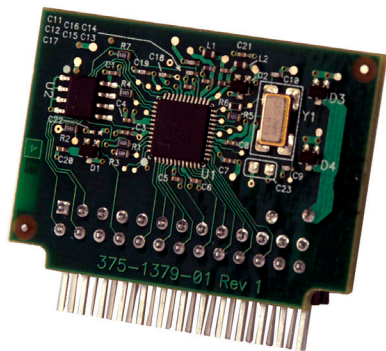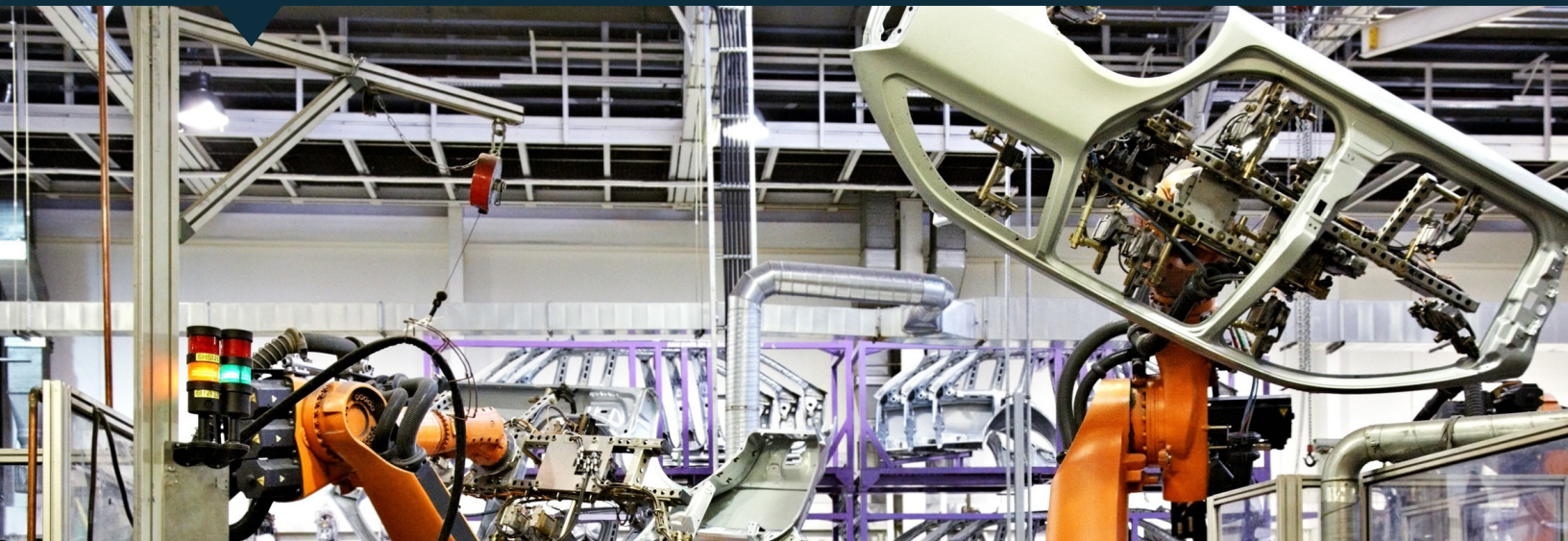# Control Point Module (CPM) 5000

The Next-generation Neuron Chip
for LonWorks® Control Networks

ECHELON®

The CPM 5000 decreases product time-to-market for LonWorks® based devices. It includes all the components needed to implement a control node using the FT 5000 Smart Transceiver — the smallest, fastest, highest performance, lowest cost twisted pair LONWORKS transceiver on the market.

The FT 5000 Smart Transceiver based control module integrates the high-performance Free Topology FT 5000 Smart Transceiver with the low-cost FT-X3 Communications Transformer, a crystal and inexpensive serial memory, to deliver a lower-cost, higher-performance LonWorks solution that dramatically reduces design time and enables a superior time-to-market.

