

Programmable Automation Controllers

APAX-5000 Series

PAC Overview		13-2
SoftLogic Control Software		13-4
PC-based Programming Software		13-6
Batch Control Solution		13-7
APAX Series Overview		13-8
APAX System Architecture		13-10
Redundancy Function Introduction		13-11
APAX Controller Selection Guide		13-12
APAX I/O Module Selection Guide		13-13
APAX Communication and Motion Module Selection Guide		13-15
APAX-6572	Intel Atom D510 1.66 GHz, 2 GB RAM Controller with 3 x LAN, 2 x COM, VGA	13-16
APAX-6572R	Redundant Control System	
APAX-5520CE/KW	PAC with Marvel XScale® CPU	13-17
APAX-5620CE/KW	PAC with Marvel XScale® CPU and CAN	
APAX-5082	8-ch Pulse Width Modulation Module	13-18
APAX-5343/E	Power Supply for APAX-5570 Series/ APAX Expansion Modules	13-19
APAX-5001/5002/5002L	1-slot/2-slot Backplane Modules	
Remote I/O Solution Introduction		13-20
APAX-5070	Modbus/TCP Communication Coupler	13-21
APAX-5072	EtherNet/IP Communication Coupler	
APAX-5071	PROFINET Communication Coupler	13-22
APAX-5073	PROFIBUS Communication Coupler	
ADAM-5000 Series		
ADAM-5000 Series	Distributed I/O Systems & PC-based Controllers	13-23
ADAM-5000 Controller Selection Guide		13-25
ADAM-5000 I/O Module Selection Guide		13-27
ADAM-5000 Controller Support Table		13-30
ADAM-5000 Remote I/O System Support Table		13-31
ADAM-5560CE	7-slot PC-based Controller with Intel Atom CPU	13-32
ADAM-5560KW	7-slot Micro PAC with Intel Atom CP	

To view all of Advantech's Programmable Automation Controllers & I/O Modules, please visit www.advantech.com/products.



PAC Overview

Introduction

Advantech offers PAC solutions designed for industrial automation applications which combine the openness and flexibility of PCs with the reliability of traditional automation controllers, such as PLCs. Advantech's offerings include the APAX series, ADAM-5000 series, and Embedded Automation Computers, utilizing sophisticated thermal designs to ensure the system stability. APAX controllers support Windows CE, Windows XP Embedded and Windows 7 operating systems. Advantech's PACs are ideal platforms to implement in diverse applications, such as power/energy, transportation, machine automation, factory automation, building automation, facility management system, environment monitoring, and more.

Real-time PACs: APAX Series

APAX series are Ethernet-enabled controllers allowing users to deploy I/O modules in flexible expansion combinations, like direct stack or daisy-chain. The control performance and functionality are not only better than PLCs, but also better than most PC-based controllers. Features including versatile CPU modules, I/O modules designed as reliable as PLC I/Os, high density I/Os with LEDs, hot swap and stackable functionality are delivered. Both C/C++ and .NET library, and IEC 61131-3 languages are provided as programming tools.

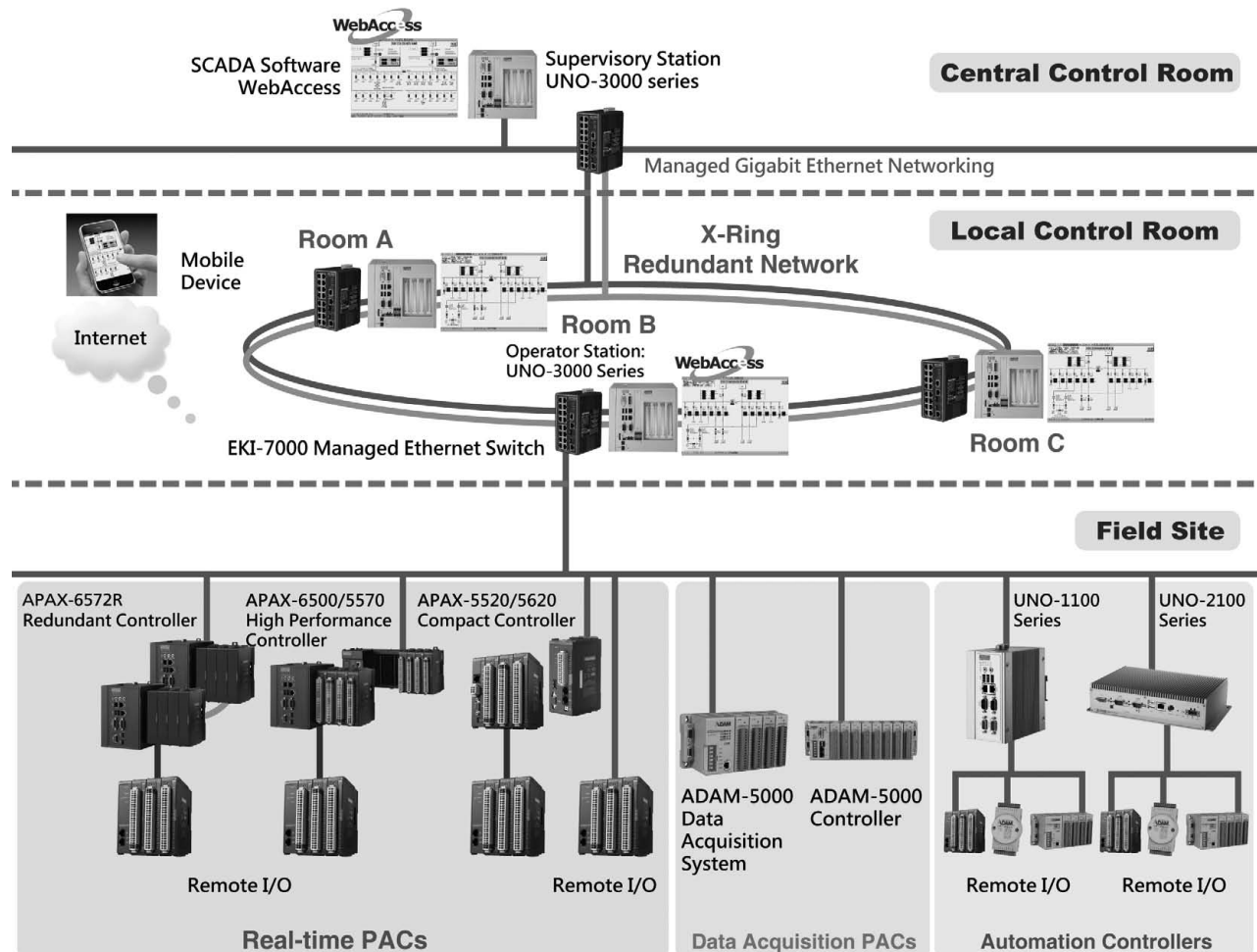
Data Acquisition PACs: ADAM-5000 Series

ADAM-5000 series are modularized I/Os to be inserted on backplanes with fixed slot numbers. Leveraging Advantech's rich experience in industrial data acquisition applications, ADAM-5000 offers a compact control system. Inheriting the reliability and robustness of a PLC system, ADAM-5000 offers the openness and flexibility of a PC, including computing power, networking and storage capability. Both C/C++ and .NET libraries and IEC 61131-3 languages are provided as programming tools.

Automation Controllers

Advantech's Embedded Automation Computers are designed to fulfill the needs of mission critical automation applications. Their embedded design, industrial automation features and advanced computer technology deliver robustness, reliability and flexibility to satisfy customers who are looking for a rugged and compact computing platform. They support various interfaces to integrate with other devices, such as Ethernet, RS-232/422/485, onboard I/O, extension PC card slots, CAN-bus and more. Through standard Ethernet networking, these computers can link to Advantech remote I/O solutions, such as APAX-5000 high density I/O (through APAX-5070 Modbus/TCP coupler module) or ADAM-6000 series compact modules, to get data and perform control tasks.

Control System Architecture



Real-time I/O Control Suitable for Multiple Domain Applications

Currently most PC-based controllers face one major challenge, especially DIN-rail PAC systems, which is real-time I/O control. Performance is severely hampered when I/O points increase because the access time also increases, which impacts control precision as well.

Food and beverage companies face shorter production runs on a wide range of products for different vendors, while automotive companies are dealing with changes in customer preference, aggressive competition and rising fuel costs. These industries require a mix of discrete, batch, process and motion control solution. In the past, these applications forced engineers to use multiple controllers: a PLC for discrete control, a motion controller for multi-axis control, and a distributed control system or loop controller for process applications, which has proven time consuming and costly. Advantech PACs feature the ability to handle all these tasks with a single control system.

The result is shortened development time through reusable programming tools, lower maintenance costs through reduced parts, better information sharing among applications, and fewer personnel support throughout the plant.

Information Processing and Networking Capabilities

Advantech PACs not only provide excellent real-time I/O control, but also another key benefit for automation applications, information processing. With the ability to perform field operations, data exchanges and valuable information collection, this series is able to execute efficient decision-making. Information processing includes data logging and analysis with storage devices like SD or CF cards, recipe management for batch control, and database exchanges through SQL and OPC. Furthermore, implementing HMI software enables local operation.

This improves control system networking tremendously, allowing the network to share a common protocol at the device level, control level, and information level. It provides the ability to move information from the device level to executives at the enterprise resource planning (ERP) level without new protocols or drivers.

Advantech PACs feature a PC-based architecture, delivering significant networking benefits for manufacturers by USB, RS-232, RS-422/485 and Ethernet interfaces. Users can connect to field devices through serial or USB interface to satisfy any kind of application. The Ethernet interface allows users to effectively manage I/O control and information flow throughout the manufacturing and IT enterprise. Leveraging the high computing power of Advantech PACs also allows networks to communicate seamlessly on the factory floor with other common sets of IT capabilities like video, data and telephones. Easy access to such information is critical to making decisions about the capacity of an enterprise.

Scalability

In the past, many PLCs required users to learn different programming software and specify networks depending on the size and complexity of the application. Advantech PACs allow users to more closely match the controller to application needs without compromising functionality or learning a new control system. Such scalability reduces the headaches and high costs associated with system redesign, lack of program re-use, and re-training.

Software

Advantech PACs support software to satisfy both PC-based and PLC-based programmers. Leveraging IEC 61131-3 SoftLogic programming environment, PLC programmers can take PLC operations to the next level in many areas, such as communication, information processing, enterprise level database integration, and user interface development.

For PC-based programmers, Advantech offers an open platform solution, with C/C++ and .NET libraries for I/O control and communication functionality. They can satisfy programmers familiar with high level programming languages like Microsoft Visual Studio .NET. In addition, several convenient utilities are offered to save development time.



1	Motion Control
2	Hazardous Location
3	Energy Automation
4	Building Automation Systems
5	Automation Software
6	Operator Panels
7	Automation Panel PCs
8	Industrial Monitors
9	Industrial Ethernet
10	Device Servers & Gateways
11	Serial Communication Cards
12	Embedded Auto. Computers
13	PACs
14	M2M I/O
15	Distributed Nano Controllers
16	RS-485 I/O
17	Ethernet I/O
18	DAQ Boards

SoftLogic Control Software

SoftLogic Software

For tradition PLC platforms, the development environment will vary by PLC supplier and they cannot be compatible with each other. PAC platforms has a trend to adapt the International standard IEC 61131-3, established to standardize the multiple languages, sets of instructions and different concepts existing in the field of automation systems. Therefore, these programming languages which comply with the IEC 61131-3 standard, usually named as SoftLogic software, make users able to leverage PLC-world typical programming interface. But they can also benefit from a portability of all platforms, reducing learning costs for building automation systems.

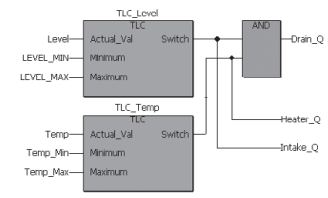
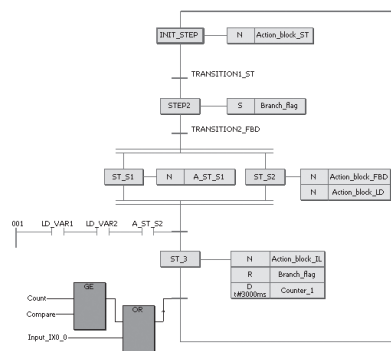
Advantech SoftLogic Software: KW MultiProg and ProConOS

Advantech delivers KW-Software's MultiProg development environment and ProConOS runtime kernel for various control platforms, including ADAM-5510 series, ADAM-5550 series and APAX series controllers. KW MultiProg supports all IEC-61131-3 programming language as following:

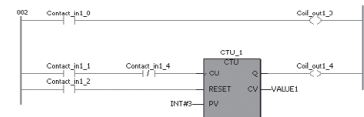
- Instruction List (IL)
- Structured Text (ST)
- Sequential Function Chart (SFC)
- Function Block Diagram (FBD)

```
1 LD I_X0.2
2 AND I_X0.3
3 OR Action_INIT
4 ST IL_VAR
5
6 LD Input_I_X0_0
7 JMPC MANUAL
8
9 (*Timer FB TON*)
10 LD Timer_start
11 ST TON_IL.IN
12 LD PT_TON_IL
13 ST TON_IL.PT
14 CAL TON_IL
15 LD TON_IL.Q
16 ST Action_INIT
17 STN Timer_start
18 LD TON_IL.ET
19 ST Timer_value
20
```

```
1 CASE MODUS OF
2 1: ROBOT_X := ROBOT_X + 200;
3   ROBOT_Z := ROBOT_Z + ADD_ARM ;
4   MODUS:=1;
5   IF ROBOT_X >= RANGE_POS_1 THEN
6     MODUS:=2;
7   END IF;
8 2: ROBOT_X := ROBOT_X - 200;
9   ROBOT_Z := ROBOT_Z - ADD_ARM ;
10  MODUS:=2;
11  IF ROBOT_X <= RANGE_NEG_1 THEN
12    MODUS:=1;
13  END IF;
14 END CASE;
15 ROBOT_Y := ROBOT_X;
16 COUNTER_1 := COUNTER_1+1;
17 IF COUNTER_1 > 1000 THEN
18   COUNTER_1 := 0;
19 END IF;
20
```



- Ladder Diagram (LD)



▪ Graphic Editor

Programmers can work with SFC, FBD, and LD programming languages. The editor supports mixing of SFC, FBD, and LD in a single worksheet. The fully graphical editor allows completely free placements of objects. The Edit Wizard helps you when inserting and replacing code elements in worksheets. You can insert keywords and statements, operators, functions and function blocks with the help of the Edit Wizard. In addition, the Wizard simplifies the declaration of own data types.

