### Distributed DA&C Systems ADAM-5000 Series

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Open Network And Fieldbus Solutions for Device Networking

Introduction

The Fieldbus concept will change the control environment and device characteristics of future control systems in both processing and manufacturing. Compared with traditional systems, the Fieldbus system reduces cost of cabling, commissioning, and installation. In addition, the Fieldbus system has greater reliability.

The ADAM-5000 series, a compact distributed data acquisition and control system, supports the shift toward Fieldbus-based systems. Based on popular Fieldbus data communication structures such as RS-485 and Modbus, the ADAM-5000 series now offers two different DA&C systems that allow field I/O devices to easily connect to PC network applications: the ADAM-5000 DA&C systems and the ADAM-5510 series of PC-based programmable stand-alone controllers.

ADAM-5000 Series - Distributed I/O System

Ethernet-based Data Acquisition and Control System

With the ADAM-5000/TCP as your Ethernet I/O data processing center, you can monitor and control field signals at a speed of 10/100 Mbps. The best field-proven communication performance that can be reached in industrial network environments. Additionally, the popular Modbus/TCP protocol is supported as well.

RS-485 based Data Acquisition and Control System

The ADAM-5000/485 system is a data acquisition and control system that can acquire, monitor and control data through multi-channel I/O modules. It communicates with a network master over a twisted-pair, multi-drop RS-485 network. Both ADAM ASCII and Modbus/RTU protocols are supported.

ADAM-5510 Series - PC-based Programmable Controller

Ethernet-Enabled Programmable Controller

The ADAM-5510 series of PC-based programmable controllers includes ADAM-5510M, ADAM-5510E, ADAM-5510/TCP and ADAM-5510E/TCP. They feature Intel x86-based CPUs running Datalight ROM-DOS. Users can use Borland C 3.0 to develop the application program and then download it by Windows-based ADAM-5510 series utility. The Ethernet-enabled feature of ADAM-5510/TCP and ADAM-5510E/TCP enables features like: FTP server, web server, TCP/UDP connections and email alarm. The ADAM-5510 controllers also have high expansion capability by supporting Modbus/RTU master/slave and Modbus/TCP client/server functions.

The ADAM-5510KW series of PC-based SoftLogic controllers includes ADAM-5510KW, ADAM-5510EKW and ADAM-5510EKW/TP. They feature the same hardware specifications as the ADAM-5510 series and is designed for PLC users who are familiar with PLC programming languages such as the Ladder Diagram. The stable built-in runtime engine - KW ProConOS and powerful programming tool - KW MULTIPROG makes the ADAM-5510KW series the best choice for PC-based SoftLogic controllers. MULTIPROG makes it possible to develop applications by IEC-61131-3 programming languages, i.e., LD, FB, SFC, ST and IL. The powerful debugging tool of MULTIPROG can effectively shorten the development time. The ADAM-5510KW series also has high expansion.
Maximum System Design Flexibility

The ADAM-5000’s modular design allows users to tailor solutions based on their own requirements. Built-in programmable I/O ranges and alarm outputs enhance flexibility in system design. A variety of communication media such as twisted-pair wiring, radio modems and fiber optics are supported.

System Maintenance and Troubleshooting

The ADAM-5000 series uses hardware self-test and software diagnosis to monitor system problems. Also included is a watchdog timer that monitors the microprocessor. If the system crashes, the watchdog automatically restarts the system. Node ID setting is easily accomplished by setting a DIP switch on the front of the system.

Easy Installation and Networking

The ADAM-5000 series can be easily mounted on a DIN-rail or on a panel. Signal connections, network modifications and maintenance are simple and quick. Building a multi-drop network only requires a single twisted pair of wires.

Proven for Industrial Environments

The ADAM-5000 series can operate in industrial environments at temperatures between -10°C and 70°C, and can use unregulated power sources between 10 and 30 VDC. These units are protected against accidental power supply reversals. A 3-way isolation design (I/O, power & communication) prevents ground loops and reduces the effect of electrical noise in the system.

Extensive Software Support

The ADAM-5000 series is supported by most standard process controls and HMI software. .NET Class LIB is provided for use with Windows applications. OPC drivers provide links to a wide range of HMI/SCADA software packages such as InTouch®, FIX and ICONICS®. Advantech data acquisition software and Advantech Studio SCADA/HMI software are both tightly integrated with the ADAM-5000 systems.

Simple & Low Cost Network Diagram
Data Acquisition and Control
The ADAM-5000 series is designed to acquire data, monitor and control processes through multi-channel I/O modules. Each system consists of two modular components: the system kernel (main unit) and the I/O modules. Each system is capable of handling up to 4 I/O modules (up to 64 I/O points). The ADAM-5000/TCP and the ADAM-5000E are capable of handling up to 8 I/O modules (up to 128 I/O points). Depending on the layout and the number of I/O points required, you can configure an optimum system to suit your applications.

Remote Configuration
The ADAM-5000 series analog input modules can be configured to accept several ranges of voltage input, current input, thermocouple input or RTD input. Counter/frequency modules can also be configured to up/down, bi-direction and frequency modes. With the exception of the system node address, all the parameters (including speed, HI/LO alarm and calibration) can be set remotely. ADAM’s flexible design will free you from the burden of making physical adjustments and overseeing a multitude of fixed-range input modules. By storing the configuration in a nonvolatile EEPROM, the system is able to retain set parameters even in the event of a power failure.

Faster Communication Speeds
The system kernel in the ADAM-5000 series integrates a 16-bit microprocessor and FIFO circuitry to dramatically accelerate communication speeds. At 115.2 kbps, it is much faster than conventional RS-485 networks. The ADAM-5000 supports 10/100 Mbps, a communication standard on the Ethernet networks.

Configurable I/O Range
With the ADAM-5000 series, each analog input/output module can be easily configured for different types and ranges to support versatile applications using the same utility software. This great flexibility reduces the number of spare parts required for analog input/output modules and therefore saves costs.

Powerful System Kernel
The ADAM-5000 system kernels (or main units) include a CPU card, a power regulator, a 4 or 8-slot I/O expansion base and communication ports. The system kernel with plug-in modules handles all software functions between the field devices and the host computer, including signal conditioning, data conversion, calibration, alarm monitoring, internal diagnosis, and communications. A system based on the ADAM-5000 is upgradable by simply changing the system kernel without changing existing modules.

3-Way Isolation
Electric noise and transients can enter your system through an I/O module, the power supply connection, or a communication connection. The ADAM-5000 series has been designed to effectively prevent noise from all possible sources with:

- 3,000 VDC isolation for ADAM-5000 I/O modules
- Isolation for input signals on communication ports
- Isolation for the communication port’s power supply

This 3-way isolation design prevents ground loops and reduces the risk of electric noise affecting your system. Some systems are also equipped with transient protection for the system power supply and communication ports. In addition to power reversal and overvoltage protection.

System Watchdog Timer
A watchdog timer monitors the microprocessor and automatically resets the system if it hangs after 1.7 seconds. This feature reduces overall maintenance work.

Built-in Diagnosis
The ADAM-5000 system provides two kinds of diagnoses: a hardware self-test and a software diagnosis. These help users detect and identify various types of system or I/O module failures.
General System Features and Software Support

ADAM OPC Server

OPC is a standardized interface for industrial device servers. An OPC server enables devices, such as ADAM and other I/O devices, to communicate with a wide range of HMI/SCADA software packages residing on a server. Advantech offers ADAM, Modbus, and Modbus/TCP OPC Servers, conforming to OPC standards, and provides immediate compatibility between Advantech ADAM systems and a very wide range of application software systems. Any software system with OPC client capabilities can access the Advantech OPC server. Advantech OPC server is available for many Advantech devices, including the ADAM-4000 and ADAM-5000 series modules.

Modbus/RTU and Modbus/TCP Drivers

ADAM-5510/TCP and ADAM-5510E/TCP support Modbus/RTU and Modbus/TCP drivers to link with on-the-shelf, popular HMI/SCADA software, such as Wonderware InTouch®, Intellution® iFIX® and Citect. You also can easily find ADAM-5000 and ADAM-4000 drivers in these software's drivers listing.

ADAMView Data Acquisition Software

ADAMView is an easy-to-use, flexible human machine interface software package designed for the Microsoft Windows environment. ADAMView provides an intuitive, object-oriented graphical user interface (GUI) that simplifies control strategy and display setups. Simply select the icon blocks from the toolbox, connect them, and draw the dynamic display without any programming. A library of function block icons representing industry's standard data acquisition, control, mathematical, and display functions is at the user's fingertips. In addition, ADAMView features Script Designer (a BasicScript engine), Data Center, Task Designer, Display Designer and OPC server. These provide a flexible industrial monitoring and control development environment especially for ADAM I/O series.

