

**High Performance CPU module**  
**180Kb user program storage**  
**Supports Ladder and High level language programming**  
**Two built in RS 232 comms ports**  
**Up to 512 digital I/O**  
**Up to 128 analogue I/O**

## Introduction

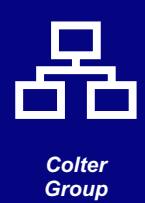
The 400-CPU-B is a high performance central processor module for use within the FMT-400 system. The 400-CPU-B offers many extended capabilities over the 400-CPU-A module. Like all the CPU modules in the FMT-400 range, the 400-CPU-B benefits from extensive 16 and 32 maths capabilities and RS232 communications supporting many different protocols, amongst many other features the 400-CPU-B supports extension racks to increase the FMT-400's I/O capability, Fieldbus modules for Fieldbus interconnectivity, extra comms port modules and more. The 400-CPU-B is programmed using the Flex32 software development package.

## Modules Supported by the 400-CPU-B

The modules supported by the 400-CPU-B module are listed in the table below:

<b>Module</b>	<b>Description</b>
400-16-I	16 channel 24Vdc input module.
400-16-IAC110	16 channel 110Vac input module.
400-32-I	32 channel 24Vdc input module.
400-16-Q	16 channel 24Vdc output module.
400-16-QR	16 channel relay output module.
400-32-Q	32 channel 24Vdc output module.
400-8-AI	8 channel Analogue input module.
400-4-AQ	4 channel Analogue output module.
400-8-AQ	8 channel Analogue output module.
400-8-HS	8 channel 24Vdc high speed input module.
400-COM	2 extra communication ports module both RS232 and RS485.
400-ETHERNET	Ethernet inter-connectivity module.
400-FBM	Fieldbus inter-connectivity module (various Fieldbus types available)
400-MODEM	MODEM module for connection to PSTN.
400-BUS-M	Master Bus extension module, links CPU rack to I/O extension rack(s), each extension rack must have a 400-BUS-S fitted.
400-F-256	Flash memory card interface module.
400-8-RTD	8 channel RTD interface module.
400-4-RTD	4 channel RTD interface module.
400-8-TC	8 channel thermocouple interface module.
400-4-TC	4 channel thermocouple interface module.

# Specifications



User Program Memory	180K bytes
User Data Storage (16 bit words)	180K bytes less user program size
Maximum Number Of Ladder Contacts	20500 (see note 1)
Typical Ladder Scan Time	2.9 mS per thousand contacts (see note 1)
Typical Contact Execution Time	1.5µS (see note 1)
Instructions Per Second	15200
Number of 16 bit registers	8192
Number of 32 Bit registers	128
Counters	128
Timers	256
Text Strings	512
Maximum Number Of Digital Inputs	256
Maximum Number Of Digital Outputs	256
Maximum Number Of Analogue Inputs	64
Maximum Number Of Analogue Outputs	64
Maximum Number Of High Speed Inputs	8 (bandwidth 30Khz)
Maximum Number Of Fieldbus Modules	1
Maximum Number Of Flash Card Modules	1
Number Of Extension Racks Supported	15 (via 400-BUS-M module and 400-BUS-S modules)
Special Card Support	Special cards are supported
Built In Communications Ports	Port 0: RS232 max baudrate: 19200, also doubles as programming port. Port 1: RS232 max baudrate: 19200
Additional Communication Ports	2. (1, 400-COM module) max baudrate 57600
Memory Back-up	User program stored in flash RAM Data storage and variables stored in battery backed RAM
Battery Life	Typically 5 years with CPU un-powered, 10 years with CPU powered
Clock	Real Time Clock, battery backed
Programming Language	Ladder Logic and High Level Instruction Language, using Flex32 programming package
System Healthy Contacts	SPST. Max load 1A at 24Vdc.
Run/Stop Input	Nominal 24Vdc input @ 8mA. Where <6V = RUN and >18V = STOP
Operating Temperature	0°C to 55°C
Storage Temperature	-10°C to +70°C
Humidity	10 to 90% non condensing
Current Consumption	118mA from rack 5v power supply
Dimensions	Standard FMT-400 single width module size
Weight	520g

Note 1: These figures are typical for a ladder logic program consisting of simple ladder logic. The scan times and the maximum number of contacts will vary according to program content, comms and whether the High Level Instruction Language is used in the same project.



## Module Racks Supported by the 400-CPU-B

The racks supported by the 400-CPU-B are listed below:

<u>Rack</u>	<u>Description</u>
RACK-400H	7 slot gear plate mounting module rack. 5 slots available for I/O modules.
RACK-400F	12 slot gear plate mounting module rack. 10 slots available for I/O modules.

