

140CPU43412A CPU Module

Overview

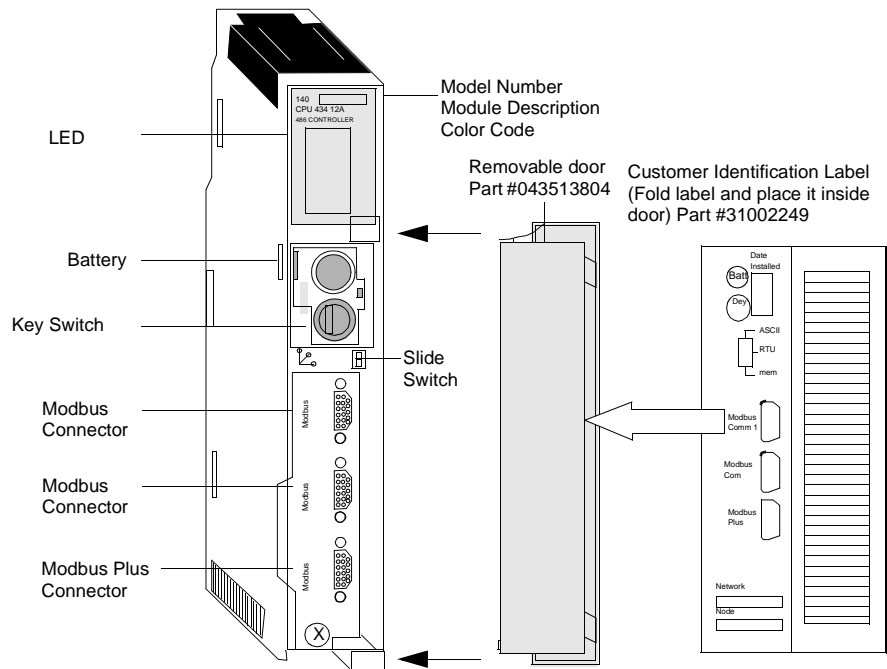
The following provides information on the specifications, LED indicators and description and error codes for the 140CPU43412A Controller Module.

This module is functionally identical to the non-"A" version, however, the following should be considered:

- If you are using the module in a Hot Standby topology, then you **must** use either two non-"A" models or two "A" models.
- The "A" version requires a new flash executive.
- The "A" version and non-"A" flash executives are **not** interchangeable.
- Schneider Automation software (Concept, ProWORX, and Modsoft) supports the "A" version. Any existing or new 140CPU43412 program configuration will load into a 140CPU43412A without any modifications.

CPU Module

The following figure shows the CPU Module and its components.



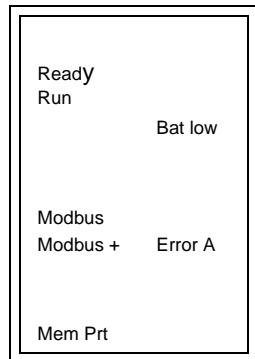
Specifications The following table shows the specifications for the CPU43412A Controller module.

Specifications					
User Logic/Reference Capacity	984 Ladder Logic	Discrete	Register	Extended Register	IEC Application
	64 k words	64 k	57 k	96 k	896 k
	57,766 4XX registers max Only if: 0XXX = 16 and 1XXX = 16 and 3XXX = 16				
Reference Capacity					
Discrete	64 k - any mix				
Local I/O					
Maximum I/O Words	64 In and 64 Out*				
Maximum Number of I/O Racks	2 (Requires Expander)				
Remote I/O					
Maximum I/O Words per Drop	64 In and 64 Out*				
Maximum Number of Remote Drops	31				
Distributed I/O					
Maximum Number of Networks per System	3**				
Maximum Words per Network (for every DIO drop, there is a minimum of words input of overhead.)	500 In and 500 Out				
Maximum Words per Node	30 In and 32 Out				
*This information can be a mix of Discrete or Register I/O. For each word of register I/O configured, one word must be subtracted from the total available. The same holds true for each block of 8 bits or 16 bits of Discrete I/O configured—one word must be subtracted from the total available.					
**Requires the use of two 140NOM21X00 Option Modules.					
Maximum Number of Network Module Interfaces	6				
Watchdog Timer	250 ms (S/W adjustable)				
Logic Solve Time	0.1 ms / k to 0.5 ms / k				
Battery					
Type	3 V Lithium				
Service Life	1200 mAh				
Shelf Life	10 years with 0.5% loss of capacity per year				

Specifications		
Battery Load Current at Power-off		
Typical	7 μ A	
Maximum	210 μ A	
Communication		
Modbus (RS-232)	2 serial port (9-pin D-shell)	
Modbus Plus (RS-485)	1 network port (9-pin D-shell)	
Programming Software Capability	Modsoft Version 2.6 minimum Concept version 2.1 with B2.1 patch Concept 2.2 with SR2 ProWORX Nxt version 2.0, minimum ProWORX Plus version 1.05, minimum ProWORX 32 version 1.0, minimum	
General		
Diagnostics	Power Up	Runtime
	RAM RAM Address Executive Checksum User Logic Check Processor	RAM RAM Address Executive Checksum User Logic Check
Bus Current Required	1.25 A	
Power Dissipation	6.25 W	
TOD Clock	+/- 8.0 seconds/day 0 ... 60° C	
Operating Temperature	0 ... 60° C	

LED Indicators and Descriptions

The following figure shows the LED indicators.



