20 to 80°C
   Operating and Storage Humidity: 20 to 80% max. RH (non-condensing) from 0°C to 40°C.
   Altitude: Up to 2000 meters
6. PHYSICAL DIMENSIONS: L = 8.82" (224 mm), H = 7.84" (199 mm), D = 2.64" (67 mm)
7. CONSTRUCTION: Steel rear metal enclosure with NEMA 4/IP65 aluminum front plate when correctly fitted with the gasket provided. This unit is rated for NEMA 4/Ip65 indoor use. Installation Category II, Pollution Degree 2
8. MOUNTING REQUIREMENTS: Max. panel thickness is 0.375" (9.5 mm)
   For NEMA 4/IP65 scaling, a steel panel with a minimum thickness of 0.125" (3.175 mm) is recommended.

DIMENSIONS In inches (mm)

CAUTION: Risk of Danger
Read complete instructions prior to installation and operation of the unit.

CAUTION: Risk of electric shock.

UL Recognized Component, File # E179259
9. CERTIFICATIONS AND COMPLIANCES:

SAFETY
UL Recognized Component, File #E179259, UL61010-1, CSA C22.2 No.61010-1
Recognized to U.S. and Canadian requirements under the Component
Recognition Program of Underwriters Laboratories, Inc.

Type 4 Enclosure rating (Face only), UL50
IEC61010-1

10. FIELD CONNECTIONS: Removable screw terminal blocks.

11. WEIGHT: 3.04 lb. (1.38 Kg.)

INPUT/OUTPUT COMMUNICATIONS SPECS

1. SERIAL PORTS: Data Format and Baud Rates for each port is individually
software programmable up to 19200 baud.
Port 1: Programming Port - RS-232 on an RJ-11 jack.
Port 2: RS-232 Port on a Plug-In Screw Terminal Block
Port 3: RS-485 Port on a Plug-In Screw Terminal Block
(Up to 29 Units can be connected and individually addressed.)

Note: LED Indicators show communications status on Ports 2 & 3

2. COMMUNICATION MODES: Any of the three ports can be used to
communicate with Serial Devices.
Model - (unit name) may communicate in Master mode with a different
device protocol on each port (See Note & Exception).
However, only one of Ports 2 and 3 may be configured if either is selected as a
Slave protocol.

Note: Ports 2 and 3 may be configured as different device protocols in
Master mode and Port 1 may be used simultaneously in Slave mode for
a third device protocol.
Exception: If Allen Bradley DH485 is selected on either Port 2 or 3, only
Port 1 will be available for a separate Device Protocol.

ORDERING INFORMATION

MODEL NO. DESCRIPTION PART NUMBER
GL350 CCFL, 16 X 40, 12 Function, 4 Soft keys, 256 K memory GL350000
GL350 CCFL, 16 X 40, 12 Function, 4 Soft keys, 768 K memory GL350010

EDICT-97 Development Kit Includes Software, Manual and 9-pin RS232 SFEDT
Programming cables
Communication Cables P895xxx
Battery Replacement BAL3R004

COMMON FEATURES FOR GRAPHIC BASED OPERATOR TERMINALS

PROGRAMMABILITY

Event Driven Configuration Tool
Edict 97, an extremely powerful Windows 95/3.11 based software program,
provides for the intuitive configuration of every aspect of the operator
interface’s behavior. The requirement for time consuming PLC ladder logic is
dramatically reduced by the unique event driven approach of EDICT 97. The
capability of this program, in conjunction with the PLC and the Paradigm
operator interface unit, ensures a great deal of advanced functionality for your
system. This powerful PLC/Paradigm system provides many of the capabilities
and features normally associated with the more complicated and costly
PC/SCADA systems. Display pages are easily generated, including PLC and
internal variables, text strings, or bar charts. All dynamic elements are also
available as alarms, recipes, triggers, and reports for the run time software. After
completion of the programming, the program is directly downloaded to the
operator interface from your PC, without any compiling or saving requirement.
When you require a change in your program, EDICT 97 loads only the change,
not the entire program, saving valuable on-line time.

DYNAMIC DISPLAY PAGE ELEMENTS

Each display page has provisions to show static and dynamic information,
including data variables, text messages, time, and date.

Data Variables can be either PLC derived or internally generated, either in data
entry or display only mode. The Paradigm unit has an extremely powerful
math capability, allowing the operator to manipulate the variables to meet the
specific application’s demands. If required, the display can be formatted to
BCD, binary, hex, floating point, or string. Upper and lower limits of data
elements are fully supported and password protected.

Text Message Animation enables several different types of animated text from
a local or global message table to be displayed. The message display is
dependent on the condition of the particular controlling expression. The
controlling expression may be a PLC bit level, a timer value, preset counter
condition, or any one of a wide variety of message triggers.

Time and Date in the Paradigm unit has the capability to display in any
combination of year, month, day, hours, minutes, and seconds.

Bar Graphs in horizontal format are easily attached to data variables. The
partial or full length bar graphs can be scaled and offset to optimize the
required display effect.

SECURITY

The password protection scheme provides the ultimate in tamper-proof
capability. Access can be limited on a unit, page, recipe, or even individual data
entries.
COMMUNICATIONS
With over 70 communication drivers available, the Paradigm operator interface offers a wide range of connectivity including: PLCs, Variable Speed Drives, Temperature Controllers, Bar Code Readers, etc. Utilizing real PLC data references, the automatic configs optimization utilizes the system’s communication performance. In the event that your specific driver does not appear on the Paradigm drivers list, let us know, as this list is always being expanded to meet our customers’ needs.

GRAPHIC UNITS
In addition to all the features of the character-based units, the GL and GX will provide exceptional value in displaying trend graphs, process schematics and flow, and others, limited only by the imagination of the designer. The programmer can use the built-in standard symbols, or construct them. A sequence of graphical symbols can be assigned to a PLC location, and the powerful software will step through the sequence without the necessity of programming multiple expressions for each bitmap. Some of the inherent features of the Graphical Display units:

- Data Logging
- Process symbols, such as tanks, valves, etc.
- Extraordinary color displays on the VX-500 and VX-550.
- Memory expansion is field-upgradeable.
- Plus all the functions available in EDICT 97, the powerful event driven configuration tool that allows one to configure a system to do what is needed.

ANIMATED GRAPHICS
Graphical pages are constructed using both bitmaps and object graphics. Animation items such as tending, tank filling, horizontal and vertical bar graphs, valves, etc., make your display pages aesthetically pleasing as well as informative to the operator.

HARDWARE INFORMATION
This bulletin contains a variety of information related to the installation and operation of the Operator Interface supplied. Ideally, you should read this document thoroughly before attempting to use the equipment. For information about the software aspects of the terminal, please consult other documentation.

CONTENTS OF PACKAGE
The Operator Interface is supplied in a packaging box containing the following...
- The interface terminal itself.
- A NEMA 4/IP65 rated mounting gasket.
- A bag containing panel hardware.
- This hardware bulletin.
- If any of these items is missing, please contact your supplier immediately.

POWER SUPPLY REQUIREMENTS
The Operator Interface requires a 11-30 VDC power supply rated at 4.8 W unless otherwise stated on the label.
- The terminal may take as little as 100 mA in certain circumstances, so be sure that the chosen power supply can operate correctly with this load. Large switch-mode supplies tend to need a certain minimum load before they will operate correctly.
- In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. A very high proportion of reported problems are caused by incorrect power supply installation, so please take care to observe the following points...
  - The power supply must be mounted close to the unit, with usually not more than 6 feet of cable between the supply and the Operator Interface. Ideally, as short a length as is possible should be used.
  - The wire used to connect the Operator Interface’s power supply should be of at least 22 gage wire. If a longer cable run is used, you should use heavier gage wire. The routing of the cable should be kept away from large contactors, inverters and other devices which may generate significant electrical noise.

BATTERY BACKUP ISSUES
The Operator Interface is supplied with a Lithium Battery designed to maintain the internal memory and real-time clock during power outages. Assuming the operator interface terminal is powered up for 50% of the time, this battery should last over 4 years. A “Battery Low” system variable is available so that the programmer can choose specific action(s) to occur when the battery voltage drops below its nominal voltage.
- It is possible to replace the battery without losing the contents of the Operator Interface’s memory, but this does not reduce the importance of ensuring that a copy of the terminal’s configuration is kept readily at hand to allow the terminal to be re-loaded in the case of mishaps. Please remember that although an image of the database contents can be uploaded, this file is not editable, so the importance of keeping a copy on disk cannot be over stressed.

CHANGING THE BATTERY

To change the internal battery, follow these steps...
- Remove the power and PLC communications connector from the unit.
- Remove the four screws from the rear-cover, and remove rear cover.
- If you wish to avoid losing the terminal’s configuration, reconnect the power connector and re-apply power. Note that this will require the panel to be powered-up and, as such, only suitably qualified staff should carry out this procedure.

CAUTION: RISK OF ELECTRIC SHOCK
The inverter board, attached to the bottom of the main board, supplies the high voltage to operate the backlight. Touching the inverter board may result in injury to personnel.
- The battery is located in a holder on the main circuit board. This should be clearly visible. Remove the battery from its holder.
- Place the new battery in the holder. The terminal’s power supply can now be disconnected, if you re-applied power in the step above.
- Replace the lid, screws and connector by following the above procedure in reverse. You may like to make a note of the date the battery was replaced to allow planned maintenance to be carried out.
- If you did not keep the unit powered-up during battery replacement, hold down the EXIT and MUTE keys on the keyboard and cycle power.
- Release the keys and follow the menu guides to clear the memory. The unit is now ready for a configuration database to be reloaded.

Please note that the old battery must be disposed of in a manner which complies with your local waste regulations. Also, the battery must not be disposed of in fire or in a manner whereby it may be damaged and its contents come into contact with human skin.
**INSTALLATION & CONNECTIONS**

The unit meets NEMA 4/IP65 requirements for indoor use, when properly installed. The units are intended to be mounted into an enclosed panel.

⚠️ The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

**INSTALLATION ENVIRONMENT**

The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

Continuous exposure to direct sunlight may accelerate the aging process of the bezel. The bezel should be cleaned only with a soft cloth and neutral soap product. Do NOT use solvents.

Do not use tools of any kind (screwdrivers, pens, pencils, etc.) to operate the keypad of the unit.

**MOUNTING INSTRUCTIONS**

The Operator Interfaces are designed for through-panel mounting. A neoprene gasket is provided, to enable sealing to NEMA 4/IP65 specification. The panel cut-out diagram for the model supplied is provided. All mounting holes should be drilled for 0.14" (3.5 mm) clearance. Care should be taken to remove any loose material from the mounting hole to avoid such metal falling into the Operator Interface itself during installation.

**CONNECTING TO A PLC**

The Operator Interface is designed to operate with a PLC. A serial communication connection must be made between the operator interface terminal and PLC, and the details of this connection vary according to which PLC is used.

The following section lists the connection details for the PLC to be used.

**PLC TYPE**

Details on how to connect to most PLCs are available on request from RLC.

**CONNECTING TO AN IBM® PC/AT**

The Operator Interface is programmed via software running on an IBM PC/AT or a compatible computer. The connection between the PC/AT and the operator interface terminal is made via a custom cable provided with the EDICT Developer’s Kit. The cable is designed for a 9-way serial port. Please contact your supplier if you require a 25-way version.

**PROGRAMMING PORT PIN OUT**

The Operator Interface’s programming port is sometimes used to connect other RS-232 devices, such as printers. The following illustration and table gives the pin-out of this port to enable such connections to be made.

<table>
<thead>
<tr>
<th>RJ11 FEMALE</th>
<th>PIN</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RTS</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Tx</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>RX</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>CTS</td>
<td></td>
</tr>
</tbody>
</table>

Rear View of Unit

The above table denotes the pin names of the programming port. When connecting, the pin name at the programming port is connected to the opposite of that pin name at the destination device.

**FUNCTION KEY STRIPS**

The function keys on the Models GL350, have clear windows that permit the user to insert labels appropriate to the process. A formatted page is supplied upon which the user can enter function names (e.g. RUN, PRINT, etc.). These strips are inserted from the rear of the panel through slots below the function keys located underneath the gasket.

Take care that the ink applied will not rub off of the paper, or else blemishes will be left on the inside of the window. Laminated paper or plastic film can prove easier to insert than normal photocopy paper. It also helps if the starting edge of the paper has about 0.25 inches of its corners cut off at a 45 degree angle.

**TROUBLESHOOTING**

For further technical assistance, contact technical support at the appropriate company numbers listed.

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This documentation, and the software and products described herein, is subject to continuous development and improvement. All information is given in good faith, but RLC shall not be liable for any omissions or errors herein or within the software herein described.

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 Courtesy of Steven Engineering, Inc.–230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
GENERAL DESCRIPTION

The G315C Operator Interface combines powerful features normally found only in PC-based HMIs, with the reliability of a dedicated operating system. It is built around a high performance core with integrated features, allowing it to provide SCADA-like functionality at a fraction of the cost.

The G315C is able to act as a multiple protocol converter using four high-speed RS232/422/485 communications ports and an Ethernet 10/100 Base-TX port. The Ethernet port supports up to four protocols simultaneously, allowing dissimilar Ethernet based products to communicate with one another.

The G315C’s USB port allows fast downloads of configuration files and access to trending and data logging. A CompactFlash socket is provided so that standard CompactFlash cards can be used to collect your trending and data logging information as well as to store configuration files. The built-in web server allows processes to be controlled remotely.

The G315C’s large, high-resolution display allows users to easily view and enter information. Data can be manipulated through the touchscreen and/or the 10-button keypad.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use the controller to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the controller.

The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

CONTENTS OF PACKAGE

- G315C Operator Interface.
- Panel gasket.
- Template for panel cutout.
- Hardware packet for mounting unit into panel.
- Terminal block for connecting power.

ORDERING INFORMATION

- G315C Operator Interface.
- Panel gasket.
- Template for panel cutout.
- Hardware packet for mounting unit into panel.
- Terminal block for connecting power.

1 Contact your Red Lion distributor or visit our website for complete selection.
2 Use this part number to purchase Crimson on CD with a printed manual, USB cable, and RS-232 cable. Otherwise, download for free from www.redlion.net.
3 Red Lion offers RJ modular jack adapters. Refer to the DR literature for complete details.
4 Battery type is lithium coin type CR2025.
5 Industrial grade two million write cycles.
1. **POWER REQUIREMENTS**: Must use Class 2 or SELV rated power supply.  
   Power connection via removable three position terminal block.  
   Supply Voltage: +24 VDC ±20%  
   Typical Power: 27 W  
   Maximum Power: 67 W  
   Notes:  
   1. Typical power with +24 VDC, RS232/485 communications, Ethernet communications, CompactFlash card installed, and display at full brightness.  
   2. Maximum power indicates the most power that can be drawn from the G315C. Refer to “Power Supply Requirements” under “Installing and Powering the G315C.”  
   3. The G315C’s circuit common is not connected to the enclosure of the unit. See “Connecting to Earth Ground” in the section “Installing and Powering the G315C.”  
   4. Read “Power Supply Requirements” in the section “Installing and Powering the G315C” for additional power supply information.

2. **BATTERY**: Lithium coin cell. Typical lifetime of 10 years.

3. **LCD DISPLAY**:  
<table>
<thead>
<tr>
<th>SIZE</th>
<th>15-inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE</td>
<td>TFT</td>
</tr>
<tr>
<td>COLORS</td>
<td>32K</td>
</tr>
<tr>
<td>PIXELS</td>
<td>1024 X 768</td>
</tr>
<tr>
<td>BRIGHTNESS</td>
<td>600 cd/m²</td>
</tr>
<tr>
<td>BACKLIGHT*</td>
<td>50,000 HR TYP</td>
</tr>
</tbody>
</table>

   *Lifetime at room temperature. Refer to “Display” in “Software/Unit Operation”

4. **10-KEY KEYPAD**: for on-screen menus.

5. **TOUCHSCREEN**: Resistive analog

6. **MEMORY**:  
   On Board User Memory: 32 Mbyte of non-volatile Flash memory.  
   Memory Card: CompactFlash Type II slot for Type I and Type II CompactFlash cards.

7. **COMMUNICATIONS**:  
   USB Device Port: Adheres to USB 2.0 Specification supporting high speed and full speed via Type B connection.
   Serial Ports: Format and Baud Rates for each port are individually software programmable up to 115,200 baud.  
   PGM Port: RS232 port via RJ12.  
   COMMs Ports: RS422/485 port via RJ45, and RS232 port via RJ12.  
   DH485 TXEN: Transmit enable; open collector, VOH = 15 VDC, VOL = 0.5 V @ 25 mA max.  
   Note: For additional information on the communications or signal common and connections to earth ground please see the “Connecting to Earth Ground” in the section “Installing and Powering the G315C.”  
   Port to port isolation: 500 Vrms for 1 minutes signal isolation : 50V

8. **ENVIRONMENTAL CONDITIONS**:  
   Operating Temperature Range: 0 to 50°C  
   Storage Temperature Range: -20 to 70°C  
   Operating and Storage Humidity: 80% maximum relative humidity (non-condensing) from 0 to 50°C.  
   Altitude: Up to 2000 meters.

9. **CERTIFICATIONS AND COMPLIANCES**:  
   **SAFETY**  
   IEC 61010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1.  
   IP66 Enclosure rating (Face only), IEC 529  
   Type 4X Enclosure rating (Face only), UL50  
   **ELECTROMAGNETIC COMPATIBILITY**  
   Emissions and Immunity to EN 61326: Electrical Equipment for Measurement, Control and Laboratory use.  
   Immunity to Industrial Locations:  
   Electrostatic discharge EN 61000-4-2  
   Criterion A: 4 kV contact discharge  
   8 kV air discharge  
   Electromagnetic RF fields EN 61000-4-3  
   Criterion B: 10 V/m  
   Fast transients (burst) EN 61000-4-4  
   Criterion B: 2 kV power  
   1 kV signal  
   Surge EN 61000-4-5  
   Criterion A: 1 kV L-L, 2 kV L&E-N-E power  
   RF conducted interference EN 61000-4-6  
   Criterion B: 3 V/rms  
   Emissions:  
   Emissions EN 55011  
   Class A  
   Note:  
   2. Criterion B: Temporary loss of performance from which the unit self recovers.  

10. **CONNECTIONS**: Compression cage-clamp terminal block.  
    Wire Gage: 12-22 AWG copper wire  
    Torque: 5-7 inch-pounds (56-79 N-cm)

11. **CONSTRUCTION**: Steel rear metal enclosure with NEMA 4X/IP66 aluminum front plate for indoor use only when correctly fitted with the gasket provided. Installation Category II, Pollution Degree 2.

12. **MOUNTING REQUIREMENTS**: Maximum panel thickness is 0.25" (6.3 mm). For NEMA 4X/IP66 sealing, a steel panel with a minimum thickness of 0.125" (3.17 mm) is recommended.  
    Maximum Mounting Stud Torque: 17 inch-pounds (1.92 N-m)

13. **WEIGHT**: 11.41 lbs (5.17 Kg)

---

**DIMENSIONS In inches (mm)**

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.00</td>
<td>(406.4)</td>
</tr>
<tr>
<td>13.00</td>
<td>(330.2)</td>
</tr>
<tr>
<td>26.00</td>
<td>(660.4)</td>
</tr>
<tr>
<td>11.59</td>
<td>(294.4)</td>
</tr>
<tr>
<td>14.59</td>
<td>(370.6)</td>
</tr>
</tbody>
</table>

---

![Protective Earth Ground](PROTECTIVE_EARTH_GROUND.png)

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Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
INSTALLING AND POWERING THE G315C

MOUNTING INSTRUCTIONS
This operator interface is designed for through-panel mounting. A panel cut-out diagram and a template are provided. Care should be taken to remove any loose material from the mounting cut-out to prevent that material from falling into the operator interface during installation. A gasket is provided to enable sealing to NEMA 4X/IP66 specification. Install the 22 kep nuts provided and tighten evenly for uniform gasket compression.

Note: Tightening the kep nuts beyond a maximum of 17 inch-pounds (1.92 N-m) may cause damage to the front panel.

CONNECTING TO EARTH GROUND
Each G315C has a chassis ground terminal on the back of the unit. Your unit should be connected to earth ground (protective earth).

The chassis ground is not connected to signal common of the unit. Maintaining isolation between earth ground and signal common is not required to operate your unit. But, other equipment connected to this unit may require isolation between signal common and earth ground. To maintain isolation between signal common and earth ground care must be taken when connections are made to the unit. For example, a power supply with isolation between its signal common and earth ground must be used. Also, plugging in a USB cable may connect signal common and earth ground.¹

¹. USB’s shield may be connected to earth ground at the host. USB’s shield in turn may also be connected to signal common.

POWER SUPPLY REQUIREMENTS
The G315C requires a 24 VDC power supply. Your unit may draw considerably less than the maximum rated power depending upon the options being used. As additional features are used your unit will draw increasing amounts of power. Items that could cause increases in current are additional communications, optional communications card, CompactFlash card, and other features programmed through Crimson.

In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. Please take care to observe the following points:

– The power supply must be mounted close to the unit, with usually not more than 6 feet (1.8 m) of cable between the supply and the operator interface. Ideally, the shortest length possible should be used.

– The wire used to connect the operator interface’s power supply should be at least 22-gage wire. If a longer cable run is used, a heavier gage wire should be used. The routing of the cable should be kept away from large contactors, inverters, and other devices which may generate significant electrical noise.

– A power supply with a Class 2 or SELV rating is to be used. A Class 2 or SELV power supply provides isolation to accessible circuits from hazardous voltage levels generated by a mains power supply due to single faults. SELV is an acronym for “safety extra-low voltage.” Safety extra-low voltage circuits shall exhibit voltages safe to touch both under normal operating conditions and after a single fault, such as a breakdown of a layer of basic insulation or after the failure of a single component has occurred.

All nonincendive circuits must be wired using Division 2 wiring methods as specified in Article 501-4 (b), 502-4 (b), and 503-3 (b) of the National Electrical Code, NFPA 70 For Installation within the United States, or as specified in Section 19-152 of Canadian Electrical Code for Installation in Canada.
**COMMUNICATING WITH THE G315C**

**CONFIGURING A G315C**

The G315C is configured using Crimson software. Crimson is available as a free download from Red Lion’s website, or it can be purchased on CD. Updates to Crimson for new features and drivers are posted on the website as they become available. By configuring the G315C using the latest version of Crimson, you are assured that your unit has the most up to date feature set. Crimson software can configure the G315C through the RS232 PGM port, USB port, Ethernet port, or CompactFlash.

The USB port is connected using a standard USB cable with a Type B connector. The driver needed to use the USB port will be installed with Crimson. The RS232 PGM port uses a programming cable made by Red Lion to connect to the DB9 COM port of your computer. If you choose to make your own cable, use the “G315C Port Pin Out Diagram” for wiring information.

The CompactFlash can be used to program a G3 by placing a configuration file and firmware on the CompactFlash card. The card is then inserted into the target G3, and the G3 is then powered up. Refer to the Crimson literature for more information on the proper names and locations of the files.

**USB, DATA TRANSFERS FROM THE COMPACTFLASH CARD**

In order to transfer data from the CompactFlash card via the USB port, a driver must be installed on your computer. This driver is installed with Crimson and is located in the folder C:\Program Files\Red Lion Controls\Crimson 2.0\Device\ after Crimson is installed. This may have already been accomplished if your G315C was configured using the USB port.

Once the driver is installed, connect the G315C to your PC with a USB cable, and follow “Mounting the CompactFlash” instructions in the Crimson 2 user manual.

**CABLES AND DRIVERS**

Red Lion has a wide range of cables and drivers for use with many different communication types. A list of these drivers and cables along with pin outs is available from Red Lion’s website. New cables and drivers are added on a regular basis. If making your own cable, refer to the “G315C Port Pin Outs” for wiring information.

**ETHERNET COMMUNICATIONS**

Ethernet communications can be established at either 10 BASE-T or 100 BASE-TX. The G315C unit’s RJ45 jack is wired as a NIC (Network Interface Card). For example, when wiring to a hub or switch use a straight-through cable, but when connecting to another NIC use a crossover cable.

The Ethernet connector contains two LEDs. A yellow LED in the upper right, and a bi-color green/amber LED in the upper left. The LEDs represent the following statuses:

<table>
<thead>
<tr>
<th>LED COLOR</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>YELLOW</td>
<td>Link established.</td>
</tr>
<tr>
<td>YELLOW</td>
<td>Data being transferred.</td>
</tr>
<tr>
<td>GREEN</td>
<td>10 BASE-T Communications</td>
</tr>
<tr>
<td>AMBER</td>
<td>100 BASE-TX Communications</td>
</tr>
</tbody>
</table>

On the rear of each unit is a unique 12-digit MAC address and a block for marking the unit with an IP address. Refer to the Crimson manual and Red Lion’s website for additional information on Ethernet communications.

**WIRING THE G315C**

![G315C PORT PIN OUTS Diagram](image-url)
RS232 PORTS
The G315C has two isolated RS232 ports. The port marked “RS232/PORT A/PGM PORT” may be used for programming as well as communications, while the port marked RS232/PORT B may only be used for communications.
Both ports can be used for either master or slave protocols.

Note: All Red Lion devices connect A to A and B to B, except for Paradigm devices. Refer to www.redlion.net for additional information.

Examples of RS485 2-Wire Connections

| G3 to Red Lion RJ11 (CBLRJ1C00)  |
|-------------------------------|-----------------|----------------|-----------------|
| D, IAMS, ITMS, PAXCDC4C       |

<table>
<thead>
<tr>
<th>Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3: RJ45</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
</tbody>
</table>

G3 to Modular Controller (CBLRLC05)

<table>
<thead>
<tr>
<th>Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3</td>
</tr>
<tr>
<td>----</td>
</tr>
<tr>
<td>1,4</td>
</tr>
<tr>
<td>4,1</td>
</tr>
<tr>
<td>2,3</td>
</tr>
<tr>
<td>3,2</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
</tbody>
</table>

DH485 Connections
The G315C’s RS422/485 COMMS port can also be used for Allen Bradley DH485 communications.

WARNING: DO NOT use a standard DH485 cable to connect this port to Allen Bradley equipment. A cable and wiring diagram are available from Red Lion.

G3 to AB SLC 500 (CBLAB003)

<table>
<thead>
<tr>
<th>Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>RJ45: RLC</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3, 8</td>
</tr>
<tr>
<td>4, 7</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>4, 7</td>
</tr>
<tr>
<td>3, 8</td>
</tr>
</tbody>
</table>
**SOFTWARE/UNIT OPERATION**

**BATTERY & TIME KEEPING**

A battery is used to keep time when the unit is without power. Typical accuracy of the G315C time keeping is less than one minute per month drift. The battery of a G315C unit does not affect the unit’s memory, all configurations and data is stored in non-volatile memory.

---

**FRONT PANEL LEDS**

There are three front panel LEDs. Shown below is the default status of the LEDs.