## LED Descriptions

<u>Label</u>	<u>Colour</u>	<u>Description</u>
Running	Green	When illuminated indicates that the 400-CPU-B is running the user program stored inside. Flashes quickly after power up for a short period while the 400-CPU-B is checking the integrity of the user program.
S/H	Green	This is normally illuminated but will be extinguished in the event of an internal failure of the 400-CPU-B.
Program	Green	Indicates that a programming lead as been connected to port 0.
Monitor	Green	Indicates that the 400-CPU-B has been placed in monitor only mode. For more information on this mode please see the Flex32 online help.*
Warning	Red	A warning has been detected by the 400-CPU-B firmware. Use the alarm option within Flex32 to find out which warning has occurred.*
Error	Red	An error has been detected by the 400-CPU-B firmware. Use the alarm option within Flex32 to find out which warning has occurred.*
Force I	Red	One or more inputs have been forced on or off. Use the debugging facilities within Flex32 to set or clear forces.*
Force Q	Red	One or more outputs have been forced on or off. Use the debugging facilities within Flex32 to set or clear forces.*
Low Batt	Red	When illuminated the battery requires replacement. Note that internal flag 7 also reflects this state.
Int Flash	Yellow	Indicates that the 400-CPU-B is writing the downloaded program to the internal Flash memory. DO NOT turn the system off when this LED is illuminated.
RxD0	Green	When flashing data is being received on by port 0.
RxD1		When flashing data is being received on by port 1.
TxD0		When flashing data is being sent out by port 0.
TxD1		When flashing data is being sent out by port 1.

\* The display menu system also allows access to these situations. The display menu system is controlled by the keypad and inbuilt display on the power supply (PSU-400) for more information please see the separate PSU-400 data sheet.

## Data Logging and Battery Backed RAM

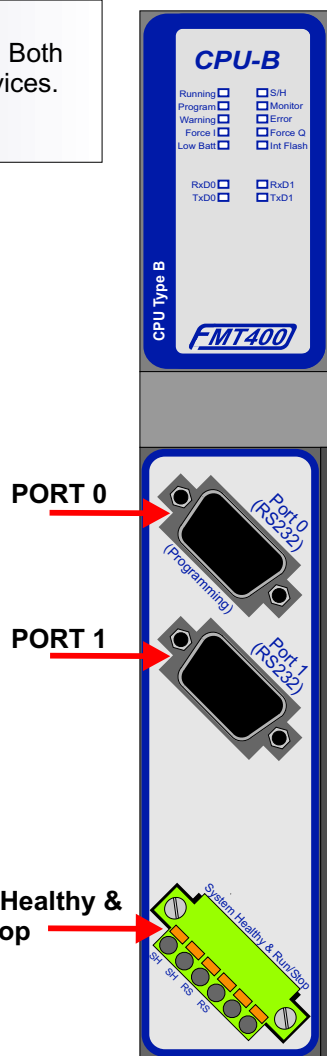
The Ram within the 400-CPU-B can be used for data logging and similar purposes if so desired. The space available within the Ram is 180Kb less the size of the user program. For more information on data logging please see the Flex32 on-line help. There is also battery backed RAM which is available for the preservation of internal facilities (such as registers and flags). For more information on the preserving of facilities please see the Flex32 on-line help.

## RS232 Communications Ports

The 400-CPU-B has two built in RS232 communication ports. Both ports have a 9 way D-type connector to connect to RS232 devices. Pin assignments for the 9 way D-types are listed below:

Pin No	Port 0 *	I/O	Port 1
1	Protective Earth	-	Protective Earth
2	Receive Data	I	Receive Data
3	Transmit Data	O	Transmit Data
4	N/C	-	N/C
5	N/C	-	N/C
6	Programming	I	N/C
7	Common	-	Common
8	N/C	-	N/C
9	N/C	-	N/C

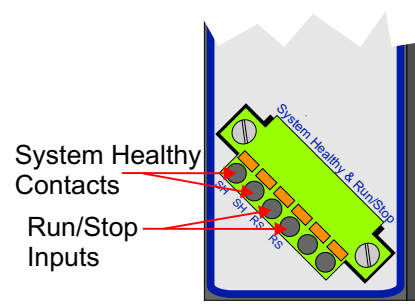
\* Port 0 is also the programming port



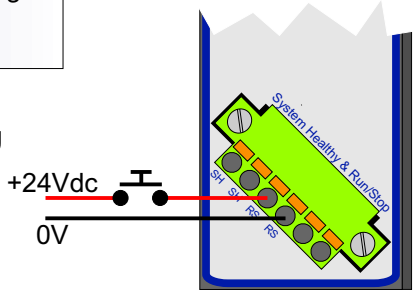
## System Healthy and Run / Stop Connections