FEATURES (of the CPM 5000)

- On-board FT 5000 Smart Transceiver Chip.
- Differential Manchester encoded signaling for polarity insensitive network wiring.
- Transformer-isolation.
- Supported Data Rate - 78 kilobits per second.
- Distances up to 500 meters max for free topology.
- Distances up to 2700 meters max for doubly terminated bus topology.
- Includes 64 KB Serial EEPROM memory.
- In-circuit programming of the I2C serial EEPROM.
- Low power consumption.
- Designed to comply with FCC Level B radiated EMI requirements.
- CSA, TÜV Recognized component.
- LonMark® certifiable.
- 3.3 Volt Support.
- Compact Vertical Mount Configuration.

Description

Control modules provide a simple, cost-effective method of adding LonWorks® technology to any control system. The CPM 5000 consists of a miniature circuit card containing an FT 5000 Smart Transceiver chip, Communications Transformer, crystal, serial EEPROM memory, and a connector for power, I/O, In-Circuit Programming and the network. The Smart Transceiver uses differential Manchester encoding, and in conjunction with the FT-X3 communications transformer, creates a Free Topology network device that supports a 78kbps data rate. The small size of the control modules permits it to be mounted on or inside an OEM's product, directly adjacent to the sensors, outputs, or displays that the module will control. Designing end products with the control modules, which have been fully designed, tested, and qualified to industry standard quality requirements, can save hundreds of hours of development time compared with designing custom modules. The control module is designed to comply with FCC Level B requirements, which can dramatically minimize time-consuming and expensive laboratory testing, component selection, and layout redesign work. The CPM 5000 - Model 55040R-10 is compliant with the European Directive 2002/95/EC with regards to the restriction of the use of certain hazardous substances (RoHS) in electrical and electronic equipment. The control module is offered in a compact vertical mount configuration (dimension 1.7"W x 1.175"H x 0.63"D) to enable customers to deliver a compact product that do not take up a lot of space.

The control module is economically priced for both low- and high-volume users and communicates at 78kbps to provide a high speed throughput to meet a wide range of control applications. The FT-X3 communications transformer, together with the FT 5000 Smart Transceiver, provides excellent network isolation. The isolation delivers very good common mode rejection and permits the system to operate well in electrically noisy environments. It also reduces the susceptibility of the system to ground loops caused by the use of multiple node power supplies that float relative to ground. This architecture lends itself well to communicating over long distances in industrial environments.

Additionally Echelon offers a comprehensive range of development tools, network interfaces, routers, and network services tools to simplify the task of designing and commissioning products using the control modules. Customers who require technical support regarding the control module can contact Echelon's technical support.

Features (of the FT 5000 Smart Transceiver)

- 3.3V operation.
- Serial interface for inexpensive external EEPROM and flash non-volatile memory devices.
- Supports up to 254 network variables (NVs).
- User-programmable interrupts provide faster response time to external events.
- 7mm x 7mm 48-pin QFN package.
- Supports polarity-insensitive, free topology star, daisy chain, bus, loop, or mixed topology wiring.
- 12 I/O pins with 35 programmable standard I/O modes.
- Supports up to 42KB of application code.
- 64KB of RAM (44KB for application code and data) and 16KB of ROM on-chip memory.
- Provides exceptional immunity from magnetic and high-frequency common-mode noise.
- Complies with worldwide communications standards.
- ISO/IEC 14908-1 and 14908-2
- ANSI 709.1 and ANSI 709.3
- -40°C to +85°C operating temperature range.

Pin Number	Signal Name	Description
1	GND	Ground
2	RST-	Reset (active low)
3	CP3_RXLED	RxActive for network activity LED
4	CP2_TXLED	TxActive for network activity LED
5	NC	No Connect
6	VDD3V3	3.3 V Input Power
7	GND	Ground
8	SCL	I2C serial clock for external memory
9	SDA_CS1-	I2C serial data for external memory
10	SVC-	Service (active low)

Pin Number	Signal Name	Description
11	IO0	IO0 for I/O objects
12	IO1	IO1 for I/O objects
13	IO2	IO2 for I/O objects
14	IO3	IO3 for I/O objects
15	IO4	IO4 for I/O objects
16	IO5	IO5 for I/O objects
17	IO6	IO6 for I/O objects
18	IO7	IO7 for I/O objects
19	IO8	IO8 for I/O objects
20	IO9	IO9 for I/O objects
21	IO10	IO10 for I/O objects
22	IO11	IO11 for I/O objects
23	MOV_GND	Return (ground) for MOV ESD clamp
24	GND	Ground
25	FT_NETA	FT network connection
26	FT_NETB	FT network connection

Specifications

CPM 5000

Echelon FT 5000 Smart Transceiver. Echelon FT-X3 Communications Transformer.

