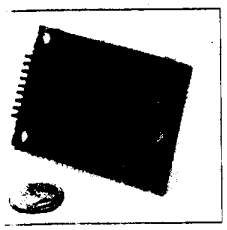
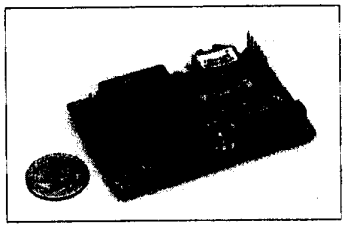
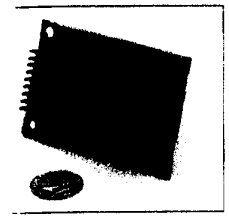
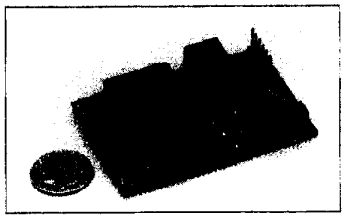
TWISTED PAIR AND GENERIC CONTROL MODULES
MODELS 55000-01, 55010-00, 55020-01, 55030-00

FEATURES

- On-board Neuron® 3150® Chip
- Local event processing
- Differential Manchester encoded signaling for polarity-insensitive network wiring (TP/FT-10, TP/XF-78, TP/XF-1250)
- Transformer-isolation (TP/FT-10, TP/XF-78, TP/XF-1250)
- 78 kilobits per second (TP/FT-10, TP/XF-78) and 1.25 megabits per second (TP/XF-1250) network bit rates
- Distances up to 500 meters worst case[1] in free topology (TP/FT-10)
- Distances up to 1400 meters worst case[1] in doubly terminated bus topology (TP/FT-10, TP/XF-78)
- Common form factor makes control modules interchangeable
- Low power consumption
- Designed to comply with FCC and VDE Level B requirements
- UL, CSA, TÜV Recognized components
- LONMARK™ certified for interoperability

DESCRIPTION

Control modules provide a simple, cost-effective method of adding LONWORKS® technology to any control system. A control module consist of a miniature circuit card containing a Neuron 3150 Chip, PROM socket, a communication transceiver (for twisted pair modules), and connectors for power, I/O, and the network. The generic control module (GCM-10) does not include a communication transceiver and is intended to be used with a PLT Power Line Transceiver or another compatible transceiver. Three transceiver options are available for twisted pair control modules:

- Free topology, transformer-isolated, 78kbps, differential Manchester encoded (TP/FT-10);
- Transformer-isolated, 78kbps, differential Manchester encoded (TP/XF-78);
- Transformer-isolated, 1.25Mbps, differential Manchester encoded (TP/XF-1250).

The small size of the control modules permits them to be mounted on or inside an OEM's product, directly adjacent to the sensors, outputs, or displays that the module will control.

Using the control modules can save hundreds of hours of development time compared with designing custom modules. The control modules are designed to comply with both FCC and VDE Level B requirements, minimizing time-consuming and expensive laboratory testing, component selection, and layout redesign work. As UL, CSA, and TÜV Recognized components, the control modules can be integrated into a product with minimal additional safety testing.

All four control modules are the same size and use the same wiring connectors, allowing the user to change communication speeds and transceivers without developing new modules. This design also allows the modules to be exchanged for one another without modifying the application electronics motherboard.

The control modules are supplied as compact circuit boards already including the surface-mount technology (SMT) Neuron 3150 Chip, eliminating the need for the customer to operate an SMT board assembly operation. The control modules are economically priced for both low and high volume users.