ADAM.NET Class Library

ADAM.NET Class Library is designed for ADAM-4000, ADAM-5000, and ADAM-6000 series modules. The supported operating systems include Windows 98/XP/2000, Windows CE, and Windows Mobile. Therefore, it can be used on various platforms including IPC and PDA. The example programs are ready for C# and VB.NET. If graphic controls are needed in the application, there is also an advanced version of ADAM.NET Class Library which is bundled with 8 graphic controls.
## Introduction
The ADAM-5000/485 and ADAM-5000E systems use the EIA RS-485 communication protocol. This is the industry’s most widely used, balanced, bidirectional transmission line standard. RS-485 was specifically developed for industrial applications to transmit and receive data at high rates over long distances.

## Specifications

### Control System
- **CPU**: 16-bit 80188 microprocessor
- **I/O Slots**: ADAM-5000/485: 4, ADAM-5000E: 8
- **LED Indicators**: Power, CPU, communications
- **Watchdog Timer**: 1.6 sec. (System)

### Communications
- **Command Format**: ASCII command/response protocol, Modbus/RTU
- **Communication Distance**: RS-485: 1.2 km (4000 feet)
- **Data Format**: Asynchronous, 1 start bit, 8 data bits, 1 stop bit, no parity
- **Network Protocols**: Programming link: RS-232 (3-wire: TX, RX, GND), Communication: RS-485 (2-wire)
- **Reliability Check**: Communication error checking with checksum
- **Max. Nodes**: 256 (in RS-485 daisy-chain network)
- **Speeds (kbps)**: 1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 57.6, and 115.2

### Power
- **Power Consumption**: 1.0 W (ADAM-5000/485) (not including I/O modules)
- **Power Input**: 4.0 W (ADAM-5000E) (not including I/O modules)
- **Power**: Unregulated 10 – 30 Vdc

### Software
- **Driver Support**: Windows DLL, OPC server, Wonderware® InTouch®, Intellution®, IFIX®, Citect.

### Protection
- **Communication Line Isolation**: 2500 Vdc (ADAM-5000/485)
- **Communication Power Isolation**: 3000 Vdc (ADAM-5000E)
- **I/O Module Isolation**: 3000 Vdc
- **Transient Protection**: RS-485 communication lines, power input
- **Power Reversal Protection**: Yes

### General
- **Certifications**: CE, FM
- **Connectors**: 1 x DB9-M/DB9-F/screw terminal for RS-485 (communication)
- **Dimensions (WxHxD)**: 4-slot: 231 x 110 x 75 mm, 8-slot: 355 x 110 x 75 mm
- **Enclosure**: ABS+PC
- **Mounting**: DIN 35 rail, wall, rack (with mounting kit)

### Environment
- **Humidity**: 5 – 95%, non-condensing
- **Operating Temperature**: -10 – 70° C (14 – 158° F)
- **Storing Temperature**: -25 – 85° C (-13 – 185° F)

### Ordering Information
- **ADAM-5000/485**: Distributed D&C System Based on RS-485 (4 slot)
- **ADAM-5000E**: Distributed D&C System Based on RS-485 (8 slot)
- **PCLS-OPC/ADM**: OPC Server for ADAM-4000/5000 Series (RS-485)
- **PCLS-OCX**: ActiveX Control for Data Acquisition and Control
- **PCLS-ADAMVIEW32**: ADAMView Data Acquisition Software
Feature Details

Two-wire Communication
ADAM-5000/485 and ADAM-5000E systems use a single twisted pair of wires to transmit and receive data. Special circuitry ensures reliable communications and suppresses line noise on communication lines. This reduces overall network cost by simplifying installation and minimizing the number of cables, connectors, communication repeaters and filters required.

Transient Protection
High-speed transient suppressors protect the system from dangerous voltage surges or power spikes from both the power supply input and the communication ports.

Network Expansion
By using the ADAM-4510 repeater to amplify or boost existing signals, your networks can be stretched beyond 1.2 km.

Each ADAM-4510 repeater enables you to add up to 32 ADAM-5000 units to your network, extending the network by another 4000 feet (1.2 km). Up to 256 ADAM-5000/485, ADAM-5000E units can be connected to a single RS-485 network.

RS-232 to RS-485 Conversion
RS-232 serial ports are standard with most industrial computer systems. Though widely accepted, RS-232 has limited transmission speed, range and networking capabilities. The RS-485 standard overcomes these limitations by using differential voltage lines for data and control signals.

ADAM-4520 is an isolated converter that lets you take advantage of RS-485 on an RS-232 system by converting RS-232 signals to RS-485 signals. Software written for half-duplex RS-232 may also be used without modification. ADAM-4520 helps you build an industrial grade, long distance communication system with standard PC hardware.

Intelligent RS-485 Data Flow Control
The RS-485 communication protocol will support half-duplex communication. Only two wires are needed for transmitting and receiving data. Handshaking signals such as RTS (Request to Send) normally control the direction of the data flow. A special I/O circuit in the ADAM-4510 and ADAM-4520 modules sense the data flow direction and automatically switches the transmission direction, making handshaking signals unnecessary. This makes the RS-485 bus control completely transparent to the user.

Built-in RS-232 Communication
The RS-232 port is used to connect to a host PC for programming, control and monitoring of applications. This aids troubleshooting, and allows a PC to be linked with all the I/O points of the I/O modules.

ASCII-based Protocol and Modbus/RTU Protocol
ADAM-5000 commands are in ASCII format. ADAM applications can be written in any high-level language that supports ASCII string functions, such as C, Pascal or BASIC. ASCII support means you can use virtually any computer to manage your ADAM network.

Furthermore, the Modbus/RTU protocol is supported for connecting to 3rd party controllers.
ADAM-5000/TCP

Distributed DA&C System Based on Ethernet

Features
- ARM 32-bit RISC CPU
- 10/100Base-T auto-negotiation high-speed communication port
- Supports Modbus/TCP for easy integration
- Supports UDP event handling function
- Up to 100 m communication distance w/o repeater
- Allows remote configuration via Ethernet
- Allows concurrent access for 8 host PCs
- 8 I/O slots for up to 128 points data monitoring and control.
- 1500 VDC isolation for Ethernet communication
- Built-in watchdog timer for system auto-reset.
- Windows utility
  - I/O modules configuration and calibration
  - Network auto searching
  - Data stream setting
  - Current status monitoring and alarm trigger
- Provides ActiveX drivers to develop applications

Introduction
ADAM-5000/TCP is an Ethernet-based I/O system. Without a repeater, ADAM-5000/TCP can cover a communication distance up to 100 m. This allows remote configuration via Ethernet and eight PCs can simultaneously access the data. The ADAM-5000/TCP is a solution for easy configuration and efficient management. An ideal and cost-effective solution for eAutomation architecture.

Specifications

Control System
- CPU: 32-bit ARM RISC
- I/O Slots: 8
- Memory: Flash ROM: 512 KB, RAM: 4 MB
- Operating System: Real-time OS
- LED Indicators: Power (3.3 V, 5 V), CPU Communication (Link, Active, 10/100 Mbps, Tx, Rx), Battery

Communications (Ethernet)
- Comm. Distance: 100 meters w/o repeater
- Comm. Protocol: Modbus/TCP, TCP, UDP, IP, ARP
- Data Transfer Rate: Up to 100 Mbps
- Event Response Time: < 5 ms
- Interface: 1 x 10/100Base-T (RJ-45)
- Wiring: UTP, category 5 or greater

Communications (Serial)
- Comm. Distance: RS-485: 1.2 km (4000 feet), RS-232: 15 m
- Comm. Protocol: Modbus/RTU
- Data Transfer Rate: Up to 115.2 kbps
- Interface: 1 x DB9-M for RS-485, 1 x DB9-F for RS-485, 1 x DB9-F for RS-232
- Max. Nodes: 32 (in RS-485 daisy-chain network)

Power
- Power Consumption: 5.0 W (not including I/O modules)
- Power Input: Unregulated 10 – 30 VDC

Software
- ActiveX Driver
- Windows Utility: Network setting, I/O configuration & calibration, data stream, alarm setting
- Modbus/TCP OPC Server

Protection
- Communication Line Isolation: 3000 VDC
- I/O Module Isolation: 3000 VDC
- LAN Communication: 1500 VDC
- Overvoltage Protection: Yes
- Power Reversal Protection: Yes

General
- Certifications: CE, FCC class A
- Connectors:
  - 1 x DB9-M/DB9-F/screw terminal for RS-485 (communication)
  - 1 x DB9-F for RS-232 (internal use)
  - 1 x Screw-terminal for power input
  - 1 x RJ-45 for LAN
- Dimensions (WxHxD): 355 x 110 x 75 mm
- Enclosure: ABS+PC
- Mounting: DIN 35 rail, wall

Environment
- Humidity: 5 – 95%, non-condensing
- Operating Temperature: -10 – 70°C (-14 – 158°F)
- Storage Temperature: -25 – 85°C (-13 – 185°F)

Ordering Information
- ADAM-5000/TCP: Distributed DA&C System Based on Ethernet (8 slot)
- PCLS-ADAMVIEW32: ADAMView Data Acquisition Software
Feature Details

Communication Network

With a 32-bit RISC CPU, ADAM-5000/TCP greatly enhances data processing performance and ability, especially in network communication. There is a standard RJ-45 modular jack Ethernet port on the ADAM-5000/TCP’s CPU board, and the field I/O modules are able to link to an Ethernet network directly without any other converter or data gateway. The communication speed can be auto-switched between 10 Mbps and 100 Mbps data transfer rates, depending on the network environment. In addition, ADAM-5000/TCP can be used as an Ethernet data gateway. It provides an RS-485 interface to integrate serial devices supporting the Modbus/RTU protocol.