Control Module

Can be programmed to run at 5, 10, 20, 40 or 80 MHz.

Memory Type

Serial I2C EEPROM.

Data Communication Type Differential Manchester encoding.

Transceiver Type Transformer-isolated.

Isolation Between Network and FT 5000 chip 0-60 Hz (60 seconds)

1000 VRMS.

Electrostatic Discharge

Designed to comply with EN61000-4-2. EMI Designed to comply with FCC Part 15 Level B.

Transceiver Bit Rate

78kbps.

Maximum Nodes Per Channel

64 (-40 to +85°C).

Network Length in Free Topology only

1000m (3280 feet) \maximum total wire with one repeater.\500m (1640 feet) maximum total wire with no repeaters.

Network Bus Polarity

Insensitive.

Power-down Network Protection

High impedance when unpowered.

Supply Voltage

3.0V to 3.6V.

Double row 0.1" center connector

for I/O, power, and communications.

Network Termination

One terminator in free topology.
Two terminators in bus topology.

Operating Temperature

-40°C to +85°C.

Non-operating Temperature

-40 to +85°C.

Operating Humidity

25 to 90% RH @ 50°C, non-condensing.

Non-operating Humidity

95% RH @ 50°C,
non-condensing.

Dimensions

1.7"W x 1.175"H x 0.63"D.

Parameter	Agency Spec or Standard	Level	Method	Limit	Unit
ESD	IEC1000-4-2	4 (20 MHz and greater)	Air Discharge	15	kV
		4 (20 MHz and greater)	Contact Discharge	8	kV
		3 (10 MHz)	Air Discharge	8	kV
		3 (10 MHz)	Contact Discharge	6	kV
Radiated EM susceptibility	IEC1000-4-3	3		10	V/m
Fast Transient Burst Immunity	IEC1000-4-4	4	Network Cable Clamp	2	kV
Surge Immunity	IEC1000-4-5	3		2	kV
Common Mode Noise Immunity	IEC1000-4-6		BCI clamp on Network Cable	10	V_{rms}
Radiated EMI	EN55022	B			
	FCC Part 15	B			
High Voltage Isolation 0–60 Hz	HIPOT (0.5 mA max leakage)	60s	Disconnect MOV	2.4	kV_{rms}
		Contin.		277	V_{rms}
Shock			3 ms half-sine	100 (peak)	g
Vibration			8 Hz – 2 kHz	1.5 peak-to-peak	g

variations in node distribution, node temperature, node voltage, wire characteristics, and FT 5000 Smart Transceiver characteristics, and allow for an average wire temperature of up to +55°C.

2. Safety agency hazardous voltage barrier requirements are not supported.

3. The I/O pins of P1 connect directly to the FT 5000 Chip and do not contain additional protection beyond what is available with a typical advanced CMOS device.

4. For ESD protection at 5 MHz and 10 MHz operations, your design should include ferrite beads in series with the network pins. An example part that meets the requirements is a Fair-Rite Products Corp 2743007112 bead on lead. Beads are not required for operations at 20 MHz or higher.

5. For wire specifications, see Junction Box and Wiring Guidelines for Twisted Pair LonWorks Networks, 005-0023-01 Rev D or later.

6. FT 5000 Smart Transceivers and Control Modules were not designed for use in equipment or systems which involve danger to human health or safety or a risk of property damage, and Echelon assumes no responsibility or liability for use of the FT 5000 Smart Transceivers or Control Modules in such applications.

ORDERING INFORMATION

CPM 5000
55040R-10
(RoHS-compliant)

LonWorks Twisted Pair Control Module User's Guide 078-0015-01
(to be ordered separately – not shipped with product)

Notes

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Adesto Technologies](#):
  [55040R-10](#)