<table>
<thead>
<tr>
<th>LED</th>
<th>INDICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>GREEN (TOP, LABELED “PWR”)</td>
<td>Valid configuration is loaded and there are no alarms present.</td>
</tr>
<tr>
<td>FLASHING</td>
<td>A tag is in an alarm state.</td>
</tr>
<tr>
<td>STEADY</td>
<td>Valid configuration is loaded and there are no alarms present.</td>
</tr>
<tr>
<td>YELLOW (MIDDLE)</td>
<td>CompactFlash card being checked.</td>
</tr>
<tr>
<td>OFF</td>
<td>No CompactFlash card is present.</td>
</tr>
<tr>
<td>STEADY</td>
<td>Valid CompactFlash card present.</td>
</tr>
<tr>
<td>FLASHING RAPIDLY</td>
<td>Unit is writing to the CompactFlash, either because it is storing data, or because the PC connected via the USB port has locked the drive.</td>
</tr>
<tr>
<td>FLICKERING</td>
<td>Incorrectly formatted CompactFlash card present.</td>
</tr>
<tr>
<td>FLASHING SLOWLY</td>
<td>Incorrectly formatted CompactFlash card present.</td>
</tr>
<tr>
<td>GREEN (BOTTOM)</td>
<td>Valid configuration is loaded and there are no alarms present.</td>
</tr>
</tbody>
</table>

---

**CAUTION: RISK OF ELECTRIC SHOCK**

The inverter board, attached to the mounting plate, supplies the high voltage to operate the backlight. Touching the inverter board may result in injury to personnel.

---

**CAUTION**

The circuit board contains static sensitive components. Before handling the operator interface without the rear cover attached, discharge static charges from your body by touching a grounded bare metal object. Ideally, handle the operator interface at a static controlled clean workstation. Also, do not touch the surface areas of the circuit board. Dirt, oil, or other contaminants may adversely affect circuit operation.

---

**CRIMSON SOFTWARE**

Crimson software is available as a free download from Red Lion’s website or it can be purchased on a CD, see “Ordering Information” for part number. The latest version of the software is always available from the website, and updating your copy is free.

**DISPLAY**

This operator interface uses a liquid crystal display (LCD) for displaying text and graphics. The display utilizes a cold cathode fluorescent tube (CCFL) for lighting the display. The CCFL tubes can be dimmed for low light conditions.

These CCFL tubes have a limited lifetime. Backlight lifetime is based upon the amount of time the display is turned on at full intensity. Turning the backlight off when the display is not in use can extend the lifetime of your backlight. This can be accomplished through the Crimson software when configuring your unit.

**KEYPAD**

The G315C keypad consists of ten keys that can be used for on-screen menus.

**TOUCHSCREEN**

This operator interface utilizes a resistive analog touchscreen for user input. The unit will only produce an audible tone (beep) when a touch on an active touchscreen cell is sensed. The touchscreen is fully functional as soon as the operator interface is initialized, and can be operated with gloved hands.

**TROUBLESHOOTING YOUR G315C**

If for any reason you have trouble operating, connecting, or simply have questions concerning your new G315C, contact Red Lion’s technical support. For contact information, refer to the back page of this bulletin for phone and fax numbers.

EMAIL: techsupport@redlion.net
Web Site: http://www.redlion.net
General Troubleshooting Tech Note:
http://www.redlion.net/TechNotes/TN0135.html

---

**WARNING - EXPLOSION HAZARD - THE AREA MUST BE KNOWN TO BE NON-HAZARDOUS BEFORE SERVICING/REPLACING THE UNIT AND BEFORE INSTALLING OR REMOVING I/O WIRING AND BATTERY.**

**WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN DISCONNECTED AND THE AREA IS KNOWN TO BE NON-HAZARDOUS.**

A battery is used to keep time when the unit is without power. Typical accuracy of the G315C time keeping is less than one minute per month drift. The battery of a G315C unit does not affect the unit’s memory, all configurations and data is stored in non-volatile memory.
To change the battery of a G315C, remove power, cabling, and then the rear cover of the unit. To remove the cover, remove the 16 screws on the rear of the unit. Then, by lifting the top side, hinge the cover, thus providing clearance for the connectors on the bottom side of the PCB as shown in the illustration below. Install in the reverse manner.

Remove the old battery* from the holder and replace with the new battery. Replace the rear cover, cables, and re-apply power. Using Crimson or the unit’s keypad, enter the correct time and date.

* Please note that the old battery must be disposed of in a manner that complies with your local waste regulations. Also, the battery must not be disposed of in fire, or in a manner whereby it may be damaged and its contents come into contact with human skin.

The battery used by the G315C is a lithium type CR2025.

---

**OPTIONAL FEATURES AND ACCESSORIES**

**COMPACTFLASH SOCKET**

CompactFlash socket is a Type II socket that can accept either Type I or II cards. Use cards with a minimum of 4Mbytes with the G315C’s CompactFlash socket. Cards are available at most computer and office supply retailers.

CompactFlash can be used for configuration transfers, larger configurations, data logging, and trending.

Information stored on a CompactFlash card by a G315C can be read by a card reader attached to a PC. This information is stored in IBM (Windows®) PC compatible FAT16 file format.

---

**OPTIONAL COMMUNICATION CARD**

Red Lion offers optional communication cards for fieldbus communications. These communication cards will allow your G315C to communicate with many of the popular fieldbus protocols.

Red Lion is also offering a communications card for additional RS232 and RS422/485 communications. Visit Red Lion’s website for information and availability of these cards.

---

**NOTE**

For reliable operation in all of our products, Red Lion recommends the use of SanDisk® and SimpleTech brands of CompactFlash cards.

Industrial grade versions that provide up to two million write/erase cycles minimum are available from Red Lion.
LIMITED WARRANTY

The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company’s liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company’s option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.

The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.

No warranties expressed or implied are created with respect to The Company’s products except those expressly contained herein. The Customer acknowledges the disclaimers and limitations contained herein and relies on no other warranties or affirmations.
MODEL TX700T - COLOR TFT TOUCHSCREEN OPERATOR INTERFACE

DESCRIPTION

Model TX700T Operator Terminal combines unique capabilities normally expected only from expensive SCADA packages, with dramatic ease of use. TX700T is configured using the same powerful EDICT97 Software as all Red Lion Paradigm Operator Interfaces. The results are savings in time to get challenging applications up and running, and frequent savings in hardware costs due to replacing many functions usually performed in separate expensive devices.

SAFETY SUMMARY

All safety regulations, local codes and instructions that appear in this and corresponding literature, or on equipment, must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the unit.

The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>TX700T</td>
<td>640 x 480 CCFL, Full VGA Color TFT, 40 x 30, W/Touchscreen 728 K memory</td>
<td>TX700T00</td>
</tr>
<tr>
<td>SFEDT</td>
<td>EDICT-97 Development Kit, Includes Software, Manual and 9-pin RS232 Programming cables</td>
<td></td>
</tr>
<tr>
<td>P895xxxZ</td>
<td>Communication Cables</td>
<td></td>
</tr>
<tr>
<td>BAL3R004</td>
<td>Battery Replacement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Backlight Tube Replacement</td>
<td>Consult Factory</td>
</tr>
</tbody>
</table>

GENERAL SPECIFICATIONS

1. POWER REQUIREMENTS: 15 VDC to 30 VDC @ 15.25 W
   - Power Up Current: 2.5 A for 4 msec. max.
   - Must use a Class 2 or SELV rated power supply.

2. DISPLAY: 640 x 480 pixels (10.4”) CCFL Liquid Crystal TFT color full VGA display. Text formats up to 40 x 30 characters.

3. KEYPAD: 6 screen legendable soft keys, raise, lower, next, previous, exit, menu, alarms and mute keys are all embossed and have tactile feedback.

4. TOUCHSCREEN: Continuous resistive soft keys, raise, lower, next, previous, exit, menu, alarms and mute keys are all embossed and have tactile feedback.

DIMENSIONS In inches (mm)

<table>
<thead>
<tr>
<th>Panel Cut-Out</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>PANEL CUT-OUT</td>
<td>11.76 (298.5)</td>
</tr>
<tr>
<td>8.39 (213.5)</td>
<td>7.03 (178.5)</td>
</tr>
<tr>
<td>5.47 (138.0)</td>
<td>4.72 (120.0)</td>
</tr>
<tr>
<td>2.36 (60.0)</td>
<td></td>
</tr>
<tr>
<td>11.36 (288.1)</td>
<td>7.31 (189.4)</td>
</tr>
<tr>
<td>18 (45.0)</td>
<td>19 (4.8)</td>
</tr>
</tbody>
</table>

Tolerance ±.005 (±0.13mm)
Text Message Animation enables several different types of animated text from 

Data Variables can be either PLC derived or internally generated, either in data entry or display only mode. The Paradigm unit has the capability to display in any combination of year, month, day, hours, minutes, and seconds.

Bar Graphs in horizontal format are easily attached to data variables. The partial or full length bar graph displays can be scaled and offset to optimize the required display effect.

Security
The password protection scheme provides the ultimate in tamper-proof capability. Access can be limited on a unit, page, recipe, or even individual data entries.

Alarms
The Paradigm unit can monitor and log up to 500 alarms. Such triggers as a simple bit level transition, a PLC coil activation, or a complex application algorithm can activate an alarm. The alarms can be time and date stamped, with an automatic screen display and/or downloading to a printer for hard copy recording purposes.

Recipe Handling
Recipe handling in the Paradigm Operator Interfaces can be tailored to your requirements. Using the “Data Files” section of Named Data, one can set up arrays with meaningful titles, and select, edit, and maintain, recipe data up to 8000 elements per file. In conjunction with User Programs, and the flexible data displays, the operator can select desired recipe, by number or by title, and either upload from, or download to, the target system. All the functions of EDICT97 are available, so the programmer can password protect the editing of the recipes and allow for the transfer of data from a host system.

Real Time Schedule
Real time schedule allows for repetitive or one time tasks to take place in the system.
MULTIPLE LANGUAGE SUPPORT
This powerful feature allows users to program the text in their databases in up to 8 different languages. A system variable entry makes it easy for end users to select one of the preprogrammed languages. EDICT 97 features powerful language editing tools for easy implementation.

USER PROGRAMS
This feature offers the user the ability to incorporate custom application requirements via a powerful program language.

TOUCH KEY EDITING
All the interface keys can be programmed to perform virtually unlimited functions with each key, having multiple actions assigned to three types of key events: key pressed, key held down (auto repeat), and key released. Typical key actions would be Gotopage, set value, load recipe, view alarms, print report, and many more. TX700T keys can be defined flexibly as touch sensitive objects anywhere on a display page, or using any of the 6 screen legendable soft-keys.

HARDWARE INFORMATION
This hardware bulletin.

A NEMA 4/IP65 rated mounting gasket.

The battery is located in a holder on the main circuit board. This should be clearly visible. Remove the battery from its holder.

Replace the lid, screws and connector by following the above procedure in reverse. You may like to make a note of the date the battery was replaced to allow planned maintenance to be carried out.

If you did not keep the unit powered-up during battery replacement, hold down the EXIT and MUTE keys on the keyboard and cycle power to clear the internal memory. Release the keys and follow the menu guides to reset the unit. The unit is now ready for a configuration database to be reloaded.

In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. A very high proportion of reported problems are caused by incorrect power supply installation, so please take care to observe the following points...

- The power supply must be mounted close to the unit, with usually not more than 6 feet of cable between the supply and the Operator Interface. Ideally, as short a length as is possible should be used.
- The wire used to connect the Operator Interface’s power supply should be of at least 22 gage wire. If a longer cable run is needed, you should use heavier gage wire. The routing of the cable should be kept away from large contactors, inverters and other devices which may generate significant electrical noise.

BATTERY BACKUP ISSUES
The Operator Interface is supplied with a Lithium Battery designed to maintain the internal memory and real-time clock during power outages. Assuming the operator interface terminal is powered up for 50% of the time, this battery should last over 4 years. A “Battery Low” system variable is available so that the programmer can choose specific action(s) to occur when the battery voltage drops below its nominal voltage.

It is possible to replace the battery without losing the contents of the Operator Interface’s memory, but this does not reduce the importance of ensuring that a copy of the terminal’s configuration is kept readily at hand to allow the terminal to be re-loaded in the case of mishaps. Please remember that although an image of the database contents can be uploaded, this file is not editable, so the importance of keeping a copy on disk cannot be over stressed.

CHANGING THE BATTERY

To change the internal battery, follow these steps...

- Remove the power and PLC communications connector from the unit.
- Remove the four screws from the rear cover and remove the rear cover.
- If you wish to avoid losing the terminal’s configuration, reconnect the power connector and re-apply power. Note that this will require the panel to be powered-up and, as such, only suitably qualified service personnel should carry out this procedure.

CAUTION: RISK OF ELECTRIC SHOCK
The inverter board, attached to the mounting plate, supplies the high voltage to operate the backlight. Touching the inverter board may result in injury to personnel.

- The battery should be stored in a holder.
- The terminal’s power supply can now be disconnected, if you re-applied power in the step above.
- Replace the lid, screws and connector by following the above procedure in reverse. You may like to make a note of the date the battery was replaced to allow planned maintenance to be carried out.
- If you did not keep the unit powered-up during battery replacement, hold down the EXIT and MUTE keys on the keyboard and cycle power to clear the internal memory. Release the keys and follow the menu guides to reset the unit. The unit is now ready for a configuration database to be reloaded.

Please note that the old battery must be disposed of in a manner which complies with your local waste regulations. Also, the battery must not be disposed of in fire or in a manner whereby it may be damaged and its contents come into contact with human skin.

COLOR GRAPHIC UNITS
In addition to all the features of the character-based units, the TX will provide exceptional value in displaying trend graphs, process schematics and flow, and others, limited only by the imagination of the designer. The programmer can use the built-in standard symbols, or construct them. A sequence of graphical symbols can be assigned to a PLC location, and the powerful software will step through the sequence without the necessity of programming multiple expressions for each bitmap. Some of the inherent features of the Graphical Display units are data logging, process symbols, such as tanks, valves, etc.

ANIMATED GRAPHICS
Graphical pages are constructed using both bitmaps and object graphics. Animation items such as trending, tank filling, horizontal and vertical bar graphs, valves, etc., make your display pages aesthetically pleasing as well as informative to the operator.

TOUCH-SCREEN
The TX700T is fitted with a continuous resolution resistive touch-screen, providing an effective resolution of over 200 by 200 cells. This allows touch-sensitive objects to be placed anywhere on the screen, without restricting your designs to the coarse grid employed by competitive products. The touch-screen is fully operable with gloved hands and is specified for up to 5 million operations.

In the event that your specific driver does not appear on the Paradigm drivers list, let us know, as this list is always being expanded to meet our customers’ needs.

COMMUNICATIONS
With over 80 communication drivers available, the Paradigm operator interface offers a wide range of connectivity, including PLCs, Variable Speed Drives, Temperature Controllers, Bar Code Readers, etc. Utilizing real PLC data references, the automatic comms configuration optimizes the system’s communication performance. In the event that your specific driver does not appear on the Paradigm drivers list, let us know, as this list is always being expanded to meet our customers’ needs.

Display units are data logging, process symbols, such as tanks, valves, etc.

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This feature offers the user the ability to incorporate custom application requirements via a powerful program language.

TOUCH KEY EDITING
All the interface keys can be programmed to perform virtually unlimited functions with each key, having multiple actions assigned to three types of key events: key pressed, key held down (auto repeat), and key released. Typical key actions would be Gotopage, set value, load recipe, view alarms, print report, and many more. TX700T keys can be defined flexibly as touch sensitive objects anywhere on a display page, or using any of the 6 screen legendable soft-keys.

HARDWARE INFORMATION
This bulletin contains a variety of information related to the installation and operation of the Operator Interface supplied. Ideally, you should read this document thoroughly before attempting to use the equipment. For information about the software aspects of the terminal, please consult other documentation.

CONTENTS OF PACKAGE
The Operator Interface is supplied in a packaging box containing the following...

- The interface terminal itself.
- A NEMA 4/IP65 rated mounting gasket.
- A bag containing panel hardware.
- This hardware bulletin.
- If any of these items are missing, please contact your supplier immediately.

POWER SUPPLY REQUIREMENTS
The Operator Interface requires a regulated 15 to 30 VDC power supply rated at 15.25 W or greater unless otherwise stated on the label.

- The terminal may take as little as 300 mA in certain circumstances, so be sure that the chosen power supply can operate correctly with this load.
- Large switch-mode supplies tend to need a certain minimum load before they will operate correctly.
**INSTALLATION & CONNECTIONS**

The unit meets NEMA 4/IP65 requirements for indoor use, when properly installed. The units are intended to be mounted into an enclosed panel.

The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

**INSTALLATION ENVIRONMENT**

The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

Continuous exposure to direct sunlight may accelerate the aging process of the bezel. The bezel should be cleaned only with a soft cloth and neutral soap product. Do NOT use solvents.

Do not use tools of any kind (screwdrivers, pens, pencils, etc.) to operate the keypad or touchscreen of the unit.

**MOUNTING INSTRUCTIONS**

The Operator Interfaces are designed for through-panel mounting. A neoprene gasket is provided, to enable sealing to NEMA 4/IP65 specification. The panel cut-out diagram for the model supplied is provided. All mounting holes should be drilled for 0.14” (3.5 mm) clearance. Care should be taken to remove any loose material from the mounting hole to avoid such material falling into the Operator Interface itself during installation.

**CONNECTING TO A PLC**

The Operator Interface is designed to operate with a PLC. A serial communication connection must be made between the operator interface terminal and PLC, and the details of this connection vary according to which PLC is used.

**PLC TYPE**

Details on how to connect to most PLCs are available on request from RLC.

**CONNECTING TO AN IBM® PC/AT**

The Operator Interface is programmed via software running on an IBM PC/AT or a compatible computer. The connection between the PC/AT and the operator interface terminal is made via a custom cable provided with the EDICT Development Kit. The cable is designed for a 9-pin serial port. Please contact your supplier if you require a 25-pin version.

**PROGRAMMING PORT PIN OUT**

The Operator Interface’s programming port is sometimes used to connect other RS-232 devices, such as printers. The following illustration and table gives the pin-out of this port to enable such connections to be made.

<table>
<thead>
<tr>
<th>RJ11 FEMALE</th>
<th>PIN</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RTS</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Tx</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Rx</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>CTS</td>
<td></td>
</tr>
</tbody>
</table>

The above table denotes the pin names of the programming port. When connecting, the pin name at the programming port is connected to the opposite of that pin name at the destination device.

**TROUBLESHOOTING**

For further technical assistance, contact technical support at the appropriate company numbers listed.
**GENERAL DESCRIPTION**

The G3 proprietary expansion slot provides a high speed, parallel architecture that extends the functionality and flexibility of the G3 series HMI. This approach allows the G3 series to evolve concurrently with the latest advances in communications and standards, without sacrificing performance. This high bandwidth channel has significantly greater throughput when compared to the traditional (external) serial gateway approach.

The G3PB option card adds PROFIBUS DP connectivity to any G3 series HMI. This allows a high speed exchange of blocks of data, at data rates up to 12 MBaud, between the hosting G3 and a Master PLC on a PROFIBUS network. The DP suffix refers to “Decentralized Periphery”, which is used to describe distributed I/O devices connected via a fast serial data link with a central controller.

The card is easily installed by removing the rear cover of your G3 operator interface, attaching the card using three screws and connecting a single cable.

**SAFETY SUMMARY**

All safety related regulations, local codes and instructions that appear in the literature or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use the controller to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the controller.

**CONTENTS OF PACKAGE**

- G3PB Option Card with pluggable DB9F connector
- Cable already attached to G3PB option card
- Hardware pack consisting of three screws
- This hardware bulletin

**GSD FILE**

The GSD file and associated bitmap are part of the Crimson 2.0 installation. Both files can be found on your PC’s hard drive at C:\Program Files\Crimson 2.0, or on our website at http://www.redlion.net.

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3PB</td>
<td>PROFIBUS option card for G3 operator interfaces</td>
<td>G3PBDP00</td>
</tr>
<tr>
<td>SFCRM2</td>
<td>Crimson 2.0 ¹</td>
<td>SFCRM200</td>
</tr>
</tbody>
</table>

¹ Use this part number to purchase Crimson on CD with a printed manual, USB cable, and RS-232 cable. Otherwise, download from www.redlion.net/g3.

---

**CAUTION: Risk of Danger.**

Read complete instructions prior to installation and operation of the unit.
1. POWER REQUIREMENTS:
   Power is supplied to the option card from the main board of your G3 operator interface.

2. COMMUNICATIONS:
   PROFIBUS Port: FIELDBUS TYPE : PROFIBUS-DP EN 50 170, I. The PROFIBUS port has a format and baud rates that are software programmable up to 12M baud and are digitally isolated.

3. CERTIFICATIONS AND COMPLIANCES:
   ELECTROMAGNETIC COMPATIBILITY
   Emissions and Immunity to EN 61326: Electrical Equipment for Measurement, Control and Laboratory use.
   Immunity to Industrial Locations: Reference G3 unit for emissions and immunity specifications

4. ENVIRONMENTAL CONDITIONS:
   Operating Temperature Range: 0 to 50°C
   Storage Temperature Range: -20 to 80°C
   Operating and Storage Humidity: 80% maximum relative humidity (non-condensing) from 0 to 50°C.
   Altitude: Up to 2000 meters.

5. CONSTRUCTION: Installation Category I, Pollution Degree 2.

6. INSTALLATION REQUIREMENTS: Card must be installed inside the rear cover of a G3 operator interface with the hardware provided. See “Installing the G3PB Option Card” for more details.

## INSTALLING THE G3PB OPTION CARD

### INSTALLATION INSTRUCTIONS

**Caution:** The option and main circuit boards contain static sensitive components. Before handling the cards, discharge static charges from your body by touching a grounded bare metal object. Ideally, handle the cards at a static controlled clean workstation. Also, handle the cards by the edges only. Dirt, oil, or other contaminants that may contact the cards can adversely affect circuit operation.

**Warning:** Depending upon the G3 operator interface, high voltage may be present inside the operator interface. Be sure to remove all power before removing the rear cover of the operator interface.

Each G3PB option card comes with three screws for attaching the option card to the inside of the G3 operator interface’s rear cover.

To install the option card remove all power and I/O communications cables from the unit. The G3 operator interface literature contains instructions for removing the rear cover, refer to the “Battery & Time Keeping” section.

Using the three screws provided connect the option card to the rear cover as shown in Figure 1.

![Figure 1](image1.png)

Connect the cable from the option card to CN11 on the main board of the G3 operator interface as shown in Figure 2. Be sure both ends of the cables are firmly seated into their appropriate connector housing.

Carefully replace the rear cover by reversing the instructions for removing the rear cover.

![Figure 2](image2.png)

### THE OPTION CARD LABEL

Place the option card label on your rear cover in the space indicated by the dashed lines and labeled “COMMS EXPANSION MODULE.”

### POWER SUPPLY REQUIREMENTS

**NEW AND EXISTING INSTALLATIONS**

The G3PB option card draws all of its power from the main board of your G3 operator interface. The specifications of your G3 operator interface account for the power needs of an option card.
CONFIGURING A G3PB OPTION CARD

The G3PB is configured using Crimson software. Crimson is available as a free download from www.redlion.net/g3, or it can be ordered on CD. Updates to Crimson for new features and drivers are posted on the website as they become available. By configuring the G3PB using the latest version of Crimson, you are assured that your unit has the most up-to-date feature set. Crimson software can configure the G3PB card through the RS232 PGM port, USB port, Ethernet port, or CompactFlash socket on your G3 operator interface. Additional information can be found in your G3 hardware bulletin and also in the Crimson user manual.

To enable the option card, click on the left hand pane of the Communications window and highlight the G3 icon. In the right pane, click the Option Card Selection Edit button to show the selection dialog and select the PROFIBUS Option Card from the list. The PROFIBUS Option Card will then appear in the left hand pane, installed in the tree of available ports.

CONFIGURING THE DRIVER

To select a driver, click on the left hand pane of the Communications window and highlight the PROFIBUS Interface icon. In the right hand pane, click the Driver Selection Edit button to show the Driver Selection dialog and select the PROFIBUS DP driver from the list.

The Station Address of the PROFIBUS node is the only property that needs to be configured. This should be a unique address on the PROFIBUS Network in the range 0..126.

CONFIGURING THE DATA TAGS

A PROFIBUS master exchanges data with slaves as separate input and output blocks. Data transfer direction is described with respect to the PROFIBUS Network such that input data is transferred to the network, or written by the G3 and output data is transferred from the network or read by the G3. This is important when it comes to configuring the data access for each tag mapped to a PROFIBUS data block.

MAPPING TAGS TO A DATA BLOCK

PROFIBUS data blocks have no concept or knowledge of data type or structure – they are described by a size in bytes. Crimson’s Tag based approach to data allows for data of mixed type, bytes, 16-bit words and 32-bit words to be mapped into a single data block.

To map a data tag to a PROFIBUS Data block, click in the left hand pane of the Data Tags window, highlight the required Data Tag icon. In the right hand pane click the Data Mapping button and select the PROFIBUS device to show the Select Address for PROFIBUS DP dialog.

- The Block Type defines whether the tag will be read from (Output Block) or written to (Input Block) the PROFIBUS network
- The Data Offset is the byte address of the Data Tag within the Data Block
- The Data Type is the actual size in bytes of the data that will be mapped into the Data Block.

CONFIGURING DATA ACCESS

As described above, Data Tags are mapped to either an Input Block and are Write only, or an Output Block and are Read Only. The Access must be selected to reflect this.

SOFTWARE/UNIT OPERATION

LEDS

The card has 3 LEDs visible through the Expansion Card slot that give state information, described in Table 1.

<table>
<thead>
<tr>
<th>DATA (Red)</th>
<th>WD (Green)</th>
<th>DP (Red)</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>SLOW ALTERNATING FLASH</td>
<td>Baud Search</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>Baud Control</td>
</tr>
<tr>
<td>OFF</td>
<td>SLOW FLASH</td>
<td>FAST FLASH</td>
<td>Waiting for Parameter Telegram</td>
</tr>
<tr>
<td>OFF</td>
<td>FAST FLASH</td>
<td>SLOW FLASH</td>
<td>Waiting for Configuration Telegram</td>
</tr>
<tr>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>Data Exchange</td>
</tr>
</tbody>
</table>

Table 1

CRIMSON SOFTWARE

Crimson 2.0 software is available as a free download from www.redlion.net or it can be purchased on a CD, see “Ordering Information” for part number. The latest version of the software is always available from the web site, and updating your copy is free.

TROUBLESHOOTING YOUR G3PB OPTION CARD

If for any reason you have trouble operating, connecting, or simply have questions concerning your new G3PB option card, contact Red Lion’s technical support. For contact information, refer to the back page of this bulletin for phone and fax numbers.