Modbus/TCP Protocol

Modbus/TCP is one of the most popular standards used for industrial Ethernet networks. Using this communication protocol, ADAM-5000/TCP is easy to integrate with any HMI software packages or user-developed applications which support Modbus. Users do not have to prepare a specific driver for the ADAM-5000/TCP when they install the DA&C system with their own operating application. It reduces required engineering efforts. Moreover, the ADAM-5000/TCP works as a Modbus data server as well. It allows eight PCs or tasks to access its current data simultaneously, no matter if they connect from LAN, an intranet, or the Internet.

Hardware Capacity & Diagnostics

ADAM-5000/TCP is designed with high I/O capacity and supports all types of ADAM-5000 I/O modules. Providing 8 slots for any mixed modules, this DA&C system handles up to 128 I/O points (only four ADAM-5024s allowed). Different from other main units, the ADAM-5000/TCP has not only higher I/O capacity, but also smarter diagnostics ability. There are eight indicators on the front case of the CPU module. Users can read the system status clearly, which includes power, CPU, Ethernet link, communication active, communication rate, etc. In addition, there are also Tx and Rx LEDs on the Ethernet port, indicating data sending and receiving.

Event Handling & Data Streaming

Though TCP/IP is the standard communication protocol for Ethernet, data transmission management is still a bottleneck when many clients are on the network at the same time. Therefore, the ADAM-5000/TCP also supports the UDP protocol to deal with regular data stream broadcasting and event/alarm triggering. These functions will upgrade your system with intelligence and performance.

Isolated Communication

High speed transient suppressors isolate the ADAM-5000/TCP Ethernet port from dangerous voltage up to 1500 VDC power spikes and avoid surge damage to the whole system.
ADAM-5510M
ADAM-5510E

4-slot PC-based Programmable Controller
8-slot PC-based Programmable Controller

Features
- Support Modbus/RTU Master and Slave function libraries
- Windows-based Utility
- Control Flexibility with C Programming
- Complete Set of I/O Modules
- Built-in 1.5 MB Flash and 640 KB SRAM
- Built-in Real-Time Clock and Watchdog Timer
- ROM-DOS operating system
- 4 serial communication ports
- 4 or 8 I/O slot extension

Introduction
The ADAM-5510M AND ADAM-5510E are ideal for PC-based data acquisition and control applications. They are compact, controllers with an Intel x86- based CPU running Datalight ROM-DOS. Built-in battery backup SRAM is the best choice for complex logic or data storage applications. For professional C/C++ programmers, the ADAM-5510M AND ADAM-5510E application programs may be written and compiled in Borland C++ 3.0, and downloaded to the ADAM-5510M AND ADAM-5510E. With the power of the ADAM-5510M AND ADAM-5510E, users can easily accomplish specialized functions, which are difficult with traditional controllers. Each ADAM-5510M AND ADAM-5510E system can handle up to 4 or 8 I/O slots (up to 64 or 128 I/O points).

Specifications

Control System
- CPU: 16-bit microprocessor
- I/O Slots: ADAM-5510E: 8, ADAM-5510M: 4
- LED Indicators: Power, CPU, communications and battery
- Memory: Flash disk: 1 MB (960 KB for user applications), Flash memory: 256 KB, RAM: 640 KB (up to 384 KB with battery backup)
- Operating System: ROM-DOS (MS-DOS 6.22 Compatible)
- Real-time Clock: Yes
- Watchdog Timer: Yes

Communications
- Max. Nodes: 256 (in RS-485 daisy-chain network)
- Transmission Distance: 1.2 km (4000 feet)
- Transmission Speed: 1200 bps – 115.2 kbps

Power
- Power Consumption: 1 W (not including I/O modules)
- Power Input: Unregulated 10 – 30 Vdc

Software Support
- C Library: Borland C++ 3.0 for DOS

Protection
- Communication Power Isolation: 3000 Vac
- Communication Line Isolation: 2500 Vac (COM2 only)
- Power Reversal Protection: Yes

General
- Certifications: CE
- Connectors: ADAM-5510E: 1 x DB9-M for RS-232/485 (COM1) ADAM-5510M: 1 x DB9-M for RS-232 (COM1) 1 x Screw terminal for RS-485 (COM2) 1 x DB9-F for RS-232/Programming (COM3) 1 x DB9-M for RS-232/485 (COM4) 1 x Screw terminal for power input

Dimensions
- 4-slot: 231 x 110 x 75 mm
- 8-slot: 355 x 110 x 75 mm
- Enclosure: ABS+PC
- Mounting: DIN 35 rail, stack, wall

Environment
- Humidity: 5 – 95%, non-condensing
- Operating Temperature: -10 – 70° C (14 – 158° F)
- Storing Temperature: -25 – 85° C (-13 – 185° F)

Ordering Information
- ADAM-5510M: 4-slot PC-based Programmable Controller
- ADAM-5510E: 8-slot PC-based Programmable Controller
- PCLS-OPC/MOD: Modbus OPC Server
- PCLS-ADAMVIEW32: ADAMView Data Acquisition Software

Courtesy of Steven Engineering, Inc. ● 230 Ryan Way, South San Francisco, CA 94080-6370 ● General Inquiries: (800) 670-4183 ● www.stevenengineering.com
Why PC-based Control?

Today, more and more major manufacturers are gaining a competitive edge by replacing their factory floor PLC “black boxes” and utilizing the latest advances in automation control technology. One of the major drawbacks of the PLC is its proprietary nature. Not only is the PLC proprietary, but so is everything associated with it – the hardware, the operating system, the programming methods, the networks, the processors, the I/O, and more. Once you have selected a PLC supplier, you are essentially locked into their product line. This exclusivity limits how far you can expand your operations – and expand your business – since you can only grow as far as your supplier’s technology will let you. On the other hand, PC-based controllers are designed as an open structure with advanced capabilities for computing, communication and controlling. There will be no more limitation to user’s further integration and expansion.

ADAM-5510M AND ADAM-5510E PC-based “C” Programmable Controller

The design of the ADAM-5510M and ADAM-5510E are based on the experience of various needs in industrial control. The ADAM-5510M and ADAM-5510E adopt a popular RS-485 bus, which can work either as a standalone unit or within a distributed control system. The user only needs to write a program in C to run on the ADAM-5510M and ADAM-5510E for a general-purpose application.

More Data Memory and I/O Slots to Support Versatile Applications

The ADAM-5510M and ADAM-5510E offer plenty of spare memory for developing complex logic or data storage applications, such as data recording, which is difficult for traditional controllers. The ADAM-5510M and ADAM-5510E features 1.5 MB flash memory and 640 KB SRAM (up to 384 KB battery backup memory). ADAM-5510M and ADAM-5510E also support up to 4 or 8 I/O slots for I/O modules, which can provide more flexibility and I/O points for user’s applications.

Supports 4 Serial Ports with Modbus/RTU Master and Slave Function Libraries

The ADAM-5510M and ADAM-5510E have four independent communication ports. That means they can simultaneously communicate with one RS-232/485 device (COM1), one RS-485 device (COM2), one RS-232 3-wire device (COM3), and one RS-232/485 device (COM4). They also support Modbus/RTU master function library for connecting Modbus remote I/O modules and Modbus/RTU slave function library for connecting to HMI/SCADA software.

Complete I/O Module and C Library Support

The ADAM-5510M and ADAM-5510E support industrial I/O modules including digital I/O, analog I/O, counter and special purpose I/O modules such as Thermocouple and RTD. It also offers well-stocked Borland C libraries, including system resources function, I/O functions, communication functions and Modbus/RTU functions. All the functions have sample programs which can save the developing time and efforts.

