

# **U905 Catalog Section**

A note from IDEC:

*Due to continuous product improvements, specifications are subject to change without notice.*

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## Micro-1: The Original Micro-PLC

### Key features of the Micro-1 PLC include:

- Intelligent control economically replaces hard-wired systems
- 8 inputs, 6 outputs
- DC inputs, relay or transistor outputs
- Expansion unit doubles I/O (16 inputs, 12 outputs)
- Micro-expansion I/O for incremental I/O increases
- 80 timers, 47 counters, 160 internal relays
- CPU base unit supplies power for input signals
- Program capacity 600 steps
- Computer link, networking



General Specifications	<b>Programming</b>	Boolean or ladder logic
	<b>Available Instructions</b>	15 basic instructions, 2 FUN instructions
	<b>Program Capacity</b>	600 steps
	<b>Memory</b>	EEPROM memory built-in to base unit
	<b>Scan Time</b>	Average: 8µs per basic instruction
	<b>Input</b>	Base unit: 8 points, Expansion: 8, 4, or 2 points
	<b>Output</b>	Base unit: 6 points, Expansion: 6, 3, or 2 points
	<b>Total I/O Points</b>	28 points (maximum)
	<b>Internal Relay</b>	160 points (all points can be maintained)
	<b>Special Internal Relay</b>	96 points
	<b>Shift Register</b>	128 points
	<b>Catch Input</b>	1 point, 0.5ms pulse
	<b>Single Shot Output</b>	96 points
	<b>Timer</b>	80 points, subtracting (0 to 999.9s)
	<b>Counter</b>	45 points, adding (0 to 9999) (all points can be maintained)
	<b>Reversible Counter</b>	2 points (all points can be maintained)
	<b>Computer Link</b>	Via RS232 interface unit
	<b>External Control Input</b>	Start/stop using switch on program loader
	<b>Power Failure Protection</b>	Capacitor back-up: 3 days; internal relay, shift register, counter, reversible counter
	<b>Self-Diagnostics</b>	CPU error (WDT), CRC error, check sum error, communication error
<b>Auto Start Function</b>	Operation starts after power-up	
<b>FA Series Compatibility</b>	Program loaders are interchangeable using special cables	

- UL Listed  
File No. E102542
- CSA Certified  
File No. LR66809
- CE Certified
- EMC Approved  
File No. E951113332321

*The CPU base unit supplies power to the micro-expansion units and program loader. Micro-expansion units are not compatible with 12V DC CPU.*

Electrical Specifications	<b>Rated Supply Voltage</b>	AC CPU base unit and (8 in/6 out) expansion: 100 to 240V AC, 50/60Hz (47.5–63Hz) 24V DC base unit and all expansion units: 12V DC CPU base unit and (8 in/6 out) expansion
	<b>Voltage Range</b>	AC: 85 to 110% of rated voltage 24V DC: 80 to 120%; 12V DC: 70 to 120%
	<b>Dielectric Strength</b>	Between power or I/O terminal and ground: 1,500V AC, 1 minute
	<b>Insulation Resistance</b>	Between power or I/O terminal and ground: 10MΩ (500V DC megger)
	<b>Temperature</b>	Operating: 0 to +55°C; Storage: -20 to +70°C
	<b>Operating Humidity</b>	45 to 85% RH (avoid condensation)
	<b>Vibration Resistance</b>	5 to 55Hz, 6G for 2 hours in each of 3 axes
	<b>Shock Resistance</b>	30G, 3 shocks in each of 3 axes
	<b>Noise Resistance</b>	Between power or I/O terminal and ground: AC: ±1.3kV, 1µs; 24V DC: ±1.0kV, 1µs; 12V DC: ±500V, 1µs
	<b>Ground Resistance</b>	100Ω (maximum)
	<b>Mounting Style</b>	35mm DIN rail and panel mount

Part Numbers: Micro-1

CPU Base Unit				
AC	Relay Output	Source Input	FC1A-C1A1E	Power: 100–240V AC; NPN transistor inputs, relay outputs
		Sink Input	FC1A-C2A1E	Power: 100–240V AC; PNP transistor inputs, relay outputs
	Transistor Output	Source Input/Sink Output	FC1A-C1B1E	Power: 100–240V AC; NPN transistor inputs, NPN transistor outputs
		Sink Input/Source Output	FC1A-C2C1E	Power: 100–240V AC; PNP transistor inputs, PNP transistor outputs
DC	Relay Output	Source Input	FC1A-C1A4E	Power: 24V DC; NPN transistor inputs, relay outputs
			FC1A-C1A2E	Power: 12V DC; NPN transistor inputs, relay outputs
		Sink Input	FC1A-C2A4E	Power: 24V DC; PNP transistor inputs, relay outputs
			FC1A-C2A2E	Power: 12V DC; PNP transistor inputs, relay outputs
	Transistor Output	Source Input/Sink Output	FC1A-C1B4E	Power: 24V DC; NPN transistor inputs, NPN transistor outputs
			FC1A-C1B2E	Power: 12V DC; NPN transistor inputs, NPN transistor outputs
		Sink Input/Source Output	FC1A-C2C4E	Power: 24V DC; PNP transistor inputs, PNP transistor outputs
			FC1A-C2C2E	Power: 12V DC; PNP transistor inputs, PNP transistor outputs

Expansion I/O				
Relay Output	Source Input	FC1A-E1A1E	Power: 100–240V AC, NPN transistor inputs, relay outputs	
	Sink Input	FC1A-E2A1E	Power: 100–240V AC, PNP transistor inputs, relay outputs	
Transistor Output	Source Input/Sink Output	FC1A-E1B1E	Power: 100–240V AC; NPN transistor inputs, NPN transistor outputs	
	Sink Input/Source Output	FC1A-E2C1E	Power: 100–240V AC; PNP transistor inputs, PNP transistor outputs	
Relay Output	Source Input	FC1A-E1A4E	Power: 24V DC, NPN transistor inputs, relay outputs	
		FC1A-E1A2E	Power: 12V DC, NPN transistor inputs, relay outputs	
	Sink Input	FC1A-E2A4E	Power: 24V DC, PNP transistor inputs, relay outputs	
		FC1A-E2A2E	Power: 12V DC, PNP transistor inputs, relay outputs	
Transistor Output	Source Input/Sink Output	FC1A-E1B4E	Power: 24V DC, NPN transistor inputs, NPN transistor outputs	
		FC1A-E1B2E	Power: 12V DC, NPN transistor inputs, NPN transistor outputs	
	Sink Input/Source Output	FC1A-E2C4E	Power: 24V DC, PNP transistor inputs, PNP transistor outputs	
		FC1A-E2C2E	Power: 12V DC, PNP transistor inputs, PNP transistor outputs	