EMAIL: techsupport@redlion.net
Web Site: http://www.redlion.net
LIMITED WARRANTY

The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company’s liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company’s option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.

The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.

No warranties expressed or implied are created with respect to The Company’s products except those expressly contained herein. The Customer acknowledges the disclaimers and limitations contained herein and relies on no other warranties or affirmations.
DESCRIPTION
The Model G3FILMs are a convenient way to protect the front of the G3 Series HMIs in dirty or abrasive environments such as foundries and concrete plants. The low-tack adhesive allows them to be applied directly to the G3’s overlay, while their large size provides protection for the keys as well as the screen.

SPECIFICATIONS
1. GENERAL:  
0.003” thick FLEXmark PM 200 Clear PTP V-314 400 Poly H-9 AS

INSTALLATION
1. Clean the surface of the HMI.  
2. Peel away the backing from one edge of the film.  
3. Attach that edge to the HMI.  
4. Slowly remove the remaining backing from the film as the film is applied to the HMI.  
5. Use a wiping action to minimize air pockets.  
6. Press entire area to achieve best adhesion.

REMOVAL
1. Start by lifting a corner of the film with a non-metallic object.  
2. Slowly pull towards other corners to remove.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3FILM</td>
<td>Pack of ten protective films for the G303M or G303S</td>
<td>G3FILM03</td>
</tr>
<tr>
<td></td>
<td>Pack of ten protective films for the G306</td>
<td>G3FILM06</td>
</tr>
<tr>
<td></td>
<td>Pack of ten protective films for the G308 or G308A</td>
<td>G3FILM08</td>
</tr>
<tr>
<td></td>
<td>Pack of ten protective films for the G310M or G310S</td>
<td>G3FILM10</td>
</tr>
</tbody>
</table>
GENERAL DESCRIPTION
The G3 proprietary expansion slot provides a high speed, parallel architecture that extends the functionality and flexibility of the G3 series HMI. This approach allows the G3 series to evolve concurrently with the latest advances in communications and standards, without sacrificing performance. This high bandwidth channel has significantly greater throughput when compared to the traditional (external) serial gateway approach.

The G3RS option card is easily installed by removing the rear cover of your G3 operator interface, attaching the card using three screws and connecting a single cable. Adding this card gives the operator interface another RS232 port and RS422/485 port. It is built with isolation to protect equipment from potentially harmful ground loops, and provides high speed RS232, RS422, RS485, and DH485 communications for many different types of hardware.

SAFETY SUMMARY
All safety related regulations, local codes and instructions that appear in the literature or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use the controller to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the controller.

CONTENTS OF PACKAGE
- G3RS Option Card
- Cable already attached to G3RS option card
- Hardware pack consisting of three screws
- This hardware bulletin

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3RS</td>
<td>RS232/485 option card for G3 operator interfaces with isolated high speed communications ports</td>
<td>G3RS0000</td>
</tr>
<tr>
<td>CBL</td>
<td>Communications Cables ¹</td>
<td>CBLxxxxx</td>
</tr>
<tr>
<td>DR</td>
<td>DIN Rail Mountable Adapter Products ²</td>
<td>DRxxxxxx</td>
</tr>
<tr>
<td>SFCRM2</td>
<td>Crimson 2.0 ³</td>
<td>SFCRM200</td>
</tr>
</tbody>
</table>

¹ Contact your Red Lion distributor or visit www.redlion.net/g3 for complete selection.
² Red Lion offers RJ modular jack adapters. Refer to the DR literature for complete details.
³ Use this part number to purchase Crimson on CD with a printed manual, USB cable, and RS-232 cable. Otherwise, download from www.redlion.net/g3.
1. **POWER REQUIREMENTS:**

Power is supplied to the option card from the main board of your G3 operator interface.

2. **COMMUNICATIONS:**

   **Serial Ports:** Format and Baud Rates for each port are individually software programmable up to 115,200 baud and are isolated to help prevent ground loops. The RS422/485 and DH485 port via RJ45 and the RS232 port via RJ12 share the same hardware. The G3RS option card multiplexes the ports to communicate via two protocols. These ports may be used to configure different master protocols, but only one port may be used if configuring a slave protocol or AB DH485.

   **DH485 TXEN:** Transmit enable; open collector, $V_{OH} = 15$ VDC, $V_{OL} = 0.5$ Isolation from G3RS Communication ports to G3 operator interface: 1000 VDC for 1 minute.

3. **CERTIFICATIONS AND COMPLIANCES:**

   **ELECTROMAGNETIC COMPATIBILITY**

   Emissions and Immunity to EN 61326: Electrical Equipment for Measurement, Control and Laboratory use.

   **Immunity to Industrial Locations:** Reference G3 unit for immunity specifications

   **Emissions:** EN 55011 Class A

   **Note:**

   G303 and G306 units’ emission level changes from class B to class A levels when G3RS option card is installed.

4. **ENVIRONMENTAL CONDITIONS:**

   **Operating Temperature Range:** 0 to 50°C
   **Storage Temperature Range:** -20 to 80°C
   **Operating and Storage Humidity:** 80% maximum relative humidity (non-condensing) from 0 to 50°C.
   **Altitude:** Up to 2000 meters.

5. **CONSTRUCTION:** Installation Category I, Pollution Degree 2.

6. **INSTALLATION REQUIREMENTS:** Card must be installed inside the rear cover of a G3 operator interface with the hardware provided. See “Installing the G3RS Option Card” for more details.

---

**INSTALLING THE G3RS OPTION CARD**

**INSTALLATION INSTRUCTIONS**

**Caution:** The option and main circuit boards contain static sensitive components. Before handling the cards, discharge static charges from your body by touching a grounded bare metal object. Ideally, handle the cards at a static controlled clean workstation. Also, handle the cards by the edges only. Dirt, oil, or other contaminants that may contact the cards can adversely affect circuit operation.

**Warning:** Depending upon the G3 operator interface, high voltage may be present inside the operator interface. Be sure to remove all power before removing the rear cover of the operator interface.

Each G3RS option card comes with a cable for communications and three screws for attaching the option card to the inside of the G3 operator interface’s rear cover.

To install the option card remove all power and I/O communications cables from the unit. The G3 operator interface literature contains instructions for removing the rear cover, refer to the “Battery & Time Keeping” section.

Using the three screws provided connect the option card to the rear cover as shown in Figure 1.

Connect the cable from the option card to CN11 on the main board of the G3 operator interface as shown in Figure 2. Be sure both ends of the cables are firmly seated into their appropriate connector housing.

Carefully replace the rear cover by reversing the instructions for removing the rear cover.

**THE OPTION CARD LABEL**

Place the option card label on your rear cover in the space indicated by the dashed lines and labeled “COMMS EXPANSION MODULE.”

**POWER SUPPLY REQUIREMENTS**

**NEW AND EXISTING INSTALLATIONS**

The G3RS option card draws all of its power from the main board of your G3 operator interface. The specifications of your G3 operator interface account for the power needs of an option card.
CONFIGURING A G3RS OPTION CARD

The G3RS is configured using Crimson software. Crimson is available as a free download from www.redlion.net/g3, or it can be ordered on CD. Updates to Crimson for new features and drivers are posted on the website as they become available. By configuring the G3RS using the latest version of Crimson, you are assured that your unit has the most up-to-date feature set. Crimson software can configure the G3RS through the RS232 PGM port, USB port, Ethernet port, or CompactFlash socket on your G3 operator interface. Additional information can be found in your G3 hardware bulletin and the Crimson user manual.

CABLES AND DRIVERS

Red Lion has a wide range of cables and drivers for use with many different communication types. A list of these drivers and cables along with pin outs is available from www.redlion.net/g3. New cables and drivers are added on a regular basis. If making your own cable, refer to the “G3RS Port Pin Outs” for wiring information.

RS232 PORTS

The G3RS option card has one RS232 port. The port can be used for either master or slave protocols with any G3 configuration. The RS232 port and RS422/485 port on the G3RS option card are multiplexed because they share the same hardware. Both ports can be used with master protocols. However, when the RS232 port is used with a slave protocol, the RS422/485 port is not available.

For examples of RS232 communications refer to your G3 operator interface literature.

RS422/485 COMMS PORT

The G3RS option card has one RS422/485 port. This port can be configured to act as either RS422 or RS485.

The RS422/485 port and RS232 port are multiplexed because they share the same hardware. Both ports can be used with master protocols. However, when the RS422/485 port is used with a slave protocol, the RS232 port is not available.

For examples of RS422/485 communications refer to your G3 operator interface literature.
SOFTWARE / UNIT OPERATION

LEDS
The transmit LED (TX) will flash when information is transmitted from the G3RS card. The receive LED (RX) will flash when information is received.

CRIMSON SOFTWARE
Crimson 2.0 software is available as a free download from www.redlion.net or it can be purchased on a CD, see “Ordering Information” for part number. The latest version of the software is always available from the web site, and updating your copy is free.

TROUBLESHOOTING YOUR G3RS OPTION CARD
If for any reason you have trouble operating, connecting, or simply have questions concerning your new G3RS option card, contact Red Lion’s technical support. For contact information, refer to the back page of this bulletin for phone and fax numbers.

EMAIL: techsupport@redlion.net
Web Site: http://www.redlion.net

LIMITED WARRANTY
The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company’s liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company’s option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.

The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.

No warranties expressed or implied are created with respect to The Company’s products except those expressly contained herein. The Customer acknowledges the disclaimers and limitations contained herein and relies on no other warranties or affirmations.

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Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
GENERAL DESCRIPTION

The G3 proprietary expansion slot provides a high speed, parallel architecture that extends the functionality and flexibility of the G3 series HMI. This approach allows the G3 series to evolve concurrently with the latest advances in communications and standards, without sacrificing performance. This high bandwidth channel has significantly greater throughput when compared to the traditional (external) serial gateway approach.

The G3CN option card is easily installed by removing the rear cover of your G3 operator interface, attaching the card using three screws and connecting a single cable. Adding this card gives the operator interface a CANopen communications port. It is built with digital isolation to protect the operator interface from the CANopen bus and vice versa. It provides the ability to communicate to any high speed CANopen device. The G3CN option board has a termination resistor built-in, and is selectable through a jumper setting. A connector housing is provided to function as a strain relief for the wires that terminate into the five position connector. The connector is pluggable for easy removal of the G3 operator interface from the CANopen bus, without disturbing communications with other devices on the bus.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the literature or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use the controller to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the controller.

CONTENTS OF PACKAGE

- G3CN Option Card with pluggable connector
- Cable already attached to G3CN option card
- Hardware pack consisting of three screws and a connector housing for the pluggable connector
- This hardware bulletin

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3CN</td>
<td>CANopen option card for G3 operator interfaces with isolated high speed communications ports</td>
<td>G3CN0000</td>
</tr>
<tr>
<td>SFCRM2</td>
<td>Crimson 2.0 ¹</td>
<td>SFCRM200</td>
</tr>
</tbody>
</table>

¹ Use this part number to purchase Crimson on CD with a printed manual, USB cable, and RS-232 cable. Otherwise, download from www.redlion.net/g3.
1. POWER REQUIREMENTS:
Power is supplied to the option card from the main board of your G3 operator interface.

2. COMMUNICATIONS:
   CANopen Port: The CANopen port has format and baud rates that are software programmable up to 1M baud and are digitally isolated. This port may be configured for various CANopen protocols. Check www.redlion.net/g3 for currently supported protocols.
   Isolation from G3CN Communication ports to G3 operator interface: 1000 VDC for 1 minute.

3. ENVIRONMENTAL CONDITIONS:
   Operating Temperature Range: 0 to 50°C
   Storage Temperature Range: -20 to 80°C
   Operating and Storage Humidity: 80% maximum relative humidity (non-condensing) from 0 to 50°C.
   Altitude: Up to 2000 meters.

4. CERTIFICATIONS AND COMPLIANCES:
   ELECTROMAGNETIC COMPATIBILITY
   Emissions and Immunity to EN 61326: Electrical Equipment for Measurement, Control and Laboratory use.
   Immunity to Industrial Locations: Reference G3 unit for immunity specifications
   Emissions:
   Emissions EN 55011 Class A
   Note:
   G303 and G306 units’ emission level changes from class B to class A levels when G3CN option card is installed.

5. CONSTRUCTION: Installation Category I, Pollution Degree 2.

6. INSTALLATION REQUIREMENTS: Card must be installed inside the rear cover of a G3 operator interface with the hardware provided. See “Installing the G3CN Option Card” for more details.

INSTALLING THE G3CN OPTION CARD

INSTALLATION INSTRUCTIONS

Caution: The option and main circuit boards contain static sensitive components. Before handling the cards, discharge static charges from your body by touching a grounded bare metal object. Ideally, handle the cards at a static controlled clean workstation. Also, handle the cards by the edges only. Dirt, oil, or other contaminants that may contact the cards can adversely affect circuit operation.

Warning: Depending upon the G3 operator interface, high voltage may be present inside the operator interface. Be sure to remove all power before removing the rear cover of the operator interface.

Each G3CN option card comes with a cable for communications and three screws for attaching the option card to the inside of the G3 operator interface's rear cover.

To install the option card, remove all power and I/O communications cables from the unit. The G3 operator interface literature contains instructions for removing the rear cover. Refer to the “Battery & Time Keeping” section.

Using the three screws provided, connect the option card to the rear cover as shown in Figure 1.

Figure 1

Connect the cable from the option card to CN11 on the main board of the G3 operator interface as shown in Figure 2. Be sure both ends of the cable are firmly seated into their appropriate connector housings.

Figure 2

Carefully replace the rear cover by reversing the instructions for removing the rear cover.

THE OPTION CARD LABEL

Place the option card label on your rear cover in the space indicated by the dashed lines and labeled “COMMS EXPANSION MODULE.”

POWER SUPPLY REQUIREMENTS

NEW AND EXISTING INSTALLATIONS

The G3CN option card draws all of its power from the main board of your G3 operator interface. The specifications of your G3 operator interface account for the power needs of an option card.
CONFIGURING A G3CN OPTION CARD

The G3CN is configured using Crimson software. Crimson is available as a free download from www.redlion.net/g3, or it can be ordered on CD. Updates to Crimson for new features and drivers are posted on the website as they become available. By configuring the G3CN using the latest version of Crimson, you are assured that your unit has the most up-to-date feature set. Crimson software can configure the G3CN through the RS232 PGM port, USB port, Ethernet port or CompactFlash socket on your G3 operator interface. Additional information can be found in your G3 hardware bulletin and the Crimson user manual.

CANopen PORT PROTOCOLS

The G3CN option card has one CANopen port. This port may be configured for various CANopen protocols. Check www.redlion.net/g3 for currently supported protocols.

G3CN PORT PIN OUTS

Figure 3

TERMINATION RESISTOR

An onboard termination resistor is selectable through a jumper setting. The termination resistor is rated for 124Ω at 1W. If a different termination resistance is desired, choose the jumper setting for no termination resistor. At this point you will be required to connect your own termination resistor between positions 2 and 4 of the five position connector.

CAN GND

Position 1 of the pluggable connector provides a CAN ground connection. This terminal is isolated from the HMI unit.

CAN-

Position 2 of the pluggable connector provides the CAN- bus line (active low). This terminal is isolated from the HMI unit.

SHLD (OPTIONAL CAN SHIELD)

Position 3 of the pluggable connector is provided for optional shield connections. This position is available only to tie shield wires together or to earth ground. There is no internal connection to earth ground. The SHLD position is not connected to any circuitry internal to the G3CN option card or G3 HMI unit.

CAN+

Position 4 of the pluggable connector provides the CAN+ bus line (active high). This terminal is isolated from the HMI unit.

V+ (OPTIONAL 24 VDC)

Position 5 of the pluggable connector is provided for optional 24 VDC connections. This position is available only to tie 24 VDC wires together. The G3CN card neither provides 24 VDC power nor uses 24 VDC power through this connection. The V+ position is not connected to any circuitry internal to the G3CN option card or G3 HMI unit.
SOFTWARE/ UNIT OPERATION

LED
The LED will illuminate green when the G3CN option card establishes communication with other CANopen devices (RUN). The LED will illuminate red if no communications have been established with other CANopen devices (ERROR).

Crimson Software
Crimson 2.0 software is available as a free download from www.redlion.net or it can be purchased on a CD, see “Ordering Information” for part number. The latest version of the software is always available from the website, and updating your copy is free.

TROUBLESHOOTING YOUR G3CN OPTION CARD
If for any reason you have trouble operating, connecting, or simply have questions concerning your new G3CN option card, contact Red Lion’s technical support. For contact information, refer to the back page of this bulletin for phone and fax numbers.

EMAIL: techsupport@redlion.net
Web Site: http://www.redlion.net

LIMITED WARRANTY
The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company’s liability under this limited warranty shall extend only to the repair or replacement of a defective product, at the Company’s option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.

The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.

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Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
MODEL G303 - GRAPHIC LCD OPERATOR INTERFACE TERMINAL

GENERAL DESCRIPTION
The G303 Operator Interface Terminal combines unique capabilities normally expected from high-end units with a very affordable price. It is built around a high performance core with integrated functionality. This core allows the G303 to perform many of the normal features of the Paradigm range of Operator Interfaces while improving and adding new features.

The G303 is able to communicate with many different types of hardware using high-speed RS232/422/485 communications ports and Ethernet 10 Base T/10 Base-TX communications. In addition, the G303 features USB for fast downloads of configuration files and access to trending and data logging. A CompactFlash socket is provided so that Flash cards can be used to collect your trending and data logging information as well as to store larger configuration files. In addition to accessing and controlling of external resources, the G303 can be configured to perform many of the normal features of the Paradigm range of Operator Interfaces.

SAFETY SUMMARY
All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use the controller to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the controller.

WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2/CLASS II, DIVISION 2 or CLASS III, DIVISION 2

CAUTION: Read complete instructions prior to installation and operation of the unit.

CAUTION: Write complete instructions prior to operation of the unit.

CONTENT OF PACKAGE
- G303 Operator Interface.
- Panel gasket.
- Two user legendable key sheets.
- Template for panel cutout.
- Hardware packet for mounting unit into panel.
- Two user legendable key sheets.
- Template for panel cutout.
- Three front panel LEDs.
- Power unit from 24 VDC ±20% supply.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>G303</td>
<td>Operator Interface for indoor applications only, textured finish with embossed keys</td>
<td>G303M000</td>
</tr>
<tr>
<td>G3CF</td>
<td>Operator Interface for indoor or outdoor applications, glossy finish with UV rated overlay (keys are not embossed)</td>
<td>G303S000</td>
</tr>
<tr>
<td>G3RS</td>
<td>64 MB CompactFlash Card 5</td>
<td>G3CF064M</td>
</tr>
<tr>
<td>G3CF</td>
<td>256 MB CompactFlash Card 5</td>
<td>G3CF256M</td>
</tr>
<tr>
<td>G3CF</td>
<td>512 MB CompactFlash Card 5</td>
<td>G3CF512M</td>
</tr>
<tr>
<td>G3CN</td>
<td>RS232/485 Optional Communications Cards</td>
<td>G3RS0000</td>
</tr>
<tr>
<td>G3CN</td>
<td>CANopen Optional Communications Cards</td>
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</tr>
<tr>
<td>G3RS</td>
<td>DIN Rail Power Supply</td>
<td>G3RSR000</td>
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<tr>
<td>G3RS</td>
<td>USB Cable</td>
<td>CBLUSB00</td>
</tr>
<tr>
<td>G3CF</td>
<td>RS-232 Programming Cable</td>
<td>CBLPROG0</td>
</tr>
<tr>
<td>G3CF</td>
<td>Communications Cables 1</td>
<td>CBLxxxxx</td>
</tr>
<tr>
<td>G3RS</td>
<td>Replacement Battery 4</td>
<td>BAL3R004</td>
</tr>
<tr>
<td>G3RS</td>
<td>Key Strip Paper</td>
<td>LBAFLM02</td>
</tr>
<tr>
<td>G3RS</td>
<td>Protective Films</td>
<td>G3FLM03</td>
</tr>
</tbody>
</table>

1 Contact your Red Lion distributor or visit our website for complete selection.
2 Use this part number to purchase Crimson on CD with a printed manual, USB cable, and RS-232 cable. Otherwise, download from www.redlion.net.
3 Red Lion offers RJ modular jack adapters. Refer to the DR literature for complete details.
4 Battery type is lithium coin type CR2025.
5 Industrial grade two million write cycles.

CompactFlash is a registered trademark of CompactFlash Association.
1. **POWER REQUIREMENTS:**
+24 VDC ±20% @ 9.5 W maximum. Must use Class 2 or SELV rated power supply.
Power connection via removable three position terminal block.

**Notes:**
1. The front panel PWR LED indicates power.
2. The G303’s circuit common is not connected to the enclosure of the unit. See “Connecting to Earth Ground” in the section “Installing and Powering the G303”.

2. **BATTERY**: Lithium coin cell. Typical lifetime of 10 years.

3. **DISPLAY**: 3.2” 128 x 64 pixel FSTN LCD with yellow LED backlight for characters and simple graphics applications.

4. **32-KEY KEYPAD**: 8 user legendable keys, 5 navigational keys, 10+2 numeric keys, 4 dedicated keys, and 3 soft keys for on-screen menus.

5. **MEMORY**: On Board User Memory: 4 Mbyte of onboard non-volatile Flash memory.
Memory Card: CompactFlash Type II slot for Type I and Type II CompactFlash cards.

6. **COMMUNICATIONS**:
- **USB Port**: Adheres to USB specification 1.1. Device only using Type B connection.
- **Serial Ports**: Format and Baud Rates for each port are individually software programmable up to 115,200 baud.
- **PDM Port**: RS232 port via RJ12.
- **COMMS Ports**: RS422/485 port via RJ45, and RS232 port via RJ12. These two ports share the same hardware; the G303 multiplexes the ports to communicate via two protocols. These ports may be used to configure different master protocols, but only one port may be used if configuring a slave protocol or AB DH485.
- **DH485 TXEN**: Transmit enable; open collector, VOH = 15 VDC, VOL = 0.5 V @ 25 mA max.

**Warning**: For additional information on the communications or signal common and connections to earth ground please see “Connecting to Earth Ground” in the section “Installing and Powering the G303”.

7. **ETHERNET PORT**: 10 BASE-T / 100 BASE-TX
RJ45 jack is wired as a NIC (Network Interface Card).

8. **CERTIFICATIONS AND COMPLIANCES**:
- **SAFETY**
  - UL Recognized Component, File #E179259, UL61010-1, CSA 22.2 No. 61010-1
  - Recognized to U.S. and Canadian requirements under the Component Recognition Program of Underwriters Laboratories, Inc.
  - UL Listed, File #E211967, UL61010-1, UL1604, CSA 22.2 No. 61010.1, CSA 22.2 No. 213-M1987
  - LISTED by Und. Lab. Inc. to U.S. and Canadian safety standards
  - Type 4X Enclosure rating (Face only), UL50
  - IEEE CB Scheme Test Certificate #US/9737/UL
  - CB Scheme Test Report #E179259-V01-S04
  - Issued by Underwriters Laboratories Inc.
  - IEC 61010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1.
  - IP66 Enclosure rating (Face only), IEC 529

- **ELECTROMAGNETIC COMPATIBILITY**
  - Emissions and Immunity to EN 61326: Electrical Equipment for Measurement, Control and Laboratory use.
  - Emissions:
    - Electrostatic discharge: EN 61000-4-2, Criterion A
    - 4 kV contact discharge
    - 8 kV air discharge
    - Electromagnetic RF fields: EN 61000-4-3, Criterion A
    - 10 V/m
    - Fast transients (burst): EN 61000-4-4, Criterion A
    - 2 kV power
    - 1 kV signal
    - Surge: EN 61000-4-5, Criterion A
    - 1 kV L-L, 2 kV L-N-E power
    - RF conducted interference: EN 61000-4-6, Criterion A
    - 3 V/m
  - Immunity to Industrial Locations:
  - WARNING - DO NOT CONNECT OR DISCONNECT CABLES WHILE POWER IS APPLIED UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS. USB PORT IS FOR SYSTEM SETUP AND DIAGNOSTICS AND IS NOT INTENDED FOR PERMANENT CONNECTION.
  - Electrostatic discharge: EN 61000-4-2, Criterion A
  - 4 kV contact discharge
  - 8 kV air discharge
  - Electromagnetic RF fields: EN 61000-4-3, Criterion A
  - 10 V/m
  - Fast transients (burst): EN 61000-4-4, Criterion A
  - 2 kV power
  - 1 kV signal
  - Surge: EN 61000-4-5, Criterion A
  - 1 kV L-L, 2 kV L-N-E power
  - RF conducted interference: EN 61000-4-6, Criterion A
  - 3 V/m

- **Notes**
  - 2.Criterion B: Temporary loss of performance from which the unit self-reverses.

9. **CONSTRUCTION**: Steel rear metal enclosure with NEMA 4X/IP66 aluminum front plate when correctly fitted with the gasket provided. Installation Category I, Pollution Degree 2.

10. **MOUNTING REQUIREMENTS**: Maximum panel thickness is 0.25” (6.3 mm). For NEMA 4X/IP66 sealing, a steel panel with a minimum thickness of 0.125” (3.17 mm) is recommended.

11. **WEIGHT**: 1.96 lbs (0.89 Kg)

---

**DIMENSIONS** In inches (mm)

![Dimensions diagram](image-url)
INSTALLING AND POWERING THE G303

USER IDENTIFIABLE KEYS

The G303 unit comes with a pre-printed key strip inserted. This key strip is labeled F1 through F8 and corresponds to Crimson software. If desired, these keys may be custom labeled for specific functions. The default key strip may be removed and a custom key strip inserted. Each unit is delivered with two sheets of white “Cover 65” paper. This 8½ x 11 paper may be used with most copiers, jet printers, or laser printers.

Custom key strips are made easily using the Adobe Acrobat file available from www.redlion.net or included with each Crimson CD. This program allows users to enter custom text and color schemes.

If more customization is needed, a graphics package can be used. The key strip dimensions are as follows.

When inserting the key strip into the slot in the G303 panel, start one corner first then slowly insert the strip into place.

Note: Key strips need to be inserted into the unit before mounting into a panel.

MOUNTING INSTRUCTIONS

This operator interface is designed for through-panel mounting. A panel cut-out diagram and a template are provided. Care should be taken to remove any loose material from the mounting cut-out to prevent material from falling into the operator interface during installation. A gasket is provided to enable sealing to NEMA 4X/IP66 specification. Install the eight kep nuts provided and tighten evenly for uniform gasket compression.

Note: tightness of the kep nuts beyond a maximum of 17 inch-pounds (1.92 N-m) may cause damage to the front panel.