▪ Text Editor

With the text editor, you edit and debug the code in IL and ST programming and define user-defined data types. IntelliSense function automatically completes your variable names, structure elements and function block parameters.

▪ Variable Grid Editor

In the variables grid, each line represents the declaration of a variable or FB instance. For an optimal overview, variables can be divided into different groups. The attributes of each variable/instance are defined in the respective table columns either by entering or selecting a combo box entry. The variables editor prevents a number of syntactical declaration errors and makes declaration easy and clear.

KW MultiProg has several features which can save your development time and well manage your complicated project:

▪ Project Template

A new project can not only be created with the Project Wizard in MultiProg, but also based on a project template. Owing to the practice-orientated template management, you can not only access supplied default templates, but save each own project as template.

▪ Cross-Compiling

The basic languages of the IEC 61131-3 standard, i.e. FBD, LD and IL, can be cross-compiled to each other including their comments. Program code which has been written in ST can be compiled to any of the three basic languages.

▪ Password Protection

You can protect complete subtrees or individual project nodes in the project tree with a password. Access rights can be restricted for editing the project structure, opening and writing worksheets, downloading to individual configurations or resources and debugging. Each user has to log in using the valid password in order to get full access to a protected project.

▪ Multi-User Feature

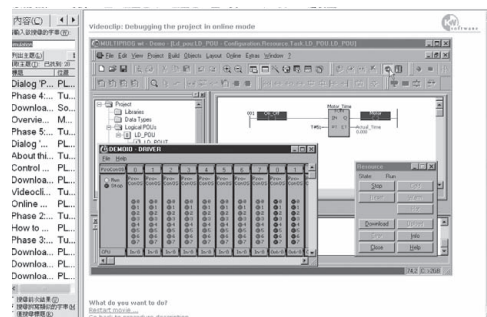
The Multi-User feature provides safe access to project source files while several users are working on the same project at the same time. In order to provide a safe and fast development environment for multiple users, the project is saved as server project on a server PC in the network. Each user can create a client project on his local PC for editing. The respective nodes in the project tree of the client project must be checked out, which means that no other user has write access for these data any longer.

▪ Online Assistance in Multiple Languages

The software includes online help systems and documentation, available in English, German, French, Spanish, Japanese and Chinese.

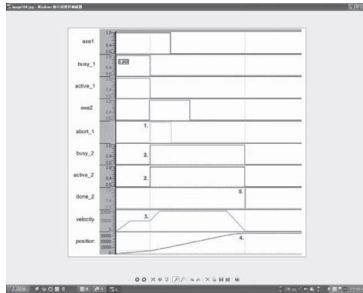
▪ Offline Simulation Tools

Program simulation is the best debug function for software developers. Before the program is downloaded into the controller, programmers can use this function to simulate programs. The easy-to-use 32 bit simulation offers fast and real-time multitasking test environment. The image below is of the simulation tool function and program with I/O status monitoring. Programmers can set the simulation value to AI or DI channels for checking the program before downloading. By simply clicking on a green input point (LED) you activate a simulator input. The output LEDs represent the actuated signal outputs in the same way.



Logic Analyzer

The Logic Analyzer is a powerful tool for recording variable values in online mode and representing them in a graph. Using the results delivered by the analyzer, you can evaluate if the program runs as expected.

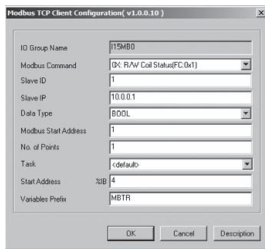


Advantech Advanced Function Blocks

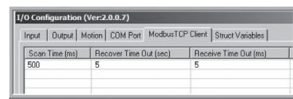
To satisfy automation applications, Advantech also add some add-on features for various dedicated control and automation applications:

- I/O Function Blocks: Used to control I/O with Advantech PAC controller. Including AI/O read FB, AI/O write FB, DI/O read FB, DI/O write FB, I/O error FB.
- SQL Database Function Blocks: Used for data log and analysis.
- Scheduling Function Blocks: Used for time scheduling control in building automation and devices schedule control applications.
- Email Function Blocks: Used for event notification and remote service applications.
- Modbus Communication Driver:

Advantech has provided an interface to monitor and control tags. This interface is accessible via Modbus/TCP as well as Modbus/RTU. The APAX controller can be treated as a Modbus Slave. The APAX Controller reserves approximately 128K Bytes memory space for Modbus use. This shared memory block can store user's data and exchange the data through Modbus/TCP and Modbus/RTU protocol with a HMI/SCADA software.



Modbus TCP Input

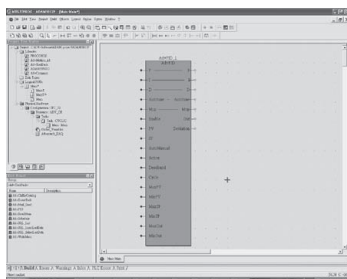


Modbus/TCP Client General Settings

Auto-Tuning PID Function Blocks

The PID function blocks provide auto-tuning functionality. This function block makes use of Proportion, Integral, and Derivative calculations to provide a control cycle function to implement modulation control, and automatically find the optimized P, I, and D parameters.

Using this control function, user can save more time on process control commissioning duty. The totally recommended PID are 32 loops, depending on customer's process application. For the flow and pressure control applications, we recommended up to 16 PID loops.

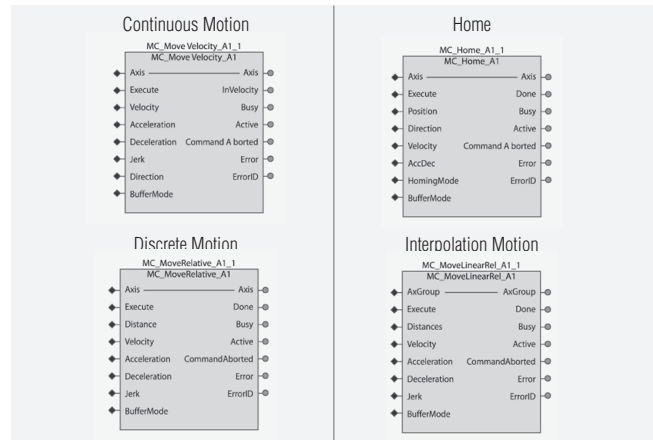


Online Change

It is not acceptable to stop a machine and shut down processes in order to carry out maintenance work. Not to mention the difficulties that occurs during the debug phase, when constant switching between development and online mode is necessary. Changes of current program can be downloaded to the targeted Advantech PAC controller after compilation and commissioned without having to stop the controller and program execution. This feature enables controller to switch between two process cycles from the "old" to the "new" code after downloading the modified program.

PLCopen Motion Control

Advantech offers motion function blocks which follow PLCopen standards. They can help system integrators to easily perform point-to-point moves, continuous moves, linear and circular interpolation and homing functionality. With the PLCopen-compliance FB, system integrators can benefit from reduced hardware cost and fully utilizing PC's high computing ability. The programmed application can be migrated to different hardware platforms in another machine development cycle.



Backup Function Blocks

APAX-5000 series delivers system backup functionality. To leverage this functionality, two controllers with the same control program, are installed in one system. After both controllers' backup function is enabled, the APAX-5000 system will automatically delegate one of the two controllers as the master controller. The control program should use the function block "AdvRdSysActiveState" to know if its controller is the master controller currently, by the parameter Value. If the Value responses "True", it means the controller is master controller, then the program should execute the control algorithm. If the Value responses "False", it means the controller is backup controller, then its program should do nothing, and simply checking if the master controller is still alive periodically. When it detect the master controller lost, it should executing the control algorithm, making it become the master controller.

Ordering Information

- MPROG-ADV46E KW Multiprog Advanced v4.6 (64 kbyte I/O)*
- MPROG-BAS46E KW Multiprog Basic v4.6 (128 bytes I/O)*
- MPROG-ADV46UE Upgrade of KW Multiprog Advanced v4.6 (64 kbyte I/O)
- MPROG-BAS46UE Upgrade of KW Multiprog Basic v4.6 (128 bytes I/O)
- MPROG-PRO535E KW Multiprog Pro v5.35 (128k bytes I/O, Win7 32-bit support)

Note:

*Using MPROG-BAS46E Basic (128 Bytes I/O), programmer can leverage 1024 points DI/O (128 Bytes*8), or 32 (APAX and ADAM-5550KW series)/64 (ADAM-5510KW series) points AI/O, or mix of DI/O and AI/O

- 1 Motion Control
- 2 Hazardous Location
- 3 Energy Automation
- 4 Building Automation Systems
- 5 Automation Software
- 6 Operator Panels
- 7 Automation Panel PCs
- 8 Industrial Monitors
- 9 Industrial Ethernet
- 10 Device Servers & Gateways
- 11 Serial Communication Cards
- 12 Embedded Auto. Computers
- 13 PACs
- 14 M2M I/O
- 15 Distributed Nano Controllers
- 16 RS-485 I/O
- 17 Ethernet I/O
- 18 DAQ Boards

PC-based Programming Software

PC-based Programming Software

Advantech PAC offers the seamless software integration for automation application. Regarded as SoftPLC, Advantech PACs not only leverage KW-Software including LD/FBD/IL/ST and SFC, but also empower many application-oriented & practice-oriented function blocks to different domain fields, such as batch control for food/beverage, auto-tuning PID for temperature control in EFMS, PLCOpen-compliant motion control blocks for a variety of trajectory control and positioning purposes in machine automation. Multi-tasking, runtime error reports and operating mode changes are also possible for PAC applications.

For PC-based users, Advantech also offers the .NET function library. System integrators can benefit from flexibility to integrate I/O control, motion control, industrial communication protocols and data process/exchange, database access, HMI interface and SCADA. Plenty of C/C++ and .NET examples save programmer learning time, helping save programmers' development effort and shortening time to market.

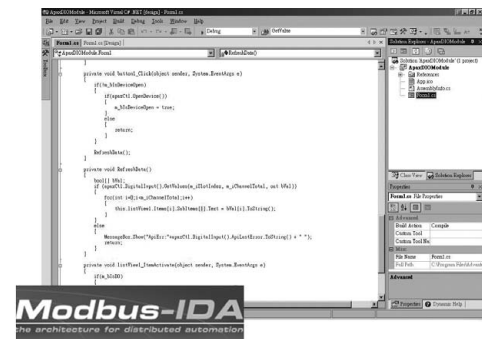
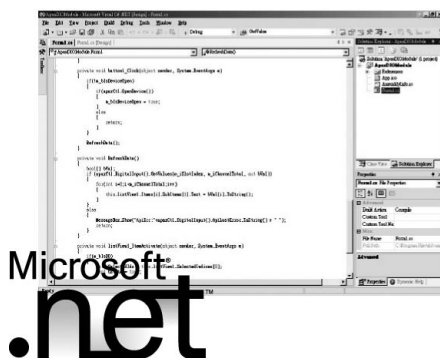


.NET and C/C++ Library

Advantech's PAC series solution offers a complete PC-based platform with Application Programming Interface (API). With C/C++ libraries and .NET class libraries provided by Advantech, PC-based programmers can develop their own programs for industrial control and automation tasks, involving I/O control, system backup function, communication, SQL and scheduling, even integrated with HMI/SCADA interface.

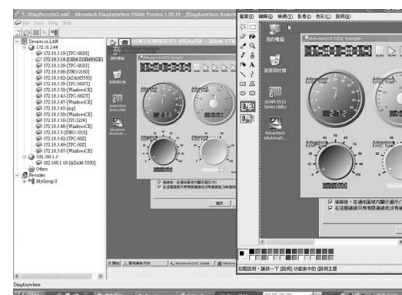
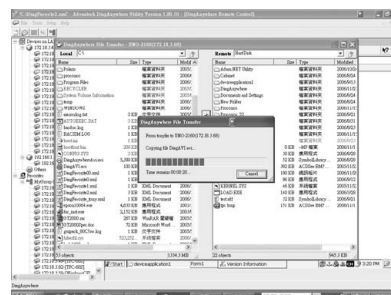
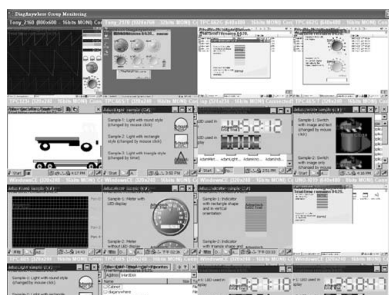
Modbus Server

Advantech's PAC series offers Modbus/RTU and Modbus/TCP for data exchange purposes. Advantech offers a series of API, including Modbus server/client configuration, easy data access function and callback function for multithread event handling. Plenty of samples programs can help you to easily set up the Modbus communication. Besides, APAX-5570 series and APAX-5520 controller has built-in Modbus server, so any Modbus client (such as HMI) can access to APAX I/O without writing programming.



DiagAnywhere – Remote Maintenance Software

DiagAnywhere, an abbreviation of "Diagnostic Anywhere", is a networking solution for remotely monitoring and controlling APAX controllers through Windows-based operating systems. It includes the utility on the client side and the server on APAX controllers. Any computer installed with the utility can connect to APAX controllers, seeing what's happens on the controller and performing remote control. It is very convenient that the engineer doesn't need use a screen to operate the controller in the field, and allows them to maintain the system on the remote site. One DiagAnywhere client can monitor and control up to 16 target controllers simultaneously. This useful software tool also supports remote screen snapshots, remote screen recording, file upload and download between utility (on the client computer) and server (APAX controller), favorite devices grouping to manage system more easily, and authentication functionality. All these features help users save maintenance cost and effort.



Batch Control Solution

Introduction

The batch control process involves a sequence of metal treatment, semiconductor crystal silicon growing, chemical or biological processes for the conversion and transport of material. The manufacturing processes can be classified as continuous and discrete control manufacturing and be processed step by step in each processes equipment. For example, a typical application is a metal heating treatment furnace: in order to convert metal ingredients for an industrial application, the metal heating process is actioned by different temperature control Set Points (SP) by a time-based, ramp/soak pattern of a PID control loop SP and in each heating period, the metal ingredients will be changed by different temperatures and other conditions.