The following table shows the LED error codes for the 140CPU43412A module.

LEDS	Color	Indication when On
Ready	Green	The CPU has passed power-up diagnostics.
Run	Green	The CPU has been started and is solving logic.
Bat Low	Red	The battery needs replacing or is not present.
Modbus	Green	Communications are active on the Modbus port 1 or 2.
Modbus +	Green	Communications are active on the Modbus Plus port.
Error A	Red	Indicates communications error on the Modbus Plus port.
Mem Prt	Amber	Memory is write-protected (the memory protect switch is on).

LED Error Codes The following table shows the run LED error codes for the 140CPU43412A.

LED Error Codes		
Number of Blinks	Code	Error
Continuous	0000	requested kernel mode
2	80B	ram error during sizing
	80C	run output active failed
	82E	MB command handler stack error
3	769	bus grant received
	72A	not master asic on cpu
	72B	master config write bad
	72C	quantum bus DPM write failure
	72F	plc asic loopback test
	730	plc asic BAD_DATA

LED Error Codes		
Number of Blinks	Code	Error
4	604	UPI timeout error
	605	bad UPI response opcode
	606	UPI bus diagnostic error
	607	modbus cmd-buffer overflow
	608	modbus cmd-length is zero
	609	modbus abort command error
	614	mbp bus interface error
	615	bad mbp response opcode
	616	timeout waiting for mbp
	617	mbp out of synchronization
	618	mbp invalid path
	619	page 0 not paragraph aligned
	61E	bad external uart hardware
	61F	bad external uart interrupt
	620	bad receive comm state
	621	bad transmit comm state
	622	bad comm state trn_asc
	623	bad comm state trn_rtu
	624	bad comm state rcv_rtu
	625	bad comm state rcv_asc
626	bad modbus state tmr0_evt	
627	bad modbus state trn-int	
628	bad modbus state rcv-int	
631	bad interrupt	
5	503	ram address test error
	52D	P.O.S.T BAD MPU ERROR
6	402	ram data test error
7	300	EXEC not loaded
	301	EXEC Checksum
8	8001	Kernal prom checksum error
	8002	flash prog / erase error
	8003	unexpected executive return

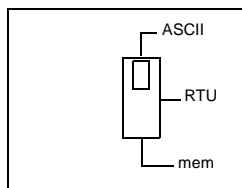
Note: Information in the Code column is visible only with the Flash download utility.

Front Panel Switch

The slide switch is used to select the comm parameter settings for the Modbus (RS232) ports. Three options are available:

1. Setting the switch to the top position assigns ASCII functionality to the port.
2. Setting the switch to the middle position assigns remote terminal unit (RTU) functionality to the port.
3. Setting the switch to the bottom position lets you assign comm parameters to the port in software.

The figure shows the three options that are available on the front panel slide switch.



Note: The CPU hardware defaults to bridge mode when the front panel switch is set to RTU or ASCII mode. When networking controllers, a panel device connected to the CPU Modbus port can communicate with the controller to which it is connected, as well as log into any nodes on the Modbus Plus network.

The following table shows the ASCII comm port parameters.

ASCII Comm Port Parameters	
Baud	2,400
Parity	Even
Data Bits	7
Stop Bits	1
Device Address	Rear panel rotary switch setting

The following table shows the RTU comm port parameters. The comm parameters are set and cannot be changed.

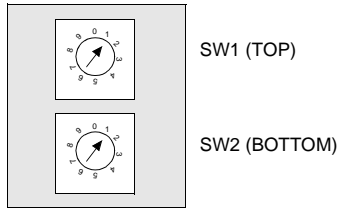
RTU Comm Port Parameters	
Baud	9,600
Parity	Even
Data Bits	8
Stop Bits	1
Device Address	Rear panel rotary switch setting

The following table shows the valid comm port parameters.

Valid Comm Port Parameters		
Baud	19,200	1,200
	9,600	600
	7,200	300
	4,800	150
	3,600	134.5
	2,400	110
	2,000	75
	1,800	50
Parity	Enable/Disable Odd/Even	
Data Bits	7 / 8	
Stop Bits	1 / 2	
Device Address	1 ... 247	

Rear Panel Switches

The following figure shows the SW1 and SW2 settings.