Accessories				
Program Loader		FC1A-HL1E	24 keys, 16-character LCD	
Data Preset Loader	Standard	FC1A-PL1E	Change timer/counter presets, monitor I/O, internal relay, timer, counter	
	Multi-Function	FC1A-PL2E	Change preset values, monitor, direct set/reset, read program, and more	
Loader Extension Cable		FC1A-KL1A FC1A-KL2A FC1A-KL3A FC1A-KL4A	5' (1.5m), connects program loader to base unit 2.75' (70mm) curl cord (attached to loader) 5' (1.5m), connects FA series program loader to Micro-1 base unit 5' (1.5m), connects Micro-1 program loader to FA series CPU	
I/O Expansion Cable		FC1A-KE1 PFA-1A*	1.57" (40mm) (attached to expansion unit) *21: 19.7" (0.5m), 22: 29.53" (0.75m), 23: 39.37" (1m)	Connect expansion unit to base unit
Micro Expansion Unit		FC1A-M1XE FC1A-M2XE FC1A-MXAE FC1A-M1BE FC1A-M2CE	4-point source input 4-point sink input 3-point relay output 2-point source input, 2-point sink output 2-point sink input, 2-point source output	
Micro Expansion Cable		FC1A-KM*	*1: 19.7" (0.5m), 2: 39.37" (1m)	
Serial I/O Module		FC1A-SM1E	8 inputs and 8 outputs with serial cable (order FC1A-KS*A separately)	
Serial Cable		FC1A-KS*A	*1: 39.37" (1m), 2: 78.74" (2m), 3: 118.11" (3m) Connect serial I/O module to CPU base unit (with shield terminal—one end)	
Serial I/O Transition		FC1A-PD10	20-pin interface to discrete terminal blocks (simplify installation of serial I/O)	
Analog Timer Unit External Power Supply Digital Display Mother Board		FC1A-TA1 PSR-AD07*E FC1A-PD1	Contains 4 analog timers (8 time ranges from 1 second to 10 minutes) *12: 12V DC, 0.63A output, 24: 24V DC, 0.32A output To mount a serial I/O module and digital displays such as IDEC's DD33 series	
Link Adaptor Cable FC Link Cable Computer Link Cable Software		FC1A-CLA FC1A-KC1A PFA-1A54A CLIP WINDLDR	Interface PC to Micro-1 CPU base unit for 1:1 communication 5.91" (150mm) curl cord: CPU base unit to PFJ-U11, PFJ-U21, or PF2-CLA 78.74" (2m), connects PC to PFJ-U12, PFJ-U22, or PF2-CLA Ladder diagram (DOS-based) software for programming and monitoring Windows-based programming software	
Micro-1 Starter Kit		MM-MICRO-1	Micro-1 PLC, WindLDR™ software, computer link cable	

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## CPU and Expansion I/O with Relay Output

Key features of the Micro-1 CPU and expansion I/O include:

- Choice of 12 CPU base units
- Choice of 12 expansion I/O units
- 8 inputs, 6 outputs (relay or transistor)
- Built-in EEPROM memory
- CPU base unit provides power for expansion I/O



Specifications: 8 Input Points	Rated Input Voltage	12V DC (8.4 to 14.4V DC)	24V DC (19.2 to 28.8V DC)	24V DC (19.2 to 28.8V DC)
	Rated Input Current	8mA	5mA	5mA
	Input Impedance	1.2k $\Omega$	4.3k $\Omega$	4.3k $\Omega$
	On/Off Current	On: 3mA (minimum) Off: 1.5mA (maximum)	On: 4mA (minimum) Off: 1mA (maximum)	On: 4mA (minimum) Off: 1mA (maximum)
	On/Off Time	On: 7ms Off: 11ms (maximum)	On: 7ms Off: 11ms (maximum)	On: 7ms Off: 11ms (maximum)
	Input Signal	For NPN input, use source input Micro-1 For PNP input, use sink input Micro-1 For no-voltage dry contact input, use source or sink input Micro-1		

Specifications: 6 Output Points	Configuration	Independent 1NO contact: 3 points Common 1NO contact: 3 points
	Switching Capacity	220V AC, 2A or 30V DC, 2A per point Total across 3-point common not to exceed 220V AC, 2A or 30V DC, 2A resistive or inductive (AC: $\cos \phi = 0.4$ , DC: L/R = 7ms)
	Minimum Applicable Load	5V DC, 1mA (reference value)
	Contact Resistance	30m $\Omega$ (maximum, initial value)
	Life Ratings	Mechanical: 20,000,000 operations (no load) at 1,800 operations/hour Electrical: 100,000 operations (rated load) at 1,800 operations/hour



When using expansion I/O, it is not possible to use micro-expansion I/O, analog timer, or serial I/O.

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**Part Numbers: 12V DC**

Power Voltage	Input and Output	
Input Output	Source Relay	Sink Relay
CPU Base Unit	FC1A-C1A2E	FC1A-C2A2E
Expansion I/O	FC1A-E1A2E	FC1A-E2A2E

**Part Numbers: 24V DC**

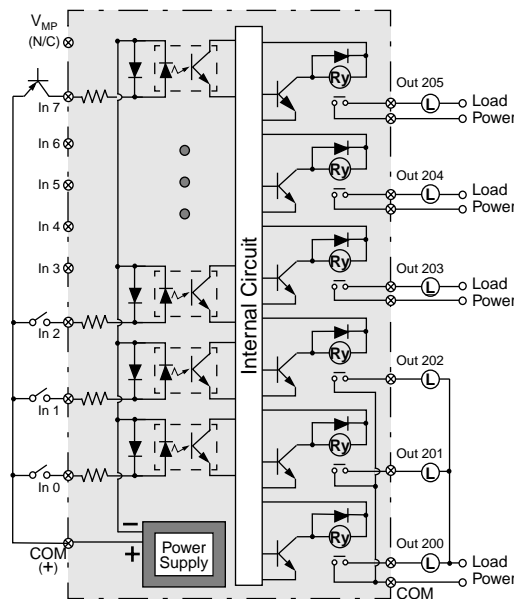
Power Voltage	Input and Output	
Input Output	Source Relay	Sink Relay
CPU Base Unit	FC1A-C1A4E	FC1A-C2A4E
Expansion I/O	FC1A-E1A4E	FC1A-E2A4E

**Part Numbers: 100 to 240V DC**

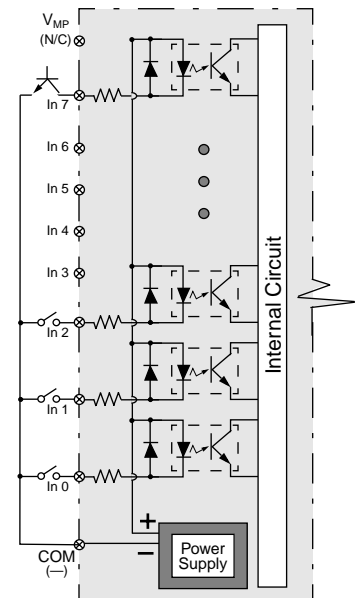
Power Voltage	Input and Output	
Input Output	Source Relay	Sink Relay
CPU Base Unit	FC1A-C1A1E	FC1A-C2A1E
Expansion I/O	FC1A-E1A1E	FC1A-E2A1E

## Circuit Diagrams

**Sink Input Relay Output**



**Source Input**



1. The I/O allocation shown above is for the base unit only. Expansion unit allocation is from input 10 to input 17 and from output 210 to output 215.



2. Input impedance is  $1.2k\Omega$  for 12V DC base and expansion units. Input impedance is  $4.3k\Omega$  for AC and 24V DC base and expansion units.

## CPU and Expansion I/O with Transistor Output



Specifications: 8 Input Points	Rated Input Voltage (allowable range)	12V DC (8.4 to 14.4V DC)	24V DC (19.2 to 28.8V DC)	24V DC (19.2 to 28.8V DC)
	Rated Input Current	8mA	5mA	5mA
	Input Impedance	1.2k $\Omega$	4.3k $\Omega$	4.3k $\Omega$
	On/Off Current	On: 3mA (minimum) Off: 1.5mA (maximum)	On: 4mA (minimum) Off: 1mA (maximum)	On: 4mA (minimum) Off: 1mA (maximum)
	On/Off Time	On: 7ms Off: 11ms (maximum)	On: 7ms Off: 11ms (maximum)	On: 7ms Off: 11ms (maximum)
	Input Signal	For NPN input, use source input Micro-1; For PNP input, use sink input Micro-1; For no-voltage dry contact input, use either source or sink input Micro-1		

Specifications: 6 Output Points	Configuration	Sink: NPN transistor, 6/common Source: PNP transistor, 6/common
	Rated Load	0.4A per circuit (maximum), 12 to 24V DC $\pm$ 10%
	Inrush Current	12V DC power: 40A (maximum) 24V DC or AC power: 5A (maximum)
	Leakage Current	100 $\mu$ A (maximum)
	On Voltage	Sink: +1.5V (maximum) Source: load voltage - 1.5V (minimum)
	On/Off Time	On: 1ms (maximum) Off: 1ms (maximum)
External Current Draw	40mA, 12 to 24V DC	



When using expansion I/O, it is not possible to use micro-expansion I/O, analog timer, or serial I/O.