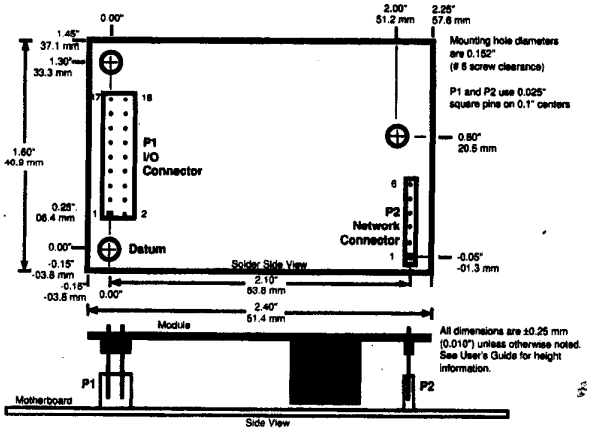
The TP/FT-10 and TP/XF-78 modules communicate at 78kbps, the TP/XF-1250 at 1.25Mbps. The GCM-10 module communication speed is adjustable up to 625kbps and is compatible with a wide variety of transceivers. All three modules provide high speed throughput to meet a wide range of control applications. The Neuron 3150 Chip is operated at a 5MHz clock speed on the GCM-10, TP/FT-10 and TP/XF-78 modules, and 10MHz on the TP/XF-1250 module.

The TP/FT-10, TP/XF-78, and TP/XF-1250 modules use a transformer to isolate them from the twisted pair network cable. This design provides excellent common mode rejection and permits the system to operate in electrically noisy environments. It also reduces the susceptibility of the system to ground loops caused by the use of multiple node power

TP/XF-1250 modules ideal for communicating over long distances in industrial environments.

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. Technical support for the modules is available through Echelon's LonSupport™ Premier technical assistance program.

Control Module Dimensions



CONNECTORS

18-Pin I/O (P1) — All Modules

Function	Pin
N/C	1
IO 0	2
GND	3
IO 1	4
GND	5
IO 2	6
GND	7
IO 3	8
~RESET	9
IO 4	10
IO 5	11
+5V	12
IO 6	13
IO 9	14
IO 7	15
IO 10	16
IO 8	17
~SERVICE	18

6-Pin Network (P2) — TP/FT-10

Function	Pin
NC	1, 2, 5, 6
DATA B	3
DATA A	4

6-Pin Network (P2) — TP/XF-78, TP/XF-1250

Function	Pin
CT B	1
CT A	2
DATA B	3
DATA A	4
N/C	5, 6

6-Pin Network (P2) — GCM-10

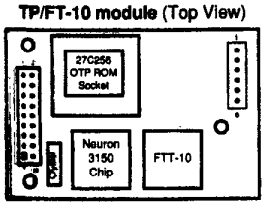
Function	Pin
CP4	1
CP2	2
CP1	3
CP0	4
CP3	5
GND	6

SPECIFICATIONS

Microprocessor	Neuron® 3150® Chip
Crystal Oscillator Clock	TP/FT-10, TP/XF-78, GCM-10: 5MHz TP/XF-1250: 10MHz
Memory Socket	PLCC type for 32-lead JEDEC, 32 KB OTP ROM
Data Communication Type	Differential Manchester coding (TP modules only)
Transceiver Type	Transformer-isolated twisted pair (TP modules only)
Network Compatibility with Echelon Transceivers	TP/FT-10: compatible with FTT-10 and LPT-10 TP/XF-78: compatible with TPT/XF-78 TP/XF-1250: compatible with TPT/XF-1250
Isolation Between Network and I/O Connectors[3]	0-60 Hz (60 seconds): 1000VRMS 0-60 Hz (continuous): 277VRMS (TP modules only)
Common Mode Range 0-60 Hz	277VRMS (TP modules only)
Typical Supply Current[4]	TP/FT-10: 25mA receive, 40mA transmit TP/XF-78: 35mA receive, 45mA transmit TP/XF-1250: 55mA receive, 80mA transmit GCM-10: 24mA
Electrostatic Discharge to Network Connector[5]	TP/FT-10: Designed to comply with IEC801-2, Level 4 TP/XF-78, TP/XF-1250: No errors to 15kV, no hard failures to 20kV tested per MIL-STD-883
EMI	Designed to comply with FCC Part 15 Level B and VDE 0871 Level B
Listings	UL 1950, CSA C22.2 No. 950, TÜV EN60950
Transceiver Bit Rate	TP/FT-10, TP/XF-78: 78kbps TP/XF-1250: 1.25Mbps GCM-10: adjustable from 9.8 to 625kbps
Maximum Nodes Per Channel	TP/FT-10: 64 (-40 to +85°C) TP/XF-78: 64 (0 to 70°C) 44 (-40 to +85°C) TP/XF-1250: 64 (0 to 70°C) 32 (-20 to +85°C) 16 (-40 to +85°C)
Network Wiring	TP/FT-10: 22 to 16AWG twisted pair; see User's Guide for qualified cable types TP/XF-78, TP/XF-1250: Level 4, 22AWG twisted pair[7]
Network Length in Free Topology[2]	TP/FT-10 only: ≤1000m (3280 feet) maximum total wire with one repeater ≤500m (1640 feet) maximum total wire with no repeaters ≤500m (1640 feet) maximum node-node distance with no repeaters