Multiple RS-232 Port Support

The ADAM-5090 is a 4-port RS-232 module that is equipped with 4 RS-232 ports, which make it especially suitable for bi-direction communication. It can simultaneously read/write data from other third-party devices such as barcode readers or PLCs, as long as they have an RS-232 interface. Furthermore, commands can be issued through the ADAM-5090 to control other devices. It is fully integrated with the ADAM-5510M and ADAM-5510E, and transmits data through RS-232 ports. The whole integrated system supports Modbus/RTU master function, which can connect and issue commands to control Modbus remote I/O devices by Modbus/RTU protocol.
Introduction

In the ADAM-5510 series of PC-based programmable controllers, Advantech has introduced Ethernet-enabled features. The new 4-slot ADAM-5510/TCP and 8-slot ADAM-5510E/TCP support HTTP server, FTP server, and e-mail alarm functions. These functions can be used to monitor a system via the Internet, acquire data through an FTP connection and send alarms to designated e-mail addresses if a critical situation emerges. Both products also support Modbus/TCP server/client functions. The ADAM-5510/TCP and ADAM-5510E/TCP can work as a Modbus/TCP client to retrieve data from remote I/Os, and Modbus/TCP server to connect with the HM/SCADA software.

Specifications

Control System
- CPU: 16-bit processor
- I/O Slots: ADAM-5510/TCP: 4, ADAM-5510E/TCP: 8
- LED Indicators: Power, CPU, communications, and battery
- Memory: Flash disk: 1 MB (960 KB for user applications), Flash memory: 256 KB, Flash ROM: 256 KB, RAM: 640 KB SRAM (384 KB for battery backup RAM)
- Operating System: ROM-DOS
- Real-time Clock: Yes
- Watchdog Timer: Yes

Communications (Ethernet)
- LAN: 10/100Base-T
- Max. Nodes: 256
- Transmission Distance: 100 m

Communications (Serial)
- Max. Nodes: 32 (in RS-485 daisy-chain network)
- Transmission Distance: 1.2 km (4000 feet)
- Transmission Speed: 1200 bps – 115.2 kbps

Protection
- Communication Line Isolation: 2500 V<sub>oc</sub> (COM2 only)
- Communication Power Isolation: 3000 V<sub>oc</sub>
- I/O Module Isolation: 3000 V<sub>oc</sub>

Software
- C Library: Borland C++ 3.0 for DOS

Power
- Power Consumption: 2.5 W (not including I/O modules)
- Power Input: Unregulated 10 – 30 V<sub>dc</sub>

General
- Certifications: CE, FCC class A
- Connectors:
  - ADAM-5510/TCP: 1 x DB9-M for RS-232 (COM1)
  - ADAM-5510E/TCP: 1 x DB9-M for RS-232/485 (COM1)
  - 1 x Screw terminal for RS-485 (COM2)
  - 1 x DB9-F for RS-232/Programming (COM3)
  - 1 x DB9-M for RS-232/485 (COM4)
  - 1 x Screw-terminal for power input
  - 1 x RJ-45 for LAN
- Dimensions:
  - 4-slot: 231 x 110 x 75 mm
  - 8-slot: 355 x 110 x 75 mm
- Enclosure: ABS+PC
- Mounting: DIN 35 rail, stack, wall

Environment
- Humidity: 5 – 95%, noncondensing
- Operating Temperature: -10 – 70° C (14 – 158° F)
- Storing Temperature: -25 – 85° C (-13 – 185° F)

Ordering Information
- ADAM-5510/TCP: Ethernet-enabled Programmable Controller (4-slot)
- ADAM-5510E/TCP: 8-Slot Ethernet-enabled Programmable Controller
- PCLS-ADAMVIEW32: ADAMView Data Acquisition Software
- PCLS-OPC/MOD: Modbus OPC Server
- PCLS-OPC/MTP: Modbus/TCP OPC Server

Features
- 10/100Base-T Ethernet interface
- Support Web Server function
- Support Email Alarm function
- Support FTP Server and Client functions
- Support Modbus/TCP Server and Client function libraries
- Support Modbus/RTU Master and Slave function libraries
- 1.5 MB Flash ROM (960 KB for user applications)
- 640 KB SRAM (384 KB for battery backup)
- ROM-DOS operating system
- Watchdog timer and real-time clock
- 4 serial communication ports
- 4 or 8 I/O slot extension
Feature Details

Support Powerful Ethernet Features
ADAM-5510/TCP and ADAM-5510E/TCP are Ethernet-enabled Programmable Controllers. The new 4-slot ADAM-5510/TCP and 8-slot ADAM-5510E/TCP support HTTP server, FTP server, and e-mail alarm functions. These functions can be used to monitor a system via the Internet, acquire data through an FTP connection and send alarms to designated e-mail addresses if a critical situation emerges.

Enable Ethernet Connectivity with Other Devices
ADAM-5510/TCP and ADAM-5510E/TCP support both Modbus/TCP Server function library and Modbus/TCP Client function library. The ADAM-5510/TCP and ADAM-5510E/TCP can work as a Modbus/TCP client to retrieve data from remote I/O modules, and Modbus/TCP server to connect with the HMI/SCADA software.

More Data Memory & I/O Slots to Support Versatile Applications
The ADAM-5510/TCP and ADAM-5510E/TCP offer more than enough spare memory for developing complex logic or data storage applications, such as data recording, which is difficult for traditional controllers. The ADAM-5510/TCP and ADAM-5510E/TCP feature 1.5 MB flash memory and 640 KB SRAM (up to 384 KB battery backup memory). ADAM-5510/TCP and ADAM-5510E/TCP also support up to 4 or 8 I/O slots for I/O modules, which can provide more flexibility and I/O points for user’s applications.

Complete I/O Module and C Library Support
The ADAM-5510/TCP and ADAM-5510E/TCP support industrial I/O modules including digital I/O, analog I/O, counter and special purpose I/O modules such as Thermocouple and RTD. It also offers well-stocked Borland C libraries, including system resources function, I/O functions, communication functions, socket functions, Modbus/TCP functions, Modbus/RTU functions and the functions of Ethernet features. All the functions have sample programs which can save development time and efforts.

Supports Four Communication Ports
The ADAM-5510/TCP and ADAM-5510E/TCP have four independent communication ports. That means they can simultaneously communicate with one RS-232/485 device (COM1), one RS-485 device (COM2), one RS-232 3-wire device (COM3), and one RS-232/485 device (COM4). They also support Modbus/RTU master function library for connecting Modbus remote I/O modules and Modbus/RTU slave function library for connecting to HMI/SCADA software.

Multiple RS-232 Port Support
The ADAM-5090 is a 4-port RS-232 module that is equipped with 4 RS-232 ports, which make it especially suitable for bi-direction communication. It can simultaneously read/write data from other third-party devices such as barcode readers or PLCs, as long as they have an RS-232 interface. Furthermore, commands can be issued through the ADAM-5090 to control other devices. It is fully integrated with the ADAM-5510/TCP and ADAM-5510E/TCP, and transmits data through RS-232 ports. The whole integrated system supports Modbus/RTU master function, which can connect and issue commands to control Modbus remote I/O devices by Modbus/RTU protocol.
Introduction

ADAM-5510KW and ADAM-5510EKW are PC-based Soft-Logic Controllers. They feature 5 standard IEC61131-3 programming languages so PLC users can develop control strategies in their familiar programming languages. The strong MULTIPROG software and stable ProConOS make ADAM-5510EKW and ADAM-5510KW the best choice for PC-based Soft-logic controllers in the market.

ProConOS, (Programmable Controller Operating System), has over 250,000+ installations, and is a pre-emptive, multi-tasking run-time software providing deterministic operation down to one millisecond and runs applications developed with MULTIPROG, a fully-featured IEC 61131-3 development environment. With this KW Software distribution agreement, Advantech has bundled the ProConOS run-time software on ADAM-5510EKW and ADAM-5510KW Controllers creating a SoftLogic Solution. It will greatly benefit PLC users to enjoy the PC-based advantage of ADAM-5510EKW and ADAM-5510KW.

Different from the original ADAM-5510 hardware, the ADAM-5510EKW and ADAM-5510KW includes more memory to raise system efficiency and users’ programming flexibility. The main unit of ADAM-5510EKW and ADAM-5510KW include a 1.5 MB flash memory and 640 KB SRAM which includes battery backup RAM up to 32 KB. In addition, 4 COM ports enrich the communication.

For advanced system integration, the ADAM-5510EKW and ADAM-5510KW are built with a Modbus/RTU Server. Therefore, it also supports Modbus/RTU protocol to communicate with any Modbus devices as well as HMI Software/User’s APs built with Modbus driver or Modbus/RTU OPC Server, both of which are included in the SCADA systems.