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**Part Numbers: 12V DC**

Power Voltage	Input and Output	
Input Output	Source Sink	Sink Source
CPU Base Unit	FC1A-C1B2E	FC1A-C2C2E
Expansion I/O	FC1A-E1B2E	FC1A-E2C2E

**Part Numbers: 24V DC**

Power Voltage	Input and Output	
Input Output	Source Sink	Sink Source
CPU Base Unit	FC1A-C1B4E	FC1A-C2C4E
Expansion I/O	FC1A-E1B4E	FC1A-E2C4E

**Part Numbers: 100 to 240V DC**

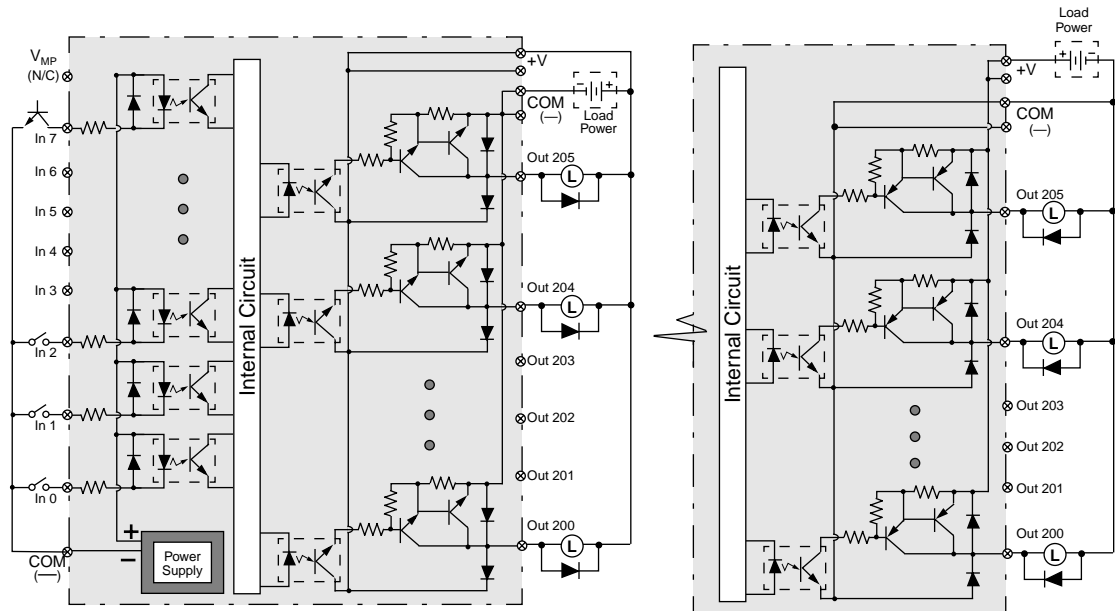
Power Voltage	Input and Output	
Input Output	Source Sink	Sink Source
CPU Base Unit	FC1A-C1B1E	FC1A-C2C1E
Expansion I/O	FC1A-E1B1E	FC1A-E2C1E

**Circuit Diagrams**

**Source Input**

**Sink Output**

**Source Output**



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**Complementary Products — Micro-Expansion I/O**
**Key features of the Micro-expansion I/O include:**

- Incremental I/O expansion
- 2 inputs with 2 outputs
- 4 inputs (source or sink)
- 3 relay outputs
- CPU base unit provides power for micro-expansion unit
- Use with AC or 24V DC CPU



<b>Specifications: 2 Inputs</b>	<b>Rated Input Voltage</b> (allowable range)	24V DC (19.2 to 28.8V DC)
	<b>Rated Input Current</b>	5mA
	<b>Input Impedance</b>	4.3k $\Omega$
	<b>On Current</b>	On: 4mA (minimum), Off: 1mA (maximum)
	<b>On/Off Time</b>	On: 7ms, Off: 11ms (maximum)
	<b>Input Signal</b>	Source: NPN open collector transistor Sink: PNP open collector transistor Either: No-voltage mechanical contact

<b>Specifications: 2 Outputs</b>	<b>Configuration</b>	Sink: NPN transistor (2/common) Source: PNP transistor (2/common)
	<b>Rated Load</b>	0.4A per circuit (maximum), 12 to 24V DC $\pm$ 10%
	<b>Inrush Current</b>	5A
	<b>Leakage Current</b>	100 $\mu$ A (maximum)
	<b>On Voltage</b>	Sink: +1.5V (maximum) Source: load voltage – 1.5V (minimum)
	<b>On/Off Time</b>	On: 1ms (maximum), Off: 1ms (maximum)
<b>External Current Draw</b>	40mA, 12 to 24V DC	

<b>Specifications: 4 Inputs</b>	<b>Rated Input Voltage</b> (allowable range)	24V DC (19.2 to 28.8V DC)
	<b>Rated Input Current</b>	5mA
	<b>Input Impedance</b>	4.3k $\Omega$
	<b>On Current</b>	On: 4mA (minimum), Off: 1mA (maximum)
	<b>On/Off Time</b>	On: 7ms, Off: 11ms (maximum)
	<b>Input Signal</b>	Source: NPN open collector transistor Sink: PNP open collector transistor Either: No-voltage mechanical contact

<b>Specifications: 3 Outputs</b>	<b>Configuration</b>	Independent 1NO contact: 1 point Common 1NO contact: 2 points
	<b>Switching Capacity</b>	220V AC, 2A or 30V DC, 2A/point (total across common $\leq$ rating) resistive or inductive (AC: $\cos \phi = 0.4$ , DC: L/R = 7ms)
	<b>Minimum Applicable Load</b>	5V DC, 1mA (reference value)
	<b>Contact Resistance</b>	30m $\Omega$ (maximum initial value)
	<b>Life Ratings</b>	Mechanical: 20,000,000 operations (no load) at 1,800 operations per hour Electrical: 100,000 operations (rated load) at 1,800 operations per hour



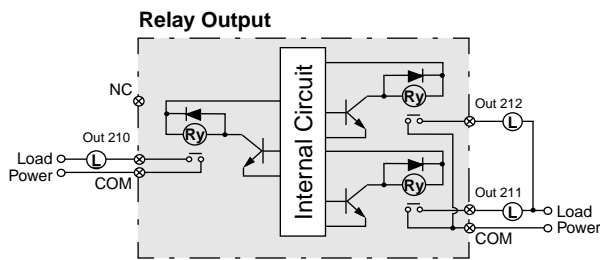
*Micro-expansion units cannot be used with a 12V DC CPU base unit.  
Only one expansion I/O or one micro-expansion I/O unit can be used per CPU base unit.*

**Part Numbers: Micro-Expansion I/O**

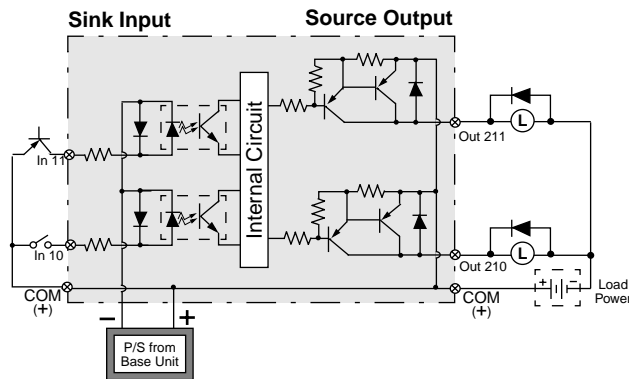
Item	Part Number	
Input Output 2 Inputs, 2 Outputs	Source Sink FC1A-M1BE	Sink Source FC1A-M2CE
Input Output 4 Inputs	Source None FC1A-M1XE	Sink None FC1A-M2XE
Input Output 3 Outputs	None Relay FC1A-MXAE	

