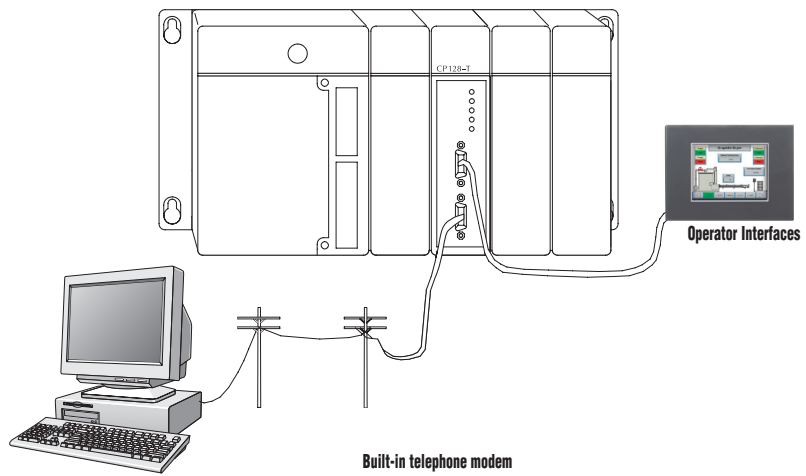


# CoProcessor Modules

## Basic CoProcessor Modules

**F4-CP128-1 \$406.00**  
**F4-CP128-T \$725.00**



## Overview

The FACTS CoProcessor Module interfaces the *Direct*LOGIC 405 family of programmable controllers with bar code readers, operator interface terminals, instrumentation equipment, computers, and other serial devices. The three ports offer a range of communication interfaces and baud rates. Please consult the port descriptions to see which module is best suited for your needs.

## Features

- FACTS Extended BASIC and ABM Commander for Window software makes program development fast and simple. Allows ONLINE, full-screen BASIC program editing and the ability to save programs on disk (software on CD included with each module)
- Non-volatile memory of up to 128K bytes allows multiple program storage and execution, DL405 register expansion, and retentive data storage and retrieval
- 16 MHz or 26 MHz CoProcessor provides fast program execution independent of the DL405 CPU scan
- Three buffered ports permit communication from module to three or more external devices
- Programmable from either port for complete serial port utilization without having to switch cables
- A real-time clock/calendar maintains time/date with battery backup when power outages occur. Programmable time-based BASIC interrupts to .005 of a second
- Directly access up to 254 bytes of DL405 CPU memory per scan. No supporting ladder logic is required
- Floating point math solves complex formulas to eight significant digits
- Options include a built-in 300/1200/2400 baud telephone modem
- Includes Modbus master/slave BASIC examples and other application examples on CD

## CoProcessor applications

The CoProcessors are designed for use with intelligent devices such as:

- Barcode readers
- Welders
- Board level controllers
- Serial printers
- Intelligent sensors
- Almost any device with an RS-232/422/485 port

CoProcessors are also good solutions for applications requiring large amounts of complex math.

# CoProcessor Modules

Specifications	
<b>Module Type</b>	CoProcessor, intelligent
<b>Modules per CPU</b>	Eight maximum, any slot in CPU base
<b>Communication</b>	256 character type-ahead input buffer on all ports. Ports are independently programmed by software. Seven or eight data bits, 1 or 2 stop bits, even, odd or no parity. XON/XOFF software flow control and RTS/CTS handshake.
<b>F4-CP128-1</b>	128K bytes of battery-backed RAM. 26MHz clock rate. Runs BASIC programs two to three times faster than 16MHz CoProcessors. Port 1, RS232/422/485 selectable, maximum baud rate of 115.2K baud. Port 2, RS232/422/485 selectable, maximum baud rate 57.6K baud. Port 3, RS232, maximum baud rate of 19.2K baud. Port 3 is available by using the RTS/CTS pins on Port 1. If you use these lines on Port 1, then Port 3 is not available.
<b>F4-CP128-T</b>	128K bytes of battery-backed RAM, 16 MHz clock rate. Port 1, RS232/422/485 selectable, maximum baud rate of 57.6K baud. Port 2, RS232, maximum baud rate 9600 baud. An optional use for port 2 is a built-in full-duplex, 300/1200/2400 baud PSK/FSK, asynchronous telephone modem. The modem is Bell 212A/103 & CCITT V.22/V.21 compatible. Automatic dialer with call progress monitoring detects no dial tone, ring and busy. Automatically answer calls. Can be used for remote data acquisition and diagnostics. Allows remote reprogramming of both BASIC CoProcessor and <i>DirectLOGIC</i> 405 CPUs. Exceeds FCC part 68 hazard protection requirements. Port 3, RS232, maximum baud rate of 9600 baud. Port 3 is available by using the RTS/CTS pins on Port 1. If you use these lines on Port 1, then Port 3 is not available.
<b>ABM Commander for Windows (CD-ROM included with module)</b>	<p>Programming/documentation software for FACTS Engineering BASIC module.</p> <p>Key features include:</p> <ul style="list-style-type: none"> <li>Runs under Windows 95/98/2000 or Windows NT 3.51 or later.</li> <li>Command Mode allows the user to program and debug with a "Point and Click" or Command Line Interface.</li> <li>Uses standard Windows applications for off-line edited (Notepad) and terminal emulation (Hyperterminal)</li> <li>Text Upload and Download BASIC programs</li> <li>Binary Upload and Download BASIC programs</li> <li>Extensive help file contains full user manual information</li> <li>Includes Modbus master and Modbus slave BASIC programs and other application examples</li> </ul>
<b>Field Termination</b>	9 pin D-sub connectors for port 1 and port 2. Port 3 uses electrical connections from port 1. (F4-CP128-T uses an RJ12 phone jack located under the module)
<b>Power Consumption</b>	F4-CP128-1 — 305mA maximum at 5VDC, (supplied by base power supply) F4-CP128-T — 350mA maximum at 5VDC, (supplied by base power supply)
<b>Operating Environment</b>	0°C-60°C (32°F-140°F), 5% to 95% humidity (non-condensing)