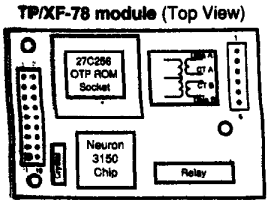
Network Length in Doubly-Terminated Bus Topology[5]	TP/FT-10: up to 2700m (8850 feet) worst case[1] TP/XF-78: 1400m (4600 feet) worst case[1] TP/XF-1250: 130m (430 feet) worst case[1]
Maximum Stub Length in Doubly-Terminated Bus Topology	TP/FT-10, TP/XF-78: 3m (9.8 feet) TP/XF-1250: 0.3m (12 inches)
Network Bus Polarity	Polarity insensitive (TP modules only)
Power-down Bus Protection	High impedance when unpowered (TP modules only)
Supply Voltage	5V ± 5%
I/O Connector	2 x 9 on 2.54 mm (0.1") centers
Network Connector	1 x 6 on 2.54 mm (0.1") centers
Network Termination	One terminator in free topology (TP/FT-10 only), two terminators in doubly-terminated bus topology
Operating Temperature[6]	-40 to +85°C
Non-operating Temperature	-40 to +85°C
Operating Humidity	25 - 90% RH @ 50°C, non-condensing
Non-operating Humidity	95% RH @ 50°C, non-condensing
Dimensions	61 mm x 18 mm x 41 mm (2.4" x 0.7" x 1.6")

TP/FT-10 module (Top View)

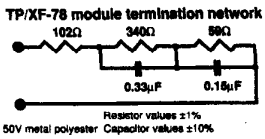


For termination options, consult the User's Guide.

TP/XF-78 module (Top View)

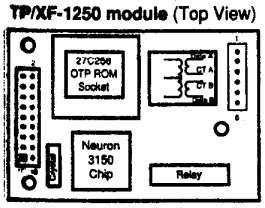


TP/XF-78 module termination network

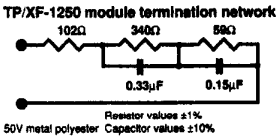


Resistor values ±1%
50V metal polyester Capacitor values ±10%

TP/XF-1250 module (Top View)

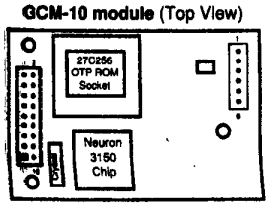


TP/XF-1250 module termination network



Resistor values ±1%
50V metal polyester Capacitor values ±10%

GCM-10 module (Top View)



FEMALE CONNECTOR PART NUMBERS

Supplier	18-pin (2 x 9) (P1)	6-pin (1 x 6) (P2)
Samtech	SSW-109-01-T-D	SSW-106-01-TS
Advanced Interconnections	BC-009-124TL	BC006-123TL
Methode	9000-209-303	9000-106-303

SOURCES FOR 32K X 8 OTP ROM TP/FT-10, TP/XF-78, GCM-10

(32-LEAD JEDEC PLCC PACKAGE)

Supplier	5 MHz Clock (150-200ns)
AMD	AM27C256-200JC
Atmel	AT27C256R-20JC
Intel	N27C256-20/L
Microchip	27C256-20/L
National	NMC27C256.20
Signetics	27C256-20A
Texas Instruments	TMS27C256.20

SOURCES FOR 32 K X 8 OTP ROM TP/XF-1250 (32-LEAD JEDEC PLCC PACKAGE)

Supplier	10 MHz Clock (90ns)
AMD	AM27C256-90JC
Catalyst	CAT27HC256LN-90
Microchip	27HC256-90/L