**Circuit Diagrams**

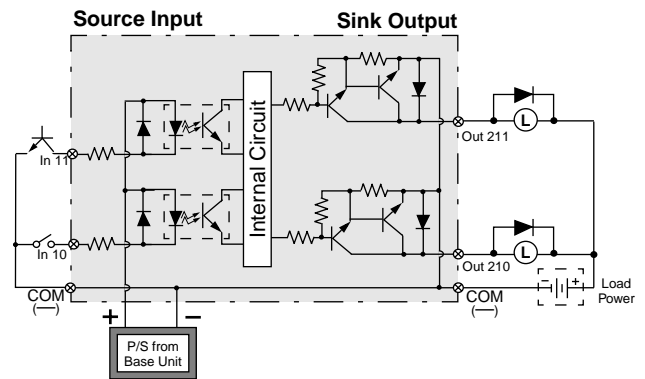
**FC1A-MXAE**



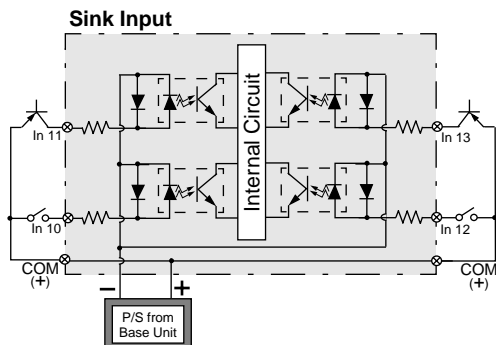
**FC1A-M2CE**



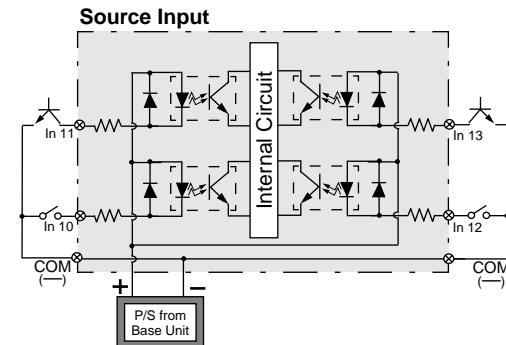
**FC1A-M1BE**



**FC1A-M2XE**



**FC1A-M1XE**



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**Complementary Products — Analog Timer/Serial I/O**
**Analog Timer**
**Key features of the Analog Timer include:**

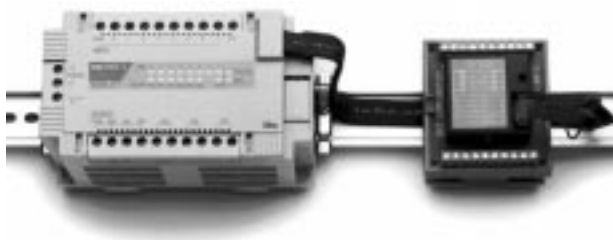
- On-delay timers allow easy, intuitive dial settings
- Set 4 independent time ranges
- Select from 8 time ranges: 1 second to 10 minutes
- CPU base unit provides power
- Use with AC or 24V DC CPU



<b>Specifications</b>	<b>Power Voltage</b>	24V DC (supplied by base unit)
	<b>Timers</b>	4 independent time ranges
	<b>8 Time Ranges</b>	1, 3, 6, 10, 30 seconds, 1, 5, 10 minutes
	<b>Setting Error</b>	± 10%
	<b>Repeat Error</b>	± 0.2%
	<b>Temperature Error</b>	± 2%
	<b>Operation Mode</b>	On-delay
	<b>Dimensions (WxHxD)</b>	1.77" x 3.15" x 2.76" (45 x 80 x 74mm)



1. When using an analog timer unit, it is not possible to use expansion I/O, micro-expansion I/O, or serial I/O. Not compatible with 12V DC CPU.

**Serial I/O**


<b>Specifications</b>	<b>Switch Input</b>	8 points (maximum)
	<b>Rated Input</b>	4.5mA, 10V DC
	<b>Indicator Output</b>	8 points (maximum)
	<b>Rated Output</b>	15mA, 24V DC (LEDs only)
	<b>Output Load P/S</b>	5 to 24V DC (supplied to base unit — capacity depends on load)
	<b>Switch/LED Connection</b>	Connector attached to PCB
	<b>Base Unit Connection</b>	Serial I/O cable (10-core shielded)
	<b>PCB Mounting</b>	Two M3 self-tapping screws
	<b>Applicable IDEC Digital Display Motherboards</b>	DD33: FC1A-PD1 DD48: FC1A-PD2
	<b>Applicable Terminal Block</b>	FC1A-PD10 transition module



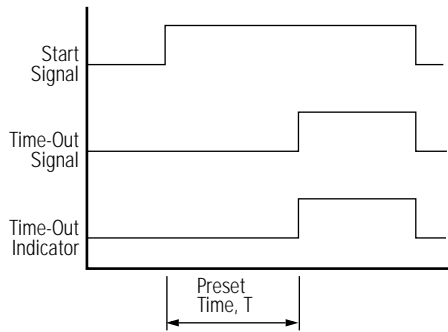
2. When using a serial I/O module, it is not possible to use expansion I/O, micro-expansion I/O, or analog timer. Not compatible with 12V DC CPU.

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Part Numbers

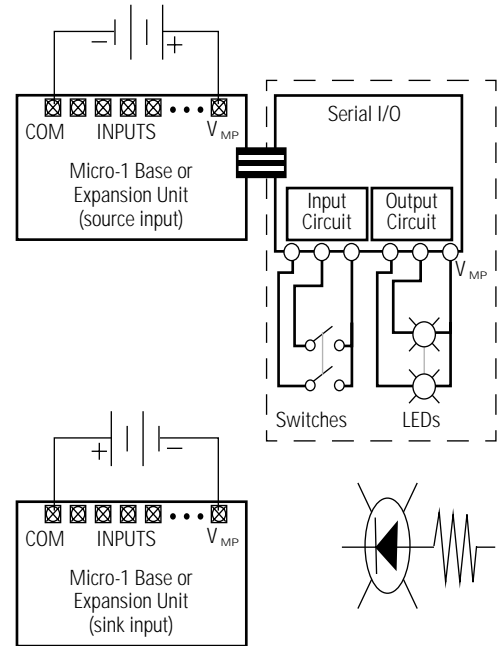
Item	Part Number
Analog Timer	FC1A-TA1
Serial I/O	FC1A-SM1E

**Timing Diagram: Analog Timer**



**Circuit Diagram: Serial I/O**

Power supply: 5 to 24V DC, as required for serial I/O output load (in addition to normal line power)



When using LEDs without a built-in resistor, connect current-limiting resistors externally.