Specifications

Control System
- CPU: 16-bit microprocessor
- I/O Capacity: 4 slots (ADAM-5510KW), 8 slots (ADAM-5510EKW)
- LED Indicators: Power, CPU, communication and battery
- Memory: Flash disk: 512 KB, Flash memory: 768 KB, Flash ROM: 256 KB, RAM: 640 KB SRAM, 32 KB with battery backup
- Operating System: ROM-DOS
- Real-time Clock: Yes
- Watchdog Timer: Yes

Communications
- Comm. Protocol: Modbus/RTU
- Max. Nodes: 32 (in RS-485 daisy-chain network)
- Medium: RS-485 (2-wire)
- Transmission Distance: 1.2 km (4000 feet)
- Transmission Speed: 9600, 19200 and 38400 bps

Protection
- Power Input: 3000 V<sub>DC</sub>
- Communication: 2500 V<sub>DC</sub> (COM2 only)
- Power Reversal Protection: Yes

Power
- Power Consumption: 1 W (not including I/O modules)
- Power Input: Unregulated 10–30 V<sub>DC</sub>

General
- Certifications: CE
- Connectors: ADAM-5510KW: 1 x DB9–M for RS-232 (COM1), ADAM-5510EKW: 1 x DB9–M for RS-232/485 (COM1), 1 x Screw terminal for RS-485 (COM2), 1 x DB9–F for RS-232/Programming (COM3), 1 x DB9–M for RS-232/485 (COM4), 1 x Screw terminal for power input
- Dimensions: 4-slot: 231 x 110 x 75 mm, 8-slot: 355 x 110 x 75 mm
- Enclosure: ABS+PC
- Mounting: DIN 35 rail, stack, wall

Environment
- Humidity: 5 – 95%, non-condensing
- Operating Temperature: -10 – 70° C (14 – 158° F)
- Storage Temperature: - 25 – 85° C (-13 – 185° F)

Ordering Information
- ADAM-5510KW: PC-based SoftLogic Controller
- ADAM-5510EKW: 8-slot PC-based SoftLogic Controller
- PCLS-OPC/MOD: Modbus OPC Server
- PCLS-ADAMVIEW32: ADAMView Data Acquisition Software
## Introduction
The ADAM-5510EKW/TP is an Ethernet-enabled SoftLogic Controller. In addition to the features of ADAM-5510KW and ADAM-5510EKW, the ADAM-5510EKW/TP has Ethernet features including Modbus/TCP Server, Modbus/TCP Client and Multiprog via Ethernet functions. Therefore, users can easily and quickly complete their programming based on Ethernet architecture.

## Standard Modbus Interface
For advanced system integration, the ADAM-5510EKW/TP supports not only Modbus/RTU Master and Slave functions via serial ports, but also the Modbus/TCP Client to retrieve data from remote I/O, and Modbus/TCP Server to send data back to the HMI/SCADA Software via Ethernet port. Furthermore, the ADAM-5510EKW/TP allows users to remotely maintain multiple ADAM-5510EKW/TP controllers by running Multiprog programming software via Ethernet.

## Specification
### Control System
- **CPU**: 16-bit microprocessor
- **I/O Capacity**: 8 slots
- **LED Indicators**: Power, CPU, communication, and battery
- **Memory**: Flash disk: 512 KB
  Flash memory: 768 KB
  Flash ROM: 256 KB
  RAM: 640 KB SRAM, 17 KB with battery backup
- **Operating System**: ROM-DOS
- **Real-time Clock**: Yes
- **Watchdog Timer**: Yes

### Communications (Ethernet)
- **Medium**: Cat.5 cable with RJ-45 connectors
- **Transmission Speed**: 100 Mbps (10/100Base-T)

### Communications (Serial)
- **Max. Nodes**: 32 (in RS-485 daisy-chain network)
- **Medium**: RS-485 (2-wire)
- **Protocols**: Modbus/RTU, Modbus/TCP
- **Transmission Speed**: 9600, 19200 and 38400 bps

### Protection
- **Power Input**: 3000 V<sub>oc</sub>
- **Communication Line Isolation**: 2500 V<sub>oc</sub> (COM2 only)
- **Power Reversal Protection**: Yes

### Power
- **Power Consumption**: 1 W (not including I/O modules)
- **Power Input**: Unregulated 10–30 V<sub>dc</sub>

### General
- **Certifications**: CE, FCC class A
- **Connectors**:
  - 1 x DB9-M for RS-232/485 (COM1)
  - 1 x Screw terminal for RS-485 (COM2)
  - 1 x DB9-F for RS-232/Programming (COM3)
  - 1 x DB9-M for RS-232/485 (COM4)
  - 1 x Screw-terminal for power input
  - 1 x RJ-45 for LAN
- **Dimensions**: 355 x 110 x 75 mm
- **Enclosure**: ABS-PC
- **Mounting**: DIN 35 rail, stack, wall

### Environment
- **Humidity**: 5 – 95%, non-condensing
- **Operating Temperature**: -10 – 70° C (14 – 158° F)
- **Storage Temperature**: -25 – 85° C (-13 – 185° F)

### Ordering Information
- **ADAM-5510EKW/TP**: 8-slot Ethernet-enabled SoftLogic Controller
- **PCLS-OPC/ MOD**: Modbus OPC Server
- **PCLS-OPC/MTP**: Modbus/TCP OPC Server
- **PCLS-ADAMVIEW32**: ADAMView Data Acquisition Software
- **MPROG-BAS33**: KW Multiprog Softlogic Development Kit Basic Edition

v3.3 for Windows® NT/2000/XP (128-byte I/O)
### Features
- Designed for control tasks that meet robust and computing performance requirements for PLC and Industrial PCs
- SoftLogic support in CE 5.0
- Can be operated with or without display/keyboard/mouse
- Remote monitoring through Web Server and Email Alarm
- Remote maintenance via FTP Server
- Dual Ethernet Ports
- Deterministic I/O
- Supports Safety Shutdown Function for power failure
- Remote I/O expansibility
- Rich support to ADAM-5000 I/O Modules
- Supports AMONet Master Module
- Supports Motion Control Modules

### Introduction
ADAM-5550 is a Programmable Automation Controller designed for control tasks which require Industrial PC computing performance with the PLC's robustness. ADAM-5550 offers an AMD Geode GX533 CPU along with control specific features such as watchdog timer, battery backup RAM and deterministic I/O. ADAM-5550 features 5 standard IEC61131-3 programming languages in CE 5.0, so PLC users can develop control strategies with their own familiar programming languages. The powerful Multiprog KW Software and stable ProCon OS have allowed ADAM-5550 to become the best choice for a Programmable Automation Controller on the market today. With the optional HMI Software and built-in VGA port, no longer will users be required to build up additional SCADA PC's in their applications. This compact and powerful PAC is ideal for a variety of applications ranging from machine automation to SCADA applications.

### Specification

#### Control System
- **CPU**: AMD Geode GX533 (GX2)
- **I/O Capacity**: 8 slots
- **LED Indicators**: Power, CPU and Communication
- **Memory**: 128 MB DDR SDRAM with 512KB Battery Backup (1 x CompactFlash® Card (Internal))
- **Operating System**: Windows® CE 5.0
- **Real-time Clock**: Yes
- **Watchdog Timer**: Yes

#### Communications
- **Comm. Protocol**: Modbus/RTU and Modbus/TCP
- **Max. Nodes**: 32
- **Medium**: 2 X Ethernet Interface with RJ-45 connectors
- **Transmission Speed**: 10M/100M bps (10/100 Base-T)

#### Protection
- **Power Input**: 3000 VDC
- **Communication**: 2500 VDC (COM2 only)
- **Power Reversal Protection**: Yes

#### Power
- **Power Consumption**: 12 W (not including I/O modules)
- **Power Input**: Unregulated +10 to +30 VDC

#### General
- **Certificate**: CE
- **Connectors**:
  - 1 x RS-232/485 (COM1)
  - 1 x RS-485 (COM2)
  - 1 x RS-232 (COM3)
  - 1 x RS-232/485 (COM4)
  - 2 X USB 1.1 ports (KB/Mouse via USB Ports)
  - 1 x VGA (1024 X 768 Resolution)
- **Dimensions**: 355 x 110 x 75 mm
- **Enclosure**: KJW with captive mounting hardware
- **Plug-in Screw Terminal**: Accepts 0.5 mm2 to 2.5 mm2, 1 - #12 or 2 - #14 to #22 AWG

#### Environment
- **Humidity**: 5% to 95%, non-condensing
- **Operating Temperature**: -10 – 50°C (14 – 122°F)
- **Storage Temperature**: -25 – 85°C (-13 – 185°F)

#### Ordering Information
- **ADAM-5550**: 8-slot Programmable Automatic Controller
- **PCLS-OPC/MOD**: Modbus OPC Server
- **PCLS-OPC/MTP**: Modbus/TCP OPC Server
- **PCLS-ADAMVIEW32**: ADAMView Data Acquisition Software
- **MPROG-BAS33**: KW Multiprog Softlogic Development Kit Basic Edition v3.3 for Windows® NT/2000/XP (128-byte I/O)
**PAC Feature**

ADAM-5550 is designed for control tasks which need Industrial PC's computing performance and PLC's robustness. Its multiple functionalities include discrete, analog and motion functions. The well-integrated programming tool and optional HMI software provide a flexible and easy-to-use software solution for versatile applications. ADAM-5550 supports Modbus protocol which allows data exchange with various Modbus devices.