CONNECTING TO EARTH GROUND

Each G303 has a chassis ground terminal on the back of the unit. Your unit should be connected to earth ground (protective earth). The chassis ground is not connected to signal common of the unit. Maintaining isolation between earth ground and signal common is not required to operate your unit. But, other equipment connected to this unit may require isolation between signal common and earth ground. To maintain isolation between signal common and earth ground care must be taken when connections are made to the unit. For example, a power supply with isolation between its signal common and earth ground must be used. Also, plugging in a USB cable may connect signal common and earth ground.¹

1. USB’s shield may be connected to earth ground at the host. USB’s shield in turn may also be connected to signal common.

POWER SUPPLY REQUIREMENTS

The G303 requires a 24 VDC power supply rated at 9.5 W. Your unit may draw considerably less than 9.5 W depending upon the options being used. As additional features are used your unit will draw increasing amounts of power. Items that could cause increases in current are additional communications, optional communications card, Compact Flash card, and other features programmed through Crimson.

In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. Please take care to observe the following points:

– The power supply must be mounted close to the unit, with usually not more than 6 feet (1.8 m) of cable between the supply and the operator interface. Ideally, the shortest length possible should be used.
– The wire used to connect the operator interface’s power supply should be at least 22-gage wire. If a longer cable run is used, a heavier gage wire should be used. The routing of the cable should be kept away from large contactors, inverters, and other devices which may generate significant electrical noise.
– A power supply with a Class 2 or SELV rating is to be used. A Class 2 or SELV power supply provides isolation to accessible circuits from hazardous voltage levels generated by a mains power supply due to single faults. SELV is an acronym for “safety extra-low voltage.” Safety extra-low voltage circuits shall exhibit voltages safe to touch both under normal operating conditions and after a single fault, such as a breakdown of a layer of basic insulation or after the failure of a single component has occurred.
CONFIGURING A G303

The G303 is configured using Crimson software. Crimson is available as a free download from Red Lion’s website, or it can be ordered on CD. Updates to Crimson for new features and drivers are posted on the website as they become available. By configuring the G303 using the latest version of Crimson, you are assured that your unit has the most up to date feature set. Crimson software can configure the G303 through the RS232 PGM port, USB port, or CompactFlash.

The USB port is connected using a standard USB cable with a Type B connector. The driver needed to use the USB port will be installed with Crimson.

The RS232 PGM port uses a programming cable made by Red Lion to connect to the DB9 COM port of your computer. If you choose to make your own cable, use the “G303 Port Pin Out Diagram” for wiring information.

The CompactFlash can be used to program a G3 by placing a configuration file and firmware on the CompactFlash card. The card is then inserted into the target G3 and powered. Refer to the Crimson literature for more information on the proper names and locations of the files.

CABLES AND DRIVERS

Red Lion has a wide range of cables and drivers for use with many different communication types. A list of these drivers and cables along with pin outs is available from Red Lion’s website. New cables and drivers are added on a regular basis. If making your own cable, refer to the “G303 Port Pin Outs” for wiring information.

USB, DATA TRANSFERS FROM THE COMPACTFLASH CARD

In order to transfer data from the CompactFlash card via the USB port, a driver must be installed on your computer. This driver is installed with Crimson and is located in the folder C:\Program Files\Red Lion Controls\Crimson 2.0\Device\ after Crimson is installed. This may have already been accomplished if your G303 was configured using the USB port.

Once the driver is installed, connect the G303 to your PC with a USB cable, and follow “Mounting the CompactFlash” instructions in the Crimson 2 user manual.

Note that using the USB port for frequent data transfers is not recommended. For frequent data transfers it is recommended that the Ethernet connection be used. Through the Ethernet connection a web page can be set up to view logged data. Refer to the Crimson 2.0 manual for details.

ETHERNET COMMUNICATIONS

Ethernet communications can be established at either 10 BASE-T or 100 BASE-TX. The G303 unit’s RJ45 jack is wired as a NIC (Network Interface Card). For example, when wiring to a hub or switch use a straight-through cable, but when connecting to another NIC use a crossover cable.

The Ethernet connector contains two LEDs. A yellow LED in the upper right, and a bi-color green/amber LED in the upper left. The LEDs represent the following statuses:

<table>
<thead>
<tr>
<th>LED COLOR</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>GREEN</td>
<td>10 BASE-T Communications</td>
</tr>
<tr>
<td>AMBER</td>
<td>100 BASE-TX Communications</td>
</tr>
</tbody>
</table>

The Crimson manual contains additional information on Ethernet communications.

RS232 PORTS

The G303 has two RS232 ports. There is the PGM port and the COMMS port. Although only one of these ports can be used for programming, both ports can be used for communications with a PLC.

The RS232 PGM port can be used for either master or slave protocols with any G303 configuration. The RS232 COMMS and RS422/485 COMMS ports are multiplexed because they share the same hardware. Both COMMS ports can be used with master protocols. However, when the RS232 COMMS port is used with a slave protocol, the RS422/485 COMMS port is not available.

Examples of RS232 communications could involve another Red Lion product or a PC. By using a cable with RJ12 ends on it, and a twist in the cable, RS232 communications with another G3 product or the Modular Controller can be established. Red Lion part numbers for cables with a twist in them are CBLPROG0 1, CBLRC01 2, or CBLRC02 3.

<table>
<thead>
<tr>
<th>G3 RS232 to a PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connections</td>
</tr>
<tr>
<td>G3: RJ12 Name</td>
</tr>
<tr>
<td>4: COMM 1 DCD</td>
</tr>
<tr>
<td>5: Rx 2 Rx</td>
</tr>
<tr>
<td>2: Tx 3 N/C</td>
</tr>
<tr>
<td>3: COM 5 GND</td>
</tr>
<tr>
<td>1: CTS 7 RTS</td>
</tr>
<tr>
<td>6: RTS 8 N/C</td>
</tr>
<tr>
<td>9: RI</td>
</tr>
</tbody>
</table>

CONNECTING A G303 OPERATOR INTERFACE TO AN ICM5

<table>
<thead>
<tr>
<th>LED COLOR</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>GREEN</td>
<td>Link established.</td>
</tr>
<tr>
<td>AMBER</td>
<td>Data being transferred.</td>
</tr>
<tr>
<td></td>
<td>10 BASE-T Communications</td>
</tr>
<tr>
<td></td>
<td>100 BASE-TX Communications</td>
</tr>
</tbody>
</table>

1 CBLPROG0 can also be used to communicate with either a PC or an ICM5.
2 DB9 adapter not included, 1 foot long.
3 DB9 adapter not included, 10 feet long.

WARNING - DO NOT CONNECT OR DISCONNECT CABLES WHILE POWER IS APPLIED UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS. USB PORT IS FOR SYSTEM SET-UP AND DIAGNOSTICS AND IS NOT INTENDED FOR PERMANENT CONNECTION.
RS422/485 COMMS PORT

The G303 has one RS422/485 port. This port can be configured to act as either RS422 or RS485.

The RS422/485 COMMS and RS232 COMMS ports are multiplexed because they share the same hardware. Both COMMS ports can be used with master protocols. However, when the RS422/485 COMMS port is used with a slave protocol, the RS232 COMMS port is not available.

Note: All Red Lion devices connect A to A and B to B, except for Paradigm devices. Refer to www.redlion.net for additional information.

Examples of RS485 2-Wire Connections

G3 to Red Lion RJ11 (CBLRLC00)
DLC, IAMS, ITMS, PAXCDC4C

<table>
<thead>
<tr>
<th>Connections</th>
<th>G3: RJ45</th>
<th>Name</th>
<th>RLC: RJ11</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>TxE1N</td>
<td>2</td>
<td>TxE1N</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>COM</td>
<td>3</td>
<td>COM</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>TxB</td>
<td>5</td>
<td>B-</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>TxA</td>
<td>4</td>
<td>A+</td>
<td></td>
</tr>
</tbody>
</table>

G3 to Modular Controller (CBLRLC05)

<table>
<thead>
<tr>
<th>Connections</th>
<th>G3</th>
<th>Modular Controller</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,4</td>
<td>TxB</td>
<td>1,4</td>
<td>TxB</td>
</tr>
<tr>
<td>4,1</td>
<td>RxR</td>
<td>4,1</td>
<td>RxR</td>
</tr>
<tr>
<td>2,3</td>
<td>TxA</td>
<td>2,3</td>
<td>TxA</td>
</tr>
<tr>
<td>3,2</td>
<td>RxA</td>
<td>3,2</td>
<td>RxA</td>
</tr>
<tr>
<td>5</td>
<td>TxE1N</td>
<td>5</td>
<td>TxE1N</td>
</tr>
<tr>
<td>6</td>
<td>COM</td>
<td>6</td>
<td>COM</td>
</tr>
<tr>
<td>7</td>
<td>TxB</td>
<td>7</td>
<td>TxB</td>
</tr>
<tr>
<td>8</td>
<td>TxA</td>
<td>8</td>
<td>TxA</td>
</tr>
</tbody>
</table>
SOFTWARE/UNIT OPERATION

FRONT PANEL LEDS
There are three front panel LEDs. Shown below is the default status of the LEDs.

<table>
<thead>
<tr>
<th>LED</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED (TOP, LABELED “PWR”)</td>
<td>Unit is in the boot loader, no valid configuration is loaded.¹</td>
</tr>
<tr>
<td>FLASHING</td>
<td>Unit is writing to the CompactFlash, either because it is storing data, or because the PC connected via the USB port has locked the drive.²</td>
</tr>
<tr>
<td>STEADY</td>
<td>Valid CompactFlash card present.</td>
</tr>
<tr>
<td>YELLOW (MIDDLE)</td>
<td>No CompactFlash card is present.</td>
</tr>
<tr>
<td>OFF</td>
<td>Valid CompactFlash card being checked.</td>
</tr>
<tr>
<td>STEADY</td>
<td>Incorrectly formatted CompactFlash card present.</td>
</tr>
<tr>
<td>FLICKERING</td>
<td>A tag is in an alarm state.</td>
</tr>
<tr>
<td>FLASHING SLOWLY</td>
<td>Valid configuration is loaded and there are no alarms present.</td>
</tr>
</tbody>
</table>

¹ If the LED still continues to flash, try downloading a configuration again.
² Do not turn off power to the unit while this light is flickering. The unit writes data in two minute intervals. Later Microsoft operating systems will not lock the drive unless they need to write data; Windows 98 may lock the drive any time it is mounted, thereby interfering with logging. Refer to “Mounting the CompactFlash” in the Crimson 2 User Manual.

DH485 COMMUNICATIONS
The G303’s RS422/485 COMMS port can also be used for Allen Bradley DH485 communications. When this port is configured to communicate DH485, the RS232 COMMS port can not be used because the ports share the same hardware and the G303 multiplexes the ports to communicate via two protocols.

WARNING: DO NOT use a standard DH485 cable to connect this port to Allen Bradley equipment. A cable and wiring diagram are available from Red Lion.

CRIMSON SOFTWARE
Crimson software is available as a free download from Red Lion’s website or it can be purchased on a CD, see “Ordering Information” for part number. The latest version of the software is always available from the website, and updating your copy is free.

KEYPAD
The G303 keypad consists of five unique key types. There are eight legendable keys (refer to “User Legendable Keys” for more information). A five key navigational keypad area. A twelve key numeric keypad with ± and decimal point. Three soft keys for on-screen menu selections. And, four keys labeled ALARMS, MUTE, EXIT, and MENU.

TROUBLESHOOTING YOUR G303
If for any reason you have trouble operating, connecting, or simply have questions concerning your new G303, contact Red Lion’s technical support. For contact information, refer to the back page of this bulletin for phone and fax numbers.

EMAIL: techsupport@redlion.net
Web Site: http://www.redlion.net
A battery is used to keep time when the unit is without power. Typical accuracy of the G303 time keeping is less than one minute per month drift. The battery of a G303 unit has no affect on the unit’s memory as all configurations and data are stored in non-volatile memory.

**CAUTION**: The circuit board contains static sensitive components. Before handling the operator interface without the rear cover attached, discharge static charges from your body by touching a grounded bare metal object. Ideally, handle the operator interface at a static controlled clean workstation. Also, do not touch the surface areas of the circuit board. Dirt, oil, or other contaminants may adversely affect circuit operation.

To change the battery of a G303, remove power, cabling, and then the rear cover of the unit. To remove the cover, remove the four screws designated by the arrows on the rear of the unit. Then, by lifting the top side, hinge the cover, thus providing clearance for the connectors on the bottom side of the PCB as shown in the illustration below. Install in the reverse manner.

Replace the rear cover, cables, and re-apply power. Using Crimson or the unit’s keypad, enter the correct time and date.

* Please note that the old battery must be disposed of in a manner that complies with your local waste regulations. Also, the battery must not be disposed of in fire, or in a manner whereby it may be damaged and its contents come into contact with human skin.

The battery used by the G303 is a lithium type CR2025.
LIMITED WARRANTY

The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company’s liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company’s option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.

The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.

No warranties expressed or implied are created with respect to The Company’s products except those expressly contained herein. The Customer acknowledges the disclaimers and limitations contained herein and relies on no other warranties or affirmations.

OPTIONAL FEATURES AND ACCESSORIES

INDOOR VERSUS OUTDOOR

Red Lion offers two versions of its G303 unit. The G303M000 uses an overlay with a textured finish and keys that are embossed. This overlay is not rated for outdoor use. The G303S000 uses an overlay with a glossy finish that uses a UV rated material for outdoor use. The keys on this overlay are not embossed.

OPTIONAL COMMUNICATION CARD

Red Lion offers optional communication cards for fieldbus communications. These communication cards will allow your G303 to communicate with many of the popular fieldbus protocols.

Red Lion is also offering a communications card for additional RS232 and RS422/485 communications. Visit Red Lion’s website for information and availability of these cards.

CUSTOM LOGO

Each G3 operator interface has an embossed area containing the Red Lion logo. Red Lion can provide custom logos to apply to this area. Contact your distributor for additional information and pricing.

COMPACTFLASH SOCKET

CompactFlash socket is a Type II socket that can accept either Type I or II cards. Use cards with a minimum of 4Mbytes with the G303’s CompactFlash socket. Cards are available at most computer and office supply retailers.

CompactFlash can be used for configuration transfers, larger configurations, data logging, and trending.

Note: Do not remove or insert the CompactFlash card while power is applied. Refer to front panel LEDs.

Information stored on a CompactFlash card by a G303 can be read by a card reader attached to a PC. This information is stored in IBM (Windows®) PC compatible FAT16 file format.

NOTE

For reliable operation in all of our products, Red Lion recommends the use of SanDisk® and SimpleTech brands of CompactFlash cards. Industrial grade versions that provide up to two million write/erase cycles minimum are available from Red Lion.
MODEL G306A - GRAPHIC COLOR LCD OPERATOR INTERFACE TERMINAL WITH TFT QVGA DISPLAY AND TOUCHSCREEN

GENERAL DESCRIPTION

The G306A Operator Interface Terminal combines unique capabilities normally expected from high-end units with a very affordable price. It is built around a high performance core with integrated functionality. This core allows the G306A to perform many of the normal features of the Paradigm range of Operator Interfaces while improving and adding new features.

The G306A is able to communicate with many different types of hardware using high-speed RS232/422/485 communications ports and Ethernet 10 Base T/100 Base-TX communications. In addition, the G306A features USB for fast downloads of configuration files and access to trending and data logging. A CompactFlash socket is provided so that Flash cards can be used to collect your trending and data logging information as well as to store larger configuration files.

In addition to accessing and controlling of external resources, the G306A Operator Interfaces while improving and adding new features.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use the controller to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the controller.

The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2/CLASS II, DIVISION 2/CLASS III, DIVISION 2

CONTENTS OF PACKAGE

- G306A Operator Interface.
- Panel gasket.
- Template for panel cutout.
- Hardware packet for mounting unit into panel.
- Terminal block for connecting power.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>G306A</td>
<td>Operator Interface for indoor applications, textured finish with embossed keys</td>
<td>G306A000</td>
</tr>
<tr>
<td>G3CF</td>
<td>64 MB CompactFlash Card</td>
<td>G3CF064M</td>
</tr>
<tr>
<td>G3CF</td>
<td>256 MB CompactFlash Card</td>
<td>G3CF256M</td>
</tr>
<tr>
<td>G3CF</td>
<td>512 MB CompactFlash Card</td>
<td>G3CF512M</td>
</tr>
<tr>
<td>G3BS</td>
<td>RS232/485 Communications Card</td>
<td>G3BS0000</td>
</tr>
<tr>
<td>G3CN</td>
<td>CANopen Communication Card</td>
<td>G3CN0000</td>
</tr>
<tr>
<td>G3DN</td>
<td>DeviceNet option card for G3 operator interfaces</td>
<td>G3DN0000</td>
</tr>
<tr>
<td>G3BOP</td>
<td>Profibus DP Communication Card</td>
<td>G3BOP000</td>
</tr>
<tr>
<td>P3D7</td>
<td>DIN Rail Power Supply</td>
<td>P3D7000</td>
</tr>
<tr>
<td>SFCRM2</td>
<td>Crimson 2.0</td>
<td>SFCRM200</td>
</tr>
<tr>
<td>CBL</td>
<td>RS-232 Programming Cable</td>
<td>CBLPROG0</td>
</tr>
<tr>
<td>CBL</td>
<td>USB Cable</td>
<td>CBLUSB00</td>
</tr>
<tr>
<td>CBL</td>
<td>Communications Cables</td>
<td>CBLxxxxx</td>
</tr>
<tr>
<td>DR</td>
<td>DIN Rail Mountable Adapter Products</td>
<td>DRxxxxx</td>
</tr>
<tr>
<td>G3FILM</td>
<td>Protective Films</td>
<td>G3FILM06</td>
</tr>
<tr>
<td>G3CF512M</td>
<td>512 MB CompactFlash Card</td>
<td>G3CF512M</td>
</tr>
<tr>
<td>G3CF256M</td>
<td>256 MB CompactFlash Card</td>
<td>G3CF256M</td>
</tr>
<tr>
<td>G3CF064M</td>
<td>64 MB CompactFlash Card</td>
<td>G3CF064M</td>
</tr>
<tr>
<td>G3CN0000</td>
<td>CANopen Communication Card</td>
<td>G3CN0000</td>
</tr>
<tr>
<td>G3DN0000</td>
<td>DeviceNet option card for G3 operator interfaces</td>
<td>G3DN0000</td>
</tr>
<tr>
<td>G3BOP000</td>
<td>Profibus DP Communication Card</td>
<td>G3BOP000</td>
</tr>
<tr>
<td>P3D7000</td>
<td>DIN Rail Power Supply</td>
<td>P3D7000</td>
</tr>
<tr>
<td>SFCRM200</td>
<td>Crimson 2.0</td>
<td>SFCRM200</td>
</tr>
<tr>
<td>CBLPROG0</td>
<td>RS-232 Programming Cable</td>
<td>CBLPROG0</td>
</tr>
<tr>
<td>CBLUSB00</td>
<td>USB Cable</td>
<td>CBLUSB00</td>
</tr>
<tr>
<td>CBLxxxxx</td>
<td>Communications Cables</td>
<td>CBLxxxxx</td>
</tr>
<tr>
<td>DRxxxxx</td>
<td>DIN Rail Mountable Adapter Products</td>
<td>DRxxxxx</td>
</tr>
<tr>
<td>G3FILM06</td>
<td>Protective Films</td>
<td>G3FILM06</td>
</tr>
</tbody>
</table>

1 Contact your Red Lion distributor or visit our website for complete selection.
2 Use this part number to purchase the Crimson® software on CD with a printed manual, USB cable, and RS-232 cable. Otherwise, download for free from www.redlion.net.
3 Red Lion offers RJ modular jack adapters. Refer to the DR literature for complete details.
4 Battery type is lithium coin type CR2025.
5 Industrial grade two million write cycles.
1. **POWER REQUIREMENTS**
   - Must use Class 2 or SELV rated power supply.
   - Power connection via removable three position terminal block.
   - Supply Voltage: +24 VDC ±20%
   - Typical Power1: 8 W
   - Maximum Power2: 14 W
   - Notes:
     1. Typical power with +24 VDC, RS232/485 communications, Ethernet communications, CompactFlash card installed, and display at full brightness.
     2. Maximum power indicates the most power that can be drawn from the G306A. Refer to “Power Supply Requirements” under “Installing and Powering the G306A.”
     3. The G306A circuit common is not connected to the enclosure of the unit. See “Connecting to Earth Ground” in the section “Installing and Powering the G306A.”
     4. Read “Power Supply Requirements” in the section “Installing and Powering the G306A” for additional power supply information.

2. **BATTERY**
   - Lithium coin cell. Typical lifetime of 10 years.

3. **LCD DISPLAY**


4. **KEYPAD**
   - for on-screen menus.

5. **TOUCHSCREEN**
   - Resistive analog

6. **MEMORY**
   - On Board User Memory: 8 Mbyte of non-volatile Flash memory.
   - Memory Card: CompactFlash Type II slot for Type I and Type II CompactFlash cards.

7. **COMMUNICATIONS**
   - USB Port: Adheres to USB specification 1.1. Device only using Type B connection.

**WARNING - DO NOT CONNECT OR DISCONNECT CABLES WHILE POWER IS APPLIED UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS. USB PORT IS FOR SYSTEM SET-UP AND DIAGNOSTICS AND IS NOT INTENDED FOR PERMANENT CONNECTION.**

Serial Ports: Format and Baud Rates for each port are individually software programmable up to 115,200 baud.

- PGM Port: RS232 port via RJ12.
- DH485 TXEN: Transmit enable; open collector, V_{OL} = 15 VDC, V_{OH} = 0.5 V @ 25 mA max.

Note: For additional information on the communications or signal connections to earth ground please see the “Connecting to Earth Ground” in the section “Installing and Powering the G306A.”

Ethernet Port: 10 BASE-T / 100 BASE-TX
- RJ45 jack is wired as a NIC (Network Interface Card).
- Isolation from Ethernet network to G3 operator interface: 1500 Vrms

### DIMENSIONS In inches (mm)

```
+-------------------------+---------------------+---------+
|                         | 8.83 (224.3)        | 3.20 (81.4) |
|                         |                     | 2.30 (58.4) |
|                         |                     | 7.42 (188.5) |
|                         |                     | 5.67 (144)  |
```

8. **ENVIRONMENTAL CONDITIONS**
   - Operating Temperature Range: 0 to 50°C
   - Storage Temperature Range: -20 to 70°C
   - Operating and Storage Humidity: 80% maximum relative humidity (non-condensing) from 0 to 50°C.

9. **CERTIFICATIONS AND COMPLIANCE**
   - SAFETY
     - UL Recognized Component, File #E179259, UL61010-1, CSA 22.2 No.61010-1
     - Recognized to U.S. and Canadian requirements under the Component Recognition Program of Underwriters Laboratories, Inc.
     - UL Listed, File #E211967, UL61010-1, UL1604, CSA 22.2 No. 61010.1, CSA 22.2 No. 213-M1987
     - LISTED by Und. Lab. Inc. to U.S. and Canadian safety standards
     - Type 4X Indoor Enclosure rating (Face only), UL50
     - IEEE CB Scheme Test Certificate #US/12460/UL, CB Scheme Test Report #E179259-A1-CB-1
     - Issued by Underwriters Laboratories Inc.
     - IEC 61010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1.
     - IP66 Enclosure rating (Face only), IEC 529

   - ELECTROMAGNETIC COMPATIBILITY
     - Emissions and Immunity to EN 61326: Electrical Equipment for Measurement, Control and Laboratory use.

   - **Immunity to Industrial Locations**:
     - Electrostatic discharge EN 61000-4-2: Criterion A
     - 4 kV contact discharge
     - 8 kV air discharge
     - Electromagnetic RF fields EN 61000-4-3: Criterion A
     - 10 V/m
     - Fast transients (burst) EN 61000-4-4: Criterion A
     - 2 kV power
     - 1 kV signal
     - Surge EN 61000-4-5: Criterion A
     - 1 kV L-L
     - 2 kV L&N-E power
     - RF conducted interference EN 61000-4-6: Criterion A
     - 3 V/rms

   - **Emissions**:
     - Emissions EN 55011: Class A

Note: 1. Criterion A: Normal operation within specified limits.

10. **CONNECTIONS**
    - Compression cage-clamp terminal block.
    - Wire Gage: 12-30 AWG copper wire
    - Torque: 5-7 inch-pounds (1.92 N-m)

11. **CONSTRUCTION**
    - Steel rear metal enclosure with NEMA 4X/IP66 aluminum front plate for indoor use only when correctly fitted with the gasket provided. Installation Category II, Pollution Degree 2.

12. **MOUNTING REQUIREMENTS**
    - Maximum panel thickness is 0.25" (6.3 mm). For NEMA 4X/IP66 sealing, a steel panel with a minimum thickness of 0.125" (3.17 mm) is recommended.
    - Maximum Mounting Stud Torque: 17 inch-pounds (1.92 N-m)

13. **WEIGHT**
    - 3.0 lbs (1.36 Kg)
**Installing and Powering the G306A**

**Mounting Instructions**

This operator interface is designed for through-panel mounting. A panel cut-out diagram and a template are provided. Care should be taken to remove any loose material from the mounting cut-out to prevent that material from falling into the operator interface during installation. A gasket is provided to enable sealing to NEMA 4X/IP66 specification. Install the ten kep nuts provided and tighten evenly for uniform gasket compression.

*Note: Tightening the kep nuts beyond a maximum of 17 inch-pounds (1.92 Nm) may cause damage to the front panel.*

**Connecting to Earth Ground**

The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

Each G306A has a chassis ground terminal on the back of the unit. Your unit should be connected to earth ground (protective earth).

**Communicating With the G306A**

**Configuring a G306A**

The G306A is configured using Crimson® software. Crimson is available as a free download from Red Lion’s website, or it can be purchased on CD. Updates to Crimson for new features and drivers are posted on the website as they become available. By configuring the G306A using the latest version of Crimson, you are assured that your unit has the most up to date feature set. Crimson® software can configure the G306A through the RS232 PGM port, USB port, or CompactFlash.

The USB port is connected using a standard USB cable with a Type B connector. The driver needed to use the USB port will be installed with Crimson.

The RS232 PGM port uses a programming cable made by Red Lion to connect to the DB9 COM port of your computer. If you choose to make your own cable, use the “G306A Port Pin Out Diagram” for wiring information.

The CompactFlash can be used to program a G3 by placing a configuration file and firmware on the CompactFlash card. The card is then inserted into the target G3 and powered. Refer to the Crimson literature for more information on the proper names and locations of the files.

**USB, Data Transfers From the CompactFlash Card**

*WARNING - DO NOT CONNECT OR DISCONNECT CABLES WHILE POWER IS APPLIED UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS. USB PORT IS FOR SYSTEM SET-UP AND DIAGNOSTICS AND IS NOT INTENDED FOR PERMANENT CONNECTION.*

In order to transfer data from the CompactFlash card via the USB port, a driver must be installed on your computer. This driver is installed with Crimson and is located in the folder C:\Program Files\Red Lion Controls\Crimson 2.0\Device\ after Crimson is installed. This may have already been accomplished if your G306A was configured using the USB port.