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**Complementary Products — Program/Data Loaders**

Key features of Micro-1 complementary products include:

- FA series compatible
- Micro-1 compatible
- Program directly, using boolean, without a computer
- Panel mount data preset loaders for changing timer and counter values
- Change data register values (FA series) with multi-function data preset loader


**Program Loader**

Specifications	<b>Power Voltage</b>	12V DC (supplied by base unit)
	<b>Display</b>	LCD, 16 characters in one line
	<b>Keys</b>	18- and 24-key membrane switch
	<b>Control Key</b>	Run/stop switch
	<b>Connection</b>	Extension cable, 2.76" (70mm)
	<b>Mounting</b>	Mounted on base unit
	<b>Power Failure Protection</b>	CMOS-RAM with capacitor backup approximately 3 minutes at 20°C
	<b>FA Series Compatibility</b>	Use FC1A-KL4 extension cable and basic instruction set
	<b>Dimensions (WxHxD)</b>	4.8" x 3.25" x 0.89" (122 x 82.5 x 22.5mm)



1. FA series program loaders can also be used with the Micro-1.


**Data Preset Loaders**

	Standard	Multi-Function	
Specifications	<b>Change Values</b>	Timer/counter preset values	Timer/counter preset values, data register values (FA series only)
	<b>Acknowledge</b>	Write new preset values	
	<b>Monitor</b>	I/O, internal relays, timers, counters	I/O, internal relays, timers, counters, shift register bits, data register values (FA series only)
	<b>Direct Set/Reset</b>	—	I/O, internal relays, shift register bits
	<b>Read Program</b>	—	Read user program
	<b>Error</b>	—	Read and clear error code
	<b>Run/Stop</b>	Start and stop Micro-1 operation	



2. FA2 loader (PF2-2H4RE) and FA3 loader (PF3S-HL161E) are compatible with all FA series PLCs and the Micro-1.

### Part Numbers: Loaders

Item	Part Number
Program Loader	FC1A-HL1E
Data Preset Loaders	FC1A-PL1E (standard)
	FC1A-PL2E (multi-function)

**Standard Data Preset Loader**



**Multi-Function Data Preset Loader**



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## Complementary Products — Power Supply

### Key features of the power supply include:

- Ideal for using 3-wire sensors with the Micro-1
- Compact, lightweight, and energy efficient
- Output: 12V DC, 0.60A or 24V DC, 0.30A
- Input: 85 to 264V AC, 105 to 370V DC
- Overcurrent protection
- LED indicator
- Built-in DIN rail mount



<b>General Specifications</b>	<b>Overcurrent Protection</b>	120% (minimum)
	<b>Dielectric Strength</b>	Between I/O term and FG terminals: 3,000VAC, 1 minute Between input terminals and housing 2000VAC, 1 minute Between output and FG terminals: 500VAC, 1 minute
	<b>Insulation Resistance</b>	Between input terminal and output terminal or housing: 100MΩ minimum (500V DC megger)
	<b>Temperature</b>	Operating: -10 to 60°C; Storage: -30 to +85°C
	<b>Operating Humidity</b>	20 to 90% RH (avoid condensation)
	<b>Vibration Resistance</b>	2 hours in each of 3 axes, 45m/s <sup>2</sup> , 10 to 55Hz
	<b>Shock Resistance</b>	294 m/sec <sup>2</sup> , 3 shocks in each of 3 axes

<b>Input Specifications</b>	<b>Input Voltage (single phase, 2-wire)</b>	100V to 240V AC nominal: 85 to 264V AC, 105 to 370V DC compatible
	<b>Frequency</b>	47 to 63Hz
	<b>Input Current</b>	0.17A at 100V, at rated input and output; 0.11A at 200V, at rated input and output
	<b>Inrush Current</b>	50A at 100V, at rated input and output; 50A at 200V, at rated input and output
	<b>Leakage Current</b>	0.75mA (maximum)
	<b>Efficiency</b>	12V DC: 68% at 100V and rated output; 24V DC: 75% at 100V and rated output

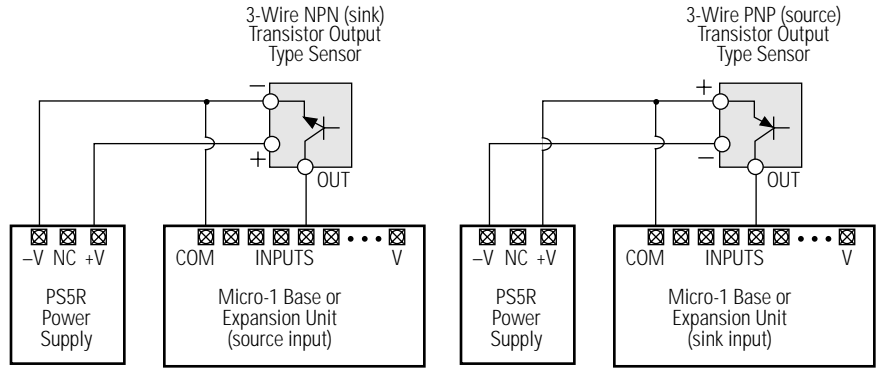
<b>Output Specifications</b>	<b>Rated Output</b>	12V unit: 12V DC, 0.60A; 24V unit: 24V DC, 0.30A
	<b>Adjustments</b>	Voltage range: ±10% (V.ADJ on front)
	<b>Output Hold Time</b>	20ms (minimum) at rated input and output
	<b>Rise Time</b>	200ms (maximum) at rated input and output
	<b>Fluctuation</b>	Input: 0.4% (maximum); Load: 1.5% (maximum)
	<b>Temperature Change</b>	0.05% per °C (maximum) 0 to 50°C
	<b>Ripple Voltage</b>	2% + 50mV p-p (maximum) including noise, measured with a 47μF capacitor