**SoftLogic Support in CE 5.0**

ADAM-5550 supports IEC-61131-3 programming in WinCE 5.0. The five programming languages of Ladder Diagram, Function Block, Sequential Function Chart, Structured Text and Instruction List cover most of the PLC programming languages in the market. The reliable PROCONOS runtime engine and powerful MULTIPROG software from KW-SoftwareR empower ADAM-5550 as the best solution of Programmable Automation Controller.

**Visualization**

ADAM-5550 has a built-in VGA port which can directly connect to a display. So HMI function can be integrated into this controller. ADAM-5550 can be operated with or without display/keyboard/mouse which can meet different requirements of applications.

**Widely Used IT Technology**

ADAM-5550 supports widely used IT technology of industrial PC. For remote monitoring function, the built-in web server can provide local I/O status for internet access and email alarm function can send alarm message to dedicated email addresses when there is any alarm occurs. For remote maintenance function, the built-in FTP server provides service for uploading application program or downloading data logging files.

**Dual Ethernet Ports**

ADAM-5550 provides two ethernet ports for different application requirements such as redundant ethernet connection for reliability concern or separated network connections for security concern. Both of the functions are possible to be implemented by customer's application program.

**Deterministic I/O**

ADAM-5550 can guarantee deterministic I/O at 1 ms. This feature guarantees control and response speed at I/O level so HMI software or operations of other application programs cannot affect the I/O control performance.

**Safe Shutdown Function**

ADAM-5550 supports battery module for CPU unit and respective safe shutdown function block which ensure important data can be saved properly when power failure occurs.

**Remote I/O Expandability**

ADAM-5550 supports not only Modbus/RTU Master and Slave functions via serial ports, but also the Modbus/TCP Client to retrieve data from remote I/O, and Modbus/TCP Server to exchange data with other Modbus devices via Ethernet port. This fully Modbus feature is very useful when the control system needs expand the remote I/O modules or connect to other controllers.

**Rich support to ADAM-5000 I/O Modules**

Most of the ADAM-5000 I/O modules are supported by ADAM-5550 including analog I/O modules, digital I/O modules, counter module and serial communication module. All the operations of supported modules are the same with the operations of ADAM-5510KW series.

**Special Functions on DI and DO Modules**

ADAM-5550 supports Reversible High/Low Definition Function, 32-bit Counter Function, up to 5k Hz Frequency Measurement Function and Digital Filter Function on DI Modules. It also supports up to 5k Hz Pulse Output Function on DO Module. These functions are very useful and convenient for some applications.

**AMONet Motion Control Module**

AMONet Module supports two RS-485 master ports, and transfers data between host and slaves directly without any operations in between. Each port of the master can control up to 2048 I/O points, 64 axes, or a combination of I/O points and axes for motion control. The master ports support up to 20 Mbps transfer rate and a maximum communication distance of up to 100 meters. The communication between master and slave is based on a customized RS-485 solution that saves wires, covers a long distance, supports high-speed communication and has time-deterministic features. Various functions can be chosen on the slave modules, and standard industrial DIN rail mounting design makes it easy to distribute them in the field.

**Motion Control Modules**

ADAM-5550 supports two types of motion control modules. One is a stepping/pulse-type servo motor control module, designed for general-purpose applications, and the other is the cost-effective intelligent stepping motor control module. The servo motor control module's intelligent NOVAR MCX314-motion ASIC comes built-in with a variety of motion control functions, such as 2/3-axis linear interpolation, 2-axis circular interpolation, T/S-curve acceleration/deceleration rate and more. It performs these motion control functions without processor loading during driving. The intelligent stepping motor control module's PCD-4541 motion controller can execute a variety of motion-control commands. Each axis can be controlled directly through the card's I/O registers.
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## Distributed Controllers Selection Guide

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<th>System</th>
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<th>ADAM-5000E</th>
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<td>Timer BIOS</td>
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### Isolation

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<th>2500 V&lt;sub&gt;dc&lt;/sub&gt;</th>
<th>3000 V&lt;sub&gt;dc&lt;/sub&gt;</th>
<th>RS-485: 1500 V&lt;sub&gt;dc&lt;/sub&gt; Ethernet: 3000 V&lt;sub&gt;dc&lt;/sub&gt;</th>
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### Diagnosis

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<th>Power, CPU, Communication</th>
<th>Power, CPU, Error Diagnostic, Communication</th>
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<td>Yes, while ON</td>
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### Communication

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<td>1200, 2400, 4800, 9600, 192 K, 38.4 K, 57.6 K, 115.2 K</td>
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<td>4000 feet (1.2 km)</td>
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### Power Requirements

| Power Requirements | +10 – +30 V<sub>dc</sub> | +10 – +30 V<sub>dc</sub> | +10 – +30 V<sub>dc</sub> |

### Environment

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## ADAM-5000 Modules Selection Guide

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<th>ADAM-5013</th>
<th>ADAM-5017</th>
<th>ADAM-5017UH</th>
<th>ADAM-5018</th>
<th>ADAM-5018P</th>
<th>ADAM-5024</th>
<th>ADAM-5050</th>
<th>ADAM-5051</th>
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<th>Analog Input</th>
<th>Input Channel</th>
<th>Sampling Rate</th>
<th>Voltage Input</th>
<th>Current Input</th>
<th>Direct Sensor Input</th>
<th>Analog Output</th>
<th>Voltage Output</th>
<th>Current Output</th>
<th>Digital Input Channels</th>
<th>Digital Output Channels</th>
<th>Counter Channels</th>
<th>Frequency, Up/Down Counter, Bi-direction Counter</th>
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<th>Isolation</th>
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<td></td>
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<td>8</td>
<td>Frequency, Up/Down Counter, Bi-direction Counter</td>
<td>4</td>
<td>RS-232</td>
<td>2500 VDC</td>
</tr>
<tr>
<td>16 bit</td>
<td></td>
<td></td>
<td></td>
<td>±10 V</td>
<td>±4~20 mA</td>
<td>J, K, T, E, R, S, B</td>
<td></td>
<td>±10 V</td>
<td>4</td>
<td></td>
<td></td>
<td>8</td>
<td>Frequency, Up/Down Counter, Bi-direction Counter</td>
<td>4</td>
<td>RS-232</td>
<td>2500 VDC</td>
</tr>
</tbody>
</table>

ADAM-5013
ADAM-5017
ADAM-5017UH

Specifications

General
- Certifications: CE
- Connectors: 1 x Plug-in screw terminal (# 14–22 AWG)
- Power Consumption: 0.85 W (typical)
  1.1 W (max.)

RTD Input
- Accuracy: ±0.1% or better
- Bandwidth: 13.1 Hz @ 50 Hz
  15.72 Hz @ 60 Hz
- Channels: 3
- CMR @ 50/60 Hz: 150 dB
- Input Connections: 2, 3 or 4 wire
- Input Impedance: 2 MΩ (Pt)
- NMR @ 50/60 Hz: 100 dB
- Resolution: 16-bit
- RTD Types and Temperature Ranges
  IEC RTD 100 ohms
  Pt -100° C to +100° C: a=0.00385
  Pt 0° C to +200° C: a=0.00385
  Pt 0° C to +600° C: a=0.00385
  JIS RTD 100 ohms
  Pt -100° C to +100° C: a=0.00392
  Pt 0° C to +200° C: a=0.00392
  Pt 0° C to +600° C: a=0.00392
  Ni RTD
  Ni -80° C to +100° C
  Ni 0° C to +100° C
- Sampling Rate: 10 samples/sec. (total)
- Span Drift: ±0.01° C/° C
- Zero Drift: ±0.015° C/° C
- Protection
  - Isolation Voltage: 3000 Vdc
  - Fault and Overvoltage Protection: Withstands overvoltage up to ±35 V

Note: The voltage difference between any two pins must not exceed ±15 V

Ordering Information
- ADAM-5013: 3-channel RTD input module

Specifications

General
- Certifications: CE, FM
- Connectors: 1 x Plug-in screw terminal (# 14–22 AWG)
- Power Consumption: 1 W (typical)
  1.25 W (max.)