To classify these industry applications, we call them Batch Control Industries. The control application of the manufacturing process is a combination of continuous and discrete controls. All of these manufacturing processes are time-based flow processes. The control functions are included in a PID closed-loop control that is a continuous process control function. The PID SP pattern generation function is a typical batch control function. The other is a discrete control for logic and sequence control function. Some of the applications need recipe controls and report management.

Target Applications Furnace

Furnace Applications	Chemical Applications	Healthy Applications
 Silicon Growing Furnace	 Rubber Process	 Pharmaceutical
 Metal Heat Treatment Furnace	 Dyeing Machine	 Food & Beverage
 Vacuum Furnace	 Plastics Process	 Bio-chemical Process
 Printed Circuit Board Press	 Glue Process	

Batch Control Function Highlight

Typical Process/Production Line Diagram

Advantech's batch control system focuses on a single path batch manufacturing process equipment, e.g. a heating treatment furnace for the metal used in semiconductors. Plastic and rubber manufacturing equipment, printed circuit board (PCB) manufacturing equipment or reactors for food & beverage applications. Main application functions focus on:

Process Control Functions

- Auto-tuning PID Function
- Temperature Control
- Air/Fluid Ratio Function
- Ramp/Soak Control

Motion Control

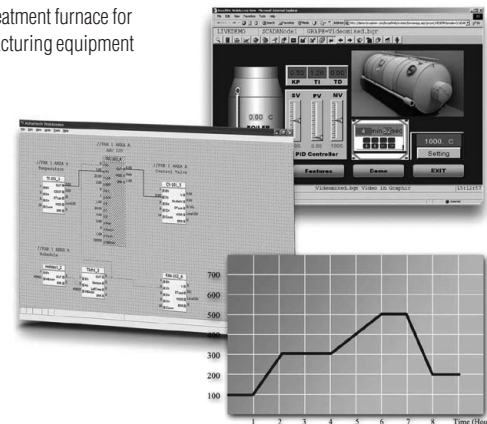
- Position & Speed

Recipe Management

- Process Parameter Configuration

Batch Report

- Daily, Weekly, Monthly, Yearly



Key Features



Guaranteed Real-time Performance

APAX I/O local bus ensures deterministic control. Contributed by the dedicated Digital Signal Processor (DSP) which handles I/O data process without controller's CPU resource, the I/O scan rate can be maintained within 1ms, regardless of the number of I/O points. Programmers can concentrate on their application program development, and the APAX system can perform real-time I/O access automatically.



Flexible Expansion Architecture

Through expansion ports on backplanes and standard Ethernet cables, a remote expansion with localbus speed can be built, and the distance can be up to 100m. A standard ethernet switch can be used between two backplanes, so line, tree or star topologies can be built for I/O expansion - all with fast local-bus speed. When fiber optic ports are available, the distance can be longer.



Hot-Swappable I/O

APAX backplanes carry communication and power to I/O modules. With a special design, the I/O modules can be hot-swapped when the system is powered-on and running. Engineers can easily change modules without shutting down the system thereby saving system management costs.



Fail Safe Value

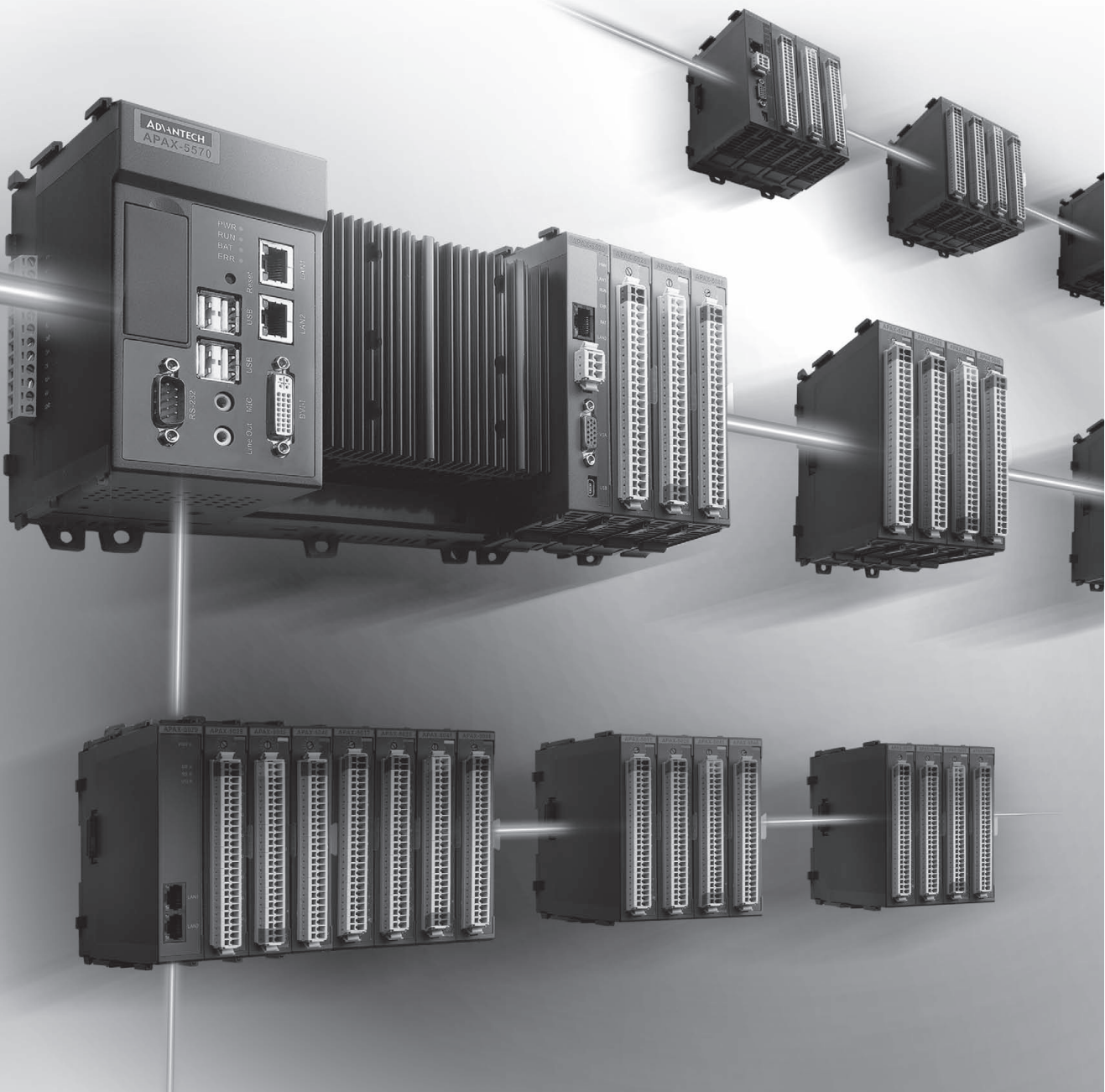
System reliability is critical for batch control applications. APAX output modules feature fail safe value settings, meaning when modules lose communication to the controller, all output channel values will be set as the pre-defined value. This can eliminate risks owing to system communication issues.

APAX Series Overview

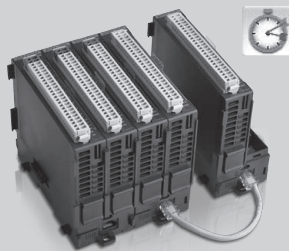
Introduction

The APAX-6000 and APAX-5000 series, are designed for industrial automation application and combine the openness and flexibility of PCs with the reliability of PLCs. APAX controllers utilize a sophisticated thermal design to ensure the system stability and the system can work under high computing by integrating multiple tasks in one platform. APAX controllers offer various storage medium and communication interfaces for data logging and networking. High performance controllers deliver custom expansion slots with PCI bus signals reserved for the integration of 3rd-party products.

The APAX series is fully Ethernet-enabled which allows users to deploy the I/O modules in many expansion combinations, like direct stack or remote expansion. It supports both DIN-rail and wall mounting which makes the installation very flexible. Furthermore, all APAX I/O modules comply with high noise immunity and excellent reliability, just like a standard PLC. The user-friendly design of this series also includes slice I/O, high density I/O with LEDs, hot swap and flexible expansion functionality.

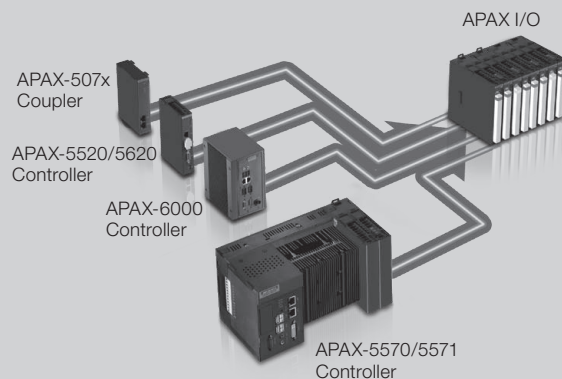


► Guaranteed Real-time Performance



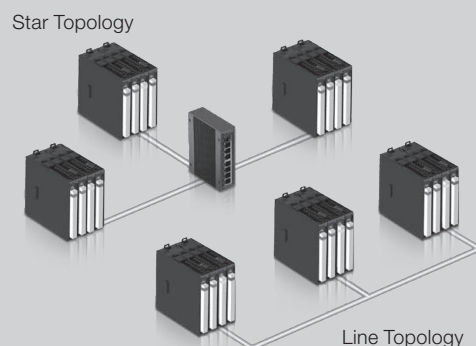
APAX I/O local bus adopts real-time I/O access methodology to ensure deterministic control with real-time performance. Contributed by the dedicated Digital Signal Processor (DSP) which handles I/O data process without controller's CPU resource, the I/O scan rate can be maintained within 1 ms, offering time deterministic I/O. The I/O processing is running on the back-end, and controller's CPU and DSP can share data through built-in dual port RAM. All these deliver real-time performance regardless of the number of I/O points. Programmers can concentrate on their application program development, and APAX system can perform real-time I/O access automatically.

► Changeable Controllers and Couplers



APAX I/O modules can be accessed by different controllers or couplers to satisfy different applications. No matter what kind of CPU or couplers are used, the APAX I/O modules are the same. Using different couplers, I/O modules can link to various real-time Ethernet and fieldbus systems. It greatly saves I/O investment and offers scalability for future needs.

► Flexible Expansion Topology



All APAX I/O modules are inserted on backplane modules. Through expansion port on backplanes and standard Ethernet cable, a remote expansion with local-bus speed between backplanes is built, and the distance can be up to 100 m. Standard Ethernet switch can be used between two backplanes. So line, tree or star topology can be built for I/O expansion - all with fast local-bus speed. The implementation of Ethernet switches not only enhances the flexibility of I/O expansion, it also increases the expansion distance. When fiber optic ports are available on the Ethernet switch, the distance can be much longer.

1

Motion Control

2

Hazardous Location

3

Energy Automation

4

Building Automation Systems

5

Automation Software

6

Operator Panels

7

Automation Panel PCs

8

Industrial Monitors

9

Industrial Ethernet

10

Device Servers & Gateways

11

Serial Communication Cards

12

Embedded Auto. Computers

13

PACs

14

M2M I/O

15

Distributed Nano Controllers

16

RS-485 I/O

17

Ethernet I/O

18

DAQ Boards

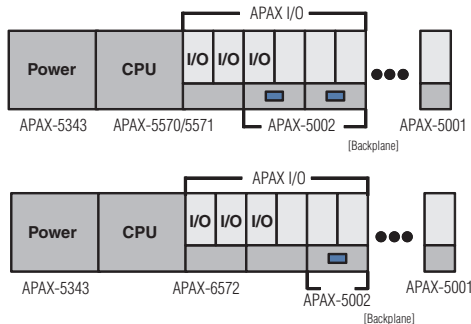
APAX System Architecture

Introduction

To simplify the system configuration, Advantech's new APAX-6000 and APAX-5000 series provide easy and flexible way to setup different functions and configurations. There are multiple APAX series system combinations that can be selected to develop reliable control systems as detailed below.

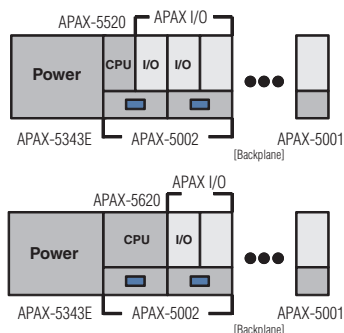
Application Ready High Performance PACs

Advantech's APAX-5570 and 6570 series offers several high performance controllers with Atom and Celeron M grade CPUs. These controllers benefit from the high throughput, openness, flexibility and connectivity brought by PC-based architectures. Contributed by excellent heat dissipation technology with no hard disks, they deliver great system reliability. Various peripheral interfaces such as LAN, USB, DVI, audio, RS-232, RS-422/485, etc. are provided. These high performance PAC controllers are suitable for many complex control applications. Besides, its powerful integration ability makes it an ideal platform to integrate video, audio, HMI/SCADA software, database, data processing into one single solution.



Robust, Compact PACs

APAX-5520/5620 series controllers offer a compact size without fans. These controllers have no rotating parts, helping further increase system reliability. APAX-5520/5620 features a VGA interface, enabling local displays, and its RS-485 and LAN ports offer communication ability with Modbus protocol. CF slot and battery backup RAM can be used for data storage. These features make APAX-5520/5620 as compact and robust as a PLC, but with enhanced displays, connectivity, and storage.



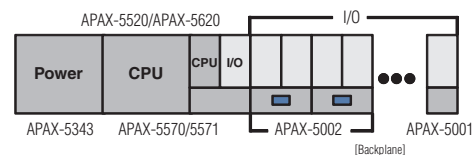
Dedicated System with Dual Controllers

APAX-6000 and APAX-5000 feature unique system architectures with two individual controllers executing different tasks, integrated into one platform. One controller focuses on I/O control processing while the other controller possesses high computing performance to be responsible for tasks like database, HMI/SCADA software, recipes, communication, storage, vision processing, and more.

For example, APAX-5570 can be one controller delivering powerful computing ability and sufficient resources to execute all other tasks except I/O processing. Another controller could be APAX-5520, concentrating on I/O control. For many control applications, I/O

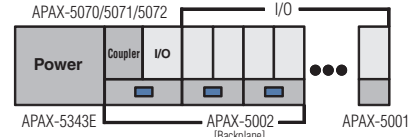
control is critical, and this dual controller architecture offers excellent reliability and efficiency. Regardless of what happens on the APAX-5570 (even if the operating system crashes), I/O control process is still secure.