**J**

### Part Numbers: Power Supply

Part Number	Output	Input
PS5R-A12 PS5R-A24	12V 24V	100 to 240V AC

### Circuit Diagrams: Power Supply

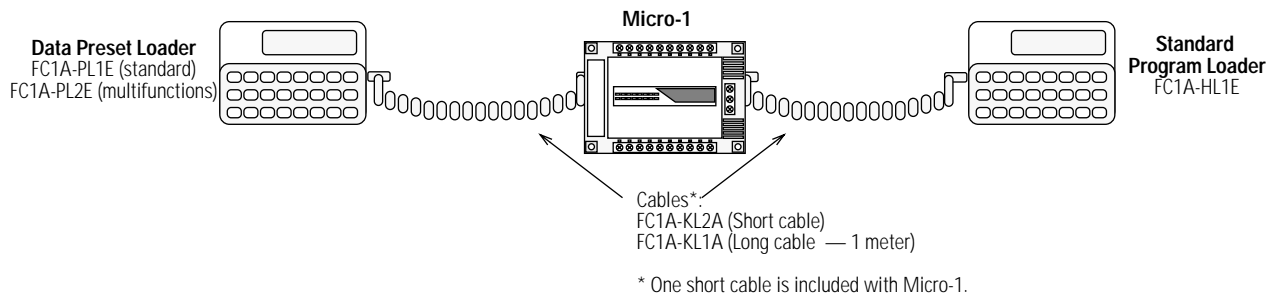


**J**

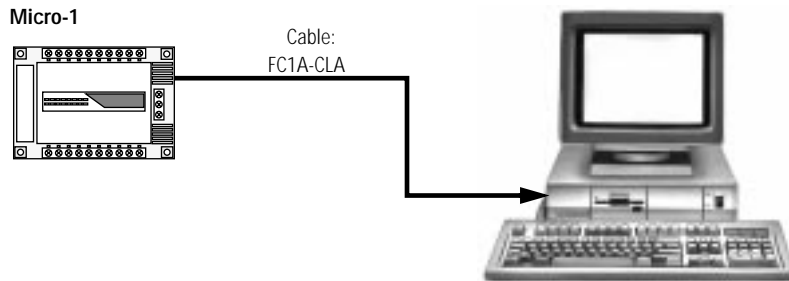


## Micro-1 Communication Configurations

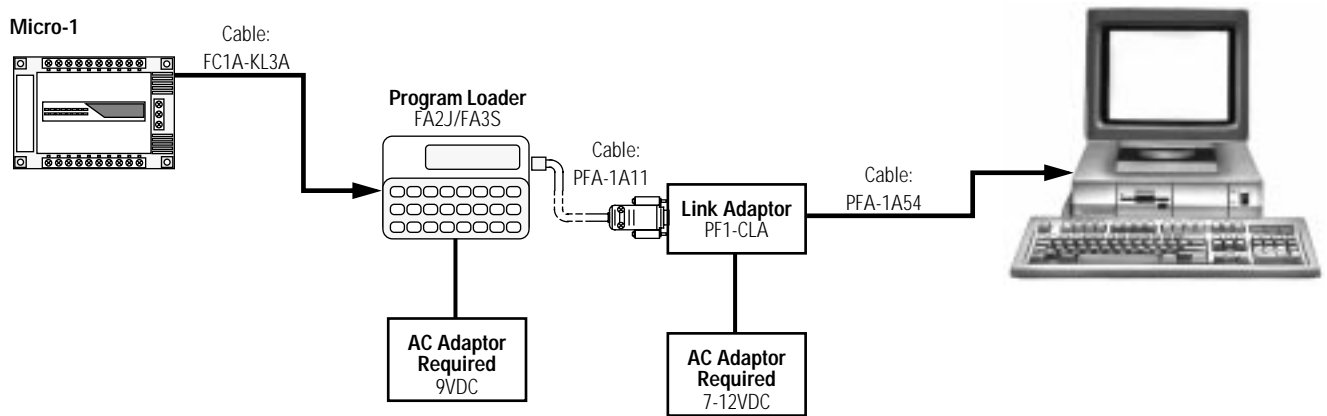
### ProgramLoader to Micro-1



### Micro-1 to Personal Computer



### Micro-1 to Program Loader to Personal Computer



J

## Configuration, continued

### Programming Software



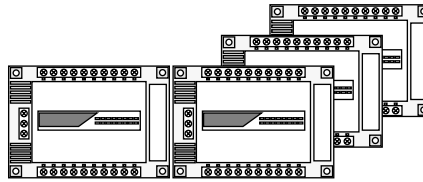
1. *WindLDR programming software—see page J-86 for details.*



**J**

2. *CLIP: Control Logic Input Program—see page J-87 for details.*

### Expansion I/O

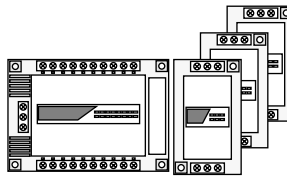


#### Expansion I/O

100–240V AC  
Source or Sink Inputs, Relay Outputs  
Source or Sink Inputs, Transistor Outputs

24V DC  
Source or Sink Inputs, Relay Outputs  
Source or Sink Inputs, Transistor Outputs

12V DC  
Source or Sink Inputs, Relay Outputs  
Source or Sink Inputs, Transistor Outputs

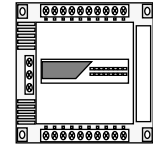


#### Micro-Expansion I/O

4-Point Input, Source or Sink  
3-Point Relay Output  
2-Point Input with 2-Point Output  
Source or Sink Inputs, Transistor Outputs

### Options

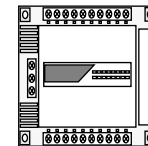
#### Analog Timer



With 4 Timers  
8 Time Ranges

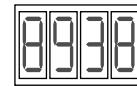
FC1A-TA1  
1s to 10m

#### Serial I/O Module



With 8 input and  
8 output expansion

FC1A-SM1E

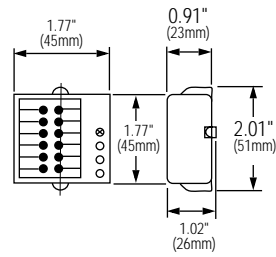


Perfect for Use with IDEC  
Digital Display Motherboards,  
DD33: FC1A-PD1

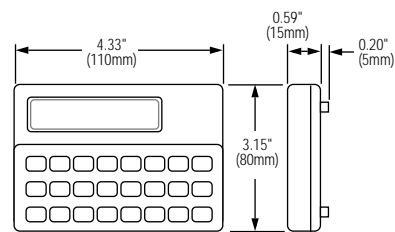


## Dimensions, continued

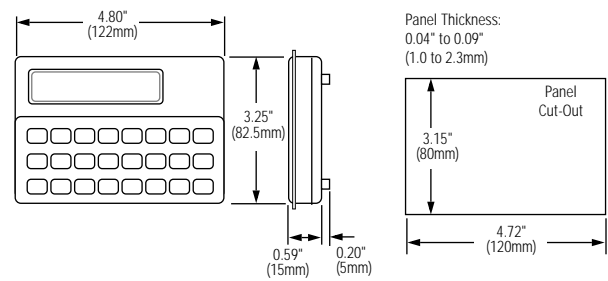
### Serial I/O



### Program Loader



### Data Preset Loaders



**J**

## WindLDR™ Programming Software



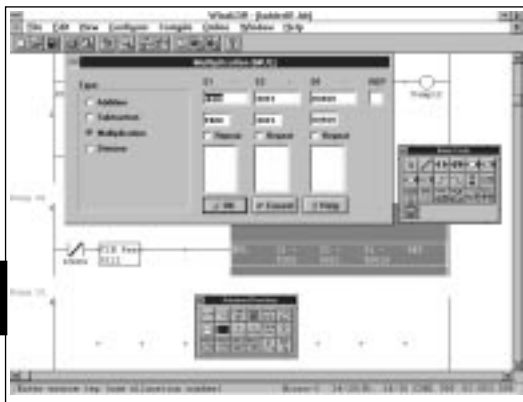
### Where Logic and Intuition Converge

WindLDR, IDEC's newest Windows-based, Ladder programming tool successfully combines logic and intuition. IDEC's WindLDR includes a graphic interface, icon-driven tool bar, on-line help, and debugging tools. In its first release, WindLDR programs the Micro-1, Micro<sup>2</sup>, and the new Micro<sup>3</sup>C. Future releases promise the inclusion of the FA series and all new PLCs as well.

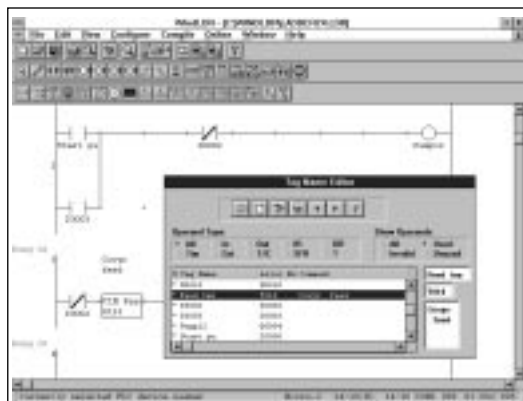
WindLDR is your icon-driven, multi-window, all-inclusive tool.

### Key features of the WindLDR software package include:

- Use the Tag Editor to access and edit all coil data in one convenient option
- Customize toolbars, ladder file characteristics, and more
- Access the most common commands with the context-sensitive right mouse button
- Open and use unlimited ladder files
- Monitor and de-bug PLC functionality on-line
- Edit ladders simply, with a drag and drop toolbar



Tag Name Editor



Tag Name Editor

General Specifications	<b>Cut and Paste Function</b>	Select one rung or multiple rungs
	<b>Tag Editor</b>	Access and edit all coil data in one convenient option
	<b>Customization</b>	For toolbars, ladder file characteristics, and many program features
	<b>Right Mouse Button</b>	Context-sensitive for convenient access to most commonly used commands
	<b>On-Line Monitoring</b>	De-bug and observe real-time PLC functionality, right from your PC. Write new values to counters, timers, and data registers.
	<b>Multiple Ladder Files</b>	Open unlimited ladder files to compare and reuse instantly, even if they are written for different PLCs
	<b>Drag and Drop</b>	User friendly toolbar makes ladder creation and editing simple
	<b>Find String</b>	Searches for text in various ways; large ladder files are easy to manage
	<b>Multi-Level Undo</b>	Limited only by available memory
	<b>CLIP and CUBIQ</b>	Fully compatible for upgrade
	<b>On-Line Help</b>	Context-sensitive; extensive coverage of WindLDR and PLC functionality
	<b>Manuals</b>	The <i>WindLDR Tutorial</i> provides a quick, simple way to get up and running; the comprehensive <i>WindLDR Reference Manual</i> answers basic through advanced questions
	<b>Support</b>	IDEC engineers maintain an excellent level of customer service and software support
	<b>Platforms</b>	Microsoft® Windows® 3.x, Windows 3.11, Windows 95
<b>System Requirements</b>	386 PC (or better) in enhance mode; 8Mb available RAM (minimum); 12Mb free hard disk space (minimum)	
<b>Installation Software</b>	Four 3.5" diskettes	

## CLIP Programming Software

**CLIP 6.0: Control Logic Input Program  
Ladder Programming and Monitoring Software**

- Keyboard shortcuts or menu selections
- Extensive program documentation
- Cut and paste elements or blocks
- Open two files for reference or copy
- Create macros for screen sequence
- Status bar and feedback messages
- Supports instructions for specific PLC type selected
- Automatic numbering of SOTs



With CLIP, you can program the Micro-1, FA1, FA1J, FA2, FA2J, or any of the four FA3S CPUs (CP11, CP11T, CP12, CP13). First create a ladder program for any of these PLCs. With a few keystrokes, the program can be converted for use with any of the FA/Micro-1 PLCs.