The System Healthy contacts are normally closed when the 400-CPU-B is switched on and is healthy. If the 400-CPU-B fails or loses power then the System Healthy contacts will open. These contacts can carry a maximum of 1A at 24Vdc. The system healthy contacts can be utilised in a variety of ways, one of which is illustrated on the next page.

The Run/Stop inputs are bipolar 24Vdc and connecting 24 volts across them will stop the 400-CPU-B from running it's program. If the 24Vdc is then removed then the program will start running again.



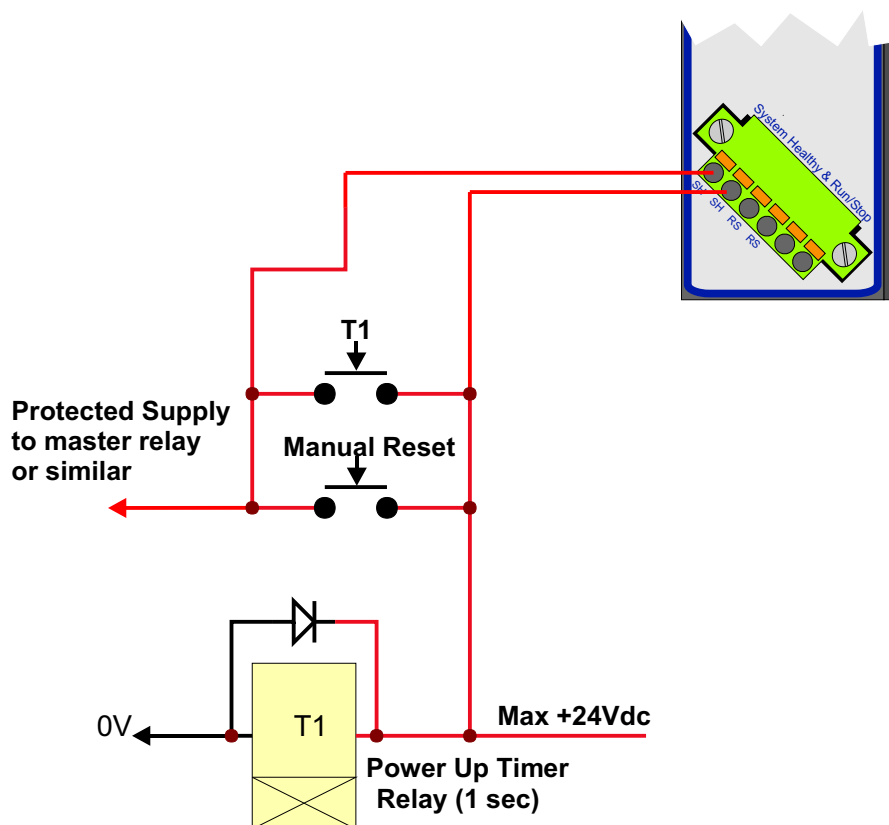
The example shown here shows a push to make push button connecting +24Vdc across the Run /Stop inputs. When the button is pressed the program will stop running. When the button is released the program will resume.





### Critical Applications

The FMT-400 (or indeed any microprocessor based control system) must never be used in an application where failure of the device will endanger human life. When controlling machines such as presses, guillotines, etc. any critical functions must firstly fail safe and secondly be electrically or mechanically devised so that any failure cannot endanger personnel. When an application will not harm personnel but PLC malfunction will damage machinery or product it is recommended that the System Healthy output is used. A typical circuit could be as follows:



### Changing the Battery

The internal battery on the 400-CPU-B should be replaced if the Batt LED is illuminated. The battery can be replaced as follows:

- \* If the 400-CPU-B is still fitted in the rack then remove from rack.
- \* The battery can be seen on the PCB side of the module (it is a silver button cell battery).
- \* Remove the battery using finger pressure only.
- \* Replace the battery with one only of the same type. If in doubt new batteries are available from your supplier.

**NOTE:** Depending on the state of charge of the old battery you will have up to one minute to swap batteries before volatile information (such as date/time and preserved facilities) is lost.



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## **Order Codes**

Part Number  
400-CPU-B

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