Any application running on APAX-5570, such as HMI/SCADA software, can access data from APAX-5520 through Modbus protocol. HMI/SCADA software that supports Modbus clients can link to Modbus servers on APAX-5520 to get data. Advantech offers related libraries for programmers. This can significantly save a lot of development time for communication.



Scalable Systems with Remote I/O

For different fieldbus or real-time Ethernet networks, such as Modbus/TCP, Ethernet/IP, PROFINET, etc, APAX series offers different kinds of couplers for communication. Controllers, HMI, and computers in the same network can access APAX I/O modules through the coupler. Not having to change I/O modules for different fieldbus or real-time Ethernet networks helps ensuring current I/O modules' investment for future demands. These couplers feature daisy-chain design, making installation easier.

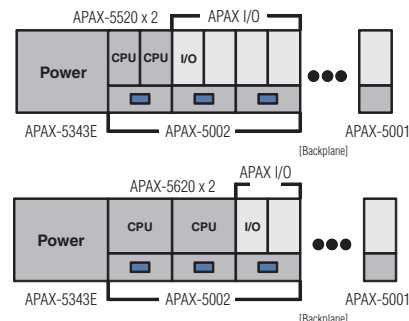


Reliable Backup System

APAX-5000 series delivers system backup functionality to significantly decrease the risk that the system will fail when the controller crashes. To leverage this, two controllers with the same control program are installed in one system. After both controllers' backup functions are enabled, APAX-5000 will automatically delegate one controller as the master controller.

The master controller will run the control program to execute the control process, while another controller (the backup controller) is put on standby. The master controller periodically sends live messages to the backup controller. If the backup controller does not receive a message from the master controller, it will automatically become the master controller and restart the control process.

If the master controller is switched, it means there was an error happening on the previous master controller. Therefore, engineers can repair or change the previous master controller and re-enable it as the backup controller. Then if the new master controller fails, the new backup controller will automatically take over the control once again. This mechanism ensures the control system will continuously run the control process.



Redundancy Function Introduction

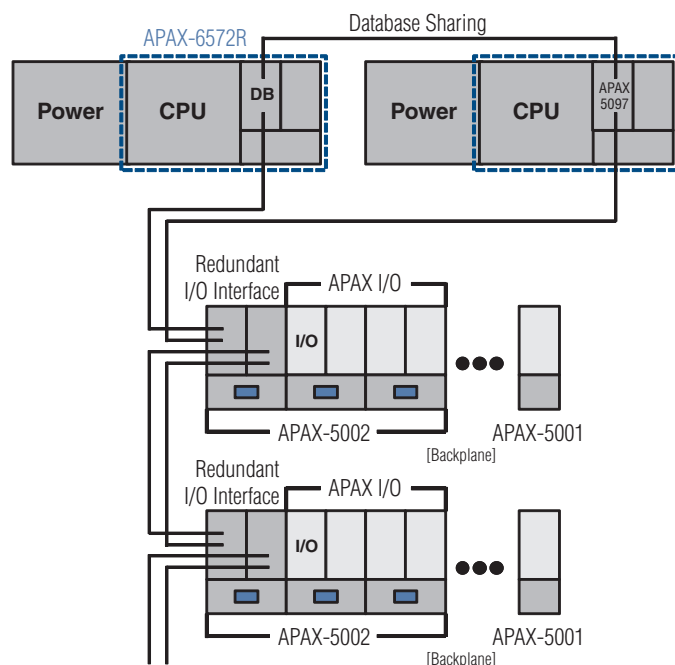
Introduction

Advantech's PAC redundancy solution is implemented in the APAX-6572R controller with ProConOS real time OS under WinCE OS environment. The hardware of the APAX-6572R includes a power supply module, CPU module, and redundant database module with fiber optic communication port to synchronize the database and variables between two controllers and a backplane. Fiber optic cable is an ideal communication media as it avoids communication noise and extends the connection distance between devices. The redundant controller APAX-6572R is a hot standby redundant system with a fast switch-over time of less than 150ms when the primary controller fails and switches control functions to a secondary controller. To ensure the switch-over time in control function, ProConOS implements trigger signal and database synchronization function which executes heart-beat checking and two times database synchronization in the IEC program.

APAX-6572R Redundancy Hardware System Architecture

Advantech's redundant solution is used on the APAX-6572 PAC controller, it has two independent control platforms for the CPU module, power supply, I/O communication, upstream Ethernet and redundant database module. The secondary controller takes over the control responsibility when primary controller fails or crashes.

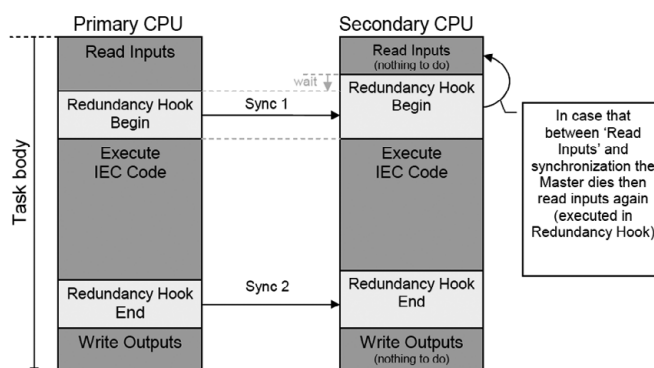
At the beginning of primary controller, the real I/O data, internal register and I/O state table are transferred to the hot standby secondary controller across a high-speed fiber optic communication link. In the event of a primary controller failure, the standby controller takes control of the system with up-to-date I/O and register status information for a bumpless, controlled transfer with minimal process impact. Critical processes which can't tolerate any disruption of control are assured a fast, smooth switch over.



APAX Redundancy System Features

- A fast database synchronization module in each controller system improves reliability by eliminating the need for an intermediate supervisor controller
- Longer distance installation of two controllers through fiber optic cable using the database synchronization module
- System control transfers occur in one program execution to increase system uptime
- Integrity of the user programs are verified in both controllers to ensure high security
- High-speed fiber optic communication links between controllers minimizes scan impact and improves productivity
- Configurable Primary State Table transfers to the standby controller provides up-to-date system integrity
- Online primary-to-standby program transfer minimizes the amount of time that the standby controller is out of service
- Supports two Modbus/TCP Ethernet ports allowing client computer communications to either controller with no custom communication drivers
- IEC 61131-3 programming language support for high availability hot standby systems
- Fast switching time of less than 150ms from preliminary to secondary controller
- All output value maintains current value when switching-over period
- Supports APAX local I/O series modules, up to 32 I/O modules
- Independent I/O communication cable to I/O modules
- Supports system self test and system failure functions for easy maintenance client computer
- Supports online debugging, analysis and repair
- I/O hot swap replacement & installation

ProConOS Operating Process: Refresh Project



Synchronization I

1. Synchronization: Secondary CPU waits on Primary CPU
2. Check life signal
3. Primary CPU sends input data.
Secondary CPU receives data and writes to process image

Synchronization II

1. Synchronization: Secondary CPU waits on Primary CPU
2. Check life signal
3. Compare output data between Primary and Secondary CPU

Note:

- The redundancy function will stop when:
1. Download or download change is executed
 2. Debug mode reaches a breakpoint
 3. One PAC stops
 4. One PAC fails

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- 14 M2M I/O
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APAX Controller Selection Guide



NEW



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System		APAX-5520	APAX-5620	APAX-5570/5571	APAX-6572
CPU		XScale PXA270 520 MHz		APAX-5570: Intel Celeron M 1 GHz APAX-5571: Intel Celeron M 1.5 GHz	Intel Atom D510 1.66 GHz
Memory		Flash 32 MB, SDRAM 64 MB		512 MB DDR2 DRAM	2 GB DDR2 DRAM
Storage		1 x CF slot		1 x SD card slot	1 x CF slot (internal)
Local Display		VGA		DVI-I	VGA
USB Ports		1 x USB 1.1		4 x USB 2.0	4 x USB 2.0
Audio		-		Mic in, Line out	Mic in, Line in, Line out
Cooling System		Fanless		APAX-5570: Fanless APAX-5571: With Fan	Fanless
Power Input		18 ~ 30 V _{DC}		18 ~ 30 V _{DC}	9 ~ 36 V _{DC}
Diagnostics LED		Power, Battery, Run, Error			Power, IDE, LAN, Serial
Real-time Clock		Yes			
Watchdog Timer		Yes			
Control Software		C/C++ library and .NET class library for C and .NET programming environment KW IEC 61131-3 SoftLogic programming tool			
Local Real-time I/O Modules		32 (max.)*			
Digital I/O Points		2048 (max.)			
Analog I/O points		512 (max.)			
Communication (Ethernet)	LAN Ports	1	2	2	3
	Speed	10/100 Mbps		10/100/1000 Mbps	10/100/1000 Mbps
	Protocol	Modbus/TCP			
Communication (Serial)	COM 1	RS-485	RS-485	RS-232	RS-232/422/485
	COM 2	-	RS-485	RS-422/485	RS-232/422/485
	COM 3	-	-	-	-
	CAN Bus	-	2	-	-
	Protocol	Modbus/RTU, CANopen (APAX-5620 only)			
Isolation	Communication	2500 V _{DC} (RS-485)	2500 V _{DC} (CAN & RS-485)	2500 V _{DC} (RS-422/485 only)	-
Environment	Operating Temperature (when mounted vertically)	-10 ~ 55°C			-10 ~ 50°C
	Storage Temperature	-40 ~ 70°C			
	Relative Humidity	0 ~ 95 % (non-condensing)			
	Vibration Protection	IEC 60068-2-64/60068-2-6: 1 Grms @ 5 ~ 500 Hz (Random, operating) 2 G @ 5 ~ 500 Hz (Sine, non-operating)		IEC 60068-2-64/2-6: 2 Grms @ 5 ~ 500 Hz (Random, operating) 2 G @ 5 ~ 500 Hz (Sine, non-operating)	IEC 60068-2-64: 2 Grms @ 5 ~ 500 Hz (Random, operating)
	Shock Protection	IEC 60068-2-27: 20 G @ wall mount		IEC 60068-2-27: 30 G @ wall mount	IEC 60068-2-27: 50 G @ wall mount
Power Supply Module (Optional)		APAX-5343E		APAX-5343	
Page		13-17	13-17	online	13-16

*APAX DI/O modules can use ID numbers 0 ~ 31, while AI/O modules and counter modules can only use ID numbers 0 ~ 15

APAX I/O Module Selection Guide



Module Name		APAX-5013	APAX-5017	APAX-5017H	APAX-5018	APAX-5028
Description		8-ch RTD Module	12-ch AI Module	12-ch High Speed AI Module	12-ch Thermocouple Module	8-ch AO Module
Analog Input	AI Channels	8	12	12	12	-
	Input Type*	RTD (2-wire or 3-wire)	V, mV, mA	V, mV, mA	V, mV, mA, Thermocouple	-
	Sampling Rate (Samples/second)	50 Hz filter: 8 (Total**) 60 Hz filter: 10 (Total**)	12 (Total**)	1000 (per channel)	12 (Total**)	-
	Input Resolution	16-bit	16-bit (voltage) 14 ~ 15-bit (current)	12-bit	16-bit (voltage) 14 ~ 15-bit (current, thermocouple)	-
	Input Accuracy	±0.1 % of FSR	±0.1 % of FSR (Voltage) ±0.2 % of FSR (Current)	±0.1 % of FSR (Voltage) ±0.2 % of FSR (Current)	±0.1 % of FSR (Voltage) ±0.2 % of FSR (Current)	-
	Voltage Input	-	±150 mV, ±500 mV, ±1 V, ±5 V, ±10 V	0 ~ 500 mV, ±10 V, 0 ~ 10 V	±50 mV, ±100 mV, ±500 mV, ±1 V, ±2.5 V	-
	Current Input	-	±20 mA, 0 ~ 20 mA, 4 ~ 20 mA	0 ~ 20 mA, 4 ~ 20 mA	±20 mA, 0 ~ 20 mA, 4 ~ 20 mA	-
	Direct Sensor Input	RTD (Pt-100, Pt-200, Pt-500, Pt-1000, Balco, Ni 518)	-	-	Thermocouple (Type J, K, T, E, R, S, B)	-
	Wire Burnout Detection	All RTD range	4 ~ 20 mA	4 ~ 20 mA	4 ~ 20 mA and all Thermocouple range	-
Analog Output	AO Channels	-	-	-	-	8
	Output Type*	-	-	-	-	V, mA
	Output Resolution	-	-	-	-	14-bit
	Output Accuracy	-	-	-	-	±0.1 % of FSR
	Output Slew Rate	-	-	-	-	0.7 VDC/μs (per channel)
	Voltage Output	-	-	-	-	±2.5 V, ±5 V, ±10 V, 0 ~ 2.5 V, 0 ~ 5 V, 0 ~ 10 V
	Current Output	-	-	-	-	0 ~ 20 mA, 4 ~ 20 mA
	Short Circuit Protection	-	-	-	-	Yes
	Fail Safe Value	-	-	-	-	Yes
General	Weight	170 g	170 g	175 g	170 g	175 g
	Operating Temperature	-10 ~ 60°C (when mounted vertically)				
	Storage Temperature	-40 ~ 85°C				
	Relative Humidity (non-condensing)	5 ~ 95%				
	Power Consumption (typical)	2.5 W @ 24 V _{DC}	4 W @ 24 V _{DC}	3.5 W @ 24 V _{DC}	3.5 W @ 24 V _{DC}	3.5 W @ 24 V _{DC}
	Isolation between channels and backplane	2500 V _{DC}				
	Power Supply Module (optional)	APAX-5343E				
Page		online	online	online	online	online

*Each channel can be configured with different type and range

**Sampling rate value depends on used channel number.

Example: Using 6 channels on APAX-5017, sampling rate for each used channel will be 12/6 = 2 samples/second.

