Features:

- 10/100 Base-T Auto-negotiation high speed communication port
- Support Modbus/TCP Communication Protocol for easy integration
- Up to 100m communication distance w/o repeater
- Allowed remote configuration via Ethernet
- Allowed 8 host PCs Access concurrently
- 8 I/O slots for up to 128 points data monitoring and control
- 1500 V_{DC} isolation for Ethernet Communication
- System status diagnostic with LED indicators
- Built-in Watchdog Timer for system auto-reset
- ARM 32-bit RISC CPU
- Windows Utility
  - I/O modules configuration and calibration
  - Network auto-searching
  - Local Control functions
  - Current status monitoring and latch output

Introduction

Undoubtedly, Ethernet is becoming to a big trend of industrial application. Longer communication distance, higher communication speed, and more advantages attract people developing their system based on this network. For fitting user's requirement, Advantech announces the new DA&C system, ADAM-5000/TCP, the Ethernet I/O solution for people developing their eAutomation architecture.

Communication Network

Adopting by 32-bit RISC CPU, ADAM-5000/TCP has greatly advanced the ability in data processing, especially for network communication. There is a standard RJ-45 modular jack Ethernet port on ADAM-5000/TCP's CPU board, and the field signals of I/O modules would be able to link to Ethernet directly without any other converter or data gateway. The communication speed can be auto-switched between 10M and 100Mbps data transfer rate depends on network environment.

Communicating Isolation

High speed transient suppressors isolate ADAM-5000/TCP Ethernet port from dangerous voltage up to 1500 V_{DC} power spikes and avoid surge damage to whole system.

Modbus/TCP Protocol

Modbus/TCP is one of the most popular standard for industrial Ethernet network. Following this communication protocol, ADAM-5000/TCP is easy to integrate with any HMI software packages or user develop applications which support Modbus. Users do not have to prepare a specific driver for ADAM-5000/TCP when they install the DA&C system with their own operating application. It will certainly reduce engineer effort. Moreover, ADAM-5000/TCP works as an Modbus data server. It allows eight PCs or tasks to access its current data concurrently, no matter connecting from LAN, intranet, or internet.

Hardware Capacity & Diagnostic

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-5024 allowed). Different from other main units, ADAM-5000/TCP not only has higher I/O capacity, but it also has smarter diagnostic ability. There are eight indicators on the front case of the CPU module. Users can read the system status clearly, includes power, CPU, Ethernet link, communication collision, communication rate, etc. In addition, there are also Tx and Rx LEDs on the Ethernet port, indicating data transferring and receiving.

Software Architecture

Basing on Modbus standard, the ADAM-5000/TCP firmware is built-in Modbus/TCP server. Therefore, Advantech provides DLL driver, OPC Server, and Windows Utility for user to client data from ADAM-5000/TCP. Users can configure this DA&C system via Windows Utility; integrate with HMI software package via Modbus/TCP driver or Modbus/TCP OPC Server. Even more, you can use DLL drive to develop your own applications.

Windows Utility

For system configuration, Windows Utility offers a friendly operating environment to calibrate I/O modules, monitor current data, set IP address etc. As you execute this program, it will automatically search each ADAM-5000/TCP devices on the network without configuration.

There are also some advanced functions, such as the scaling function, helps users converting various field signals to engineer units; and latch output function, forces a data or status as system simulation. Moreover, Windows Utility is designed with security concept. If you assigned the configuring authority to a specific password, no other one would be allowed to change the configuration.

Modbus/TCP OPC Server

As we know, OPC is a data exchange tool in worldwide. Almost each Hardware and software venders support this standard. And Modbus/TCP OPC Server is design for connecting with Modbus devices on Ethernet. It acquires data from ADAM-5000/TCP, then links with OPC Client from HMI. So any HMI software package is possible and easy to integrate with ADAM Ethernet solution.