# Check the Power Budget

## Verify your power budget requirements

Your I/O configuration choice can be affected by the power requirements of the I/O modules you choose. When determining the types and quantity of I/O modules you will be using, it is important to remember there is a limited amount of power available from the power supply.

The chart on the opposite page indicates the power supplied and used by each DL405 device. The adjacent chart shows an example of how to calculate the power used by your particular system. These two charts should make it easy for you to determine if the devices you have chosen fit within the power budget of your system configuration.

If the I/O you have chosen exceeds the maximum power available from the power supply, you can resolve the problem by shifting some of the modules to an expansion base or remote I/O base (if you are using remote I/O).

**Warning: It is extremely important to calculate the power budget correctly. If you exceed the power budget, the system may operate in an unpredictable manner which may result in a risk of personal injury or equipment damage.**

## Use ZIPLinks to reduce power requirements

If your application requires a lot of relay outputs, consider using the ZipLink AC or DC relay output modules. These modules can switch high current (10A) loads without putting a load on your base power budget. Refer to Wiring System for DL405 PLCs later in this section for more information.

This logo is placed next to I/O modules that are supported by the ZIPLink connection systems.

See the I/O module specifications at the end of this section.



## Calculating your power usage

The following example shows how to calculate the power budget for the DL405 system. The example is constructed around a single 8-slot base using the devices shown. It is recommended you construct a similar table for each base in your system.

A				
	<b>Base Number</b> 0	<b>Device Type</b>	<b>5 VDC (mA)</b>	<b>External 24 VDC Power (mA)</b>
<b>B</b>	<b>CURRENT SUPPLIED</b>			
	<b>CPU/Expansion Unit /Remote Slave</b>	D4-440 CPU	3700	400
<b>C</b>	<b>CURRENT REQUIRED</b>			
	<b>SLOT 0</b>	D4-16ND2	+150	+0
	<b>SLOT 1</b>	D4-16ND2	+150	+0
	<b>SLOT 2</b>	F4-04DA	+120	+100
	<b>SLOT 3</b>	D4-08ND3S	+100	+0
	<b>SLOT 4</b>	D4-08ND3S	+100	+0
	<b>SLOT 5</b>	D4-16TD2	+100	+0
	<b>SLOT 6</b>	D4-16TD2	+100	+0
	<b>SLOT 7</b>	D4-16TR	+1000	+0
<b>D</b>	<b>OTHER</b>			
	<b>BASE</b>	D4-08B-1	+80	+0
	<b>Handheld Programmer</b>	D4-HPP-1	+320	+0
<b>E</b>	<b>Maximum Current Required</b>		<b>2820</b>	<b>100</b>
<b>F</b>	<b>Remaining Current Available</b>		<b>3700-2820=880</b>	<b>400-100=300</b>
	1. Using a chart similar to the one above, fill in column 2. 2. Using the tables on the opposite page, enter the current supplied and used by each device (columns 3 and 4). Pay special attention to the current supplied by the CPU, Expansion Unit, and Remote Slave since they differ. Devices which fall into the "Other" category (Row D) are devices such as the Base and the Handheld programmer, which also have power requirements, but do not plug directly into the base. 3. Add the current used by the system devices (columns 3 and 4) starting with Slot 0 and put the total in the row labeled "maximum current required" (Row E). 4. Subtract the row labeled "Maximum current required" (Row E), from the row labeled "Current Supplied" (Row B). Place the difference in the row labeled "Remaining Current Available" (Row F). 5. If "Maximum Current Required" is greater than "Current Supplied" in either column 3 or 4, the power budget will be exceeded. It will be unsafe to use this configuration and you will need to restructure your I/O configuration. Note the auxiliary 24 VDC power supply does not need to supply all the external power. If you need more than the 400mA supplied, you can add an external 24VDC power supply. This will help keep you within your power budget for external power.			