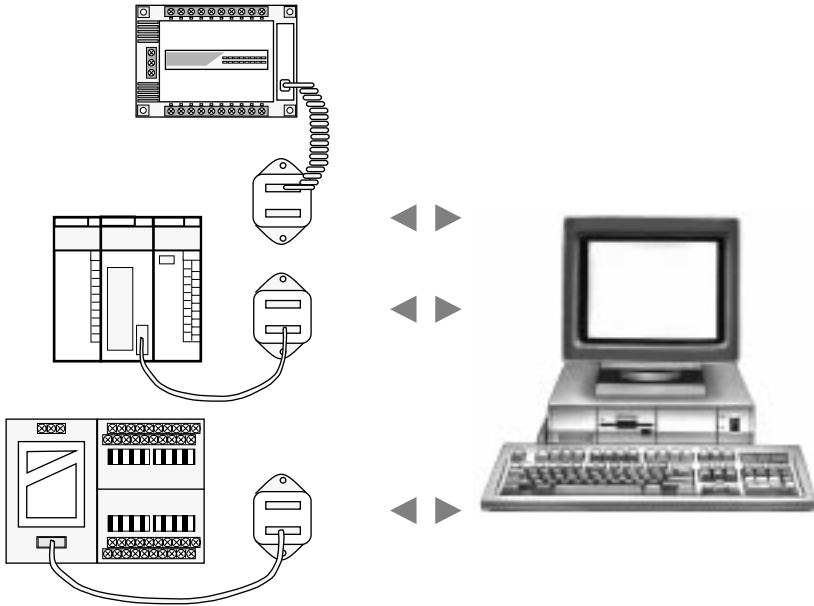
CLIP can access up to 32 IDEC PLCs in a network, using any combination of FA/Micro-1 PLCs.

User programs can be documented extensively in CLIP. Each element can be labeled with four fields, six characters each, and rung comments are unlimited. On-line help includes allocation numbers, instruction syntax, and menu information.

CLIP's compiler detects programming errors and validates operands. Transfer options include PC to and from the PLC, PC to and from the loader, and program verification.

## PC Communication

### 1:1 Communication (RS232)



- RS232 serial communication
- Computer serial cable: PFA-1A54A (one required for any PLC)
- Computer link adaptor: PF2-CLA (one required for any PLC)
- Micro-1 interface cable: FC1A-KC1A (one required for each Micro-1 PLC only)
- FA series interface cable: PFA-1A51 (one required for each FA series PLC only)

### 1:1 Communication (RS422)

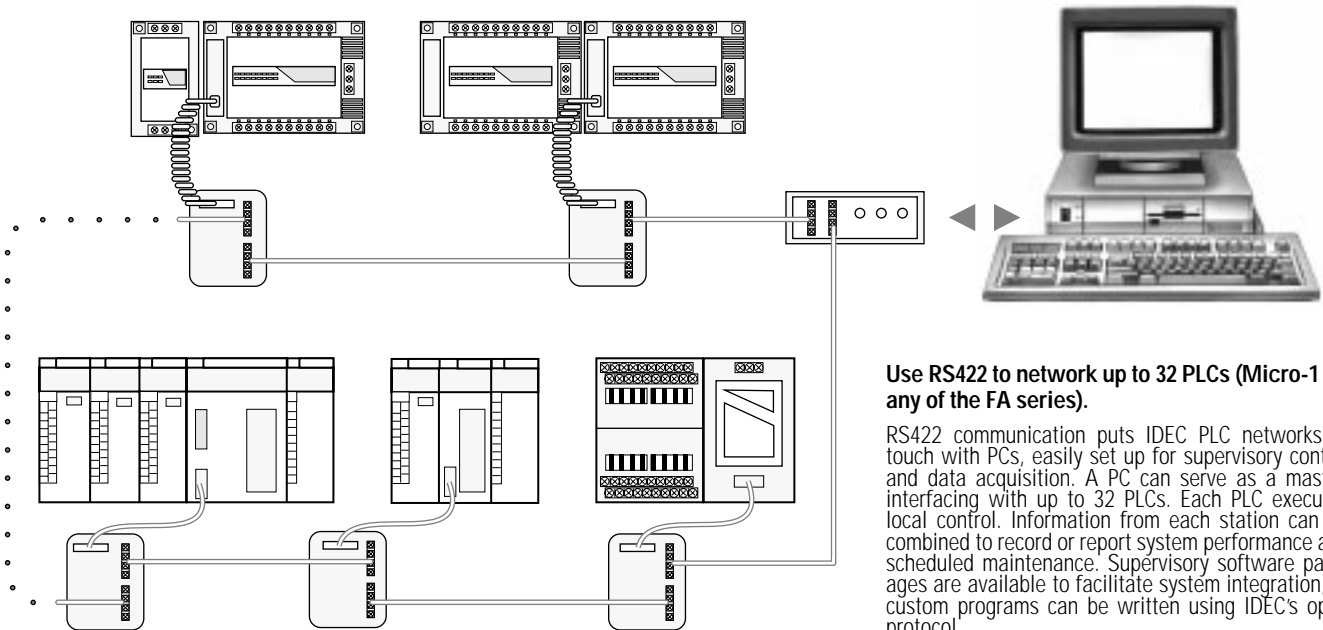
#### Fiber Optic

- Computer serial cable: PFA-1A54A (one required per network)
- Main computer link, fiber optic: PFJ-U12 (one required per network)
- Individual fiber optic adaptor: PFJ-U11 (one required for each PLC)
- Micro-1 interface cable: FC1A-KC1A (one required per Micro-1)
- FA series interface cable: PFA-1A51 (one required per FA CPU)
- Transmission line: optical fiber

#### Cable

- Computer serial cable: PFA-1A54A (one required per network)
- Main computer link, cable: PFJ-U22 (one required per network)
- Individual cable adaptor: PFJ-U21 (one per CPU for each PLC)
- Micro-1 interface cable: FC1A-KC1A (one required per Micro-1)
- FA series interface cable: PFA-1A51 (one required per FA CPU)
- Transmission line: 4-core twisted pair

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#### Use RS422 to network up to 32 PLCs (Micro-1 or any of the FA series).

RS422 communication puts IDEC PLC networks in touch with PCs, easily set up for supervisory control and data acquisition. A PC can serve as a master, interfacing with up to 32 PLCs. Each PLC executes local control. Information from each station can be combined to record or report system performance and scheduled maintenance. Supervisory software packages are available to facilitate system integration, or custom programs can be written using IDEC's open protocol.