ADAM-5000/TCP Specification

System

- **CPU**: 32-bit RISC CPU
- **Memory**: 4 MB RAM
  512 KB Flash ROM for user's AP
- **Operating System**: Real-time OS
- **I/O Capacity**: 8 slots (four ADAM-5024 allowed)
- **Status Indicator**: Power (3.3V, 5V), CPU, Communication(Link, Active, 10/100 Mbps, Tx, Rx)
- **CPU Power Consumption**: 5.0 W
- **Reset Push Bottom**: Yes

Isolation

- **Ethernet Communication**: 1500 V_{DC}
- **I/O Module**: 3000 V_{DC}
- **Comm. Power**: 3000 V_{DC}

Diagnostic

- **Power-up Self Test**: Hardware and Software

Communication

- **Ethernet**: 10/100 Base T
- **Wiring**: UTP, category 5 or greater
- **Bus Connection**: RJ45 modular jack
- **Comm. Protocol**: Modbus/TCP, TCP, UDP, IP, ARP
- **Data Transfer Rate**: Up to 100 Mbps
- **Max Communication Distance**: 100 meters W/O repeater
- **Even Response Time**: <5 ms

Power Requirements

- **Unregulated 10 to 30 V_{DC}**
- **Protection**: Over-voltage and power reversal

Software Support

- **Windows Utility**:
  Network setting, I/O configuration & calibration, Local control functions
- **Modbus/TCP OPC Server**

Mechanical

- **Case**: KJW with captive mounting hardware
- **Plug-in Screw Terminal Block**: Accepts 0.5 mm 2 to 2.5 mm 2 , 1 - #12 or 2 - #14 to #22 AWG
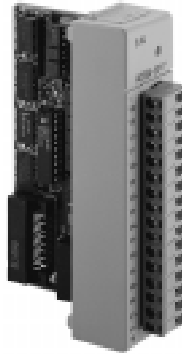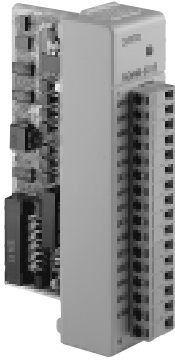
Environment

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

Order Information

- ❑ **ADAM-5000/TCP**
  Distributed DA&C System based on Ethernet

ADAM-5013   3-channel RTD Input Module
ADAM-5017   8-channel Analog Input Module
ADAM-5017H   8-channel High Speed Analog Input Module

ADAM-5013
3-Channel RTD Input Module

- **Channels:** 3

- **Effective resolution:** 16-bit

- **Input type:** PT100 or Ni RTD

- **RTD types and temperature ranges**
  IEC RTD 100 ohms

  Pt -100° C to +100° C α=0.00385
  Pt   0° C to +100° C α=0.00385
  Pt   0° C to +200° C α=0.00385
  Pt   0° C to +600° C α=0.00385

  JIS RTD 100 ohms

  Pt -100° C to +100° C α=0.00392
  Pt   0° C to +100° C α=0.00392
  Pt   0° C to +200° C α=0.00392
  Pt   0° C to +600° C α=0.00392

  Ni RTD

  Ni -80° C to +100° C
  Ni   0° C to +100° C

- **Isolation voltage:** 3000 V$_{DC}$

- **Sampling rate:** 10 samples/sec. (total)

- **Input impedance:** 2 MΩ

- **Bandwidth:** 13.1 Hz @ 50 Hz, 15.72 Hz @60 Hz

- **Input connections:** 2, 3 or 4 wire

- **Accuracy:** ±0.1% or better

- **Zero drift:** ±0.015° C/ ° C

- **Span drift:** ±0.01° C/ °C

- **CMR @ 50/60 Hz:** 150 dB

- **NMR @ 50/60 Hz:** 100 dB

- **Power consumption:** 0.85 W (typical);
  1.1 W (max)