## DL405 CPU power supply specifications and power requirements

Specification	AC Powered Units	24 VDC Powered Units	125 VDC Powered Units
<b>Part Numbers</b>	D4-454, D4-450, D4-440, D4-EX (expansion base unit), D4-RS (remote slave unit)	D4-454DC-1, D4-440DC-1, (expansion base unit), (remote slave unit) D4-EXDC D4-RSDC	D4-450DC-2
<b>Voltage Withstand (dielectric)</b>	1 minute @ 1,500 VAC between primary, secondary, field ground, and run relay		
<b>Insulation Resistance</b>	> 10MΩ at 500VDC		
<b>Input Voltage Range</b>	85-132 VAC (110 range) 170-264 VAC (220 range)	20-28 VDC (24 VDC) with less than 10% ripple	90-146 VDC (125 VDC) with less than 10% ripple
<b>Maximum Inrush Current</b>	20 A	20 A	20 A
<b>Maximum Power</b>	50 VA	38 W	30 W

# Power Requirements

Power Supplied					
<i>CPUs/Remote Units/ Expansion Units</i>	<i>5 VDC Current Supplied in mA</i>	<i>24V Aux Power Supplied in mA</i>	<i>CPUs/Remote Units/ Expansion Units</i>	<i>5V Current Supplied in mA</i>	<i>24V Aux Power Supplied in mA</i>
D4-440 CPU	3700	400	D4-EX	4000	400
D4-440DC-1 CPU	3700	NONE	D4-EXDC	4000	NONE
D4-450 CPU	3700	400	D4-RS	3700	400
D4-454 CPU	3100	400	D4-RSDC	3700	NONE
D4-450DC-2 CPU	3100	NONE	H4-EBC	3470	400
D4-454DC-1	3100	NONE	H4-EBC-F	3300	400
Power Consumed					
<i>Power-consuming Device</i>	<i>5V Current Consumed</i>	<i>External 24VDC Current Required</i>	<i>Power-consuming Device</i>	<i>5V Current Consumed</i>	<i>External 24VDC Current Required</i>
<i>I/O Bases</i>			<i>Analog Modules (continued)</i>		
D4-04B-1	80	NONE	F4-16AD-1	75	100
D4-06B-1	80	NONE	F4-16AD-2	75	100
D4-08B-1	80	NONE	F4-04DA-1	70	75+20per circuit
			F4-04DA-2	90	90
			F4-04DAS-1	60	60 per circuit
			F4-04DAS-2	60	60 per circuit
			F4-08DA-1	90	100+20 per circuit
			F4-08DA-2	80	150
			F4-16DA-1	90	100+20 per circuit
			F4-16DA-2	80	25 max.
			F4-08RTD	80	NONE
			F4-08THM-n	120	50
			F4-08THM	110	60
<i>DC Input Modules</i>			<i>Remote I/O</i>		
D4-08ND3S	100	NONE	H4-ERM100	320(300)	NONE
D4-16ND2	150	NONE	H4-ERM-F	450	NONE
D4-16ND2F	150	NONE	D4-RM	300	NONE
D4-32ND3-1	150	NONE			
D4-64ND2	300 max.	NONE			
<i>AC Input Modules</i>			<i>Communications and Networking</i>		
D4-08NA	100	NONE	H4-ECOM100	300	NONE
D4-16NA	150	NONE	D4-DCM	500	NONE
			F4-MAS-MB	235	NONE
			FA-UNICON	NONE	65
<i>AC/DC Input Modules</i>			<i>CoProcessors</i>		
D4-16NE3	150	NONE	F4-CP128-1	305	NONE
F4-08NE3S	90	NONE	F4-CP128-T	350	NONE
<i>DC Output Modules</i>			<i>Specialty Modules</i>		
F4-08TD1S	295	NONE	H4-CTRIO	400	NONE
D4-16TD1	200	125	D4-INT	100	NONE
D4-16TD2	400	NONE	F4-16PID	160	NONE
D4-32TD1	250	140	F4-8MPI	225	170
D4-32TD1-1	250	140 (15V)	D4-16SIM	150	NONE
D4-32TD2	350	120 (4A max including loads)	F4-4LTC	280	75
D4-64TD1	800	NONE			
<i>AC Output Modules</i>			<i>Programming</i>		
D4-08TA	250	NONE	D4-HPP-1 (Handheld Prog.)	320	NONE
D4-16TA	450	NONE			
<i>Relay Output Modules</i>			<i>Operator Interface</i>		
D4-08TR	550	NONE	DV-1000	150	NONE
F4-08TRS-1	575	NONE			
F4-08TRS-2	575	NONE	C-more Micro-Graphic	210	NONE
D4-16TR	1000	NONE			
<i>Analog Modules</i>					
F4-04AD	150	100			
F4-04ADS	370	120			
F4-08AD	75	90			