Analogue Input
- Accuracy: ±0.1% or better
- Analog Signal Range: ±15 V max.
- Bandwidth: 13.1 Hz @ 50 Hz
  15.72 Hz @ 60 Hz
- Channels: 8 differential
- CMR @ 50/60 Hz: 92 dB min.
- Input Impedance: 2 MΩ
- Input Type: mV, V, mA
- Input Range: ±150 mV, ±500 mV, ±1 V, ±5 V, ±10 V, ±20 mA
- Resolution: 16-bit
- Sampling Rate: 10 samples/sec. (total)
- Span Drift: ±25 PPM/° C
- Zero Drift: ±1.5 µV/° C
- Protection
  - Isolation Voltage: 3000 V
  - Fault and Overvoltage Protection: Configured by User
  - Low or high pass filter: 12-bit
- Signal Input Bandwidth: 13.1 Hz @ 50 Hz
  15.72 Hz @ 60 Hz

Ordering Information
- ADAM-5017: 8-channel analog input module

Specifications

General
- Certifications: CE
- Connectors: 1 x Plug-in screw terminal (# 14–22 AWG)
- Power Consumption: 1.75 W (typical)
  2.2 W (max.)

Analogue Input
- Accuracy: ±0.1% or better
- Analog Signal Range: ±15 V max.
- Bandwidth: 13.1 Hz @ 50 Hz
  15.72 Hz @ 60 Hz
- Channels: 8 differential
- CMR @ 50/60 Hz: 92 dB min.
- Input Impedance: 2 MΩ
- Input Type: mV, V, mA
- Input Range: ±10 V, ±0–10 V, ±20 mA, +4–20 mA
- Resolution: 12-bit
- Sampling Rate: 100 K (single channel)
  50 K (8 channels)
- Span Drift: ±25 PPM/° C
- Zero Drift: ±1.5 µV/° C
- Protection
  - Isolation Voltage: 3000 V
  - Fault and Overvoltage Protection: Withstands overvoltage up to ±35 V

Ordering Information
- ADAM-5017UH: 8-channel Ultra High Speed Analog Input Module

Ordering Information
- ADAM-5013: 3-channel RTD input module
### ADAM-5018
- **7-channel Thermocouple Input Module**

### ADAM-5018P
- **7-channel Thermocouple Input Module with Independent Input Range**

### ADAM-5024
- **4-channel Analog Output Module**

---

#### Specifications

**General**
- **Certifications**: CE, FM
- **Connectors**: 1 x Plug-in screw terminal (# 14–22 AWG)
- **Power Consumption**: 0.5 W (typical), 0.63 W (max.)

**Thermocouple Input**
- **Accuracy**: ±0.1% or better
- **Bandwidth**: 13.1 Hz @ 50 Hz, 15.72 Hz @ 60 Hz
- **Channels**: 7 differential
- **CMR @ 50/60 Hz**: 92 dB min
- **Input Impedance**: 2 MΩ
- **Input Range**: ±15 mV, ±50 mV, ±100 mV, ±500 mV, ±1 V, ±2.5 V, ±20 mA
- **Input Type**: mV, V, mA, thermocouple
- **Resolution**: 16-bit
- **Sampling Rate**: 10 samples/sec. (total)
- **Span Drift**: ±25 PPM/°C
- **T/C Type and Temperature Range**
  - J 0° – 760° C
  - K 0° – 1370° C
  - T -100° – 400° C
  - E 0° – 1000° C
  - R 500° – 1750° C
  - S 500° – 1750° C
  - B 500° – 1800° C
- **Zero Drift**: ±0.3 µV/° C

**Protection**
- **Fault and Overvoltage Protection**: Withstands overvoltage Up to ±35 V
- **Isolation Voltage**: 3,000 V<sub>DC</sub>

**Ordering Information**
- **ADAM-5018**: 7-channel Thermocouple Input Module

---

#### Specifications

**General**
- **Certifications**: CE, FM
- **Connectors**: 1 x Plug-in screw terminal (# 14–22 AWG)
- **Power Consumption**: 0.5 W (typical), 0.63 W (max.)

**Thermocouple Input**
- **Accuracy**: ±0.1% or better
- **Bandwidth**: 13.1 Hz @ 50 Hz, 15.72 Hz @ 60 Hz
- **Channels**: 7 differential with Independent Input Range
- **CMR @ 50/60 Hz**: 92 dB min
- **Input Impedance**: 2 MΩ
- **Input Range**: ±15 mV, ±50 mV, ±100 mV, ±500 mV, ±1 V, ±2.5 V, ±20 mA
- **Input Type**: mV, V, mA, thermocouple
- **Resolution**: 16-bit
- **Sampling Rate**: 10 samples/sec. (total)
- **Span Drift**: ±25 PPM/°C
- **T/C Type and Temperature Range**
  - J 0° – 760° C
  - K 0° – 1370° C
  - T -100° – 400° C
  - E 0° – 1000° C
  - R 500° – 1750° C
  - S 500° – 1750° C
  - B 500° – 1800° C
- **Zero Drift**: ±0.3 µV/° C

**Protection**
- **Fault and Overvoltage Protection**: Withstands overvoltage Up to ±35 V
- **Isolation Voltage**: 3,000 V<sub>DC</sub>
- **Filter function**: Yes
- **Built-in Dual Watchdog Timer**: Yes
- **Built-in TUV/ESD Protection**: Yes

**Ordering Information**
- **ADAM-5018P**: 7-channel Thermocouple Input Module with Independent Input Range

---

#### Specifications

**General**
- **Certifications**: CE, FM
- **Connectors**: 1 x Plug-in screw terminal (# 14–22 AWG)
- **Power Consumption**: 1.4 W (typical), 2.9 W (max.)

**Analog Output**
- **Accuracy**: ±0.1% of FSR for current output, ±0.2% of FSR for voltage output
- **Channels**: 4
- **Current Load Resistor**
  - 0 – 500 Ω (source)
- **Output Type**: mA, V
- **Output Range**: 0 – 20 mA, 4 – 20 mA, 0 – 10 V
- **Programmable**: 0.125 – 128.0 mA/sec.
- **Output Slope**: 0.0625 – 64.0 V/sec.
- **Resolution**: 12-bit
- **Resolution**: ±0.015% of FSR
- **Span Temperature Coefficient**: ±25 PPM/°C
- **Zero Drift**: Voltage: ±30 µV/° C
- **Isolation Voltage**: 3,000 V<sub>DC</sub>

**Ordering Information**
- **ADAM-5024**: 4-channel Analog Output Module
ADAM-5050
ADAM-5051/5051D
ADAM-5051S

Specifications
General
- Certifications: CE, FM
- Connectors: 1 x Plug-in screw terminal (# 14~22 AWG)
- Power Consumption: 0.35 W (typical); 1.2 W (max.)

Digital I/O
- Channels: 16
- Channel I/O Type: Bit-wise selectable by DIP switch
- Digital Input
  - Dry Contact: Logic level 0: close to GND
    - Logic level 1: open
  - Wet Contact: Logic level 0: 2 V max.
    - Logic level 1: 30 V
    - Open collector to 30 V,
      100 mA and 450 mW max. load
- Digital Output

Ordering Information
- ADAM-5050: 16-channel Universal Digital Input/Output Module

Specifications
General
- Certifications: CE, FM (ADAM-5051 only)
- Connectors: 1 x Plug-in screw terminal (# 14~22 AWG)
- LED Indicators: (ADAM-5051D)
  - On: Input logic level 1
  - Input floating
  - Off: Input logic level 0
  - Digital Input: Pull-up current: 0.5 mA (Source Type)
  - Channels: 16
  - Input Voltage: Logic level 0: 1 V max.
    - Logic level 1: 3.5 ~ 30 V
  - Logic Level
    - Bit-wise selectable by DIP switch
- Power Consumption: ADAM-5051: 0.4 W (typical); 0.53 W (max.)
  - ADAM-5051D: 0.5 W (typical); 0.84 W (max.)

Protection
- Optical Isolation: 2500 V

Ordering Information
- ADAM-5050: 16-channel Universal Digital Input/Output Module
- ADAM-5051: 16-channel Digital Input Module
- ADAM-5051D: 16-channel Digital Input Module with LED

Specifications
General
- Certifications: CE
- Connectors: 1 x Plug-in screw terminal (# 14~28 AWG)
- LED Indicators: On: Active
  - Off: Inactive
- Power Consumption: 0.8 W (typical)

Digital Input
- Channels: 16
- Input Voltage: 50 V max.
- Logic Level
  - Logic level 0: 3 V max.
  - Logic level 1: 10 ~ 50 V

Protection
- Overvoltage Protection: 70 V DC

Ordering Information
- ADAM-5051S: 16-channel Isolated Digital Input Module with LED
### ADAM-5052
- **8-channel Isolated Digital Input Module with LED**
- **16-channel Isolated Digital I/O Module with LED**

#### Specifications
**General**
- Certifications: CE, FM
- Connectors: 1 x Plug-in screw terminal (# 14-22 AWG)
- Power Consumption:
  - ADAM-5052: 0.21 W (typical), 0.27 W (max.)