ADAM-5017
8-Channel Analog Input Module

- **Channels:** 8 differential

- **Effective resolution:** 16-bit

- **Input type:** mV, V, mA

- **Input range:**
  ±150 mV, ±500 mV, ±1 V, ±5 V, ±10 V; ±20 mA

- **Isolation voltage:** 3000 V$_{DC}$

- **Fault and overvoltage protection:** withstands overvoltage up to ±35 V

- **Sampling rate:** 10 samples/sec. (total)

- **Input impedance:** 2 MΩ

- **Bandwidth:** 13.1 Hz @ 50 Hz, 15.72 Hz @ 60 Hz

- **Accuracy:** ±0.1% or better

- **Zero drift:** ±1.5 mV/ ° C

- **Span drift:** ±25 PPM/ ° C

- **CMR @ 50/60 Hz:** 92 dB min.

- **Power consumption:** 1 W (typical);
  1.25 W (max)

- **Analog Signal Range:** ±15 V max.

Note: The voltage difference between any two pins must not exceed ±15 V.
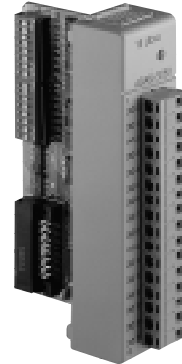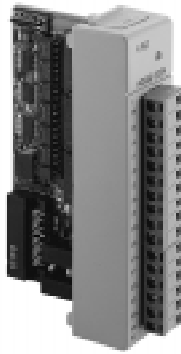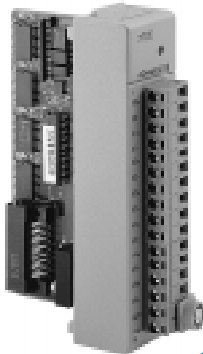
ADAM-5017H
8-Channel High Speed Analog Input Module

- **Channels:** 8 differential

- **Effective resolution:** 12-bit plus sign bit

- **Input type:** mV, V, mA

- **Input range:** ±250 mV, ±500 mV, ±1 V, ±5 V, ±10 V, 0 ~ +250 mV, 0 ~ +500 mV, 0 ~ +1 V, 0 ~ +5 V, 0 ~ +10 V, 0 ~ 20 mA, 4 ~ 20 mA

- **Isolation voltage:** 3000 V$_{DC}$

- **Sampling rate:** various according to base unit
  ADAM-5000/485&5000/MOD&5000E
  1000 samples/sec: one ADAM-5017H installed, 2's complement format
  600 samples/sec: one ADAM-5017H installed, engineering format

  ADAM-5510 & ADAM-5511
  8000 samples/sec max:
  one ADAM-5017H installed

- **Input impedance:**
  20 MΩ (voltage inputs)
  125 Ω (current inputs)

- **Bandwidth:** 1000 Hz

- **Signal input bandwidth:** 1 kHz for both voltage and current inputs

- **Accuracy:** ±0.1 % or better

- **CMR @ 50/60 Hz:** 92 dB min

- **Power consumption:** 1.75 W (typical);
  2.2 W (max)

- **Distinct range settings allowed on each channel**

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

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ADAM-5018   7-channel Thermocouple Input Module
ADAM-5024   4-channel Analog Output Module
ADAM-5050   16-channel Universal Digital I/O Module

ADAM-5018
7-Channel Thermocouple Input Module

- **Channels:** 7 differential
- **Effective resolution:** 16-bit
- **Input type:** mV, V, mA, Thermocouple
- **Input range:**
  ±15 mV, ±50 mV, ±100 mV,
  ±500 mV, ±1 V, ±2.5 V, ±20 mA
- **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
- **Isolation voltage:** 3000 V_{DC}
- **Fault and overvoltage protection:**
  withstands overvoltage up to ±35 V
- **Sampling rate:** 10 samples/sec. (total)
- **Input Impedance:** 2 MΩ
- **Bandwidth:** 13.1 Hz @ 50 Hz, 15.72 Hz @ 60 Hz
- **Accuracy:** ±0.1% or better
- **Zero drift:** ±0.3 mV/ ° C
- **Span drift:** ±25 PPM/ ° C
- **CMR @ 50/60 Hz:** 92 dB min
- **Power consumption:** 0.5 W (tpical);
  0.63 W (max)