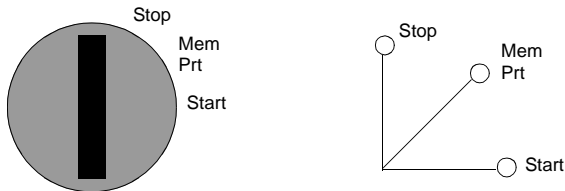
SW1 sets the upper digit (tens) of the address. SW2 sets the lower digit (ones) of the address. The following table shows the SW1 and SW2 address settings.

SW1 and SW2 Address Settings		
Node Address	SW1	SW2
1 ... 9	0	1 ... 9
10 ... 19	1	0 ... 9
20 ... 29	2	0 ... 9
30 ... 39	3	0 ... 9
40 ... 49	4	0 ... 9
50 ... 59	5	0 ... 9
60 ... 64	6	0 ... 4

Note: If "0" or an address greater than 64 is selected, the Modbus + LED will be "on" steady, to indicate the selection of an invalid address.

Key Switch

The key switch protects memory from programming changes while the controller is in operation. The following figure shows the key switch.



Note: The key switch positions shown next to the switch (above) are for reference only and are marked on the module as indicated on the right.

Key Switch Description

The following table shows the key switch information.

Key Switch Description				
Key switch Position	Controller Status	Memory Protected From Programmer Changes	Will Accept Programmer Stop or Start	Key switch Transition
Stop	Controller is stopped and disables Programmer changes.	Y	N	From Start or Memory Protect: Stops controller, if running, and disables Programmer changes
Mem Prt	Controller may be either stopped or running and Programmer changes are disabled. User cannot write to unlocated variables.	Y	N	From Stop or Start: Prevents Programmer changes, controller run status is not changed
Start	Controller may be either stopped or running. Programmer may make changes and start/stop the controller.	N	Y	From Stop: Enables Programmer changes, starts controller. From Memory Protect: Enables programmer changes, starts controller if stopped.

Modbus Connector Pinouts

All Quantum CPUs are equipped with a nine-pin RS-232C connector that support Modicon's proprietary Modbus communication protocol. The following is the Modbus port pinout connections for nine-pin and 25-pin connections.

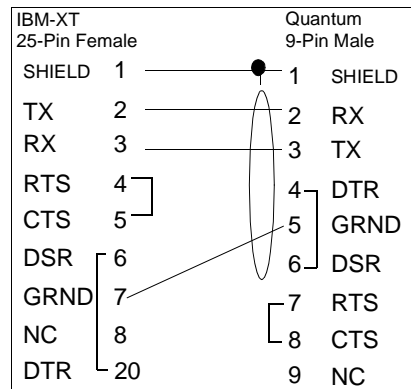
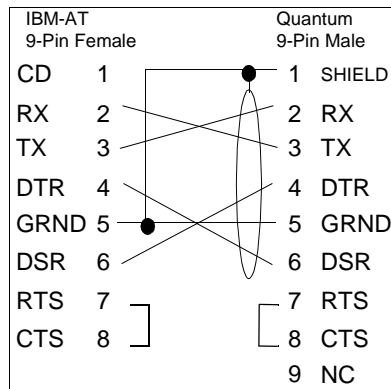
Note: Although the Modbus ports electrically support existing Modbus cables, it is recommended that a Modbus programming cable (Part # 990NAA26320 or 990NAA26350) be used. This cable has been designed to fit under the door of a Quantum CPU or NOM module.

Modbus Port Modem Support

Modbus Port 1 has full modem interfacing ability. Modbus Port 2 RTS/CTS connections function properly for normal non-modem communications but do not support modems.

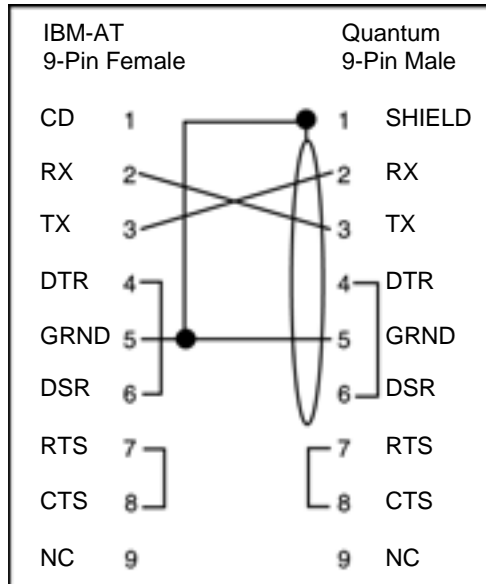
Modbus Ports Pinout Connections

The following figure shows the Modbus port pinout connections for 9-pin and 25-pin connections.



**Modbus Ports
Pinout
Connections for
Portable
Computers**

The following figure shows the Modbus port pinout connections for portable (laptop) computers.



The following is the abbreviation key for the above figures.

TX: Transmitted Data	DTR: Data Terminal Ready
RX: Received Data	CTS: Clear to Send
RTS: Request to Send	NC: No Connection
DSR: Data Set Ready	CD: Carrier Detect