**Digital Input**
- Channels: 8
- Input Resistance: 3 kΩ / 0.5 W
- Logic Level:
  - Logic level 0: 1 V
  - Logic level 1: 3.5 – 30 V

**Protection**
- Isolation Voltage: 5000 V

#### Ordering Information
- ADAM-5052: 8-channel Isolated Digital Input Module with LED

---

### ADAM-5055S
- **16-channel Isolated Digital I/O Module with LED**

#### Specifications
**General**
- Certifications: CE
- Connectors: 1 x Plug-in screw terminal (# 14-28 AWG)
- LED Indicators:
  - On: Active
  - Off: Inactive
- Power Consumption:
  - ADAM-5055S: 0.68 W (Typical)

**Digital I/O**
- Channels: 16
- Channel I/O Type: 8 DO, 8 DI
- Logic Level (DI):
  - Dry contact: Logic level 0: open
  - Wet contact: Logic level 0: 3 V max.
  - Logic level 1: 10 – 50 V
  - Open collector to 40 V
  - 200 mA max. load

**Protection**
- Isolation Voltage: 2500 V
- Overvoltage Protection: 70 V (DI only)

#### Ordering Information
- ADAM-5055S: 16-channel Isolated Digital I/O Module with LED

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### ADAM-5056/5056D
- **16-channel Digital Output Module**

#### Specifications
**General**
- Certifications: CE
- Connectors: 1 x Plug-in screw terminal (# 14-28 AWG)
- LED Indicators: (ADAM-5056D)
  - On: output logic level "1"
  - Off: output logic level "0"
- Power Consumption:
  - ADAM-5056: 0.25 W (typical), 0.53 W (max.)
  - ADAM-5056D: 0.25 W (typical), 0.53 W (max.)

**Digital Output**
- Channels: 16
- Digital Output:
  - Open collector to 30 V
  - 100 mA max. load
- Operating Voltage: 30 V
- Power Dissipation: 450 mW for each channel

#### Ordering Information
- ADAM-5056: 16-channel Digital Output Module
- ADAM-5056D: 16-channel Digital Output Module with LED
ADAM-5056S/5056SO
ADAM-5060/5068
ADAM-5069

16-channel Sink / Source Type Isolated Digital Output Module with LED
6/8-channel Relay Output Module
8-channel Power Relay Output Module with LED

Specifications

ADAM-5056S
6-channel Relay Output Module

ADAM-5056SO
6/8-channel Relay Output Module

ADAM-5060
6-channel Relay Output Module

ADAM-5068
8-channel Relay Output Module

ADAM-5069
8-channel Power Relay Output Module with LED

General
- Certifications
  CE
  FCC (5056SO only)
- Connectors
  1 x Plug-in screw terminal (# 14~22 AWG)
- LED Indicator
  On: active
  Off: inactive
- Power Consumption
  0.6 W (typical)

Digital Output
- Channels
  16
- Digital Output
  Open collector to 40 V, 200 mA max. load

Protection
- Optical Isolation
  2500 V_{oc}
- Overvoltage Protection
  70 V_{oc}

Ordering Information
- ADAM-5056S
  16-channel Sink Type Isolated Digital Output Module with LED
- ADAM-5056SO
  16-channel Source Type Isolated Digital Output Module with LED

Specifications

ADAM-5060
6-channel Relay Output Module

ADAM-5068
8-channel Relay Output Module

General
- Certifications
  CE
  FM (ADAM-5060 only)
- Connectors
  1 x Plug-in screw terminal (# 14~22 AWG)
- Power Consumption
  ADAM-5060: 0.7 W (typical); 1.8 W (max.)
  ADAM-5068: 0.25 W (typical); 1.8 W (max.)

Relay Output
- Breakdown Voltage
  500 V_{ac} (50/60 Hz)
- Channels
  2 x form A, 4 x form C

Contact Rating
- AC: 125 V @ 0.6 A
  250 V @ 0.3 A
  110 V @ 0.6 A
- DC: 30 V @ 2 A
- ADAM-5068:
  AC: 120 V @ 0.5 A
  DC: 30 V @ 1 A
- 1 G\Omega min. @ 500 V_{oc}

Insulation Resistance
- 1 G\Omega @ 500 V_{oc}

Relay On Time
- 2 ms
- 3 ms
- 7 ms

Relay Off Time
- 2 ms
- 3 ms
- 7 ms

Total Switching Time
- 10 ms

Ordering Information
- ADAM-5060
  6-channel Relay Output Module
- ADAM-5068
  8-channel Relay Output Module

Specifications

ADAM-5056SO
6-channel Relay Output Module

ADAM-5060
6-channel Relay Output Module

General
- Certifications
  CE
  FCC class A
- Connectors
  1 x Plug-in screw terminal (# 14~22 AWG)
- LED Indicator
  On: Active
  Off: Non-active
- Power Consumption
  0.25 W (typical); 2.2 W (max.)

Relay Output
- Breakdown Voltage
  750 V_{ac} (50/60 Hz)
- Channels
  8 x form A
- Contact Rating
  AC: 250 V @ 5 A
  DC: 30 V @ 5 A

Insulation Resistance
- 1 G\Omega @ 500 V_{oc}

Relay On Time
- 5 ms
- 5.6 ms

Ordering Information
- ADAM-5069
  8-channel Power Relay Output Module with LED

Specifications

ADAM-5069
8-channel Power Relay Output Module

General
- Certifications
  CE, FCC class A
- Connectors
  1 x Plug-in screw terminal (# 14~22 AWG)
- LED Indicator
  On: Active
  Off: Non-active
- Power Consumption
  0.25 W (typical); 2.2 W (max.)

Relay Output
- Breakdown Voltage
  750 V_{ac} (50/60 Hz)
- Channels
  8 x form A
- Contact Rating
  AC: 250 V @ 5 A
  DC: 30 V @ 5 A

Insulation Resistance
- 1 G\Omega @ 500 V_{oc}

Relay On Time
- 5 ms
- 5.6 ms

Ordering Information
- ADAM-5069
  8-channel Power Relay Output Module with LED
ADAM-5080
ADAM-5090

Specifications

General
- Certifications: CE, FM
- Connectors: 1 x Plug-in screw terminal (# 14–22 AWG)
- Power Consumption: 1.3 W (typical), 1.5 W (max.)

Counter/Frequency
- Counter Aux. Function: Initial preset, hi-low alarm setting, alarm digital output mapping, overflag
- Channels: 4
- Input Frequency: 0.3 – 1000 Hz max. (frequency mode)
  5000 Hz max. (counter mode) TTL only
- Input Level: Isolated or TTL level
- Isolation Input Level: Logic level 0: 1 V_{\text{max}}
  Logic level 1: 3.5 – 30 V
- Isolation Voltage: 1000 V_{\text{max}}
- Max. Count: 4,294,967,285 (32 bits)
- Minimum Input Current: 2 mA (isolated)
- Minimum Pulse Width: 8 – 65000 ms
- Modes: Counter (up/down, bi-direction) frequency
- Programmable Digital Noise Filter
- TTL Input Level: Logic level 0: 0 – 0.8 V
  Logic level 1: 2.3 – 5 V

Ordering Information
- ADAM-5080: 4-channel Counter/Frequency Module

Specifications

General
- Certifications: CE
- Connectors: 4 x RJ-45
- LED Indicators: TX, RX (each port)
- Power Consumption: 0.6 W (max.)

Communications
- Data Bits: 5, 6, 7, 8
- Data Signals: TxD, RxD, RTS, CTS, DTR, DSR, DCD, RI, GND
- Parity: none, even, old
- Ports: 4
- Speed: 50 – 115.2 kbps
- Stop Bits: 1, 1.5, 2
- UARTs: 1 x 16C954 (128-byte FIFO)

Note: For ADAM-5510 Series, ADAM-5510KW Series, and ADAM-5511 only

Ordering Information
- ADAM-5090: 4-port RS-232 Module
Specifications

Input
- Input Current: 1.4 A max.
- Inrush Current (cold): 25 A/110 V AC, 50 A/220 V AC
- Input Frequency: 47 ~ 63 Hz
- Input Voltage: 100~240 V AC
- Short Protection

Output
- Output Current: 4.2 A max.
- Output Voltage: +24 V DC ±10%
- Overload Protection

General
- Certifications: CE, UL
- Connectors: Screw-terminal
- Dimensions (LxWxH): 198 x 99 x 35 mm (7.80" x 3.90" x 1.38")
- Enclosure: Sheet metal
- MTBF: 70,000 hrs
- Operating Temperature: 0 ~ 50° C (32 ~ 122° F)

Ordering Information
- PWR-242: DIN-rail Power Supply

Dimensions
- Unit: mm

Ordering Information
- PWR-244: Panel Mount Power Supply

Dimensions
- Unit: mm