## Programming Instruction Set

Instruction Set		Instruction Number	Micro-1	FA1J	FA2J FA3S CP11	FA3S CP1T	FA3S CP12/13
AND	And		*	*	*	*	*
ANDL0D	And load		*	*	*	*	*
CNT	Counter		*	*	*	*	*
END	End		*	*	*	*	*
FUN	Fun		*	*	*	*	*
FUN147	Advanced instructions		*	*	*	*	*
FUN247	Advanced instructions		*	*	*	*	*
FUN100	Equivalent comparison (FUN100 - 146)		*	*	*	*	*
FUN200	Equal to/greater than (FUN200 - 246)		*	*	*	*	*
FUN-00	Addressed jump		*	*	*	*	*
JEND	Jump end		*	*	*	*	*
JMP	Jump		*	*	*	*	*
LOD	Load		*	*	*	*	*
MCR	Master control reset		*	*	*	*	*
MCS	Master control set		*	*	*	*	*
NOT	Not		*	*	*	*	*
OR	Or		*	*	*	*	*
OR LOD	Or load		*	*	*	*	*
OUT	Output		*	*	*	*	*
RST	Reset		*	*	*	*	*
SET	Set		*	*	*	*	*
SFR	Shift register		*	*	*	*	*
SFR NOT	Reverse shift register		*	*	*	*	*
SOT	Single output		*	*	*	*	*
TIM	Timer		*	*	*	*	*
JNOP	No operation	0	*	*	*	*	*
JTBIN	BCD (binary coded decimal) to binary	1	*	*	*	*	*
JTBCD	Binary to BCD	2	*	*	*	*	*
JCMP	Comparison	3	*	*	*	*	*
JADDC	Addition with carry	4	*	*	*	*	*
JSUBB	Subtraction with borrow	5	*	*	*	*	*
JMUL	Multiplication	6	*	*	*	*	*
JDIV	Division	7	*	*	*	*	*
JDSFT	Data shift	8	*	*	*	*	*
JBCDS	BCD (Binary Coded Decimal) data shift	9	*	*	*	*	*
JLD0	Load data register D0	10	*	*	*	*	*
JLD0B	Load data register D0, byte data	11	*	*	*	*	*
JLD0I	Load data register D0, indirect	12	*	*	*	*	*
JLD1	Load data register D1	13	*	*	*	*	*
JLD1B	Load data register D1, byte data	14	*	*	*	*	*
JINC	Data increment	18	*	*	*	*	*
JDEC	Data decrement	19	*	*	*	*	*
JST0	Store data register D0	20	*	*	*	*	*
JST0B	Store data register D0, byte data	21	*	*	*	*	*
JST0I	Store data register D0, indirect	22	*	*	*	*	*
JST1	Store data register D1	23	*	*	*	*	*
JST1B	Store data register D1, byte data	24	*	*	*	*	*
JDISP	Display	25	*	*	*	*	*
WGE	Word greater than or equal to	110	*	*	*	*	*
WLE	Word less than or equal to	120	*	*	*	*	*
WEQ	Word equal to	130	*	*	*	*	*
TADD3	10,000 addition, 3 operands	144	*	*	*	*	*
TSUB3	10,000 subtraction, 3 operands	154	*	*	*	*	*
TMUL	10,000 multiplication	163	*	*	*	*	*
TDIV	10,000 division	173	*	*	*	*	*
WAND3	Word AND, 3 operands	181	*	*	*	*	*
WOR3	Word OR, 3 operands	191	*	*	*	*	*
WXOR3	Word exclusive OR, 3 operands	201	*	*	*	*	*
WCMP	Word comparison	210	*	*	*	*	*
WMOV	Word move	220	*	*	*	*	*
WBM0V	Word block move	224	*	*	*	*	*
WNSET	Word N set	225	*	*	*	*	*
WNRS	Word N repeat set	226	*	*	*	*	*
PDFMT	Print/display format	26L	*	*	*	*	*
PDCMD	Print/display command	27L	*	*	*	*	*
SPRUN	Step advance, run	31L	*	*	*	*	*
SPJMP	Step advance, jump	320	*	*	*	*	*
SPFRC	Step advance, force	33L	*	*	*	*	*
SPINH	Step advance, inhibit	34L	*	*	*	*	*
W12IM	Word S1/D2 indirect move	600	*	*	*	*	*
W21IM	Word S2/D1 indirect move	601	*	*	*	*	*
BILD	Bit indirect load	610	*	*	*	*	*
BIST	Bit indirect store	620	*	*	*	*	*
T10MS	High-Speed, 10-ms timer	750	*	*	*	*	*
SFWT	Soft wait	760	*	*	*	*	*

Instruction Set, continued		Instruction Number	Micro-1	FA1J	FA2J FA3S CP11	FA3S CP1T	FA3S CP12/13
XYFS	XY conversion format	8LL			*	*	*
CVXY	Convert X to Y	8dd			*	*	*
CVYX	Convert Y to X	8ff			*	*	*
TJMP	Tag jump	5itt			*	*	*
TAG	Tag number	8itt			*	*	*
STEP	Step number	9sss			*	*	*
WADD	Word addition	140					*
WSUB	Word subtraction	150					*
WMUL	Word multiplication	160					*
WDIV	Word division	170					*
CVNBN	Convert N bits to number	236					*
WRRWC	Word right rotation with carry	240					*
WLRWC	Word left rotation with carry	241					*
RET	Return, program branching	300					*
DJNZ	Decrement jump, non-zero	303					*
ITJMP	Indirect tag jump, program branching	304					*
ITCAL	Indirect tag call, program branching	305					*
BRGTO	Branch go to, program branching	306					*
BRGSB	Branch go sub, program branching	307					*
FIFO	First-in, first-out data file format	40m					*
FIEX	First-in data file execution	41m					*
FOEX	First-out data file execution	42m					*
IRET	Interrupt return	702					*
UITIJ	User internal timer interrupt jump	710					*
WDTR	Watchdog timer reset	770					*
DFTLP	Data file top	904					*
DFTBM	Data file bottom	905					*
CLKST	Clock set	940				*	*
CLKRD	Clock read	941				*	*
CLKCF	Clock comparison format	942				*	*
CLKCP	Clock comparison	943				*	*
CLKAJ	Clock adjust	944				*	*
FRA1U	Four rules of arithmetic, 1 data unit	1000					*
FRA2U	Four rules of arithmetic, 2 data units	1001					*
SCOWP	Serial communication write protect	101i					*
FNTWR	FA-NET word read	1020					*
FNTWW	FA-NET word write	1030					*
FNTBR	FA-NET bit read	1040					*
FNTBW	FA-NET bit write	1050					*
RMTIO	Remote I/O (allocation)	1060					*
UPRPW	User program read/write protect	1070			*	*	*
UECIJ	User external module interrupt jump	1100					*
UITPZ	User interrupt pause	1101					*
HIIRD	High-Speed interrupt input read	1110					*
HIOWT	High-Speed interrupt output write	1120					*
T3TOD	T <sup>3</sup> to double word	1200					*
TCSLD	TIM/CNT preset value load	1201					*
TCCST	TIM/CNT current value store	1202					*
BMVTM	Byte move with transfer mode	1203					*
NDSRC	N data search	1240					*
DREPL	Data replace	1241					*
NDADD	N data add	1242					*
DFTOR	Data file to operand	1243					*
CVDU	Convert data unit	1244					*
KYMTX	Key matrix	125L					*
DSQFT	Drum sequencer format	130L					*
DSQEX	Drum sequencer execute	131L					*
SRXFT	Serial RX format (receiving)	1320					*
SRXEX	Serial RX execute (receiving)	1321					*
UDCMS	User-Defined communication mode set	1322					*
STXFT	Serial TX format (transmitting)	133L					*
STXEX	Serial TX execute (transmitting)	134L					*
UIETM	User interrupt execution time measure	1430					*
BISRT	Bit set/reset	1440					*
BINOT	Bit NOT	1441					*
BIMOV	Bit move	1442					*
BIAND	Bit AND	1443					*
BIOR	Bit OR	1444					*
BIXOR	Bit exclusive OR	1445					*
BISCT	Bit set counter	1446					*
DRBSR	Data register bit set/reset	1447					*
DRBRD	Data register bit read	1448					*
ANNFT	Annunciator format	146L					*
ANNEX	Annunciator execute	147L					*

**J**