ADAM-5024
4-Channel Analog Output Module

- **Channels:** 4
- **Effective resolution:** 12-bit
- **Output type:** mA, V
- **Output range:**
  0 ~ 20 mA, 4 ~ 20 mA, 0 ~10 V
- **Isolation voltage:** 3000 V_{DC}
- **Accuracy:**
  ±0.1% of FSR for current output
  ±0.2% of FSR for voltage output
- **Resolution:** ±0.015% of FSR
- **Zero drift:**
  Voltage output: ±30 mV/ ° C
  Current output: ±0.2 mA/ ° C
- **Span temperature coefficient:**
  ±25 PPM/ ° C
- **Programmable output slope:**
  0.125 ~ 128.0 mA/sec.;
  0.0625 ~ 64.0 V/sec.
- **Current load resistor:**
  0 ~ 500 Ω (source)
- **Power consumption:** 1.4 W (typical);
  2.9 W (max)

ADAM-5050
16-Channel Universal Digital I/O Module

- **Channels:** 16
- **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: +4 V to +30 V
- **Digital output:**

  Open Collector to 30 V,

  100 mA and 450 mW max. load
- **Power consumption:** 0.35 W (typcal);
  1.2 W (max)

ADAM-5068   8-channel Relay Output Module
ADAM-5080   4-channel Counter/Frequency Module
ADAM-5090   4-port RS-232 Module

Available Soon

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ADAM-5068
8-channel Relay Output Module

- **Channels:** 8, form A

- **Contact rating**:
  AC: 120 V @ 0.5 A;
  DC: 30 V @ 1 A

- **Breakdown voltage**:
  500 V_{AC} (50/60 Hz)

- **Relay on time (typical):** 7 msec.

- **Relay off time (typical)**: 3 msec.

- **Total switching time**: 10 msec.

- **Insulation resistance**:
  1000 MW minimum at 500 V_{DC}

- **Power consumption**: 0.25 W (typical);
  1.8 W(max)

ADAM-5080
4-channel Counter/ Frequency Module

- **Channels:** 4

- **Maximum count:** 4,294,967,285 (32 bit)

- **Input frequency:**
  0.3 ~ 1000 Hz max. (frequency mode)
  5000 Hz max. (counter mode)

- **Input level:** Isolated or TTL level

- **Minimum pulse width:**
  500μ sec. (Frequency mode)
  100μ sec. (Counter mode)

- **Minimum input current:** 2 mA (Isolated)

- **Isolation input level:**
  Logic level 0: +1 V_{max}
  Logic level 1: +3.5 V to 30 V

- **TTL input level:**
  Logic level 0: 0 V to 0.8 V
  Logic level 1: 2.3 V to 5 V

- **Isolation voltage:** 1000 V_{RMS}

- **Mode:** Counter (Up/Down, Bi-direction) Frequency

- **Counter Aux. function:** Initial preset, Hi-Low alarm setting, alarm digital output Mapping, Overflag

- **Programmable digital noise filter:**
  8 ~ 65000 Msec

- **Power consumption:** 1.3 W (Typical);
  1.5 W (max)

ADAM-5090
4-port RS-232 Module

- **Ports:** 4 serial ports

- **Data bits:** 5, 6, 7, 8

- **Stop bits:** 1, 1.5, 2

- **Parity:** None, even, old

- **UARTs:** 1 x 16C954 (128-byte FIFO)

- **Speed:** 50 ~ 115.2 Kbps

- **Data signals:** T x D, R x D, RTS, CTS, DTR, DSR, DCD, RI, GND

- **Connector:** RJ-45

- **LED display:** TX, RX

- **Power consumption:** 0.6 W (max)

- **Supports ADAM-5510, ADAM-5511 only**