Once the driver is installed, connect the G306A to your PC with a USB cable, and follow “Mounting the CompactFlash” instructions in the Crimson 2 user manual.

The G306A requires a 24 VDC power supply. Your unit may draw considerably less than the maximum rated power depending upon the options being used. As additional features are used your unit will draw increasing amounts of power. Items that could cause increases in current are additional communications, optional communications card, CompactFlash card, and other features programmed through Crimson.

In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. Please take care to observe the following points:

- The power supply must be mounted close to the unit, with usually not more than 6 feet (1.8 m) of cable between the supply and the operator interface. Ideally, the shortest length possible should be used.
- The wire used to connect the operator interface’s power supply should be at least 22-gage wire. If a longer cable run is used, a heavier gage wire should be used. The routing of the cable should be kept away from large contactors, inverters, and other devices which may generate significant electrical noise.
- A power supply with a Class 2 or SELV rating is to be used. A Class 2 or SELV power supply provides isolation to accessible circuits from hazardous voltage levels generated by a mains power supply due to single faults. SELV is an acronym for "safety extra-low voltage." Safety extra-low voltage circuits shall exhibit voltages safe to touch both under normal operating conditions and after a single fault, such as a breakdown of a layer of basic insulation or after the failure of a single component has occurred.

**Cables and Drivers**

Red Lion has a wide range of cables and drivers for use with many different communication types. A list of these drivers and cables along with pin outs is available from Red Lion’s website. New cables and drivers are added on a regular basis. If making your own cable, refer to the “G306A Port Pin Outs” for wiring information.

**Ethernet Communications**

Ethernet communications can be established at either 10 BASE-T or 100 BASE-TX. The G306A unit’s RJ45 jack is wired as a NIC (Network Interface Card). For example, when wiring to a hub or switch use a straight-through cable, but when connecting to another NIC use a crossover cable.

The Ethernet connector contains two LEDs. A yellow LED in the upper right, and a bi-color green/amber LED in the upper left. The LEDs represent the following statuses:

<table>
<thead>
<tr>
<th>LED Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow solid</td>
<td>Link established.</td>
</tr>
<tr>
<td>Yellow flashing</td>
<td>Data being transferred.</td>
</tr>
<tr>
<td>Green</td>
<td>10 BASE-T Communications</td>
</tr>
<tr>
<td>Amber</td>
<td>100 BASE-TX Communications</td>
</tr>
</tbody>
</table>

On the rear of each unit is a unique 12-digit MAC address and a block for marking the unit with an IP address. Refer to the Crimson manual and Red Lion’s website for additional information on Ethernet communications.

---

**Diagnostics and Is Not Intended for Permanent Connection. USB port is for System Set-Up and Diagnostics and is Not Intended for Permanent Connection.**

---

**All Nonincendive Circuits Must Be Wired Using Division 2 Wiring Methods As Specified in Article 501-4(b), 502-4(b), and 503-3(h) of the National Electrical Code, NFPA 70 for Installation Within the United States, or as Specified in Section 19-152 of Canadian Electrical Code for Installation in Canada.**

---

**Warning - Do Not Connect or Disconnect Cables While Power is Applied Unless Area is Known to Be Non-Hazardous. USB Port is for System Set-Up and Diagnostics and is Not Intended for Permanent Connection.**

---

**Ethernet Connector Contains Two LEDs. A Yellow LED in the Upper Right, and a Bi-Color Green/Amaran LED in the Upper Left. The LEDs Represent the Following Statuses:**

<table>
<thead>
<tr>
<th>LED Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow</td>
<td>Link established.</td>
</tr>
<tr>
<td>Yellow flash</td>
<td>Data being transferred.</td>
</tr>
<tr>
<td>Green</td>
<td>10 BASE-T Connections</td>
</tr>
<tr>
<td>Amber</td>
<td>100 BASE-TX Connections</td>
</tr>
</tbody>
</table>
**RS232 PORTS**

The G306A has two RS232 ports. There is the PGM port and the COMMS port. Although only one of these ports can be used for programming, both ports can be used for communications with a PLC.

The RS232 ports can be used for either master or slave protocols with any G306A configuration.

Examples of RS232 communications could involve another Red Lion product or a PC. By using a cable with RJ12 ends on it, and a twist in the cable, RS232 communications with another G3 product or the Modular Controller can be established. Red Lion part numbers for cables with a twist in them are CBLPROG0 1, CBLRLC01 2, or CBLRC02 3.

---

**G3 RS232 to a PC**

<table>
<thead>
<tr>
<th>Connections</th>
<th>G3: RJ12</th>
<th>Name</th>
<th>PC: DB9</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>COMM</td>
<td>1</td>
<td>DCD</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Tx</td>
<td>2</td>
<td>Rx</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Rx</td>
<td>3</td>
<td>Tx</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>N/C</td>
<td>4</td>
<td>DTR</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>COM</td>
<td>5</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>N/C</td>
<td>6</td>
<td>DSR</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CTS</td>
<td>7</td>
<td>RTS</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>RTS</td>
<td>8</td>
<td>CTS</td>
<td></td>
</tr>
<tr>
<td>N/C</td>
<td>9</td>
<td></td>
<td>RI</td>
<td></td>
</tr>
</tbody>
</table>

1 CBLPROG0 can also be used to communicate with either a PC or an ICM5.
2 DB9 adapter not included, 1 foot long.
3 DB9 adapter not included, 10 feet long.
RS422/485 COMMS PORT

The G306A has one RS422/485 port. This port can be configured to act as either RS422 or RS485.

Note: All Red Lion devices connect A to A and B to B, except for Paradigm devices. Refer to www.redlion.net for additional information.

![RS422/485 4-WIRE CONNECTIONS](image1)

**Examples of RS485 2-Wire Connections**

**G3 to Red Lion RJ11 (CBLRLC00)**

DLC, IAMS, ITMS, PAXCDC4C

<table>
<thead>
<tr>
<th>Connections</th>
<th>G3: RJ45</th>
<th>Name</th>
<th>RLC: RJ11</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>TxEN</td>
<td>2</td>
<td>TxEN</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>COM</td>
<td>3</td>
<td>COM</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Tb</td>
<td>5</td>
<td>B-</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>TxA</td>
<td>4</td>
<td>A+</td>
<td></td>
</tr>
</tbody>
</table>

**G3 to Modular Controller (CBLRLC05)**

<table>
<thead>
<tr>
<th>Connections</th>
<th>G3</th>
<th>Name</th>
<th>Modular Controller</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 4</td>
<td>Tb</td>
<td>1, 4</td>
<td>Tb</td>
<td></td>
</tr>
<tr>
<td>4, 1</td>
<td>RxB</td>
<td>4, 1</td>
<td>RxB</td>
<td></td>
</tr>
<tr>
<td>2, 3</td>
<td>TxA</td>
<td>2, 3</td>
<td>TxA</td>
<td></td>
</tr>
<tr>
<td>3, 2</td>
<td>RxA</td>
<td>3, 2</td>
<td>RxA</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>TxEN</td>
<td>5</td>
<td>TxEN</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>COM</td>
<td>6</td>
<td>COM</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Tb</td>
<td>7</td>
<td>Tb</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>TxA</td>
<td>8</td>
<td>TxA</td>
<td></td>
</tr>
</tbody>
</table>

DH485 COMMUNICATIONS

The G306A's RS422/485 COMMS port can also be used for Allen Bradley DH485 communications.

**WARNING: DO NOT** use a standard DH485 cable to connect this port to Allen Bradley equipment. A cable and wiring diagram are available from Red Lion.

<table>
<thead>
<tr>
<th>Connections</th>
<th>RJ45: RLC</th>
<th>Name</th>
<th>RJ45: A-B</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tb</td>
<td>1</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>TxA</td>
<td>2</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>3, 8</td>
<td>RxA</td>
<td>-</td>
<td>24V</td>
<td></td>
</tr>
<tr>
<td>4, 7</td>
<td>RxB</td>
<td>-</td>
<td>COMM</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>TxEN</td>
<td>5</td>
<td>TxEN</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>COM</td>
<td>4</td>
<td>SHIELD</td>
<td></td>
</tr>
<tr>
<td>4, 7</td>
<td>TxB</td>
<td>-</td>
<td>COMM</td>
<td></td>
</tr>
<tr>
<td>3, 8</td>
<td>TxA</td>
<td>-</td>
<td>24V</td>
<td></td>
</tr>
</tbody>
</table>
SOFTWARE/UNIT OPERATION

CRIMSON® SOFTWARE

Crimson® software is available as a free download from Red Lion’s website or it can be purchased on a CD, see “Ordering Information” for part number. The latest version of the software is always available from the website, and updating your copy is free.

DISPLAY

This operator interface uses a liquid crystal display (LCD) for displaying text and graphics. The display utilizes a cold cathode fluorescent tube (CCFL) for lighting the display. The CCFL tubes can be dimmed for low light conditions. These CCFL tubes have a limited lifetime. Backlight lifetime is based upon the amount of time the display is turned on at full intensity. Turning the backlight off when the display is not in use can extend the lifetime of your backlight. This can be accomplished through the Crimson® software when configuring your unit.

FRONT PANEL LEDS

There are three front panel LEDs. Shown below is the default status of the LEDs.

<table>
<thead>
<tr>
<th>LED</th>
<th>INDICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED (TOP, LABELED “PWR”)</td>
<td>Unit is in the boot loader, no valid configuration is loaded.¹</td>
</tr>
<tr>
<td>STEADY</td>
<td>Unit is powered and running an application.</td>
</tr>
<tr>
<td>YELLOW (MIDDLE)</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td>No CompactFlash card is present.</td>
</tr>
<tr>
<td>STEADY</td>
<td>Valid CompactFlash card present.</td>
</tr>
<tr>
<td>FLASHING RAPIDLY</td>
<td>CompactFlash card being checked.</td>
</tr>
<tr>
<td>FLICKERING</td>
<td>Unit is writing to the CompactFlash, either because it is storing data, or because the PC connected via the USB port has locked the drive.²</td>
</tr>
<tr>
<td>FLASHING SLOWLY</td>
<td>Incorrectly formatted CompactFlash card present.</td>
</tr>
<tr>
<td>GREEN (BOTTOM)</td>
<td></td>
</tr>
<tr>
<td>FLASHING</td>
<td>A tag is in an alarm state.</td>
</tr>
<tr>
<td>STEADY</td>
<td>Valid configuration is loaded and there are no alarms present.</td>
</tr>
</tbody>
</table>

¹ The operator interface is shipped without a configuration. After downloading a configuration, if the light remains in the flashing state continuously, try cycling power. If the LED still continues to flash, try downloading a configuration again.

² Do not turn off power to the unit while this light is flickering. The unit writes data in two minute intervals. Later Microsoft operating systems will not lock the drive unless they need to write data; Windows 98 may lock the drive any time it is mounted, thereby interfering with logging. Refer to “Mounting the CompactFlash” in the Crimson 2 User Manual.

TOUCHSCREEN

This operator interface utilizes a resistive analog touchscreen for user input. The unit will only produce an audible tone (beep) when a touch on an active touchscreen cell is sensed. The touchscreen is fully functional as soon as the operator interface is initialized, and can be operated with gloved hands.

KEYPAD

The G306A keypad consists of five keys that can be used for on-screen menus.

TROUBLESHOOTING YOUR G306A

If for any reason you have trouble operating, connecting, or simply have questions concerning your new G306A, contact Red Lion’s technical support. For contact information, refer to the back page of this bulletin for phone and fax numbers.

EMAIL: techsupport@redlion.net
Web Site: http://www.redlion.net

Valid configuration is loaded and there are no alarms present.

STEADY

A tag is in an alarm state.

FLASHING

Incorrectly formatted CompactFlash card present.

FLICKERING

Unit writing to the CompactFlash, either because it is storing data, or because the PC connected via the USB port has locked the drive.

GOOD

Valid configuration is loaded and there are no alarms present.

BAD

Incorrectly formatted CompactFlash card present.
A battery is used to keep time when the unit is without power. Typical accuracy of the G306A time keeping is less than one minute per month drift. The battery of a G306A unit does not affect the unit’s memory, all configurations and data is stored in non-volatile memory.

**CAUTION: RISK OF ELECTRIC SHOCK**
The inverter board, attached to the mounting plate, supplies the high voltage to operate the backlight. Touching the inverter board may result in injury to personnel.

**CAUTION:** The circuit board contains static sensitive components. Before handling the operator interface without the rear cover attached, discharge static charges from your body by touching a grounded bare metal object. Ideally, handle the operator interface at a static controlled clean workstation. Also, do not touch the surface areas of the circuit board. Dirt, oil, or other contaminants may adversely affect circuit operation.

To change the battery of a G306A, remove power, cabling, and then the rear cover of the unit. To remove the cover, remove the four screws designated by the arrows on the rear of the unit. Then, by lifting the top side, hinge the cover, thus providing clearance for the connectors on the bottom side of the PCB as shown in the illustration below. Install in the reverse manner.

Remove the old battery* from the holder and replace with the new battery. Replace the rear cover, cables, and re-apply power. Using Crimson or the unit’s keypad, enter the correct time and date.

* Please note that the old battery must be disposed of in a manner that complies with your local waste regulations. Also, the battery must not be disposed of in fire, or in a manner whereby it may be damaged and its contents come into contact with human skin.

The battery used by the G306A is a lithium type CR2025.
OPTIONAL FEATURES AND ACCESSORIES

OPTIONAL COMMUNICATION CARD
Red Lion offers optional communication cards for fieldbus communications. These communication cards will allow your G306A to communicate with many of the popular fieldbus protocols.
Red Lion is also offering a communications card for additional RS232 and RS422/485 communications. Visit Red Lion’s website for information and availability of these cards.

CUSTOM LOGO
Each G3 operator interface has an embossed area containing the Red Lion logo. Red Lion can provide custom logos to apply to this area. Contact your distributor for additional information and pricing.

COMPACTFLASH SOCKET
CompactFlash socket is a Type II socket that can accept either Type I or II cards. Use cards with a minimum of 4 Mbytes and a maximum of 2 Gbytes with the G306A’s CompactFlash socket. Cards are available at most computer and office supply retailers.
CompactFlash can be used for configuration transfers, larger configurations, data logging, and trending.

Note: Do not remove or insert the CompactFlash card while power is applied. Refer to "Front Panel LEDs."
Information stored on a CompactFlash card by a G306A can be read by a card reader attached to a PC. This information is stored in IBM (Windows®) PC compatible FAT16 file format.

NOTE
For reliable operation in all of our products, Red Lion recommends the use of SanDisk® and SimpleTech brands of CompactFlash cards.
Industrial grade versions that provide up to two million write/erase cycles minimum are available from Red Lion.

LIMITED WARRANTY
The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company's liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company's option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.
The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.
No warranties expressed or implied are created with respect to The Company’s products except those expressly contained herein. The Customer acknowledges the disclaimers and limitations contained herein and relies on no other warranties or affirmations.

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**DESCRIPTION**

Models VX500 & VX500T Operator Terminals combine unique capabilities normally expected only from expensive SCADA packages, with dramatic ease of use. The VX500 & VX500T are configured using the same powerful EDICT97 Software as all Red Lion Paradigm Operator Interfaces. The results are savings in time to get challenging applications up and running, and frequent savings in hardware costs due to replacing many functions usually performed in separate expensive devices.

**SAFETY SUMMARY**

All safety regulations, local codes and instructions that appear in this and corresponding literature, or on equipment, must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the unit.

The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

---

**DIMENSIONS In inches (mm)**

- 9.77 (248.2)
- 7.37 (187.2)
- 2.13 (54.1)
- 6.93 (176.0)
- 6.61 (167.9)
- 8.93 (226.8)
- 20 (5.1)
- 3.46 (89.0)
- 4.86 (123.5)
- 2.43 (61.8)
- 12X 0.14 (3.5)
- 7.29 (185.3)
- 9.33 (237.0)

**SPECIFICATIONS**

1. **POWER REQUIREMENTS**: 15 to 30 VDC @ 9.75 W
   - Power Up Current: 2.5 A for 4 msec max.
   - Must use a Class 2 or SELV rated power supply.
2. **DISPLAY**: 640 x 480 pixels (7.75 inch diagonal) CCFL Liquid Crystal DSTN color full VGA display.
   - Text formats up to 40 x 30 characters.
3. **KEYPAD**: 6 screen legendable soft keys, raise, lower, next, previous, exit, menu, alarms and mute keys are all embossed and have tactile feedback.
4. **TOUCHSCREEN (VX500T only)**: Continuous resistive touch screen interface specified for up to 5 million operations.
   - 200 X 200 touch cells
5. **MEMORY**: 736 K (672 K user) battery backed RAM.
   - Battery life expectancy 3 years 50/50 on/off cycle.
6. **RELAY OUTPUT**: Form C relay output 1 A @ 120 VAC, 1 A @ 28 VDC.

---

**CAUTION**: Risk of Danger.
Read complete instructions prior to installation and operation of the unit.

**CAUTION**: Risk of electric shock.
# Common Features for Graphic Based Operator Terminals

## Programmability

### Event Driven Configuration Tool

Edict 97, an extremely powerful Windows® 95/3.11 based software program, provides for the intuitive configuration of every aspect of the operator interface's behavior. The requirement for time consuming PLC ladder logic is drastically reduced by the unique event driven approach of Edict 97. The capability of this program, in conjunction with the PLC and the Paradigm operator interface unit, ensures a great deal of advanced functionality for your system. This powerful PLC/Paradigm system provides many of the capabilities and features normally associated with the more complicated and costly PC/SCADA systems. Display pages are easily generated, including PLC and internal variables, text strings, or bar charts. All dynamic elements are also available as alarms, recipes, triggers, and reports for the run time software. After completion of the programming, the program is directly downloaded to the operator interface from your PC, without any compiling or saving requirement. When you require a change in your program, Edict 97 loads only the change, not the entire program, saving valuable on-line time.

### Dynamic Display Page Elements

Each display page has provisions to show static and dynamic information, including data variables, text messages, time, and date.

- **Data Variables**: can be either PLC derived or internally generated, either in data display or display only mode. The Paradigm unit has an extremely powerful math capability, allowing the operator to manipulate the variables to meet the specific application’s demands. If required, the display can be formatted to BCD, binary, hex, floating point, and string. Upper and lower limits of data entry variables are fully supported and password protected.

- **Text Message Animation**: enables different types of animated text from a local or global message table to be displayed. The message displayed is dependent on the condition of the particular controlling expression. The controlling expression may be a PLC bit level, a timer value, preset counter condition, or any one of a wide variety of message triggers.

### Time and Date

The Paradigm unit has the capability to display in any combination of year, month, day, hours, minutes, and seconds. Bar Graphs in horizontal format are easily attached to data variables. The partial or full length bar graph displays can be scaled and offset to optimize the required display effect.

### Security

The password protection scheme provides the ultimate in tamper-proof capability. Access can be limited on a unit, page, recipe, or even individual data entries.

### Alarms

The Paradigm unit can monitor and log up to 500 alarms. Such triggers as a simple bit level transition, a PLC coil activation, or a complex application algorithm can activate an alarm. The alarms can be time and date stamped, with an automatic screen display and/or downloading to a printer for hard copy recording purposes.

### Recipe Handling

Recipe handling in the Paradigm Operator Interfaces can be tailored to your requirements. Using the “Data Files” section of Named Data, one can set up arrays with meaningful titles, and select, edit, and maintain, recipe data up to 8000 elements per file. In conjunction with User Programs, and the flexible data displays, the operator can select desired recipe, by number or by title, and either upload from, or download to, the target system. All the functions of EDICT97 are available, so the programmer can password protect the editing of the recipes and allow for the transfer of data from a host system.
REAL TIME SCHEDULE
Real time schedule allows for repetitive or one time tasks to take place in the system.

MULTIPLE LANGUAGE SUPPORT
This powerful feature allows users to program the text in their databases in up to 8 different languages. A system variable entry makes it easy for end users to select one of the preprogrammed languages. EDICT-97 features powerful language editing tools for easy implementation.

USER PROGRAMS
This feature offers the user the ability to incorporate custom application requirements via a powerful program language.

KEYBOARD EDITING
All the interface keys can be programmed to perform virtually unlimited functions with each key, having multiple actions assigned to three types of key events: key pressed, key held down (auto repeat), and key released. Typical key actions would be Goto page, set value, load recipe, view alarms, print report, and many more.

COMMUNICATIONS
With over 80 communication drivers available, the Paradigm operator interface offers a wide range of connectivity including: PLCs, Variable Speed Drives, Temperature Controllers, Bar Code Readers, etc. Utilizing real PLC data references, the automatic comms configuration optimizes the system’s communication performance. In the event that your specific driver does not appear on the Paradigm drivers list, let us know, as this list is always being expanded to meet our customers’ needs.

COLOR GRAPHIC UNITS
In addition to all the features of the character-based units, the VX will provide exceptional value in displaying trend graphs, process schematics and flow, and others, limited only by the imagination of the designer. The programmer can use the built-in standard symbols, or construct them. A sequence of graphical symbols can be assigned to a PLC location, and the powerful software will step through the sequence without the necessity of programming multiple expressions for each bitmap. Some of the inherent features of the Graphical Display units are data logging, process symbols, such as tanks, valves, etc.

ANIMATED GRAPHICS
Graphical pages are constructed using both bitmaps and object graphics. Animation items such as tending, tank filling, horizontal and vertical bar graphs, valves, etc., make your display pages aesthetically pleasing as well as informative to the operator.

TOUCH-SCREEN
The VX500T is fitted with a continuous resolution resistive touch-screen, providing an effective resolution of over 200 by 200 cells. This allows touch-sensitive objects to be placed anywhere on the screen, without restricting your designs to the coarse grid employed by competitive products. The touch-screen is fully operable with gloved hands and is specified for up to 5 million operations.

HARDWARE INFORMATION
This bulletin contains a variety of information related to the installation and operation of the Operator Interface supplied. Ideally, you should read this document thoroughly before attempting to use the equipment. For information about the software aspects of the terminal, please consult other documentation.

CONTENTS OF PACKAGE
The Operator Interface is supplied in a packaging box containing the following:

♦ The interface terminal itself.
♦ A NEMA 4/IP65 rated mounting gasket.
♦ A bag containing panel hardware.
♦ This hardware bulletin.
♦ If any of these items are missing, please contact your supplier immediately.

POWER SUPPLY REQUIREMENTS
The Operator Interface requires a regulated 15 to 30 VDC power supply rated at 9.75 W or greater unless otherwise stated on the label:

♦ The terminal may take as little as 300 mA in certain circumstances, so be sure that the chosen power supply can operate correctly with this load. Large switch-mode supplies tend to need a certain minimum load before they will operate correctly.

In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. A very high proportion of reported problems are caused by incorrect power supply installation, so please take care to observe the following points...

♦ The power supply must be mounted close to the unit, with usually not more than 6 feet of cable between the supply and the Operator Interface. Ideally, as short a length as is possible should be used.
♦ The wire used to connect the Operator Interface’s power supply should be of at least 22 gage wire. If a longer cable run is used, you should use heavier gage wire. The routing of the cable should be kept away from large contactors, inverters and other devices which may generate significant electrical noise.

BATTERY BACKUP ISSUES
The Operator Interface is supplied with a Lithium Battery designed to maintain the internal memory and real-time clock during power outages. Assuming the operator interface terminal is powered up for 50% of the time, this battery should last over 4 years. A “Battery Low” system variable is available so that the programmer can choose specific action(s) to occur when the battery voltage drops below its nominal voltage.

It is possible to replace the battery without losing the contents of the Operator Interface’s memory, but this does not reduce the importance of ensuring that a copy of the terminal’s configuration is kept readily at hand to allow the terminal to be re-loaded in the case of mishaps. Please remember that although an image of the database contents can be uploaded, this file is not editable, so the importance of keeping a copy on disk cannot be over stressed.

CHANGING THE BATTERY
To change the internal battery, follow these steps...

1. Remove the power and PLC communications connector from the unit.
2. Remove the four screws from the rear cover and remove the cover.
3. If you wish to avoid losing the terminal’s configuration, reconnect the power connector and re-apply power. Note that this will require the panel to be powered-up and, as such, only suitably qualified service personnel should carry out this procedure.

CAUTION: RISK OF ELECTRIC SHOCK
The inverter board, attached to the bottom of the main board, supplies the high voltage to operate the backlight. Touching the inverter board may result in injury to personnel.

♦ The battery is located in a holder on the main circuit board. This should be clearly visible. Remove the battery from its holder.
♦ Place the new battery in the holder. The terminal’s power supply can now be disconnected, if you re-applied power in the step above.
♦ Replace the lid, screws and connector by following the above procedure in reverse. You may like to make a note of the date the battery was replaced to allow planned maintenance to be carried out.
♦ If you did not keep the unit powered-up during battery replacement, hold down the EXIT and MUTE keys on the keyboard and cycle power. Release the keys and follow the menu guides to clear the memory. The unit is now ready for a configuration database to be reloaded.

Please note that the old battery must be disposed of in a manner which complies with your local waste regulations. Also, the battery must not be disposed of in fire or in a manner whereby it may be damaged and its contents come into contact with human skin.
**INSTALLATION & CONNECTIONS**

The unit meets NEMA 4/IP65 requirements for indoor use, when properly installed. The units are intended to be mounted into an enclosed panel.

The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

**INSTALLATION ENVIRONMENT**

The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

Continuous exposure to direct sunlight may accelerate the aging process of the bezel. The bezel should be cleaned only with a soft cloth and neutral soap product. Do NOT use solvents.

Do not use tools of any kind (screwdrivers, pens, pencils, etc.) to operate the keypad or touchscreen of the unit.

**MOUNTING INSTRUCTIONS**

The Operator Interfaces are designed for through-panel mounting. A neoprene gasket is provided, to enable sealing to NEMA 4X/IP65 specification. The panel cut-out diagram for the model supplied is provided. All mounting holes should be drilled for 0.14” (3.5 mm) clearance. Care should be taken to remove any loose material from the mounting hole to avoid such metal falling into the Operator Interface itself during installation.

**CONNECTING TO A PLC**

The Operator Interface is designed to operate with a PLC. A serial communication connection must be made between the operator interface terminal and PLC, and the details of this connection vary according to which PLC is used.

**PLC TYPE**

Details on how to connect to most PLCs are available on request from RLC.

**CONNECTING TO AN IBM® PC/AT**

The Operator Interface is programmed via software running on an IBM PC/AT or a compatible computer. The connection between the PC/AT and the operator interface terminal is made via a custom cable provided with the EDICT Development Kit. The cable is designed for a 9-pin serial port. Please contact your supplier if you require a 25-pin version.

**PROGRAMMING PORT PIN OUT**

The Operator Interface’s programming port is sometimes used to connect other RS-232 devices, such as printers. The following illustration and table gives the pin-out of this port to enable such connections to be made.