- 1 Motion Control
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- 12 Embedded Auto. Computers
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- 18 DAQ Boards

APAX I/O Module Selection Guide



Module Name		APAX-5040	APAX-5045	APAX-5046	APAX-5060	APAX-5080
Description		24-ch DI Module	24-ch DI/O Module	24-ch DO Module	12-ch Relay Module	4/8-ch Counter Module
Digital Input	DI Channels	24	12	-	-	4
	Input Type	Sink or Source Load	Sink or Source Load	-	-	Source Load
	Rated Input Voltage	24 V _{DC}	24 V _{DC}	-	-	24 V _{DC}
	Input Voltage Range (signal "0")	-5 ~ 5 V _{DC}	-5 ~ 5 V _{DC}	-	-	0 ~ 3 V _{DC}
	Input Voltage Range (signal "1")	15 ~ 30 V _{DC} -15 ~ -30 V _{DC}	15 ~ 30 V _{DC} -15 ~ -30 V _{DC}	-	-	10 ~ 30 V _{DC}
	Rated Input Current	4.4 mA (typical)	4.4 mA (typical)	-	-	10 mA (typical)
	Input Filter	3 ms	3 ms	-	-	3 ms
	Over Voltage Protection	Yes	Yes	-	-	Yes
Counter Input	Counter Channels	-	-	-	-	8 (Up and Frequency mode) 4 (Pulse/Direction, Up/Down, A/B phase mode)
	Rated Input Voltage	-	-	-	-	24 V _{DC}
	Input Voltage Range (signal "0")	-	-	-	-	0 ~ 3 V _{DC}
	Input Voltage Range (signal "1")	-	-	-	-	10 ~ 30 V _{DC}
	Rated Input Current (signal "1")	-	-	-	-	5 ~ 15 mA (typical)
	Counting Range	-	-	-	-	32-bit + 1-bit overflow/underflow
	Counter Frequency	-	-	-	-	1 MHz (max.)
	Counter Gate and Alarm Function	-	-	-	-	Yes
Digital Output	DO Channels	-	12	24	12	4
	Output Type	-	Sink	Sink	Relay (Form A, SPST)	Sink
	Rated Output Voltage	-	24 V _{DC}	24 V _{DC}	250 V _{AC} , 30 V _{DC}	24 V _{DC}
	Rated Output Current (signal "1")	-	0.5 A	0.5 A	5 A	0.5 A
	Short Circuit Protection	-	Yes	Yes	-	Yes
	Thermal Shutdown Protection	-	Yes	Yes	-	Yes
General	Weight	160 g	165 g	165 g	195 g	170 g
	Operating Temperature	-10 ~ 60°C (when mounted vertically)				
	Storage Temperature	-40 ~ 85°C				
	Relative Humidity (non-condensing)	5 ~ 95%				
	Power Consumption (typical)	2 W @ 24 V _{DC}	2.5 W @ 24 V _{DC}	2.5 W @ 24 V _{DC}	2 W @ 24 V _{DC}	2.5 W @ 24 V _{DC}
	Isolation between channels and backplane	2500 V _{DC}				
	Channel Status LED	Yes (per channel)				
	Fail Safe Value	-	Yes (DO channel)	Yes	Yes	Yes (DO channel)
	Power Supply Module (optional)	APAX-5343E				
	Page	online	online	online	online	online

APAX Communication and Motion Module Selection Guide

Coupler Modules



NEW



NEW



Module Name		APAX-5070	APAX-5071	APAX-5072	APAX-5073
Description		Modbus/TCP Communication Coupler	PROFINET Communication Coupler	EtherNet/IP Communication Coupler	PROFIBUS Communication Coupler
Communication	Protocol	Modbus/TCP	PROFINET RT, DCP, DHCP, TCP/UDP, DNS, SNTP, ICMP		PROFIBUS
	Data Transfer Rates	10/100 Mbps	100 Mbps	10/100 Mbps	12 Mbits/s
	Connected I/O Modules	32 (max.)*			
	Digital Signals	768 (max.)			
	Analog Signals	192 (max.)			
General	Connector	2 x RJ-45 (2-channel switch, share same IP address)			1 x DB-9
	Topology	Line or star wiring			
	Operating Temperature	-10 ~ 60°C (when mounted vertically)			
	Storage Temperature	-40 ~ 85°C			
	Relative Humidity	5 ~ 95% (non-condensing)			
Page		13-21	13-22	13-21	13-22

*APAX DI/O modules can use ID number 0 ~ 31, while AI/O modules and counter modules can only use ID numbers 0 ~ 15

Communication and Motion Modules



Module Name		APAX-5090P	APAX-5095P	APAX-5202P
Description		4-port RS-232/422/485 Communication Module	2-port CANopen Master Module	2-port AMONet Master Module
Serial Communication	Baud Rate	50 bps ~ 230.4 kbps	-	-
	Data Bits	5, 6, 7, 8	-	-
	Stop Bits	1, 1.5, 2	-	-
	Parity	None, even, odd	-	-
CANopen Communication	Data Transfer Rates	-	Max. 1 Mbits/s	-
Motion	Transmission Speed	-	-	2.5, 5, 10 or 20 Mbps
	Slaves Number	-	-	1 Ring: 64 (max.) 2 Rings: 128 (max.)
General	Interface	2 x RS-422/485 2 x RS-232/422/485	2 x CAN Bus	2 x AMONet
	Connector	26-pin clamp-type terminal	DB9	RJ-45
	Operating Temperature	0 ~ 60°C (when mounted vertically)		
	Storage Temperature	-40 ~ 70°C		
	Relative Humidity	5 ~ 95% (non-condensing)		
Page		online	online	online

Note: APAX-5090P, APAX-5095P and APAX-5202P can only be used by controller with a PCI interface

- 1 Motion Control
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APAX-6572

APAX-6572R

Intel® Atom™ D510 1.66 GHz, 2 GB RAM
Controller with 3 x LAN, 2 x COM, VGA

Redundant Control System

NEW



RoHS
Compliant
2002/95/EC

CE FCC

Features

- Intel Atom D510 1.66 GHz CPU
- Onboard 2 GB DDR2 DRAM
- Redundant system with two controllers (master and slave) to ensure continuous I/O control
- Expands I/O by connecting with APAX-5000 I/O modules
- Supports Windows WES7, WES2009 and Windows CE
- Provides C/C++ and .NET library for I/O control and communication
- Supports real-time control tasks under Windows CE through ProConOS
- 2 x RS-232/422/485 (automatic flow control)
- 3 x 10/100/1000 Mbps LAN, 4 x USB 2.0

Introduction

The APAX-6572 is a high performance controller with an Intel Atom D510 CPU. By installing Windows WES7, WES2009 or Windows CE operating system, it becomes an application ready platform. It is an ideal open control platform which can be combined with APAX I/O modules, and features flexible I/O expansion, real-time I/O control, and powerful computing and networking capability through various interfaces.

The APAX-6572R is a redundant system with two controllers, both equipped with high performance CPUs to backup and monitor each other, offering excellent reliability for I/O control. Master controller performs I/O processing, while the slave controller is automatically synchronizing with master controller to update the latest database information. When the master controller fails, the slave controller automatically takes over the control responsibility in a short time.

Specifications

General

- **Certification** CE, FCC Class A
- **Cooling System** Fanless
- **Mounting** DIN-rail, Wall mount (panel mount)
- **Dimension (W x H x D)** 222 x 155 x 140 mm
- **Enclosure** Aluminum + SECC, ABS + PC (I/O)
- **Weight** 2.6 kg (APAX-6572)
2.8 kg (APAX-6572R)
- **Power Consumption** 35 W @ 24 V_{DC} (APAX-6572, Typical, Without I/O modules)
40 W @ 24 V_{DC} (APAX-6572R, Typical, Without I/O modules)
- **Power Requirement** 10 ~ 36 V_{DC} (e.g +24 V @ 1 A) (Min. 24 W), AT
- **Watchdog Timer** Programmable 7-tier event handler, from 1 ~ 255 seconds for each tier
- **Switchover Timer** ≤50 ms (For APAX-6572R)

System Hardware

- **CPU** Intel Atom D510 1.66 GHz
- **Memory** 2 GB DDR2 DRAM (onboard)
- **Battery Backup SRAM** 1 MB
- **Watchdog Timer** Programmable 7-tier event handler, from 1 ~ 255 seconds for each tier
- **LED Indicators** Power, CF, LAN (Active, Status), Serial (Tx, Rx)
- **Display** VGA (DB15 connector), up to 1600 x 1200 @ 85Hz
- **Audio** Line in, Line out, Mic in
- **Storage** 1 x internal Type I/II CompactFlash card slot

Software

- **Operating System** Windows WES7, WES2009, Windows CE
- **Control Software** C/C++ and .NET library with utility
KW MultiProg (development), ProConOS (kernel)
- **Remote Management** Built-in Advantech DiagAnywhere agent
Modbus/ASCII master/slave mode
KW MultiProg (development), ProConOS (kernel)

I/O Expansion

- **Built-in I/O Module Slots** 4 (APAX-6572)
3 (APAX-6572R)
- **Connected I/O Modules** 32 (max.)*
- **Digital Signals** 2048 (max.)
- **Analog Signals** 512 (max.)

Communication

- **Serial Ports** 2 x RS-232/422/485 (supports automatic RS-485 data flow control)
- **Serial Baud Rate** 50 ~ 115.2 kbps
- **LAN Ports** 3 x RJ-45 Ports, 10/100/1000 Mbps
- **USB Ports** 4 x USB 2.0

Environment

- **Operating Temperature** -10 ~ 50°C (when mounted vertically)
- **Storage Temperature** -40 ~ 70°C
- **Operating Humidity** 20 ~ 95% (non-condensing)
- **Storage Humidity** 0 ~ 95% (non-condensing)
- **Shock Protection** 50 G @ wall mount, half sine, 11 ms
(Conforms to IEC 60068-2-27)
- **Vibration Protection** 2 Grms @ 5 ~ 500 Hz
(Random, operating, 1hr/axis)
(Conforms to IEC 60068-2-64)

Ordering Information

- **APAX-6572-AE** Intel Atom D510 1.66 GHz, 2 GB RAM Controller
- **APAX-6572R-AE** Redundant Control System

*APAX DI/O modules can use ID number 0 ~ 31, while AI/O modules and counter modules can only use ID numbers 0 ~ 15

APAX-5520CE/KW

APAX-5620CE/KW

PAC with Marvel
XScale® CPU

PAC with Marvel
XScale® CPU and CAN



APAX-5520CE/KW



Specifications

General

- **Certification** CE, FCC class A
- **Dimension (W x H x D)** 30 x 139 x 100 mm
- **Enclosure** ABS+PC
- **Weight** 210 g
- **Power Consumption** 4.5 W @ 24 V_{DC} (typical)

System Hardware

- **CPU** Intel XScale PXA270 520 MHz
- **Memory Flash** 32M bytes, SDRAM 64M bytes
- **Battery Backup Memory** 256 KB file system, 256 KB direct access
- **Real-time Clock** Yes
- **Watchdog Timer** Yes
- **VGA** DB15 connector
- **SB Ports** 1 x USB 1.1
- **Storage** 1 x Type II CompactFlash card slot

Software

- **OS Support** Windows CE
- **Control Software** C/C++ and .NET library
KW Multiprog (development tool)
KW ProConOS (runtime kernel)

I/O Expansion

- **Connected I/O Modules** 32 (max.)*
- **Digital Signals** 2048 (max.)
- **Analog Signals** 512 (max.)

Communication (Ethernet)

- **LAN Ports** 1 x RJ-45 Port, 10/100 Mbps
- **Offers Modbus/TCP Server and Client APIs**

Communication (Serial)

- **Medium** 1 x Isolated RS-485 (2-wire, isolated)
- **Offers Modbus/RTU Master and Slave APIs**

Environment

- **Operating Temperature** -10 ~ 55°C (when mounted vertically)
- **Storage Temperature** -40 ~ 70°C
- **Relative Humidity** 5 ~ 95% (non-condensing)

Ordering Information

- **APAX-5520CE** PAC with Marvel XScale CPU, WinCE
- **APAX-5520KW** PAC with Marvel XScale CPU, KW

Accessories

- **APAX-5002** 2-slot Backplane Module
- **APAX-5343E** Power Supply for APAX Expansion Module

*APAX DI/O modules can use ID number 0 ~ 31, while AI/O modules and counter modules can only use ID numbers 0 ~ 15

NEW



APAX-5620CE/KW



Specifications

General

- **Certification** CE, FCC class A
- **Dimension (W x H x D)** 60 x 139 x 100 mm
- **Enclosure** ABS+PC
- **Weight** 310 g
- **Power Consumption** 5 W @ 24 V_{DC} (typical)

System Hardware

- **CPU** Intel XScale PXA270 520 MHz
- **Memory Flash** 32M bytes, SDRAM 64M bytes
- **Battery Backup Memory** 256 KB file system, 256 KB direct access
- **Real-time Clock** Yes
- **Watchdog Timer** Yes
- **VGA** DB15 connector
- **USB Ports** 1 x USB 1.1
- **Storage** 1 x Type II CompactFlash card slot

Software

- **OS Support** Windows CE
- **Control Software** C/C++ and .NET library
KW Multiprog (development tool), KW ProConOS (runtime kernel)

I/O Expansion

- **Connected I/O Modules** 32 (max.)*
- **Digital Signals** 2048 (max.)
- **Analog Signals** 512 (max.)

Communication (Ethernet)

- **LAN** 2 x RJ-45 Port, 10/100 Mbps
- **Offers Modbus/TCP Server and Client APIs**

Communication (Serial)

- **Medium** 2 x Isolated RS-485 (2-wire, isolated)
- **Offers Modbus/RTU Master and Slave APIs**

Communication (CAN)

- **Medium** 2 x Isolated CAN
- **Protocol** CANopen
- **Speed** maximum 1 Mbit/s

Environment

- **Operating Temperature** -10 ~ 55°C (when mounted vertically)
- **Storage Temperature** -40 ~ 70°C
- **Relative Humidity** 5 ~ 95% (non-condensing)

Ordering Information

- **APAX-5620CE** PAC with Marvel XScale CPU, CAN, WinCE
- **APAX-5620KW** PAC with Marvel XScale CPU, CAN, KW

Accessories

- **APAX-5002** 2-slot Backplane Module
- **APAX-5343E** Power Supply for APAX Expansion Module

- 1 Motion Control
- 2 Hazardous Location
- 3 Energy Automation
- 4 Building Automation Systems
- 5 Automation Software
- 6 Operator Panels
- 7 Automation Panel PCs
- 8 Industrial Monitors
- 9 Industrial Ethernet
- 10 Device Servers & Gateways
- 11 Serial Communication Cards
- 12 Embedded Auto. Computers
- 13 PACs
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- 16 RS-485 I/O
- 17 Ethernet I/O
- 18 DAQ Boards

APAX-5082

8-ch Pulse Width Modulation Module

NEW



CE FCC



Features

- 8-ch pulse width modulation output
- Automatic generation of PWM output by hardware, without software effort
- PWM frequency up to 30kHz with 0.1 ~ 99.9% duty cycle
- Built-in 6-ch DI and DO for convenient usage

Introduction

APAX-5082 is a 8-ch pulse width modulation module and designed to control analog circuit. It uses digital outputs to generate a waveform with variant duty cycle and frequency to control analog circuits. The PWM frequency is up to 500kHz and the range of duty cycle is from 0.1% to 99.9%. It also has built-in 6-ch DI and DO for easy and convenience usage without additional digital I/O modules.