<table>
<thead>
<tr>
<th>PIN</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RTS</td>
</tr>
<tr>
<td>2</td>
<td>Tx</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>Rx</td>
</tr>
<tr>
<td>6</td>
<td>CTS</td>
</tr>
</tbody>
</table>

The above table denotes the pin names of the programming port. When connecting, the pin name at the programming port is connected to the opposite of that pin name at the destination device.

**TROUBLESHOOTING**

For further technical assistance, contact technical support at the appropriate company numbers listed.
MODEL ADI - ALPHANUMERIC DISPLAY INTELLIGENT UNIT

- 256 MESSAGE CAPACITY
- REAL TIME CLOCK/CALENDAR
- MESSAGE QUEUE (Holds Up To Thirty-two Requested Messages)
- SERIAL COMMUNICATIONS (RS-232 and Isolated 20 mA Current Loop)
- OUTPUT/BUSY TERMINAL (NPN Open Collector Output)
- PARALLEL COMMUNICATIONS
- EMBEDDED DATA
- ELAPSED TIMERS
- BAUD RATES UP TO 19.2 K
- COMBINED MESSAGE AND DATA MEMORY, 32 K
- SIMPLE PUSH-BUTTON AND/OR CONTACT CLOSURE MESSAGE REQUESTS
- AC VERSION: Switch Selectable 115/230 VAC
- DC VERSION: Terminal Selectable 12/24 VDC
- NEMA 4/IP65 SEALED FRONT PANEL CONSTRUCTION
- DIN STANDARD PANEL CUTOUT 3.62” (92 mm) x 7.32” (186 mm)
- IBM® COMPATIBLE SOFTWARE FOR PROGRAMMING (sold separately)

DESCRIPTION
The Alphanumeric Display Intelligent (ADI) unit is a simple-to-use, yet versatile and powerful message center. The broad flexibility and functionality of the ADI make it particularly adaptable to a wide variety of applications, including:

- Display and Monitoring of Measured Values
- Indication of Warning, Error, and Alarm Conditions
- Monitoring of Manufacturing Processes
- Display of Machine Start-Up and Operation Procedures

The ADI is capable of storing and displaying up to 256 separate messages. A message can contain up to 250 characters of text and can display any of the 153 customizable characters, including the standard 96 character ASCII set. Individual lines of the message text can be programmed to scroll in a block or character fashion. Individual characters, blocks, and lines of text can be programmed to blink.

The ADI can assemble and transmit message text to one or more Message Display Slave (MDS) units for remote display of messages. For interfacing with serial printers and ASCII terminals, the message text can be assembled and transmitted in any format the user desires. In this case, the appropriate lower ASCII control characters can be inserted in the message text where necessary.

Messages can also display the Current Time and Date and any of the ADI’s sixteen Elapsed Timer values. A message can also collect and display multiple Embedded Data items.

Messages can be requested via the ADI’s Serial and Parallel ports, which the user can configure to meet the needs of most applications. The Parallel Port can also be configured to issue Automatic Message Requests based on changing port values.

The ADI contains functions for requesting messages on a Periodic basis, and for processing requests based on Elapsed Time and Embedded Data values, as well as for executing Chained and Linked message lists.

Any programmed message can be designated for automatic request on Unit Power-Up and Reset. A separate message can be designated for display when the ADI’s Display would be blank.

RLC offers IBM® compatible software for configuring and programming the ADI. The Message Display User software (SFMD), with its easy-to-use menus, extensive prompts, on-line Help functions, message simulator, and terminal emulator, greatly assists the user in fitting the ADI to the application at hand.

DIMENSIONS “In inches [mm]”

UL Recognized Component, File # E171375

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
**DESCRIPTION (Cont’d)**

The user can easily create and save multiple Configuration, Character, and Message files with the SFMD software. Extensive file handling features are included, such as uploading, downloading, and printing of files. Message simulation and terminal emulation functions also come with the software.

A powerful feature of the ADI is the Message Queue. With the Queue function disabled, the ADI processes messages on a first-come, first-served basis. Once the message is processed, higher priority or equal priority go to the display, while lower priority messages are discarded. However, with the Queue function enabled, after the message is processed, high priority messages are placed on the Display while lower priority messages are placed on the Queue for later display in priority order.

The ADI display features a transmissive LCD with LED backlighting. The unit is available in positive or negative image LCD versions with a choice of backlight colors. The display consists of two lines of 5x7 dot-matrix characters, with 20 characters per line. A large 0.45” (11.4 mm) character height makes the ADI display readable to 15 feet (4.5 meters). An on-board pot allows for adjustment of the display viewing angle to accommodate various mounting heights.

The sealed front panel of the ADI meets NEMA 4/IP65 requirements, allowing for wash-down when properly installed. Modern surface-mount technology and extensive testing make the unit extremely reliable in industrial environments. Connections are made on rear panel removable terminal blocks, that accept solid or stranded wire in the range of 12 to 24 AWG.

**SAFETY SUMMARY**

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

**SPECIFICATIONS**

1. **POWER:**
   - AC Version: Switch selectable 115/230 VAC ±10%, 50/60 Hz, 10 VA max.
   - DC Version: Switch selectable, 12/24 VDC ±10%, 450 mA max. Power supplies must be Class 2 or SELV rated.

2. **DISPLAY:**
   - 2 X 20: 0.45” (11.4 mm) high characters, readable to 15 feet (4.5 meters).
   - Transmissive SBE LCD: Negative Image with Red LED backlighting, OR
   - Positive Image with Yellow-Green or Tri-color LED backlighting.

   The brightness of the LED backlight is software adjustable through seventeen levels for the single color units. For the Tri-color unit, the color can be adjusted across 17 shades from Full Red to Orange to Full Yellow-Green. On-board pots separately adjust the intensity of the red and green backlight.

3. **PARALLEL COMMUNICATIONS:**
   - Message Request Format:
     - Binary: 4 or 8 bits.
     - BCD: 4 or 8 bits.
     - ASCII: 4 or 8 bits.

   **Embedded Data Format:**
   - Binary: 4 or 8 bits.
   - BCD: 4 or 8 bits.
   - ASCII: 4 or 8 bits.

4. **PARALLEL PORT INPUTS:**
   - Data Inputs (D0 - D7) & Control Inputs (Strobe & Message/Data):
     - V_{OH} = 30 VDC max.
     - V_{OL} = 0 VDC min.
   - Hi Bias: V_{OH} = 8 VDC min., V_{OL} = 4 VDC max.
   - Control Lo/Hi Bias: 5 V or 12 V compatible logic levels, switch selectable.
     - Lo Bias: V_{OH} = 8 VDC min., V_{OL} = 4 VDC max.
   - For SNK/SRC: Sink or Source, switch selectable.
   - Control SNK/SRC: Sink or source, switch selectable.
   - Logic Level: Positive or negative, switch selectable.
   - Current Sinking: Internal 10 KΩ pull-up, I_{sink} = 1.2 mA typ.
   - Current Sourcing: Internal 10 KΩ pull-down, with I_{sink} = 5.6 mA max. @ 30 VDC.
   - Debounce Time: 0.01 to 2.55 seconds (programmable).
   - Strobe Time: 3 to 255 ms (programmable).

5. **SERIAL COMMUNICATIONS:**
   - RS-232 Port w/9-Pin D-type female connector, full duplex. Also, 20 mA current loop w/DIP switch Enable/Disable.

   **Data Format:**
   - Four types available, switch selectable.
     - 11 bits: 1 start bit, 8 data bits, 1 parity bit, 1 stop bit.
     - 10 bits: 1 start bit, 8 data bits, 1 stop bit.
     - 10 bits: 1 start bit, 7 data bits, 1 parity bit, 1 stop bit.
     - 9 bits: 1 start bit, 7 data bits, 1 stop bit.

   **Data Code:** ASCII

   **Unit Address:** Programmable from 0 to 99. (The number of units in a single loop is limited by the hardware specifications.)

   **Baud Rate:** 300 to 19200, switch selectable.

   **Parity:** Enabled or Disabled, switch selectable.

   **Even/Odd:** Selects parity type, switch selectable.

6. **SERIAL:**
   - 7/8 BIT: Data Bits, switch selectable.

   **Serial Hardware:**
   - 20 mA Current Loop: Terminal block connections +20mA SRC: Provides 20 mA nominal @ 12 VDC.
   - Note: Can power up to 7 units in a loop.
   - -20mA SRC: Loop return for -20 mA SRC.

   **SO/Output Transistor Rating:**
   - V_{CE} = 30 VDC max.,
   - V_{CE} = 1 VDC max. @ 20 mA.

   **Input Diode Rating:**
   - V_{D} = 1.25 VDC typ., 1.5 VDC max. @ 20 mA.
   - Note: The compliance voltage rating of the source must be greater than the sum of the diode voltage drops around the loop. Typically a 30 VDC source (with adequate current capability) is capable of operating between 18 and 22 units in a loop.

7. **OUTPUT/BUSY PIN:**
   - Solid State: NPN open collector, current sinking, V_{CE} = 30 VDC max., I_{sink} = 100 mA max.@, V_{CE} = 1 VDC max.
   - Busy Mode: Indicates the Ready/Busy status of the unit.

8. **Message Files:**
   - Output Mode: Output is activated from a Command or Message for a specified time out value.

9. **Time Out:**
   - 10 msec to 63 mins or Latched.

10. **REAL-TIME CLOCK:**
    - Non-volatile Date and Time, accurate to ±1 minute/month.

11. **MEMORY:**
    - 32 K bytes of non-volatile memory retains all programmed Configuration, Message, and Character settings when power is removed or interrupted.
    - Provides space for 256 Messages of 100 bytes each capable of storing 4 K bytes of Embedded Data. The actual amount of embedded data storage space is determined by the size of the message file.

12. **ENVIRONMENTAL CONDITIONS:**
    - Operating Temperature: 0 to 50°C
    - Storage Temperature: -20 to 60°C
    - Operating and Storage Humidity: 85% max. (non-condensing) from 0°C to 50°C.
    - Altitude: Up to 2000 meters

13. **CERTIFICATIONS AND COMPLIANCES:**
    - UL Recognized Component, File #E171375
    - Recognized to U.S. and Canadian requirements under the Component Recognition Program of Underwriters Laboratories, Inc.

14. **Electromagnetic Compatibility**
    - Immunity to EN 50082-2
      - electrostatic discharge EN 61000-4-2 level 2; 4 V contact level 3; 8 V air level 3; 10 V/m 80 MHz - 1 GHz
      - electromagnetic RF fields EN 61000-4-3 level 2; 4 V/µT level 3; 10 V/m 80 MHz - 1 GHz
      - fast transients (burst) EN 61000-4-4 level 2; 4 V/I/O level 3; 2 V power level 3; 10 V/m 150 KHz - 80 MHz
      - simulation of cordless telephone ENV 50204 level 3; 10 V/m 900 MHz ± 5 MHz
      - Emissions to EN 50081-2
        - RF interference EN 55011 enclosure class A power mains class A

15. **Refer to the EMC Installation Guidelines section of the manual for additional information.**

16. **MOUNTING REQUIREMENTS:**
    - Maximum panel thickness is 0.375” (9.5 mm). Minimum panel thickness for NEMA 4/IP65 sealing is 0.060” (1.57 mm).

17. **CONSTRUCTION:**
    - Steel construction with textured black polyurethane paint for scratch and corrosion resistance. Sealed front panel meets NEMA 4/IP65 specifications for indoor use when properly installed. Installation Category II, Pollution Degree 2. (panel gasket and key/pegs included).

18. **CONNECTIONS:**
    - Rear panel removable terminal blocks.

19. **WEIGHT:**
    - 3.4 lb. (1.5 Kg).
CONNECTING THE ADI TO AN IBM® COMPATIBLE COMPUTER

In order for the user to program Messages in the ADI, the ADI must be connected to an IBM® compatible computer running the Message Display User Software (SFMD). User-friendly menus with numerous prompts and on-line Help functions assist the user in interfacing with and programming the ADI. The SFMD software allows the user to program Configuration, Character, and Message files for the ADI and save them to disk. The user can then download these files, as needed, from the computer’s serial port to one or more ADI units on the communications loop. The SFMD software also includes utilities for message simulation and terminal emulation.

System Requirements:
IBM® compatible PC-AT (286 or greater) with:
- RS232 serial port
- 640k RAM Free
- DOS 3.0 or later
- 1.4 Meg floppy drive
- Monitor with MDA, CGA, EGA, or VGA graphics card.

Note: The SFMD software will not run on a PC-XT computer.

Cabling:
Single Unit
- Standard RS-232 cable

Multiple Units
- RLC GCM232 Serial Converter Module
- Serial communications cable (straight through)
- RLC Auxiliary Power Supply (Model APS) or equivalent (12 VDC power supply).

Message Display User Software (SFMD):
- Available on 3.5” floppy disks.
- Note: Setup may only be performed via the serial port.

BASIC OPERATION
The ADI performs two basic functions; it processes Messages and executes Commands. The ADI begins processing a Message in response to a request for that Message. In processing the Message, the ADI performs the functions the user has specified for that Message. A Message may specify any combination of the following functions:
1. Display Text Locally: The ADI displays the Message Text, which can include the Current Time and Date, Elapsed Timer values, and Embedded Data items.
2. Display Text Remotely: The ADI transmits the Message Text to an RLC Message Display Slave (MDS) unit for Display.
3. Transmit Text: The ADI transmits the Message Text, which can include ASCII control codes, over the serial port to a computer, serial printer, or ASCII terminal.
4. Configure Elapsed Timers: The Message can access one or more of the ADI’s sixteen Elapsed Timers.
5. Collect Embedded Data: The Message can collect up to fifteen Embedded Data items.
6. Configure the Output Pin: The Message can access the ADI’s Output Pin function.

See the Message section for descriptions of the Message features.

A full set of Commands is available for configuring the ADI to the user’s application. Two methods are available to the user for issuing Commands to the ADI. A Command string can be issued directly over the Serial Port, or a Message can be programmed containing the desired Command string (Command Message). In this case, the ADI executes the Command when the Message containing the Command is requested.

See the Command section for descriptions of the available Commands.

Several sources are available to the user for requesting Messages. The ADI constantly monitors the following sources for pending Message requests:
1. The Serial Port: A computer, ASCII terminal, or PLC issues the request over the Serial Port.
2. The Parallel Port: A PLC, thumb-wheel switch, push-button, or relay contact issues the request over the Parallel Port.
3. A Chained Message List: The requested Message is part of a programmed Message sequence.

4. The Link Function: The requested Command Message is linked to any other Message.
5. The Periodic Function: The Message is designated for request on a regular interval.
6. The Reset Function: The Message is designated for request on Unit Power-Up or Reset.
7. The Default Function: The Message is designated for request when there is no other pending message request.
8. The Queue Function: The Message was previously requested, and placed on the Queue because a higher Priority Message was on the Display at that time.
9. An Elapsed Timer: The Message is designated for request at a predetermined Elapsed Timer value.
10. A Test Condition: The Message request is generated based on the results of an Index Embedded Data Item comparison.

SERIAL PORT
The ADI hardware includes a full duplex Serial Port implemented as both an RS-232 port and an isolated, two-way 20 mA current loop. Some typical devices that can be connected to the serial port are:
- ASCII Terminals
- Programmable Logic Controllers with Serial Communications
- Host Computers
- RLC and other Products with Serial Communications
- Serial Printers

Communication between devices must conform to identical Data Bit, Baud Rate, and Parity settings. The following operations can be performed

Uploading and Downloading Files
- Requesting Messages
- Receiving and Transmitting Message Text
- Receiving and Transmitting Commands
- Collecting and Transmitting Embedded Data
- Transmitting Error Codes

A serial hardware loop-back test can easily be performed to verify proper operation of the ADI’s Serial Port.

With the Message Simulator, the user can verify the proper operation of a Message or Message file on the computer screen without having to download the Message file to the ADI.

The Terminal Emulator can assist the user in verifying and testing the operation of the downloaded Message file. It can also be used to monitor and trouble-shoot serial port communications.
PARALLEL PORT

The ADI hardware includes a Parallel Port consisting of eight Data lines and two Control lines; the Message/Data line and the Strobe line. The Message/Data line indicates whether a Message number or Embedded Data value is present on the Data lines. The Strobe line signals the ADI to read the Parallel Port.

Among the devices that can be connected to the Parallel Port are:
- Programmable Logic Controllers (PLC’s)
- BCD and Binary Thumb-wheel Switches
- Push Buttons
- Transducers w/Logic Level Outputs
- Electro-mechanical and Solid State Relays

The Parallel Port can be configured for 4, 8, or 9 bit BCD and 4 or 8 bit binary Message requests. Embedded Data can be presented in 4 or 8 bit ASCII, BCD, and binary formats. The Parallel Port Data and Control line inputs are separately DIP switch selectable for either positive or negative logic, current sinking or sourcing inputs, and 5 V or 12 V logic level compatibility.

The Parallel Port interface protocol is straightforward:

1. Set the Data lines and the Message/Data line to the appropriate values.
2. Apply a Strobe pulse (programmable from 3-250 msec).
3. Allow the Debounce time to expire (programmable from 10 to 2550 msec).
4. Repeat as required by the chosen Parallel Port configuration.

The Parallel Port can be configured for one of two Automatic Message Request (AMR) operation modes. Either of these modes issues automatic message requests, without need for a Strobe pulse, when the value on the Parallel Port changes.

In AMR Mode 1, Message requests are edge-triggered, based on the individual Data line values. A pair of Messages is assigned to each Parallel Port Data line. One Message is requested when its associated Data line goes to the active state, the other is executed when the Data line goes to the inactive state.

In AMR Mode 2, the eight Data lines represent a Message number. The appropriate Message is requested when the 8-bit value on the Data lines changes.

In either AMR mode, the Message/Data line can be used to enable and disable Automatic Message Requests. In addition, the Strobe and Debounce times can be programmed to set the noise immunity level and message request rate. A Default Message can be designated for request on any unused data lines or “don’t care” conditions. If the Default Message function is disabled, all non-programmed combinations are ignored.

OUTPUT/BUSY PIN

The ADI hardware includes one NPN open-collector output pin which can be configured for positive or negative logic. The pin can be set to operate in one of two modes, the Busy Mode or the Output Mode.

Busy Mode: The ADI uses the pin in the Busy Mode to acknowledge Message requests and reception of data items. The pin is in the active state during the Busy time (while the ADI is processing a Message request or collecting Embedded Data).

Output Mode: With the pin in the Output Mode, a Message or Command can change the status of any of the following Output Pin settings:
- Lock or Unlock: The ADI only accepts changes to the pin settings while the pin is Unlocked.
- On, Off, or Toggle: The ADI sets the Output pin to the specified state. In the case of Toggle, the ADI switches the current state, from On to Off, or Off to On.
- Set, Hold, or Run Time Out: When the Output Time Out expires, the ADI automatically sets the pin to the inactive state. The Time Out can be Halted at any time. It can be resumed at a later time, or started from one of the following values:
  1. 10 to 1260 msec.
  2. 1 to 63 secs.
  3. 1 to 63 mins.
  4. Latched On.
  5. Configuration File value.

MESSAGES

Messages make up the heart of the ADI. The user can program a Message to perform many functions, or a Message can simply display text. In addition, the user can choose to have the Message collect Embedded Data, configure more Elapsed Timers, access the Output Pin, transmit character strings and/or text to remote locations, and display the Current Time, Elapsed Time, and previously collected Embedded Data Items. The Message can also be programmed to perform any of the ADI’s Command functions.

MESSAGE FEATURES

Message Destination:
- Display
- MDS Unit
- Transmit
- Display & MDS Unit
- Display & Transmit
- Command Message

Message Time Out:
- Immediate Time Out (0 secs)
- 10 to 1260 msecs
- 1 to 63 secs
- 1 to 63 mins
- No time out

Message Scrolling:
- Static (none)
- Character (horizontal)
- Block

Message Priority:
- 1 to 255

Queue Message:
- Can select Message for Queue

Message Chain:
- Can Chain up to 32 Messages

Output Pin:
- Can access the Output Pin

Periodic Message:
- Can designate the Message for Periodic request

Message Text:
- Characters:
  - Standard: 20h to 7Fh
  - European and Special: 80h to B8h
  - All Characters Customizable
- ASCII Control Codes
- Current Time and Date
- Elapsed Timer Values
- Local Embedded Data Items
- Indexed Embedded Data Items
- Scrolling Text
- Blinking Text

Elapsed Timers:
- Can access up to 16 timers

Embedded Data:
- Can collect up to 15 items

Update Data:
- Continuous Update
- 10 to 1260 msecs
- 1 to 63 secs
- 1 to 63 mins
- No Update

Data Types:
- Local Item: Only the collecting Message can access the item.
- Index Item: Any Message can access the item, and Commands can operate on the item (increment, decrement, test).

Data Sources:
- Serial Port
- Parallel Port

Internal: any combination of the following
- Elapsed Time: Capture an Elapsed Timer value
- Current Time: Capture the Current Time value
- Indexed Item: Capture an Index value
- Text: Any Text Character

The Message Editing menu of the SFMD software greatly simplifies the task of programming Messages for the ADI. The menu is structured in a logical, easy-to-understand order and displays all of the possible functions that a Message can perform. The user programs a particular message by specifying the number of the Message and then selects the applicable functions for the Message. The software displays numerous prompts and on-line Help functions during the Message programming process.

The ADI can store 256 different Messages at one time, numbered 0 to 255. A collection of Messages for a particular application comprises a Message file. The user then downloads the resulting Message file to the ADI using the SFMD software via the Serial Port.
MESSAGE DESTINATION

The destination of a Message determines the manner in which the ADI processes a request for that Message. The following Message Destinations are available to the user:

Display: The ADI processes the Message and then places the Message Text on its own Display.

MDS Unit: The ADI processes the Message and transmits the Message Text to an RLC Message Display Slave (MDS) unit.

Transmit: The ADI processes the Message and then transmits the Message Text via the Serial Port in a user definable format.

Display and MDS Unit: The ADI performs both the Display and MDS Unit functions.

Display and Transmit: The ADI performs both the Display and Transmit functions.

Command Message: The ADI executes the Command specified in the Message.

Only Messages destined for the Display can be assigned a Priority, placed on the Queue, and specify a Chained Message List. Also, a Message must be destined for the Display and/or an MDS unit in order for it to have a Time Out value.

MESSAGE TEXT

The user specifies the text format for a Message in the text area of the SFMD Message menu. In addition to any of the characters in the ADI’s character set, Message Text can include the Current Time and Date, Elapsed Timer values, Local and Indexed Data items, and the lower ASCII control codes, such as CR and LF.

The user can select among several different scrolling techniques for each line of the text. The text can be a static display or can be scrolled horizontally across the screen. The user can break the text into blocks, which are displayed one after another. Also, the user can designate individual characters, blocks, and whole lines of text for blinking.

DISPLAYABLE CHARACTER SET

The ADI can display 153 different characters. The standard ASCII character set, from 00h to 7Fh comprises the first 96 characters. The remainder of the character set, from 80h to 9Fh includes many European and special characters. The SFMD software allows the user to customize all 153 characters.

CURRENT DATE/TIME AND ELAPSED TIME

The Real Time Clock (RTC) in the ADI maintains the current Date and Time whether or not power is applied to the unit. The user can insert the Current Time and/or Date in the Message Text in any desired format. Also any of the Elapsed Timers can have their time fields included in the Message Text. The ADI automatically updates all currently displayed values.

Date Formats:
- Day of the Week: Full (e.g., MONDAY) or Abbreviated (e.g., MON).
- Day of the Month: Numeric (e.g., 1-31).
- Month: Full (e.g., JANUARY), Abbreviated (e.g., JAN.), or Numeric (e.g., 1 = January).
- Year: Full (e.g., 1993) or Abbreviated (e.g., 93).

Current Time Formats:
- Civilian (12 Hour) Clock: Any combination of Hours, Minutes, Seconds, Tenths and Hundredths of seconds. The A.M. or P.M. designator may be included (e.g, 4:30 P.M.).
- Military (24 Hour) Clock: Any combination of Hours, Minutes, Seconds, Tenths and Hundredths of seconds (e.g. 16:30).

Elapsed Time Formats: Any combination of Hours, Minutes, Seconds, Tenths and Hundredths of seconds. (e.g. 97:31.25).

Field Separators: Any character NOT used in the Date and Time fields can be used to separate the fields (e.g. ‘-’ or ‘.’).

Format examples: Monday, April 26, 1993 4:30 P.M.
26Apr93 16:30:7

MESSAGE SCROLLING AND BLINKING

The user can designate individual lines of text for various forms of scrolling. A programmed Message can specify separate scrolling methods for each line of the display. The Message designates whether to scroll the text for a line, while the appropriate Configuration setting determines the rate at which the ADI scrolls the text. The user can specify separate scroll rates for the top and bottom lines of the display.

Character Scrolling: A line of text designated for Character scrolling repeatedly moves across the Display from right to left at the rate specified by that line’s Character Scroll setting. The user can also choose to separate the text into blocks, which would then scroll across the Display separately, one after another. In this case, the user specifies the size of the blocks by inserting control codes at the desired locations in the Message Text.

Block Scrolling: A line of Text designated for Block scrolling repeatedly displays blocks of information, one after another, at the rate specified by that line’s Block Scroll setting. The user specifies the size of the blocks by inserting control codes at the desired locations in the Message Text.

Blinking: Characters designated for Blinking in a line, blink at the rate specified by that line’s Blink setting. The user designates individual characters and/or blocks of text for Blinking by inserting control codes at the desired locations in the Message Text.

DISPLAYING MESSAGES

The ADI processes Messages for display based on their Destination, Priority, Time Out value, and type of Message request.

Message Time Out: The Message Time Out value specifies how long the ADI should display the Message. The ADI automatically cancels a Message after its remaining display time reaches zero. Messages placed on the Queue have their remaining display time frozen. The ADI resumes the Message Time Out when the Message is placed from the Queue to the Display. Messages can be set for No Time Out, in which case the Message does not Time Out. To remove the Message from the Display, it must be canceled, or replaced by an equal or higher Priority Message.

Message Priority: The user can assign a Priority of 1 (highest) to 255 (lowest) to a Message. If the user does not require a Prioritized Message scheme, the SFMD software automatically assigns each programmed Message a default Priority of 1, and the ADI processes all Messages on an equal basis.

The ADI compares the Priority of the newly requested Message with that of the Message on the Display to determine which Message to display. In this scheme, the ADI always places an equal or higher Priority Requested Message on the Display.

If the Message Queue function is enabled and the lower Priority Message is designated for the Queue, the ADI discards the Message. (See the Message Queue section).

Immediate Message Request: A user can request any Message while overriding its programmed Priority. In this case, the ADI immediately places the requested Message on the Display. The Message, however, reverts to its assigned Priority once having been placed on the Display.

Temporary Message Request: It is also possible to place a Temporary Message on the Display. In this case, the actual Message text is transmitted to the ADI via the Serial Port, and the ADI immediately places the Message Text on the Display. A Temporary Message has no Priority and the ADI replaces the Temporary Message with any subsequently requested Message destined for the Display.

MESSAGE CHAINING

The user can specify up to thirty-two Messages in a Chained Message list. When processing a Message Chain, the ADI automatically requests the next Message in the Chain list after the previous Message expires or is canceled. The Priority of a Message Chain is the Priority of the Message specifying the Chain. Message Chains are useful for performing programmed sequences of Messages and Commands. Message Chains can also loop back to any point in the Message Chain list, providing the user with a means for programming a repetitive sequence or loop of Messages and Commands.
EMBEDDED DATA FEATURES

A Message can collect up to fifteen Embedded Data (ED) Items. An ED Item can originate from any of the following sources:

The Serial Port: The data is received as an ASCII character string over the Serial Port.

The Parallel Port: The data is received in ASCII, BCD, or Binary formats, as specified by the user, over the Parallel Port.

ADI Internal Data: The data consists of any combination of the Current Time/Date, Elapsed Timer values, Indexed Data Items, and/or character strings, as specified by the user.

Once the ADI has collected and processed an ED item, it stores the item as one of the following ED types:

Local: Only the Message collecting a Local ED item can Display that item. The ADI deletes the data when the Message Times Out or when the message is removed from the Queue.

Indexed: The ADI stores the data in one of 96 Indexed locations, as specified by the user. Any Message can then update and/or display the data. In addition, Indexed data items can be incremented, decremented, and have comparison tests performed upon them, resulting in conditional message requests (See the Commands and Command Messages section).

Data can be collected from any combination of sources and both Local and Indexed items can be collected in the same Message. The user specifies the order in which the ADI should collect the data. The ADI collects all Local items first before collecting any Indexed items.

Serial Port Embedded Data Features:

Transmit Request: The ADI issues the programmed character string (up to 127 characters) before collecting the data. This feature is useful for requesting data transmissions from serial units.

Data Length: Up to 128 characters, including the string terminator.

Data Time Out: The time the ADI waits to receive the data.

Immediate: The ADI does not wait for any data.

In 1 second increments:

Indefinite: The ADI waits indefinitely until it receives data.

Data Terminator: The character indicating the end of the data.

0 to 7, 9 to 26, 28 to 255 decimal.

Leading Zero Blanking or Suppression.

Data Formatting: Any combination of characters can be kept or deleted after the data is collected.

Update Data: Each item can be updated while on the Display.

Continuous: The ADI updates the data as fast as possible.

In 1 second increments:

Indefinite: The ADI waits indefinitely until it receives data.

Data Terminating Character: The character indicating the end of the data.

0 to 256: In 10 millisecond increments.

1 to 63 seconds: In 1 second increments.

1 to 63 minutes: In 1 minute increments.

No Update: The ADI does not update the data.

Parallel Port Embedded Data Features:

Transmit Request: The ADI issues the programmed character string (up to 127 characters) before collecting the data. This feature is useful for logging unit activity on a serial printer or ASCII terminal.

Data Type and Length:

ASCII: Up to 23 characters.

BCD: Up to 22 digits.

Binary: Up to two bytes (16 bits, max. value 65535).

Data Time Out: The time the ADI waits to receive the data.

Immediate: The ADI does not wait for any data.

In 1 second increments:

Indefinite: The ADI waits indefinitely until it receives data.

Leading Zero Blanking or Suppression.

Data Formatting: Any combination of characters can be kept or deleted after the data is collected.

Update Data: Each item can be updated while on the Display.

Continuous: The ADI updates the data as fast as possible.

In 10 to 1260 msecs:

1 to 63 seconds: In 10 millisecond increments.

1 to 63 minutes: In 1 second increments.

1 to 63 minutes: In 1 minute increments.

No Update: The ADI does not update the data.

Internal Embedded Data Features: The user specifies the format of an Internal Data item much the same as the format of Message Text.

Data Length: An Internal item can be up to 127 characters long.

Characters: The item can include any of the displayable characters plus the lower ASCII control codes, if desired.

Current Time and Date: The current value of the Time and/or Date can be captured and inserted in any specified location and format.

Elapsed Timer Values: The current value of the designated Elapsed Timer can be captured and inserted in any user specified location and format.

Indexed Data Values: The current value of the designated Index item can be inserted at any user specified location.

Leading Zero Blanking or Suppression.

Data Formatting: Any combination of characters can be kept or deleted after the data is collected.

Update Data: Each item can be updated while on the Display.

Continuous: The ADI updates the data as fast as possible.

10 to 1260 msecs: In 10 millisecond increments.

1 to 63 seconds: In 1 second increments.

1 to 63 minutes: In 1 minute increments.

No Update: The ADI does not update the data.

ELAPSED TIMERS

The ADI has sixteen independent Elapsed Timers. The Elapsed Timer functions can be accessed through both Messages and Commands. The ADI configures the designated Elapsed Timers to the settings of the requested Message. Commands and Command Messages can also be issued to access any of the Elapsed Timer functions.

The user can display the value of an Elapsed Timer in any desired format. The ADI constantly updates all displayedElapsed Timer values.

The following features are available for the Elapsed Timers:

Disposition: On every unit Power-Up and Reset, the ADI configures each Elapsed Timer based on the Timer’s Disposition setting.

Save: The ADI maintains the timer configuration on Power-Down or Reset (e.g., if the Timer was running when the ADI powered-down, the Timer will continue to run when power is restored to the unit).

Clear: The ADI resets the Timer configuration to the default settings on Power-Down or Reset (i.e. the ADI halts and clears the timer on Power-Up).

Timer Status: Each Timer can be independently running or halted.

Timer Direction: Each Timer can run Up or Down. The direction of the Timer can be changed without stopping or resetting the Timer.

Timer Value: The Timer can be set to any value within the range from 0000:00.00.00 to 9999:59:59.99.

Timer Overflow/Underflow: The Timer value rolls-over on Overflow or Underflow. A user resettable flag indicates the event.

Trigger Status: Enables and disables the Trigger function for a Timer. With this function enabled, the ADI automatically requests the assigned Trigger Message when the Timer reaches its Trigger value.

Trigger Type:

One-Shot: With the Trigger enabled, once the Timer reaches its Trigger value, the ADI requests the Trigger Message and then disables the Trigger function. The Timer continues to run and the Timer value is unaffected.

Retrigger: With the Trigger enabled, once the Timer reaches its Trigger value, the ADI requests the Trigger Message, resets the Timer value to zero, and re-enables the Trigger function. The Timer continues to run. This feature is useful for generating automatic Message requests on a repetitive basis.

Trigger Value: The Trigger value can be set to any value in the range from 0000:00.00.00 to 9999:59:59.99.

Trigger Message: With the Trigger function enabled, the ADI requests the Trigger Message when the Timer value reaches the Trigger value. The Trigger Message can be any programmed Message.

PERIODIC MESSAGE FUNCTION

The Periodic function enables the user to specify up to 32 Messages for automatic request on a Periodic basis. Any programmed Message can be assigned to the Periodic function. The user can enable or disable the Periodic function in the Configuration file. Also, individual Periodic entries can be enabled, disabled, turned On, and turned Off.

The ADI monitors two parameters when processing the Periodic function; the Activation Time and the Periodic Interval. The Activation Time of a Periodic entry indicates the next time the ADI should request the Message for that entry. The Periodic Interval specifies how frequently the ADI should request the Message. Once the Current Time reaches the Activation Time, the ADI requests the Message and then advances the Activation Time by one Interval.

The Activation Time is specified as a Time and Date and can be set to any time in the future with one minute precision. The available Interval types are listed below.

Seconds: 1 to 5, 10, 15, 20, or 30

Minutes: 1 to 99

Hours: 1 to 99

Days: 1 to 99 (weeks 1 to 14)

Months: 1 to 99 (years 1 to 8)

Semi-Monthly: 15th and 30th/31st of the month

Day-of-Month: 1st, 2nd, 3rd, 4th, Last Sunday to Saturday of month

End-of-Month: 28, 29, 30, or 31

End-of-Quarter: 28, 29, 30, or 31

One Time Activation

"59"

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
MESSAGE QUEUE FUNCTION
The Message Queue is a holding area for requested Messages while the Display is occupied with a higher Priority Message. When enabled, the Queue function causes the ADI to keep a lower Priority requested Message. It can hold up to 32 requested Messages.

The configuration setting enables and disables the Message Queue function. With the function disabled, an equal or higher Priority requested Message is always displayed, while a lower Priority Message is always discarded. If a prioritized Message scheme is not desired, the user should simply allow the SFMD software to assign the default Priority of 1 to all the programmed Messages. In this case, the most recently requested Message is always placed on the Display.

The user can select individual Messages for placement on the Queue. Messages so designated are positioned on the Queue based on their individual Priorities. Messages not designated for the Queue are discarded when they cannot be displayed.

Messages destined for an MDS Unit or transmission via the Serial Port are processed when requested and then discarded. These Messages have no Priority or Time Out value assigned and are never placed on the Display or the Queue.

DEFAULT MESSAGE FUNCTION
The user can designate any programmed Message as the Default Message. With the Default function enabled, the ADI automatically requests the Default Message when the Display is empty.

RESET MESSAGE FUNCTION
The user can designate any programmed Message as the Reset Message. With the Reset Message function enabled, the ADI automatically requests the Reset Message on unit Power-Up and Reset. The Reset Message function is useful for performing customized start-up and initialization procedures.

COMMANDS AND COMMAND MESSAGES
A full set of Commands is available to the user for both configuring and interrogating the ADI. It is possible for the user to program any Command string as a Message, resulting in a Command Message. The ADI executes the specified Command when the command message is requested. A Command Message can be executed from any of the Message request sources. A Command string must be transmitted to the ADI over the serial port.

Commands are available for changing the configuration settings of the ADI on-line. Consequently, the ADI can be programmed to adapt itself to changing system requirements and demands. Commands can also cause the ADI to transmit any of its current configuration settings over the serial port in an easy to read mnemonic format.

Commands are provided for configuring and interrogating the Elapsed Timers and the Output Pin. Indexed data items can be programmed, interrogated, incremented, decremented, and tested using commands.

Certain Commands can request specific Messages on the Queue to be displayed, transmitted, or canceled based on their Priority, Message number, or Queue position. Commands can also transmit Temporary Message text to the ADI as well as cause the ADI to transmit the text of any Message on its Display or in its Queue.

It is possible to communicate with other units down-stream of the ADI and to have the ADI automatically configure other units on the loop with the appropriate Commands.

SELF-TEST FEATURES
With the appropriate DIP-switch settings applied at unit Power-Up, the user can have the ADI perform any of the following functions:

Display the Hardware Configuration Setup
Display the Configuration Parameter Settings
Display the Parallel Port Configuration and Pin Values
Perform a Serial Loop-Back Test
Perform a Memory Self Test
Perform a Real Time Clock Self-Test
Restore the Default Factory Settings

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADI</td>
<td>Red, Negative Image</td>
<td>ADI2R11D ADI2R11A</td>
</tr>
<tr>
<td></td>
<td>Yel-Grn, Positive Image</td>
<td>ADIY11D ADIY11A</td>
</tr>
<tr>
<td></td>
<td>Tri-color (Red, Orange, Green), Positive Image</td>
<td>ADIOT11D ADIOT11A</td>
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<td>SFMD</td>
<td>Apollo Message Display User Software (3 1/2”, 1.44M)</td>
<td>SFMD0</td>
</tr>
<tr>
<td>GCM232</td>
<td>Serial Converter Module RS-232</td>
<td>GCM23201</td>
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</tbody>
</table>

Note: Only one copy of software is required for multiple units.
APPLICATION #1

A customer is installing a PLC based system and would like to display various messages on the ADI. The PLC is wired to the ADI to request specific messages dependent upon the state of the process. Once the ADI receives and processes the message request, it displays the message that corresponds to the change in the process. The ADI is also set up to transmit the display messages to various MDS units located at remote locations.

The ADI and the PLC are connected serially, using the RS232 card of the PLC and the 9 pin RS232 port of the ADI. The cable run between the units is shielded twisted pair (for better noise immunity). The PLC’s serial card is requesting messages from the ADI.

The ADI will re-transmit the displayed messages to various MDS units, using the 20 mA current loop. The ADI is set up for “Display & MDS unit” in the software. The MDS’s are set up for RLC mode. The output of the ADI is wired to the inputs of the MDS units. With the handshaking off, the outputs of the MDS units do not need to be wired to the input of the ADI.

APPLICATION #2

A customer would like to monitor several process variables at one location. At various stages of the process, the ADI will display the process data for the operator. If a critical condition develops, the ADI will display that condition, as well as the suspected cause.

A TCU is used to monitor and control the heating of the process. An IMH is used to monitor the status of the heating element and an IMI to monitor the speed of the process.

Messages will display the information that is pertinent during the start-up of the process. Messages are programmed to take into account all the various conditions the process may incur. The parallel port is configured for AMR Mode 1 for Message requests over the parallel port.

The TCU, IMH, and IMI are set up to activate their alarm outputs in the event of an error condition. Each output is tied to a separate data pin on the parallel port of the ADI. The ADI will automatically request a specific Message from the parallel port when a level change occurs.

Example: The TCU’s alarm output 1 is tied to data line 1. In the event of a high temperature condition, alarm output 1 closes. The ADI monitors Data line 1 for a logic level change. Data line 1 has two message numbers attached to it, Message #1 for the Active logic level and Message #11 for the Inactive logic level. The ADI requests Message #1 when the Data line undergoes an Inactive-to-Active transition and informs the operator of a high temperature condition and the time it occurred. Message #11 is requested when the Data line undergoes an Active-to-Inactive transition and indicates that the temperature condition was corrected and the time of correction.

When the operator presses a switch to start the process, the start-up Messages are requested. This switch is connected to one of the ADI’s parallel port data lines. Messages can also be requested and monitored via the serial port, which is connected to the office computer.

All Messages and Configuration Settings are programmed on an IBM® compatible computer using the Message Display Software SFMD. The Message and Configuration files are then downloaded to the ADI via the serial port. After the files are downloaded, the ADI is ready to interface with the system.
MODEL MCCA - MESSAGE CENTER COMMUNICATIONS ADAPTER (SERIAL COM-PORT TO 20 mA CURRENT LOOP)

- PROVIDES SERIAL COMMUNICATIONS BETWEEN THE RS232 SERIAL COMMUNICATIONS PORT OF AN IBM® PC COMPATIBLE COMPUTER AND AN APOLLO MESSAGE CENTER UNIT
- ISOLATED 20 mA SERIAL COMMUNICATION CURRENT LOOP
- FULLY ENCLOSED DURABLE PLASTIC CASE

DESCRIPTION

The MCCA allows easy hook-up between an IBM® PC compatible computer and an Apollo Message Center unit.

The cable assembly has a D-type 25-pin receptacle connector that plugs into the computer’s serial port and a pre-wired terminal block which plugs into a Message Center unit. The AC adapter version has a 10 position terminal block and the DC version has an 11 position terminal block.

The isolated 20 mA current loop wires are connected to the terminal block, ready to be plugged into the appropriate Message Center unit.

The MCCA AC version adapter has a two prong AC cord connected to the terminal block to power the Message Center unit. Before applying power to the Message Center unit, make sure the voltage selector switch is set for the proper voltage position (115 or 230).

Note: Reference Message Center manual for voltage selector switch settings.

The MCCA DC version adapter has NO wires connected to the first three positions of the terminal block. An external DC power source must be supplied and connected by the user, to power a DC version Message Center unit.

Note: Reference Message Center manual for power requirements and connections.

Connection for the RS-232 loop is made via a D-Type 25-pin receptacle connector. In some cases a 9 to 25 pin connector adapter may be required to connect to the computer’s comport.

The data format and baud rate must be identical between the computer and the Message Center unit for the data to be interpreted correctly.

Note: Reference Message Center manual for DIP switch settings.

SPECIFICATIONS

1. POWER:
   - Message Center Transmit Loop: Power to the transmit loop of the Message Center is supplied by the computer at either pin 4 (RTS), pin 20 (DTR), or both. A 3-15VDC voltage on either or both of these pins is required for proper operation.
   - Message Center Receive Loop: Supplied by Message Center unit.

2. CABLE LENGTH: 6 Ft. (1.8 M)
3. BAUD RATE: 19200 max.
4. OPERATING TEMPERATURE: 0°C to 50°C
5. CASE DIMENSIONS:
   - 0.50" H x 2.00" W x 2.37" L
   - 1.27cm H x 5.08cm W x 6.03cm L

ORDERING INFORMATION

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<tr>
<td>MCCA DC</td>
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<td>MCCA1000</td>
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Note: The adapter will only operate with Apollo Message Center User Software versions 2.30 or later.
MODEL MDS - MESSAGE DISPLAY SLAVE UNIT

- 2x20 OR 1x10 TRANSMISSIVE LCD, NEGATIVE IMAGE WITH RED, OR POSITIVE OR NEGATIVE IMAGE WITH YELLOW/GREEN LED BACKLIGHTING
- 153 DIFFERENT DISPLAYABLE CHARACTERS
  96 Standard ASCII Characters
  57 European and Special Characters
  Fully Customizable Character Set
- SERIAL MODE ACCEPTS AND DISPLAYS SERIAL ASCII CHARACTER STRINGS

DESCRIPTION
The Message Display Slave (MDS) unit is a simple-to-use, yet versatile, alphanumeric message center. The broad flexibility and functionality of the MDS make it particularly adaptable to a wide variety of applications, including:

- Display of Measured Values
- Indication of Warning, Error, and Alarm Conditions
- Indication of Manufacturing Process Steps
- Display of Machine Start-Up and Operation Procedures
- Display of RLC Message Display Intelligent (MDI) Unit Messages
- Display of Information from other Serial RLC Units

The MDS is capable of displaying messages up to 127 characters long. A message can include any of the 153 customizable characters, including the standard 96 character ASCII set. Individual lines of the message text can be designated to scroll in a block or character fashion. Individual characters, blocks, and lines of text, can be designated to blink.

You can configure the MDS for one of three modes of operation:

- RLC Mode
- Serial Mode
- Transmit Mode

In the RLC Mode, the MDS receives and displays Messages transmitted in an RLC Mode compatible format from one or more Message Display Intelligent (MDI) units. An MDI unit assembles and transmits the Message text to the MDS for remote display. The Message text may include Current and Elapsed Timer values, as well as any data the MDI collects.

In the Serial Mode, the MDS displays any ASCII text strings it receives over its Serial Port. The ASCII text string must end with the programmed Serial Terminator. The MDS automatically scrolls any Message longer than the display width. Special control code sequences are available for accessing the blinking and scrolling features of the MDS. Other control codes are available for accessing and displaying Current and/or Elapsed Time values. You can also assign a unique unit address to an MDS unit, for applications requiring individual addressing of multiple MDS units in the Serial Mode.

The Transmit Mode requires the optional Parallel Port and allows the MDS to interface directly with other RLC products with serial communications. The MDS accepts BCD unit address and data item number over its Parallel Port. The MDS constantly gathers the selected unit and item numbers, over the Serial Port. The MDS updates its display with the information it receives from the selected RLC unit. Therefore, you can use a single MDS placed at a centralized location to retrieve and display information from multiple RLC units.

RLC supplies optional IBM® PC compatible software for configuring and programming the MDS. The MDS’s non-volatile memory retains all programmed Configuration settings when power is removed from the unit. The Message Display User software (SFMD), with its easy-to-use menus and extensive prompts and on-line Help functions, greatly assists you in fitting the MDS to the application at hand. You can easily create and save Configuration Files with the SFMD software. Extensive file handling features are included, such as uploading, downloading, and printing of files.

DIMENSIONS “In inches (mm)”

Note: Recommended minimum clearance (behind the panel) for mounting clip installation is 2.1” (53.3) H x 5.5” (140) W.
DESCRIPTION (Cont’d)

Message Simulation and Terminal Emulation functions are also provided with the software. Although the MDS has no Message storage capability of its own, you can use the STMD Message Editing function to construct the Message strings you wish to transmit to an MDS in either the RLC Mode or the Serial Mode.

The Message Simulator is available to show you the actual Message string to transmit, as well as simulate the action of the Message once the MDS receives the string. You can then test the MDS unit by transmitting the assembled string to the MDS with the Terminal Emulator.

The metal front bezel of the MDS meets NEMA 4/IP65 requirements, allowing for washdown when properly installed. Modern surface-mount technology and extensive testing make the unit extremely reliable in industrial environments. Connections are made on removable terminal blocks, simplifying installation.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

SPECIFICATIONS

1. POWER:
   AC Version:
   115/230 VAC ±10%, 50/60 Hz, 6 VA, switch selectable.
   DC Version:
   12/24 VDC ±10%, 300 mA max., jumper selectable.

2. DISPLAY: (available in various configurations)
   2x20: 0.25” (5 mm) high characters (available without Parallel Port only)
   1x10: 0.35” (9 mm) high characters (available with Parallel Port only)

Transmissive STN LCD with Red or Yellow-Green LED backlighting.

The brightness of the LED backlight is software adjustable through seventeen levels.

The viewing angle of the display may be adjusted through an on-board pot.

By connecting an external pot to the Vcontrast pin, the viewing angle can be adjusted from a remote location.

3. PARALLEL PORT: (optional, for use with Transmit Mode only)

   Data Format: 8-bit BCD

   PARALLEL PORT INPUTS:
   Data Inputs (D0 - D7) & Control Inputs (Strobe & Item/Addr):
   \( V_{IH} = 8 \text{ VDC}, V_{IL} = 4 \text{ VDC}, V_{MAX} = 30 \text{ VDC} \)
   Data SNK/SRC: Sink or Source, switch selectable.
   Control Logic Level: Positive or negative, switch selectable.
   Control Logic Level: Positive or negative, switch selectable.
   Control Logic Level: Switch selectable.

   Current Sinking: Internal 10 KΩ pull-up, \( I_{MAX} = 1.2 \text{ mA} \)
   Current Sourcing: Internal 10 KΩ pull-down, \( I_{MAX} = 3.1 \text{ mA} @ 30 \text{ VDC} \)

   Debounce Time: 0.01 to 2.5 seconds (programmable).
   Strobe Time: 3 to 255 msec (programmable).

4. SERIAL COMMUNICATIONS: 20 mA current loop, full-duplex.

   Data Format: Four types available, switch selectable.
   11 bits: 1 start bit, 8 data bits, 1 parity bit, 1 stop bit.
   10 bits: 1 start bit, 8 data bits, 1 stop bit.
   10 bits: 1 start bit, 7 data bits, 1 parity bit, 1 stop bit.
   9 bits: 1 start bit, 7 data bits, 1 stop bit.

   Data Code: ASCII
   Unit Address: Programmable from 0 to 99. (The number of units in a single loop is limited by the hardware specifications.)
   Baud Rate: 300 to 19200, switch selectable.
   Parity: Enabled or Disabled, switch selectable.
   Even/Odd: Selects Parity Type, switch selectable.
   7/8 BIT: Data Bits, switch selectable.
   Serial Hardware: Terminal TBA.

   +20mA SRC: Provides 20 mA @ 12 VDC.
   Note: Power up to 7 units in a loop.

   -20mA SRC: Loop return for +20 mA.

   SO/Output Transistor Rating: \( V_{MAX} = 30 \text{ VDC}, V_{SAT} = 1 \text{VDC} @ 20 \text{ mA} \)
   Note: Transistor rating allows for up to 28 units in a loop.

   SI/Input Diode Rating: \( VF = 1.25 \text{ VDC}, 1.5 \text{ VDC} \max @ 20 \text{ mA} \)
   Note: The compliance voltage rating of the source must be greater than the sum of the diode voltage drops around the loop. Typically a 30 VDC source (with adequate current capability) is capable of operating between 18 and 22 units in a loop.

5. OUTPUT BUSY PIN: (only accessible in the RLC and Serial Modes)

   Solid state: NPN open-collector, current sinking, \( V_{MAX} = 30 \text{ VDC}, I_{MAX} = 100 \text{mA}, V_{SAT} = 1 \text{VMAX} @ 100 \text{ mA} \)
   Busy Mode: Indicates the Ready/Busy status of the unit.
   Output Mode: Output Pin can be activated from a Command or Message for a specified time out value.
   Time Out: 10 msec to 63 mins or Latched.

6. MEMORY: Non-volatile memory retains all programmed Configuration settings when power is removed or interrupted. Customized Character sets and Day/Month names are not retained, and must be loaded on each unit power-up.

7. ENVIRONMENTAL CONDITIONS:

   Operating Temperature: 0 to 50°C
   Storage Temperature: -20 to 60°C
   Operating and Storage Humidity: 85% max. (non-condensing) from 0°C to 50°C.

   Altitude: Up to 2000 meters

8. CERTIFICATIONS AND COMPLIANCES:

   EMC EMISSIONS:
   CISPR 11 Radiated and conducted emissions

   EMC IMMUNITY:
   Meets EN 50082-2: Industrial Environment.
   ENV 5140 - Radio-frequency radiated electromagnetic field
   ENV 50141 - Radio-frequency conducted electromagnetic field
   EN 61000-4-2 - Electrostatic discharge (ESD)
   EN 61000-4-4 - Electrical fast transient/burst (EFT)
   EN 61000-4-8 - Power frequency magnetic field

   Notes:
   1. RF Conducted Immunity Power Lines:
      At 10 Vrms, from 24 to 60 MHz, random messages requested.
      a. At 10 Vrms, using a line filter (RLC# LFIL0000) on power lines, unit operated properly.
   2. EFT Immunity Power Lines:
      With a line filter (RLC# LFIL0000) unit met levels up to ±2.5 Kv.
   3. EFT Immunity I/O Lines:
      Cables routed in conduct which is grounded at both ends.
   4. ESD Immunity to Bezel:
      Metal bezel of unit connected to mounting panel with a 1/4” wide, 2” long wire braided from rear bezel screw.

Ref to the EMC Installation Guidelines section of the manual for additional information.

9. CONSTRUCTION:

   Metal front bezel meets NEMA 4/IP65 specifications for indoor use when properly installed.

Installation Category II, Pollution Degree 2. Case is black high impact plastic (panel gasket, mounting clips and screws included).

10. CONNECTIONS: Removable terminal blocks.

11. WEIGHT: 1.1 lbs (0.5 Kg).

BASIC OPERATION

The MDS must be configured for one of three modes of operation:

   RLC Mode
   Serial Mode
   Transmit Mode

The mode you select determines the function of the and the interface with the MDS. In the Transmit Mode, the MDS directly interfaces to other RLC products with serial communications, and serves as a remote display for those products.

In either the RLC Mode or the Serial Mode, the MDS displays a Message after receiving a Message string over the Serial Port, terminated by the programmable Serial Terminator. You can program the Serial Terminator for any of the characters from 01h (1) to 40h (64), excluding the BACKSPACE (08h - 8) and ESCAPE (1Bh - 27) characters, and the ASCII digit characters 30h (48) to 39h (57).