Specifications

General

- **Dimension (W x H x D)** 30 x 139 x 100 mm
- **Weight** 165 g
- **Power Consumption** 2.5 W @ 24 V_{DC} (Typical)
- **Status Display** LED per channel
On: Logic level 1
Off: Logic level 0

Isolated Pulse Width Output

- **Channels** 8
- **Pulse Frequency** 0 ~ 30kHz
- **Duty Ratio** 0.1 ~ 99.9%
- **Resolution** 16 bits
- **Output Voltage Range** 8 ~ 35 V_{DC}
- **Normal Output Current** 0.5A (per channel)
- **Isolation Protection** 2,500 V_{DC}

Isolated Digital Input

- **Channel** 6
- **Type** Sink/Source (Wet Contact)
- **Input Voltage** For "0" Signal: -5 ~ 5 V_{DC}
For "1" Signal: 15 ~ 30 V_{DC} & -15 ~ -30 V_{DC}
- **Maximum Input Current** 7.3 mA
- **Input Impedance** 5.4k Ω
- **Input Filter** 3 ms
- **Isolation Protection** 2,500 V_{DC}

Isolated Digital Output

- **Channel** 6
- **Type** Sink
- **Voltage Range** 8 ~ 35 V_{DC}
- **Rated Output Current at Signal "1"** 0.5 A (per channel)
- **Permitted Output Current at Signal "1"** max. 0.75 A
- **Output Current at Signal "0"** 0.1 mA
- **Lamp Load** max. 5 W
- **On-State Voltage Drop** 0.15 V at 0.5 A
- **Switch Rate**
For Resistive Load max. 300 Hz
For Inductive Load max. 20 Hz
For Lamp Load max. 200 Hz
(Using 5W lamp and testing under 24 V)
- **Isolation Protection** 2,500 V_{DC}

Environment

- **Operating Temperature** -10 ~ 60°C
- **Storage Temperature** -40 ~ 70°C
- **Relative Humidity** 5 ~ 95% (non-condensing)

Ordering Information

- **APAX-5082** 8-ch Pulse Width Modulation Module
- **APAX-5001** 1-slot Backplane Module
- **APAX-5002** 2-slot Backplane Module

APAX-5343/E APAX-5001/5002/5002L

**Power Supply for APAX-5570
Series/ APAX Expansion
Modules**
**1-slot/2-slot Backplane
Modules**

NEW



APAX-5343

APAX-5343E



Specifications

Input

- **Rated Voltage** 115/230 V_{AC}
- **Voltage Range** 90 ~ 264 V_{AC}
- **Rated Input Current** 1.5 A (at rated load)
- **Rated Input Frequency** 50/60 Hz
- **Input Frequency Range** 47 ~ 63 Hz
- **Inrush Current Limit** < 50 A

Output

- **Output Power** 72 W
- **Power Loss** about 8~9 W (at rated load)
- **Efficiency** > 88% (at rated load)
- **Rated Voltage** 24 V_{DC}
- **Rated Output Current** 3 A
- **Output Current Limit** 3.5 ~ 4.3 A
- **Residual Ripple** < 240 mVpp
- **Startup Delay** < 3 second
- **Voltage Rise** 60 ms (typical)

Protection

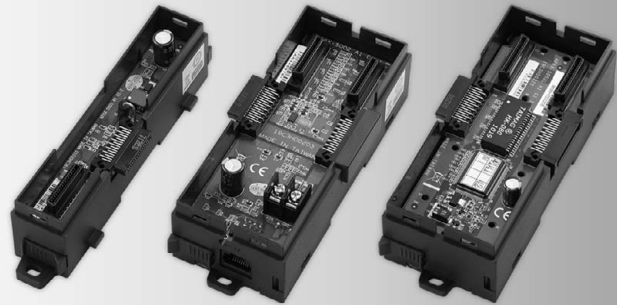
- **Isolation Protection (In/Out)** 4242 V_{DC}
- **Output Over Voltage Protection** shutdown as approximate 25 ~ 27 V_{DC}, latch off mode
- **Over Load Protection** auto-recovery mode
- **Short Circuit Protection** auto-recovery mode

General

- **Certifications** CE, FCC class A, UL 508, Energy Star
- **Dimensions (W x H x D)** 75 x 151 x 115 mm
- **Enclosure** PC
- **Operating Temperature** 0 ~ 50°C (mounted vertically)
- **Storage Temperature** -20 ~ 75°C
- **Relative Humidity** 5 ~ 95% (non-condensing)
- **Mounting** DIN-rail, wall mount (panel mount)

Ordering Information

- **APAX-5343-AE** Power Supply for APAX-5570 Series
- **APAX-5343E-AE** Power Supply for APAX Expansion Module



APAX-5001

APAX-5002

APAX-5002L



Specifications

General

- **Certifications** CE, FCC class A
- **Dimensions (W x H x D)** 28 x 151 x 38 mm (APAX-5001)
54 x 151 x 38 mm (APAX-5002, APAX-5002L)
- **Enclosure** ABS+PC
- **Weight** 70 g (APAX-5001)
120 g (APAX-5002, APAX-5002L)
- **Mounting** DIN-rail, Wall mount (panel mount)
- **Power Consumption** 0.3 W @ 24 V_{DC} (APAX-5001)
1.3 W @ 24 V_{DC} (APAX-5002, APAX-5002L)
- **Power Input** 18 ~ 30 V_{DC}
- **Slot Number** 1 (APAX-5001)
2 (APAX-5002, APAX-5002L)

Environment

- **Operating Temperature** 0 ~ 60°C (when mounted vertically)
- **Storage Temperature** -25 ~ 75°C
- **Relative Humidity** 5 ~ 95% (non-condensing)

Ordering Information

- **APAX-5001-AE** 1-slot Backplane Module
- **APAX-5002L-AE** 2-slot Backplane Module
- **APAX-5002-AE** 2-slot Backplane Module with RJ-45 Port

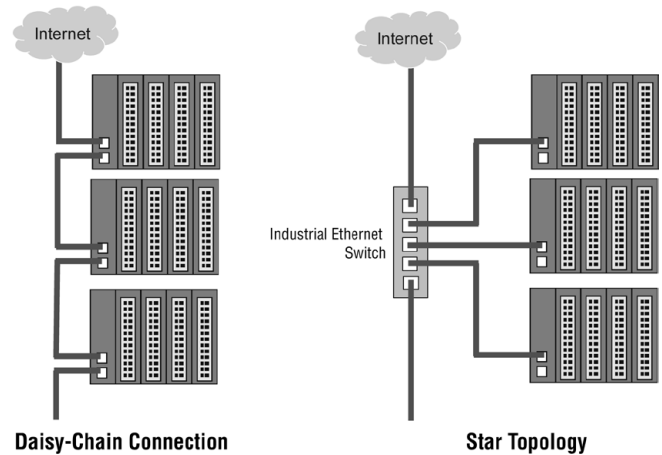
	Slot Number	Expansion Port (RJ-45)	Power Input Terminal
APAX-5001	1	N/A	N/A
APAX-5002L	2	N/A	N/A
APAX-5002	2	Yes	Yes

- 1 Motion Control
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- 11 Serial Communication Cards
- 12 Embedded Auto. Computers
- 13 PACs
- 14 M2M I/O
- 15 Distributed Nano Controllers
- 16 RS-485 I/O
- 17 Ethernet I/O
- 18 DAQ Boards

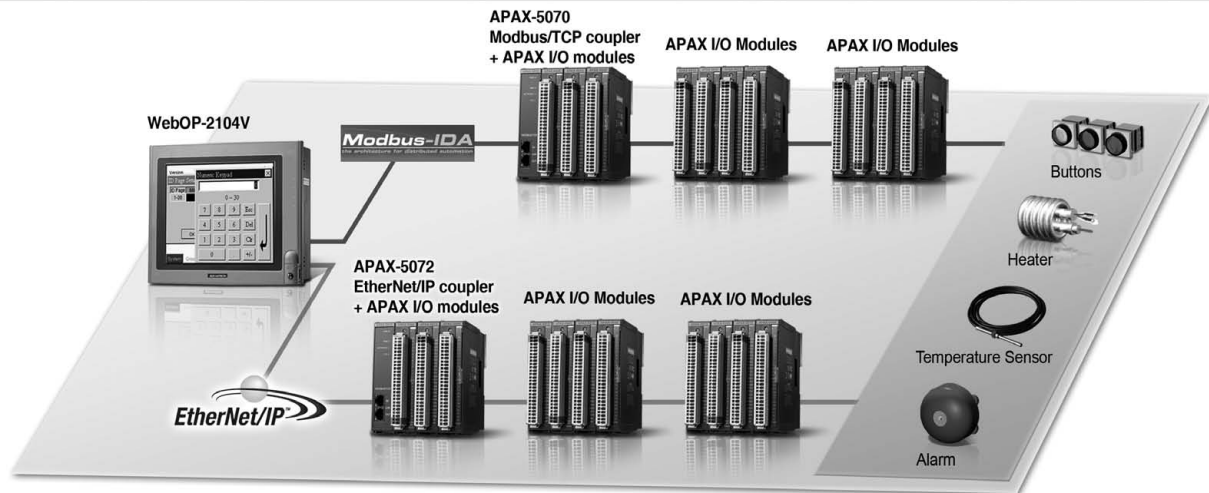
Remote I/O Solution Introduction

APAX and ADAM-5000 series I/O modules can be stacked with APAX and ADAM controllers to deliver excellent real-time control performance, allowing users to form centralized control systems. However, many applications require multiple I/O stations with a certain amount of I/O points, and these stations can be located in different places to build distributed systems. A lot of industrial fieldbus and real-time Ethernet products and communication protocols have been developed to satisfy these demands. APAX I/O modules can link to different networking types through specific APAX coupler modules to leverage these commonly used industrial networking protocols. For example, using the APAX-5070 Modbus/TCP coupler, APAX I/O modules can link to Modbus/TCP networks. With a coupler attached, APAX I/O modules can also function as remote I/O stations, which can be distributed in different locations for data acquisition and control tasks. All APAX couplers support both daisy-chain and star topologies as well.

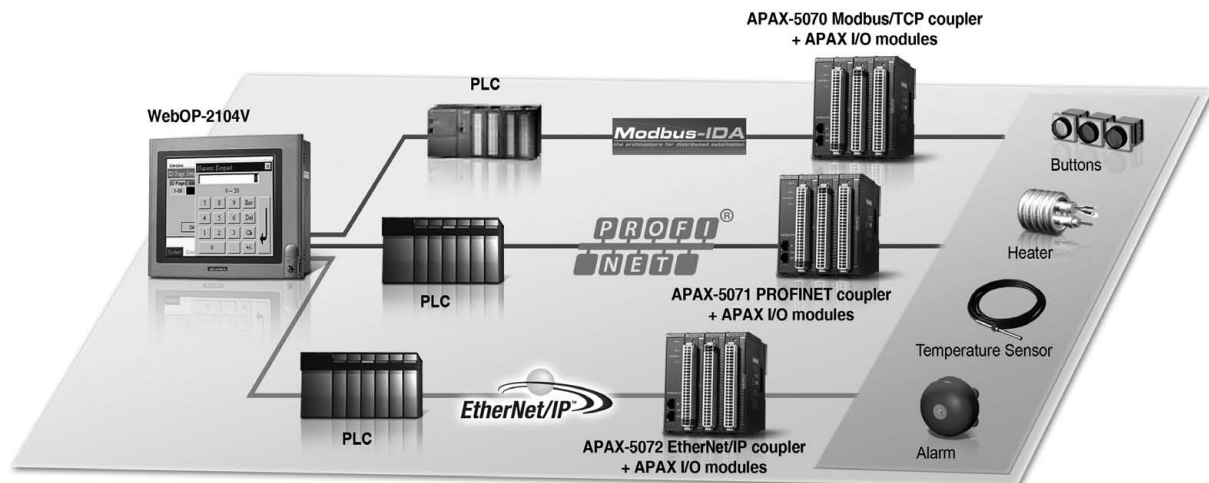
HMI, embedded automation computers, or PLCs that support the same protocol as the coupler can control remote APAX I/O modules. By changing coupler module, APAX I/O modules can link to different fieldbus and real-time Ethernet networks.



Remote Data Acquisition System with HMI



Control System with HMI



APAX-5070

APAX-5072

Modbus/TCP Communication Coupler

EtherNet/IP Communication Coupler



APAX-5070



Specifications

General

- **Certification** CE, FCC class A
- **Dimension (W x H x D)** 30 x 139 x 100 mm
- **Enclosure** ABS+PC
- **Weight** 190 g
- **Connector** 2 x RJ-45 (2-channel switch, share same IP address)
- **Power Consumption** 2 W @ 5 V_{DC} (typical)

Communication

- **Protocol** Modbus/TCP
- **Connected I/O Modules** 32 (max.)*
- **Digital Signals** 768 (max.)
- **Analog Signals** 192 (max.)
- **Data Transfer Rates** 10/100 Mbps
- **Topology** Line or star
- **Isolation Protection** 1,500 V_{AC}

Environment

- **Operating Temperature** -10 ~ 60°C (mounted vertically)
- **Storage Temperature** -40 ~ 85°C
- **Relative Humidity** 5 ~ 95% (non-condensing)
- **Shock Protection** 10 G @ wall mount, half sine, 11 ms (Confirms to IEC 60068-2-27)
- **Vibration Protection** 1 Grms @ 5 ~ 500 Hz (Random, operating, 1 hr/axis)
2 G @ 5 ~ 500 Hz (Sine, non-operating, 1 hr/axis)
(Confirms to IEC 60068-2-64 and IEC 60068-2-6)

Ordering Information

- **APAX-5070-AE** Modbus/TCP Communication Coupler

Accessories

- **APAX-5002-AE** 2-slot Backplane Module
- **APAX-5343E-AE** Power Supply for APAX Expansion Module



APAX-5072



Specifications

General

- **Certification** CE, FCC class A
- **Dimension (W x H x D)** 30 x 139 x 100 mm
- **Enclosure** ABS+PC
- **Weight** 180 g
- **Connectors** 2 x RJ-45 (2-channel switch, share same IP address)
- **Power Consumption** 2 W @ 5 V_{DC} (typical)

Communications

- **Protocol** EtherNet/IP
- **Connected I/O Modules** 32 (max.)*
- **Digital Signals** 768 (max.)
- **Analog Signals** 192 (max.)
- **Data Transfer Rates** 10/100 Mbps
- **Topology** line or star
- **Isolation Protection** 1,500 V_{AC}

Environment

- **Operating Temperature** -10 ~ 60°C (mounted vertically)
- **Storage Temperature** -40 ~ 85°C
- **Relative Humidity** 5 ~ 95% (non-condensing)
- **Shock Protection** 10 G @ wall mount, half sine, 11 ms (Confirms to IEC 60068-2-27)
- **Vibration Protection** 1 Grms @ 5 ~ 500 Hz (Random, operating, 1 hr/axis)
2 G @ 5 ~ 500 Hz (Sine, non-operating, 1 hr/axis)
(Confirms to IEC 60068-2-64 and IEC 60068-2-6)

Ordering Information

- **APAX-5072-AE** EtherNet/IP Communication Coupler

Accessories

- **APAX-5002-AE** 2-slot Backplane Module
- **APAX-5343E-AE** Power Supply for APAX Expansion Module

- 1 Motion Control
- 2 Hazardous Location
- 3 Energy Automation
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- 5 Automation Software
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- 11 Serial Communication Cards
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- 13 PACs
- 14 M2M I/O
- 15 Distributed Nano Controllers
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- 17 Ethernet I/O
- 18 DAQ Boards

*APAX DI/O modules can use ID number 0 ~ 31, while AI/O modules and counter modules can only use ID numbers 0 ~ 15

APAX-5071

APAX-5073

PROFINET Communication Coupler

PROFIBUS Communication Coupler

NEW



APAX-5071



Specifications

General

- **Certification** CE, FCC class A
- **Dimension (W x H x D)** 30 x 139 x 100 mm
- **Enclosure** ABS+PC
- **Weight** 180 g
- **Connector** 2 x RJ-45 (2-channel switch, share same IP address)
- **Power Consumption** 2 W @ 5 V_{DC} (typical)

Communication

- **Protocol** PROFINET RT
- **Connected I/O Modules** 32 (max.)*
- **Digital Signals** 768 (max.)
- **Analog Signals** 192 (max.)
- **Data Transfer Rates** 10/100 Mbps
- **APAX IO Topology** Line or Star

Environment

- **Operating Temperature** -10 ~ 60°C (mounted vertically)
- **Storage Temperature** -40 ~ 85°C
- **Relative Humidity** 5 ~ 95% (non-condensing)
- **Shock Protection** 10 G @ wall mount, half sine, 11 ms (Confirms to IEC 60068-2-27)
- **Vibration Protection** 1 Grms @ 5 ~ 500 Hz (Random, operating, 1 hr/axis)
2 G @ 5 ~ 500 Hz (Sine, non-operating, 1 hr/axis)
(Confirms to IEC 60068-2-64 and IEC 60068-2-6)

Ordering Information

- **APAX-5071** PROFINET Communication Coupler

Accessories

- **APAX-5002** 2-slot Backplane Module
- **APAX-5343E** Power Supply for APAX Expansion Module

NEW



APAX-5073



Specifications

General

- **Certification** CE, FCC class A
- **Dimension (W x H x D)** 30 x 139 x 100 mm
- **Enclosure** ABS+PC
- **Weight** 180 g
- **Connectors** DB-9
- **Power Consumption** 2 W @ 5 V_{DC} (typical)

Communications

- **Protocol** PROFIBUS-DP
- **Connected I/O Modules** 32 (max.)*
- **Digital Signals** 768 (max.)
- **Analog Signals** 192 (max.)
- **Data Transfer Rates** 12Mbps/s
- **APAX IO Topology** Line or Star
- **Isolation Protection** 2,500 V_{AC}

Environment

- **Operating Temperature** -10 ~ 60°C (mounted vertically)
- **Storage Temperature** -40 ~ 85°C
- **Relative Humidity** 5 ~ 95% (non-condensing)
- **Shock Protection** 10 G @ wall mount, half sine, 11 ms (Confirms to IEC 60068-2-27)
- **Vibration Protection** 1 Grms @ 5 ~ 500 Hz (Random, operating, 1 hr/axis)
2 G @ 5 ~ 500 Hz (Sine, non-operating, 1 hr/axis)
(Confirms to IEC 60068-2-64 and IEC 60068-2-6)

Ordering Information

- **APAX-5073** PROFIBUS Communication Coupler

Accessories

- **APAX-5002** 2-slot Backplane Module
- **APAX-5343E** Power Supply for APAX Expansion Module

*APAX DI/O modules can use ID number 0 ~ 31, while AI/O modules and counter modules can only use ID numbers 0 ~ 15

ADAM-5000 Series



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 controllers.

Distributed I/O Systems

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.

PC-based Controllers

Ethernet-enabled PC-based Controllers

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.

ADAM-5550CE features AMD GX2 CPU running Windows CE operating system. Users can use Microsoft Visual Studio .NET to develop the application program.

ADAM-5550KW and ADAM-5510KW series allow users leverage IEC 61131-3 SoftLogic programming environment to complete their automation task.

- 1 Motion Control
- 2 Hazardous Location
- 3 Energy Automation
- 4 Building Automation Systems
- 5 Automation Software
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Distributed I/O Systems & PC-based Controllers

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 resets the system. Node ID setting is easily accomplished by setting a DIP switch on the front of the system.

Easy Installation and Networking

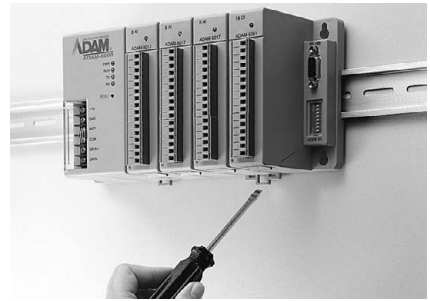
The ADAM-5000 series can be easily mounted on a DIN-rail or on a panel. Signal connections, network modifications and maintenance are simple and quick. Building a multi-drop network only requires a single twisted pair of wires.

Proven for Industrial Environments

The ADAM-5000 series can operate in industrial environments at temperatures between -10 and 70°C, and can use unregulated power sources between 10 and 30 V_{DC}. 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.



DIN-rail Mounting

Installed on industrial standard DIN-rails



Panel/Wall Mounting

Flat surface system mounting



Node ID Setting

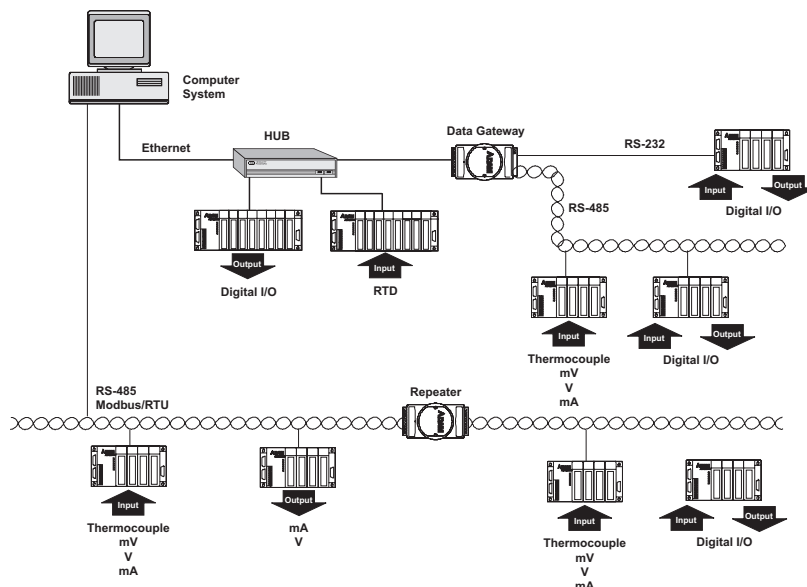
8-pin dip switch configuration



Connection

Pre-wired plug-in terminals with I/O modules

Simple & Low Cost Network



ADAM-5000 Controller Selection Guide



System		ADAM-5510M ADAM-5510KW	ADAM-5510E	ADAM-5510/TCP ADAM-5510KW/TCP	ADAM-5510E/TCP ADAM-5510EKW/TP	ADAM-5560CE ADAM-5560KW
CPU		80188				Intel Atom Z510P 1.1 GHz
RAM		640 KB				1 GB DDR2 SDRAM
Flash ROM		256 KB				-
Flash Memory		256 KB				-
Flash Disk		1 MB				-
OS		ROM-DOS				WinCE
Control Software		ADAM-5510M: Borland C ADAM-5510KW: KW SoftLogic	Borland C	ADAM-5510/TCP: Borland C ADAM-5510KW/TCP: KW SoftLogic	ADAM-5510E/TCP: Borland C ADAM-5510EKW/TP: KW SoftLogic	ADAM-5560CE: C/C++ and .NET ADAM-5560KW: KW SoftLogic
Real-time Clock		Yes				
Watchdog Timer		Yes				
COM1		RS-232	RS-232/485	RS-232	RS-232/RS-485	RS-232/485
COM2		RS-485				
COM3 (Programming)		RS-232 (TX, RX, GND)				RS-232/485
COM4		RS-232/485				
I/O Slots		4	8	4	8	7
Power Consumption		4 W				17 W
Isolation	Communication	2,500 V _{DC} (COM2 RS-485)				2,500 V _{DC} (COM2 RS-485) 1,500 V _{DC} (COM1, COM3, COM4 RS-485)
	Communication Power	3,000 V _{DC}				
	I/O Module	3,000 V _{DC}				
Diagnosis	Status Display	Power, CPU, Communication, Battery				Power, User Define
	Self Test	Yes, while ON				
	Software Diagnosis	Yes				
Communication	Network	RS-232/485		Ethernet (RJ-45)		Ethernet (2 x RJ-45)
	Speeds	1,200 bps ~ 115.2 kbps		10/100 Mbps		10/100 Mbps
	Max. Distance	4,000 feet (1.2 km)		150 m		150 m
	Data Format	N, 8, 1, 1		-		-
	Max. Nodes	32	32	256 for Ethernet, 32 for RS-485	256 for Ethernet, 32 for RS-485	256 for Ethernet, 32 for RS-485
	Protocol	User Defined, Modbus/RTU	User Defined, Modbus/RTU	User Defined, Modbus/RTU, Modbus/TCP	User Defined, Modbus/RTU, Modbus/TCP	Modbus/RTU, Modbus/TCP
	Remote I/O	Modbus Device				
	Power Requirements	10 ~ +30 V _{DC}				
Environment	Operating Temperature	-10 ~ 70°C (14 ~ 158°F)				0 ~ 55°C (32 ~ 131°F)
	Storage Temperature	-25 ~ 85°C (-13 ~ 185°F)				
	Humidity	5 ~ 95%				
Page		online	online	online	online	13-32

- 1 Motion Control
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Controller Selection Guide



System		ADAM-5000/485	ADAM-5000E	ADAM-5000L/TCP	ADAM-5000/TCP
CPU		80188	80188	RISC CPU	
RAM		-	-	4 MB	
Flash ROM (User AP)		-	-	512 KB	
Flash Memory (Data Storage)		-	-	-	
Flash Disk		-	-	-	
OS		-	-	real-time OS	
Timer BIOS		-	-	-	
Real-time Clock		-	-	-	
Watchdog Timer		Yes			
I/O Slots		4	8	4	8
Power Consumption		3 W		4.0 W	5.0 W
Isolation	Communication	2,500 V _{DC}	3,000 V _{DC}	RS-485: 1,500 V _{DC}	
	Communication Power	3,000 V _{DC}			
	I/O Module	3,000 V _{DC}			
Diagnosis	Status Display	Power, CPU, Communication		Power, CPU, Error Diagnostic, Communication	
	Self Test	Yes, while ON			
	Software Diagnosis	Yes			
Communication	Interface	RS-232/485 (2-wire)	RS-232/485 (2-wire)	Ethernet	
	Speeds (bps)	1,200, 2,400, 4,800, 9,600, 19.2 K, 38.4 K, 57.6 K, 115.2 K	1,200, 2,400, 4,800, 9,600, 19.2 K, 38.4 K, 57.6 K, 115.2 K	10 M, 100 M	
	Max. Distance	4,000 feet (1.2 km)	4,000 feet (1.2 km)	100 m without repeater	
	Data Format	Advantech protocol: N, 8, 1 Modbus protocol: N, 8, 1 N, 8, 2 E, 8, 1 O, 8, 1	Advantech protocol: N, 8, 1 Modbus protocol: N, 8, 1 N, 8, 2 E, 8, 1	TCP/IP	
	Max. Nodes	128	128	Depend on IP address	
	Protocols	ADAM ASCII/Modbus Protocol	ADAM ASCII/Modbus Protocol	Modbus/TCP	
	Remote I/O	-	-	20 nodes Modbus devices	
	Power Requirements	+10 ~ +30 V _{DC}			
	Environment	Operating Temperature	-10 ~ 70°C (14 ~ 158°F)		
Storage Temperature		-25 ~ 85°C (-13 ~ 185°F)			
Humidity		5 ~ 95%			
Page		online	online	online	online

ADAM-5000 I/O Module Selection Guide

Analog Input/Output Modules



Module		ADAM-5013	ADAM-5017	ADAM-5017P	ADAM-5017UH	ADAM-5018
Analog Input	Resolution	16 bit	16 bit	16 bit	12 bit	16 bit
	Input Channel	3	8	8	8	7
	Sampling Rate	10 (total*)	10 (total*)	10 (total*)	200K**	10 (total*)
	Voltage Input	-	±150 mV, ±500 mV ±1 V, ±5 V, ±10 V	±150 mV, ±500 mV ±15V, ±10V, ±5 V, ±1 V 0 ~ 150mV, 0 ~ 500mV 0 ~ 1V, 0 ~ 5V, 0 ~ 10V 0 ~ 15V	±10 V, 0 ~ 10 V	±15 mV, ±50 mV ±100 mV, ±500 mV ±1 V, ±2.5 V
	Current Input	-	±20 mA	±20 mA, 4 ~ 20mA	0 ~ 20 mA, 4 ~ 20 mA	±20 mA
	Direct Sensor Input	Pt or Ni RTD	-	-	-	J, K, T, E, R, S, B
Isolation		3,000 V _{DC}	3,000 V _{DC}	3,000 V _{DC}	3,000 V _{DC}	3,000 V _{DC}
Page		online	online	online	online	online

*Sampling rate value depends on used channel number.