Before displaying a Message, the MDI performs the functions specified in the Message string. You can specify any combination of the following functions for a Message:

1. Display Text: The MDS displays the Message Text, which can include the Current Time and Date, and Elapsed Timer values. A special control code sequence is available for designating text for the bottom line of dual line displays. The MDS automatically character scrolls any line of text longer than the unit display width.

2. Blink and/or Scroll Message Text: Special control code sequences embedded in the Message Text control these functions.

3. Message Time Out: You can include a Time Out value for the Message. This Time Out value specifies how long the MDS should display the Message. Once the Time Out expires, the MDS automatically blanks the display.

4. Set the Current Time: The Message can set the Current Time in the MDS.

5. Configure Elapsed Timers: The Message can access one or more of the MDS’s sixteen Elapsed Timers.

6. Configure the Output Pin: The Message can access the MDS’s Output Pin function.
In order for the user to configure the MDS, the MDS must be connected to an ASCII Terminal or a computer running a terminal emulation program. RLC supplies the optional Message Display User Software (SFMD), which runs on IBM® compatible PC’s, and assists you, through its user-friendly menus, numerous prompts, and on-line Help functions, in interfacing with and programming the MDS.

The SFMD software allows you to program multiple Configuration files for an MDS unit and save them to disk. You can then download any Configuration file, as needed, from the computer’s serial port to one or more MDS units on the communications loop.

**System Requirements:**
- IBM® compatible PC-AT (286 or greater) with:
  - RS232 serial port,
  - 640 K RAM,
  - DOS 3.0 or later,
  - Monitor with MDA, CGA, EGA, or VGA graphics card.

  *Note: The SFMD software will not run on a PC-XT computer.*

**Cabling:**
- RLC Model MCCCA cable for single unit operation only,
- Or
- RLC GCM232 Serial Converter Module for setup with multiple units (RS232/20 mA Current Loop),
- Serial communications cable,
- RLC Model APS supply or equivalent (12 VDC power supply).

**Message Display User Software (SFMD):**
- Available on 3.5” floppy disks.

  *Note: Setup may only be performed via the serial port.*

**MODES OF OPERATION**

**RLC MODE**
The RLC Mode of the MDS unit provides an easy interface for remotely displaying Messages programmed in, and processed by, one or more Message Display Intelligent (MDI) units. An MDI unit assembles and transmits any Message designated for an MDS Unit in an RLC Mode compatible format.

You select a mode of operation through a DIP switch setting on units without a parallel port, or by tying the parallel port DATA lines to a specific value on units with a parallel port.

The Message string sent from the MDI specifies the address number of the MDS unit for which the transmission is intended. Only MDS unit’s with this address will process and display the Message after receiving the transmission.

When the transmitting MDI encounters a Current Time field in the Message Text, it inserts the current value of its Real Time Clock (RTC), along with the specified format of the Current Time field in the Message string. When the MDS processes the Message string, it sets its internal software clock to this transmitted value, thus “slaving” its own clock to the transmitting MDI’s RTC.

The MDI performs a similar function when encountering Elapsed Timer fields in the Message Text. In this case, the MDI inserts the current configuration and value of the designated timer, along with the specified Elapsed Time format, into the transmitted string. When the MDS processes this string, it sets its Elapsed Timers to the configurations and values specified in the Message string, thus “slaving” its own Elapsed Timers to those of the transmitting MDI.

If the Message in the MDI configures the Output Pin, this configuration information is included in the transmitted Message string. When the MDS processes the string, it configures its Output Pin to the settings contained in the Message string, thus “slaving” its own Output Pin to that of the transmitting MDI.

The MDI includes the Time Out value of the Message in the Message string, and replaces all Index and Local Embedded Data Item fields with their respective values before transmission. The MDI then terminates the assembled Message string with its own terminator, which must match that of the receiving MDS unit.

In essence, through all of the previously mentioned functions, you can use an MDS unit in the RLC mode as a “slave” display for one or more MDI units.

**SERIAL MODE**
The Serial Mode of the MDS unit provides an easy interface for displaying ASCII character strings. The MDS displays any ASCII text string it receives that is terminated with the MDS’s Serial Terminator.

You select a mode of operation through a DIP switch setting on units without a parallel port, or by tying the parallel port DATA lines to a specific value on units with a parallel port.

All of the functions and methods described for the RLC Mode are available in the Serial Mode. In order for you to access these functions, the unit transmitting the Message strings to the MDS must be capable of transmitting the lower ASCII control characters 01h (1) to 1fh (31).

A unit address function is also available in the Serial Mode. Unlike the RLC Mode, however, if a Message string is not preceded by a unit address identifier, all Serial Mode units on the loop receive and process the transmission. An address for a Message string must be provided only if the string is to be transmitted to a particular Serial MDS.

**TRANSMIT MODE (Parallel Port units only)**
In the Transmit Mode, which requires the optional Parallel Port, the MDS interfaces directly with other RLC products with serial communications. The MDS accepts the unit address and data item numbers over the Parallel Port in a BCD format, usually from a BCD thumbwheel or rotary switch. The MDS constantly gathers the data item from the designated unit, over the Serial Port.

The MDS updates its display with the information it receives from the selected RLC unit. Therefore, you can use the MDS in the Transmit Mode to interrogate multiple RLC units in remote locations from one centralized location.
SERIAL PORT
The MDS hardware includes a full duplex Serial Port implemented as an isolated, two-way 20mA current loop. Communication between devices must conform to identical Data Bit, Baud Rate, and Parity settings. A serial hardware loop-back test can easily be performed to verify proper operation of the MDS’s Serial Port.
In the Transmit Mode, the MDS uses the Serial Port to collect data from the designated RLC unit. While in this mode, the MDS cannot receive Commands or other Message Text.
In the RLC and Serial Modes, all communications with the MDS must be accomplished over the Serial Port. In either of these modes, the following operations can be performed over the Serial Port:
- Uploading and Downloading Files
- Receiving and Transmitting Message Text
- Receiving Commands and Transmitting Command Responses
- Transmitting Error Conditions

Some typical devices that you can connect to the serial port are:
- ASCII Terminals
- Programmable Logic Controllers with Serial Communications
- Host Computers
- RLC Products with Serial Communications

OUTPUT BUSY PIN (Used only in the RLC and Serial Modes)
The MDS hardware includes one NPN open-collector Output Pin which can be configured for positive or negative logic. The pin can be set to operate in one of two modes, the Busy Mode or the Output Mode.
- Busy Mode: The MDS uses the pin in the Busy Mode to acknowledge Message and Command requests. The MDS sets the Output Pin to the READY level when the unit is ready to receive Message Text and Commands. The Output Pin is set to the BUSY level when the unit is processing a newly received Message or Command.
- Output Mode: With the pin in the Output Mode, a Message or Command can change the status of any of the following Output Pin settings:
  - Lock or Unlock: The MDS only accepts changes to the pin settings while the pin is Unlocked.
  - On, Off, or Toggle: The MDS sets the Output pin to the specified state. In the case of Toggle, the MDS switches the current state, from ON to OFF, or OFF to ON.
  - Set, Halt, or Run Time Out: When the Output Time Out expires, the MDS automatically sets the pin to the OFF state. The Time Out can be Halted at any time. It can be resumed at a later time, or started from one of the following values:
    1) 10-1260 msecs
    2) 1 to 63 secs
    3) 1 to 63 mins
    4) Latched ON
    5) Unit Configuration value

PARALLEL PORT (Optional - used only in the Transmit Mode)
The MDS hardware can include an optional Parallel Port, which consists of eight DATA lines and two CRTL lines (the ITEM/ADDR line and the STROBE line). The Transmit Mode of operation uses the Parallel Port to accept Unit Addresses and Data Item numbers in 8-bit BCD format. The ITEM/ADDR line indicates whether a Unit Address (ADDR) or an Item number (ITEM) is present on the Data lines. The STROBE line signals the MDI to read the Parallel Port. The DATA and CRTL line inputs are separately DIP switch selectable for either positive or negative logic and current sinking or sourcing inputs. The Parallel Port interface protocol is straight-forward:
1) Set the DATA lines and the ITEM/ADDR line to the appropriate values.
2) Apply a STROBE pulse (programmable from 3-250 msecs).
3) Allow the Debounce time to expire (programmable from 10 to 2550 msecs) before issuing the next request.

Among the devices that you can connect to the Parallel Port are:
- Programmable Logic Controllers (PLC’s)
- BCD and Binary Thumb-wheel Switches
- Push Buttons

MESSAGES (RLC and Serial Modes only)
You can program a Message string to perform many functions. A Message can simply display text. In addition, you can choose to have the Message blink and/or scroll its text, configure one or more Elapsed Timers, access the Output Pin, and display the Current Time and/or any of the Elapsed Timer values.
Even though the MDS cannot save the Messages it receives, the Message Editing feature of the SFMD software can greatly simplify the task of assembling Messages for the MDS. The Message Editing screen is laid out in a logical, easy-to-understand order and displays all of the possible functions that a Message can perform. The software displays numerous prompts and on-line Help functions throughout the Message editing process.

MESSAGE FEATURES
- Message Time Out:
  - Immediate Time Out (0 secs)
  - 1 to 1260 msecs
  - 1 to 63 secs
  - 1 to 63 mins
  - No time out
- Elapsed Timers:
  - Can access up to 16 timers
- Message Text:
  - Characters:
    - Standard: 20h to 7Fh
    - European and Special: 80h to B8h
  - All Characters Customizable
  - ASCII Control Codes
  - Current Time and Date
  - Elapsed Timer Values
  - Scrolling Text
  - Blinking Text

MESSAGE TEXT
A Message string can contain up to 127 characters in Serial Mode, and 122 characters in RLC Mode. In addition to any of the characters in the MDS’s character set, you can also include the Current Time and Date and/or Elapsed Timer values through the inclusion of special control code sequences. The text can also include lower ASCII control codes, such as CR and LF, although the MDS does not display them.
You can select among several different scrolling techniques for each line of text by specifying certain control code sequences. The MDS can display text statically, scroll the text horizontally across the screen, or you can break the text into blocks, which the MDS displays one after another. In the Serial Mode, the MDS automatically character scrolls any Message with a line of text longer than the unit display width. You can also designate individual characters, blocks, and whole lines of text for blinking.
Each of the previously mentioned control code sequences consists of two characters, the ‘^’ (5Eh - 94) character immediately followed by a specific ASCII punctuation character in the range from 20h (32) to 2Fh (47). If your application does not require any of the special functions previously mentioned, the control code sequences need not be entered.

DISPLAYABLE CHARACTER SET
The MDS can display 153 different characters. The standard ASCII character set, from 20h (32) to 7Fh (127), comprises the first 96 characters. The remainder of the character set, from 80h (128) to B8h (184), includes many European and special characters. The SFMD software allows the user to customize all 153 characters.
The MDS does not contain enough non-volatile memory to permanently store a customized character set. Therefore, if your application requires custom characters, the custom character file must be downloaded to the MDS after every unit power-up. If you are using the MDS in an application with an MDI, you can program the MDI to automatically perform this function for you.
CURRENT DATE AND TIME

The MDS contains an internal software clock. This clock keeps the Time and Date only when power is applied to the unit. Whenever power is removed, the Current Time and Date are lost, and must be reloaded after the next power-up. Even though the MDS stores the Current Date, it does not contain a calendar function and cannot update the date when the Current Time rolls-over to midnight. If you are using the MDS in an application with an MDI, you can program the MDI to automatically update the Current Time and Date on a periodic basis, as well as on every unit power-up.

You can insert the Current Time and/or Date in the Message Text in any desired format through the use of specific control code sequences and format characters.

Date Formats:
- Day of the Week: Full (e.g., MONDAY) or Abbreviated (e.g., MON).
- Day of the Month: Numeric (e.g., 1-31).
- Month: Full (e.g., JANUARY), Abbreviated (e.g., Jan), or Numeric (e.g., 1 = January).
- Year: Full (e.g., 1993) or Abbreviated (e.g., 93).

Time Formats:
- 12 Hour Clock: In Hours, Minutes, Seconds, Tents and/or Hundredths of seconds. The AM or PM designator may be included (e.g., 4:30 PM).
- 24 Hour Clock: In Hours, Minutes, Seconds, Tens and/or Hundredths of seconds (e.g., 16:30).

Field Separators: Any character NOT used in the Date and Time fields can be used to separate the fields (e.g., “~”/“\”).

Format examples: Monday, April 26, 1993 4:30 PM
26-Apr-93 16:30:7
4:30 PM
16:30:75

MESSAGE SCROLLING AND BLINKING

You can designate individual lines of text for various forms of scrolling. A Message programmed for a 2x20 unit can specify separate scrolling methods for each line of the Display. The Message designates whether to scroll the text for a line, while the appropriate Configuration setting determines the rate at which the MDS scrolls the text. The user can specify separate blink and scroll rates for the top and bottom lines of a 2x20 unit.

Character Scrolling: A line of text designated for Character scrolling repeatedly moves across the Display from right to left at the rate specified by the respective Configuration setting (e.g., 1 to 1270 msecs). The Direction of Character Scroll is determined on the top line and by that line’s Character Scroll setting. You designate individual characters and/or blocks of text for Character Scroll by inserting control codes at the desired locations in the Message Text.

Block Scrolling: A line of text designated for Block scrolling repeatedly moves across the Display from right to left at the rate specified by the respective Configuration setting (e.g., 1 to 1270 msecs). The Direction of Block Scroll is determined on the top line and by that line’s Block Scroll setting. You designate individual blocks by inserting control codes at the desired locations in the Message Text.

Blinking: Characters designated for Blinking in a line blink at the rate specified by that line’s Blink setting. You designate individual characters and/or blocks of text for Blinking by inserting control codes at the desired locations in the Message Text.

DISPLAYING MESSAGES

The MDS can display only one Message at a time. The most recently received Message is always placed on the display, replacing any Message that may currently have been displayed. You can provide an optional Time Out value for a Message. A Message’s Time Out value specifies how long the MDS should display the Message. The MDS automatically cancels a Message and blanks the display once the Message’s remaining display time reaches zero. A Message not designated to Time Out remains on the display until the MDS receives another Message, or until the Message is explicitly cancelled with a Command.

ELAPSED TIMERS

The MDS has sixteen independent Elapsed Timers. Elapsed Timers only run while power is applied to the unit and on every unit power-up the MDS halts and clears them. The Elapsed Timer functions can be accessed through both Messages and Commands. One of the functions the MDS performs when processing a Message string is to configure the appropriate Elapsed Timers to the specifications in the Message. You can also issue Commands to access any of the Elapsed Timer functions.

You can display the value of an Elapsed Timer in any desired format. The following features are available for the Elapsed Timers:

- **Timer Status**: Each Timer can independently run (ON) or be halted (OFF).
- **Timer Direction**: Each Timer can run Up or Down. The direction of the Timer can be changed without stopping or resetting the Timer.
- **Timer Value**: The Timer can be set to any value within the range from 0000:00:00:00 to 9999:59:59:99.
- **Timer Overflow/Underflow**: The Timer value rolls-over on Overflow or Underflow. A user resettable flag indicates the event.

COMMANDS (RLC and Serial Modes only)

A full set of Commands is available to the user for both configuring and interrogating the MDS. Commands are available for changing the configuration of the MDS on-line. Commands can also cause the MDS to transmit any of its current configuration settings in an easily readable mnemonic form. Commands are provided for setting the internal software clock’s Time and Date, for configuring and interrogating the Elapsed Timers and the Output Pin, and for causing the MDS to transmit the text of the Message on its Display over the serial port.

You can issue any of the Commands to the MDS “on-line” over the serial port. Thus, you can configure the MDS to the changing requirements and demands of your system.

CONFIGURATION SETTINGS

The various Configuration settings of the MDS determine the method in which the unit processes and displays Messages. These Configuration settings include the Function settings for the unit, it’s communications parameters for the Serial Port and the Parallel Port, and the Output/Busy pin and Display settings.

The Configuration settings can be programmed in the Configuration menu of the Message Display User Software (SFMD). A programmed Configuration file can be downloaded to one or more MDS’s over the serial port. It is also possible to change individual Configuration settings in an MDS through the use of Commands. You can issue Commands to the MDS in the Terminal Emulator function of the SFMD software, as well as through other terminal emulation software, or any ASCII terminal.

**Configuration Settings**

<table>
<thead>
<tr>
<th>Unit Address</th>
<th>Output/Busy Pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 99</td>
<td>Output mode</td>
</tr>
<tr>
<td></td>
<td>Busy mode</td>
</tr>
<tr>
<td></td>
<td>Disabled</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Error Handling</th>
<th>Logic Level</th>
<th>Time Out Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td>Positive</td>
<td>10 to 1260 msecs</td>
</tr>
<tr>
<td>Transmit</td>
<td>Negative</td>
<td>1 to 63 secs</td>
</tr>
<tr>
<td>Display &amp; Transmit</td>
<td>Latched On</td>
<td>1 to 63 mins</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parallel Port</th>
<th>Display Settings</th>
<th>Backlight Intensity</th>
<th>Blink Time</th>
<th>Character Scroll Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Transmit Mode only)</td>
<td></td>
<td></td>
<td>Top line: 10 to 1270 msecs</td>
<td>Top line: 10 to 1270 msecs</td>
</tr>
<tr>
<td>Data Type:</td>
<td></td>
<td></td>
<td>Bottom line: 10 to 1270 msecs</td>
<td>Bottom line: 10 to 1270 msecs</td>
</tr>
<tr>
<td>BCD - 8 bits</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Debounce Time</th>
<th>Serial Port</th>
<th>Sample Time</th>
<th>Serial Port</th>
<th>Serial Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 to 2550 msecs</td>
<td>Transmit Delay:</td>
<td>3 to 255 msecs</td>
<td>10 to 2550 msecs</td>
<td>10 to 2550 msecs</td>
</tr>
<tr>
<td>1 to 63 secs</td>
<td>10 to 2550 msecs</td>
<td>10 to 2550 msecs</td>
<td>10 to 2550 msecs</td>
<td>10 to 2550 msecs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Termination:</th>
<th>Embedded Data Time Out:</th>
<th>Time Out Value:</th>
<th>Character Scroll Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-7, 9-26, 28-47, 58-64 decimal</td>
<td>(Transmit Mode only)</td>
<td>Immediate</td>
<td>Top line: 10 to 1270 msecs</td>
</tr>
<tr>
<td>On or Off</td>
<td></td>
<td>0 to 254 secs</td>
<td>Bottom line: 10 to 1270 msecs</td>
</tr>
</tbody>
</table>

Serial Port: 0 to 99; Parallel Port: 0 to 99; Serial Port: 0 to 99; Parallel Port: 0 to 99.
SELF-TEST FEATURES

With the appropriate DIP-switch settings applied at unit Power-Up, you can have the MDS perform any of the following functions:

- Display the Hardware Configuration Setup
- Display the Configuration Parameter Settings
- Display the Parallel Port Configuration and Pin Values
- Perform a Serial Loop-Back Test
- Perform a Memory Self Test
- Set the RLC Mode (Units without Parallel Port only)
- Set the SRL Mode (Units without Parallel Port only)
- Restore the Default Factory Settings

APPLICATIONS

TRANSMIT MODE APPLICATION

The customer has a process that is temperature sensitive and needs to monitor temperatures at various stages in the process from a single location. One or more RLC IMT (Intelligent Meter - Temperature) units have been installed at the necessary locations in the processing equipment. An MDS unit, configured for the Transmit Mode, is installed in the centralized processing control panel. The MDS transmits to and receives data from the IMT’s.

With an 8-bit (2 digit) BCD thumbwheel switch and pushbutton connected to the MDS’s parallel port, the operator inputs the address of the desired unit by dialing in the address and pushing the button. The MDS interrogates the selected IMT and retrieves and displays the latest temperature reading.

RLC MODE APPLICATION

A manufacturing process is split between two buildings. Building #1 contains the test lab, and building #2 contains the actual process mixing equipment. When the lab has completed an analysis of the current mix, any formula changes must be transmitted to the mixing department. An intercom system was originally installed between the two buildings, but the mixing room is very noisy, and the formulae received over the intercom were frequently misinterpreted, or not heard at all. A more reliable method of communication needs to be established.

RLC proposes installing a Message Display Slave (MDS) unit configured for the RLC Mode of operation at each mixer. In the RLC Mode, an MDS unit receives and displays messages from one or more Message Display Intelligent (MDI) units. In this system, each MDS is assigned a unique address and connected to an MDI unit located in the lab, which is attached to the lab PC via a serial port. The lab technician calls up the appropriate message number on the MDI, which then asks the technician to supply the appropriate values for the revised mix from the PC’s keyboard. The MDI inserts these values into the formula contained in the message and then transmits the completed message over the serial port to the MDS unit located at the appropriate mixer.

SERIAL MODE APPLICATION

Presently, the customer uses a software package to control the many processes throughout a manufacturing plant. The software performs data acquisition and logging, and makes decisions based on the collected information. Information on current plant conditions is transmitted to various printers located around the plant. Plant operators review the information on the printers and take whatever action is appropriate for the given condition(s).

However, the customer is concerned with the upkeep and maintenance of the printers, the cost of the paper and ribbons, and the downtime due to mechanical failures. RLC addressed these concerns by replacing the printers with Message Display Slave (MDS) units configured for the Serial (SRL) Mode of operation. An MDS in the SRL Mode displays any ASCII character string it receives which is terminated with the programmed Serial TERMINATOR character. The programmability of the TERMINATOR is essential when the MDS is interfaced with a third party software package, especially if the software cannot be programmed to transmit a specific termination character.

In addition, with unique unit addresses assigned to the MDS units, the host software can then transmit information to specific unit(s). It is also possible to override the unit address and programmed TERMINATOR functions so that the same information can be transmitted to all MDS units in a system, regardless of their respective address and TERMINATOR settings.

With a wide variety of baud rate, parity, and data bit selections, the many display types, and several power supply options, the MDS unit is an ideal choice for replacing printers and other more cumbersome methods of providing plant wide system information.

ORDERING INFORMATION MDS

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PARALLEL PORT</th>
<th>12/24 VDC</th>
<th>115/230 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1x10 Red, Negative Image</td>
<td>YES</td>
<td>MDS1R01D</td>
<td>MDS1R01A</td>
<td></td>
</tr>
<tr>
<td>1x10 Yel/Grn, Negative Image</td>
<td>YES</td>
<td>MDS1Y01D</td>
<td>MDS1Y01A</td>
<td></td>
</tr>
<tr>
<td>2x20 Red, Negative Image</td>
<td>NO</td>
<td>MDS2R00D</td>
<td>MDS2R00A</td>
<td></td>
</tr>
<tr>
<td>2x20 Yel/Grn, Negative Image</td>
<td>NO</td>
<td>MDS2Y00D</td>
<td>MDS2Y00A</td>
<td></td>
</tr>
</tbody>
</table>

ORDERING INFORMATION FOR MESSAGE DISPLAY ACCESSORIES

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF00D</td>
<td>Apollo Message Display User Software (3 1/2&quot;,1.44M)</td>
<td>SF00D</td>
</tr>
<tr>
<td>MCCB</td>
<td>AC Communications Adapter</td>
<td>MCCB0000</td>
</tr>
<tr>
<td>GCM232</td>
<td>Serial Converter Module RS-232</td>
<td>GCM23201</td>
</tr>
</tbody>
</table>

Note: Only one copy of SFMD software is required for multiple units.
**DLC & IAMS/ITMS CABLES**

**MODEL CBPRO - PROGRAMMING AND INTERFACE CABLE**

**DESCRIPTION**

The CBPRO007 Programming Interface Cable is a port-powered device that can be used to
download or interface with Red Lion Controls products that have an RS485 RJ-11 port. The
cable converts the RS-232 TD and RD lines to balanced half-duplex RS-485 signals which
can transmit up to 4,000 feet at 19,200 baud. It is powered from the RS-232 data and
handshake lines whether the lines are high or low. An external 12 V power supply
can be connected to two terminals on the connector if handshake lines are
not available.

The CBPRO has a DB-9 female connector on the
RS-232 side for connection to a PC COM port.
The RS485 side, has a terminal block where
the 7' long RJ11 cable is connected.

**SPECIFICATIONS**

1. **POWER REQUIREMENTS**: Port powered *
   * An external 12 VDC (unit draw @ 35 mA max.) can be applied if RS-232
   output handshake lines are not available.
   Note: When using an external supply, the supply should be connected only to
   specifically labeled terminal block power inputs. Connecting an external
   supply to the handshake lines may damage the unit.
2. **BAUD RATE**: 19200 Baud max.
3. **RS-232 SIDE**: Connector: DB-9 female
4. **RS485 SIDE**: Connector: terminal block

<table>
<thead>
<tr>
<th>SIGNAL</th>
<th>PIN</th>
<th>JUMPERED</th>
</tr>
</thead>
<tbody>
<tr>
<td>TD</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>RD</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GND</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>RTS</td>
<td>7</td>
<td>to pin 8</td>
</tr>
<tr>
<td>CTS</td>
<td>8</td>
<td>to pin 7</td>
</tr>
<tr>
<td>DTR</td>
<td>4</td>
<td>to pin 6, 1</td>
</tr>
<tr>
<td>DSR</td>
<td>6</td>
<td>to pin 4, 1</td>
</tr>
<tr>
<td>CD</td>
<td>1</td>
<td>to pin 4, 6</td>
</tr>
</tbody>
</table>

4. **RS485 SIDE**:
   Connector: terminal block

<table>
<thead>
<tr>
<th>TERMINAL</th>
<th>RJ11 CABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TD(A)</td>
<td>Green</td>
</tr>
<tr>
<td>TD(B)</td>
<td>Yellow</td>
</tr>
<tr>
<td>GND</td>
<td>Red</td>
</tr>
<tr>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>+12V</td>
<td></td>
</tr>
</tbody>
</table>

* External 12 VDC supply optional.
5. **CERTIFICATIONS AND COMPLIANCE**:
   Immunity to EN 50082-1 Residential, Commercial and Light Industry
   (IEC 801-2, IEC 801-3, IEC 801-4)
   Emissions to EN 50081-1 Residential, Commercial and Light Industry
   (EN 55022)
6. **CONVERTER DIMENSIONS**: L = 3.50” (88.9 mm) x W = 1.34” (34 mm)
   x H = 0.67” (17 mm)
7. **CABLE LENGTH**: 7 feet (2.13 meters)

**PARADIGM TO RS485 RJ-11 INTERFACE CABLE**

**DESCRIPTION**

The Paradigm to RJ-11 Interface Cable allows the Paradigm operator
interfaces to be easily connected to any Red Lion Controls DIN rail module with
an RS485 RJ-11 port. Both ends of this 7-foot cable are pre-wired to provide
a reliable RS485 connection.

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBPRO</td>
<td>Programming Interface Cable</td>
<td>CBPRO007</td>
</tr>
<tr>
<td></td>
<td>Paradigm to RJ-11 Interface Cable</td>
<td>P893805Z</td>
</tr>
</tbody>
</table>