Example: Using 5 channels on ADAM-5017, sampling rate for each used channel will be 10/5 = 2 samples/second.

**The sampling rate vary with the controller.



Module		ADAM-5018P	ADAM-5024	ADAM-5050	ADAM-5051/ ADAM-5051D/ ADAM-5051S	ADAM-5052	ADAM-5053S
Analog Input	Resolution	16 bit	-	-	-	-	-
	Input Channel	7	-	-	-	-	-
	Sampling Rate	10 (total*)	-	-	-	-	-
	Voltage Input	±15 mV, ±50 mV ±100 mV, ±500 mV ±1 V, ±2.5 V	-	-	-	-	-
	Current Input	4 ~ 20 mA	-	-	-	-	-
	Direct Sensor Input	J, K, T, E, R, S, B	-	-	-	-	-
Analog Output	Output Channels	-	4	-	-	-	-
	Resolution	-	12 bit	-	-	-	-
	Voltage Output	-	0 ~ 10 V	-	-	-	-
	Current Output	-	0 ~ 20 mA 4 ~ 20 mA	-	-	-	-
Digital Input and Digital Output	Digital Input Channels	-	-	16 DI/O (bit-wise selectable)	16 (ADAM-5051) 16w/LED (5051D/5051S)	8 w/LED	32
	Digital Output Channels	-	-	-	-	-	-
Isolation		3,000 V _{DC}	3,000 V _{DC}	-	2,500 V _{DC} (5051S)	5,000 V _{RMS}	2,500 V _{DC}
Page		online	online	online	online	online	online

*Sampling rate value depends on used channel number.

Example: Using 6 channels on ADAM-5017, sampling rate for each used channel will be 12/6 = 2 samples/second.

- 1 Motion Control
- 2 Hazardous Location
- 3 Energy Automation
- 4 Building Automation Systems
- 5 Automation Software
- 6 Operator Panels
- 7 Automation Panel PCs
- 8 Industrial Monitors
- 9 Industrial Ethernet
- 10 Device Servers & Gateways
- 11 Serial Communication Cards
- 12 Embedded Auto. Computers
- 13 PACs
- 14 M2M I/O
- 15 Distributed Nano Controllers
- 16 RS-485 I/O
- 17 Ethernet I/O
- 18 DAQ Boards

ADAM-5000 I/O Module Selection Guide

Digital Input/Output Modules



Module		ADAM-5055S	ADAM-5056/ ADAM-5056D	ADAM-5056S/ ADAM-5056SO	ADAM-5057S	ADAM-5060
Digital Input and Digital Output	Digital Input Channels	8 w/LED	-	-	-	-
	Digital Output Channels	8 w/LED	16 (ADAM-5056) 16 w/LED (ADAM-5056D)	16 w/LED	32	6 relay (2 form A/4 form C)
Isolation		2,500 V _{DC}	-	2,500 V _{DC}	2,500 V _{DC}	-
Page		online	online	online	online	online



Module		ADAM-5069	ADAM-5080	ADAM-5081	ADAM-5090/ ADAM-5091	ADAM-5095
Digital Input and Digital Output	Digital Input Channels	-	-	-	-	-
	Digital Output Channels	8 power relay (form A)	-	-	-	-
Counter (32-bit)	Channels	-	4	4/8	-	-
	Input Frequency	-	0.3 ~ 1000 Hz max. (frequency mode) 5000 Hz max. (counter mode)	5 Hz ~ 1 MHz max. (frequency mode) 1 MHz max. (counter mode)	-	-
	Mode	-	Frequency, Up/Down Counter, Bi-direction Counter	Frequency, Counter (Up/Down, Bi-direction, Up, A/B Phase)	-	-
Communication	Channels	-	-	-	4	2
	Type	-	-	-	RS-232	CAN
Isolation		-	1,000 V _{RMS}	2,500 V _{DC}	-	1,000 V _{DC}
Page		online	online	online	online	online

Motion and Storage Modules



Model		ADAM-5202	ADAM-5240	ADAM-5030
Axes	Number of Axes	-	4	-
	Linear Interpolation	-	v	-
	2-Axis Circle Interpolation	-	v	-
Advanced Functions	Encoder Channels	-	4	-
	Limit switch Input Channel	-	8	-
	Home Input Channel	-	4	-
	Emergency stop Input Channel	-	1	-
	Slow Down Limit Switch	-	8	-
	Servo On Output Channel	-	4	-
	General Purpose DO Channel	-	4	-
	Position Compare Event	-	v	-
	Remote Motion	v	-	-
	Remote I/O	v	-	-
	Board ID	-	-	-
Connectors		4 x RJ-45	100-PinSCSI-II	-
Wiring Board		-	ADAM-3952	-
Remote Slave Module		AMAX-2752SY/2754SY/2756SY AMAX-2241/2242/2243	-	-
Storage	Type	-	-	SD (Secure Digital Card)
	Channel	-	-	2
	Size	-	-	2 GB (Max)
USB	Type	-	-	V2.0 (compliant)
	Channel	-	-	2
Supported Controller		ADAM-5550KW		
Page		online	online	online

1

Motion Control

2

Hazardous Location

3

Energy Automation

4

Building Automation Systems

5

Automation Software

6

Operator Panels

7

Automation Panel PCs

8

Industrial Monitors

9

Industrial Ethernet

10

Device Servers & Gateways

11

Serial Communication Cards

12

Embedded Auto. Computers

13

PACs

14

M2M I/O

15

Distributed Nano Controllers

16

RS-485 I/O

17

Ethernet I/O

18

DAQ Boards

ADAM-5000 Controller Support Table

Type		PAC			PC-based Controller		
System		ADAM-5560KW	ADAM-5510KW/ ADAM-5510EKW	ADAM-5510KW/TCP ADAM-5510EKW/TP	ADAM-5560CE	ADAM-5510/TCP ADAM-5510E/TCP	ADAM-5510M ADAM-5510E
Function	I/O Module	7-slot Micro PAC with Atom™ CPU	4/8-slot Softlogic Controller w/ RS-485	4/8-slot Softlogic Controller w/ Ethernet	7-slot PC-based Controller with Atom™ CPU	4/8-slot PC-based Controller with Ethernet	4/8-slot PC-based Controller with RS-485
Analog Input (AI)	ADAM-5013	•	•	•	•	•	•
	ADAM-5017	•	•	-	•	•	•
	ADAM-5017P	•	-	-	•	•	•
	APAX-5017H	-	•	•	•	•	•
	ADAM-5017UH	•	-	-	•	•	•
	APAX-5018	•	•	•	•	•	•
	ADAM-5018P	•	-	-	•	•	•
Analog Output (AO)	ADAM-5024	•	•	•	•	•	•
Digital Input (DI)	ADAM-5051	•	•	•	•	•	•
	ADAM-5051D	•	•	•	•	•	•
	ADAM-5051S	•	•	•	•	•	•
	ADAM-5052	•	•	•	•	•	•
	ADAM-5053S	•	-	-	•	-	-
Digital Output (DO)	ADAM-5056	•	•	•	•	•	•
	ADAM-5056D	•	•	•	•	•	•
	ADAM-5056S	•	•	•	•	•	•
	ADAM-5056SO	•	•	•	•	•	•
	ADAM-5057S	•	-	-	•	-	-
Digital I/O	ADAM-5050	•	•	•	•	•	•
	ADAM-5055S	•	•	•	•	•	•
Relay Output	ADAM-5060	•	•	•	•	•	•
	ADAM-5069	•	•	•	•	•	•
Counter/ Frequency	ADAM-5080	-	•	•	-	•	•
	ADAM-5081	•	-	-	•	•	•
Comm.	ADAM-5090	-	•	•	-	•	•
	ADAM-5091	•	-	-	•	-	-
	ADAM-5095	•	-	-	•	-	-
Motion	ADAM-5202	•	-	-	•	-	-
	ADAM-5240	•	-	-	•	-	-
SD	ADAM-5030	•	-	-	•	-	-

ADAM-5000 Remote I/O System Support Table

Remote I/O System			ADAM-5000/485	ADAM-5000E	ADAM-5000L/TCP	ADAM-5000/TCP
Function	I/O Module	Description	4-slot Distributed DA&C for RS-485	8-slot Distributed DA&C for RS-485	4-slot Distributed DA&C for Ethernet	8-slot Distributed DA&C for Ethernet
Analog Input (AI)	ADAM-5013	3-ch RTD Input	•	•	•	•
	ADAM-5017	8-ch AI	•	•	•	•
	ADAM-5017P	8-ch AI w/ Independent Input Range	•	•	•	•
	ADAM-5017H	8-ch high Speed (1K) AI	•	•	•	•
	ADAM-5017UH	8-ch Ultra high Speed (200K) AI	•	•	•	•
	ADAM-5018	7-ch Thermocouple Input	•	•	•	•
	ADAM-5018P	7-ch Thermocouple Input w/ Independent Input Range	•	•	•	•
Analog Output (AO)	ADAM-5024	4-ch AO	•	•	•	•
Digital Input (DI)	ADAM-5051	16-ch DI	•	•	•	•
	ADAM-5051D	16-ch DI w/ LED	•	•	•	•
	ADAM-5051S	16-ch Isolated DI w/ LED	•	•	•	•
	ADAM-5052	8-ch Isolated DI w/ LED	•	•	•	•
Digital Output (DO)	ADAM-5056	16-ch DO	•	•	•	•
	ADAM-5056D	16-ch DO w/ LED	•	•	•	•
	ADAM-5056S	16-ch Isolated DO w/ LED	•	•	•	•
	ADAM-5056SO	16-ch Source Type Isolated DO w/ LED	•	•	•	•
Digital I/O	ADAM-5050	16-ch Universal Digital I/O	•	•	•	•
	ADAM-5055S	16-ch Isolated Digital I/O w/ LED	•	•	•	•
Relay Output	ADAM-5060	6-ch Relay Output	•	•	•	•
	ADAM-5069	8-ch Power Relay Output w/ LED	•	•	•	•
Counter/Frequency	ADAM-5080	4-ch Counter/Frequency	•	•	•	•
	ADAM-5081	4-ch High Speed Counter/Frequency	•	•	•	•

1
Motion Control

2
Hazardous Location

3
Energy Automation

4
Building Automation Systems

5
Automation Software

6
Operator Panels

7
Automation Panel PCs

8
Industrial Monitors

9
Industrial Ethernet

10
Device Servers & Gateways

11
Serial Communication Cards

12
Embedded Auto. Computers

13
PACs

14
M2M I/O

15
Distributed Nano Controllers

16
RS-485 I/O

17
Ethernet I/O

18
DAQ Boards

ADAM-5560CE ADAM-5560KW

**7-slot PC-based Controller with
Intel® Atom™ CPU**

**7-slot Micro PAC with
Intel® Atom™ CPU**

NEW



CE FCC



Features

- Integrated VGA port for local display of HMI software
- Can be operated with or without display/ keyboard/ mouse
- Remote monitoring through Web Server
- Remote maintenance via FTP Server
- Supports .NET class library in Windows CE
- Supports IEC-61131-3 SoftLogic Control Software
- Supports Modbus/RTU (Master/Slave) and Modbus/TCP (Server/Client)
- Supports SD Storage I/O Module
- Remote I/O expansion
- Supports ADAM-5000 I/O Modules

Introduction

ADAM-5560 is a Programmable Automation Controller designed for control tasks which require Industrial PC computing performance with a PLC's robustness. The ADAM-5560 offers an Intel Atom CPU along with control specific features such as watchdog timer, battery backup RAM and deterministic I/O. The ADAM-5560KW features 5 standard IEC 61131-3 programming languages in Windows CE, so PLC users can develop control strategies with their own familiar programming languages. The powerful Multiprog KW Software and stable ProConOS have caused the ADAM-5560KW to become the best choice for a Programmable Automation Controller on the market today. Besides, the ADAM-5560CE offers an open platform that helps users to develop their own program using the common eVC and .NET programming environments to build compact and reliable control solutions. With the optional HMI Software and built-in VGA port, users no longer need to build additional SCADA PC's into their applications. This compact and powerful PAC is ideal for a variety of applications ranging from machine automation to SCADA applications.

Specifications

Control System

- **CPU** Intel Atom Z510P
- **I/O Capacity** 7 slots
- **LED Indicators** Power, User defined
- **Memory** 1 GB DDR2 SDRAM
1 MB Battery Backup
1 x CompactFlash® Card (Internal, 1GB)
- **Operating System** Windows® CE5.0
- **Real-time Clock** Yes
- **Watchdog Timer** Yes
- **Control Software** ADAM-5560CE: eVC and .NET library
ADAM-5560KW: KW Multiprog (development tool)
ProConOS (runtime Kernel)

Communications

- **Comm. Protocol** Modbus/RTU and Modbus/TCP
- **Medium** 2 x 10/100 Base-T w/ RJ-45
4 x RS-485 w/ DB9

Protection

- **Communication** RS-485 Isolation 1.5kV for COM1, COM3 and COM4
RS-485 Isolation 2.5kV for COM2
- **Power Reversal** Yes

General

- **Certifications** CE, FCC Class A
- **Connectors** 1 x RS-232/485 (COM1)
1 x RS-485 (COM2)
1 x RS-232/485 (COM3)
1 x RS-232/485 (COM4)
2 x USB 2.0 ports (KB/Mouse via USB Ports)
1 x VGA (1024 x 768 Resolution)
- **Dimensions** 355 x 110 x 75 mm
- **Enclosure** ABS+PC
- **Mounting** DIN-rail, wall mount (panel mount)
- **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** 0 ~ 55°C (32 ~ 131°F)
- **Storage Temperature** -25 ~ 85°C (-13 ~ 185°F)

Ordering Information

- **ADAM-5560CE** 7-slot PC-based Controller with Intel Atom CPU
- **ADAM-5560KW** 7-slot Micro PAC with Intel Atom CPU