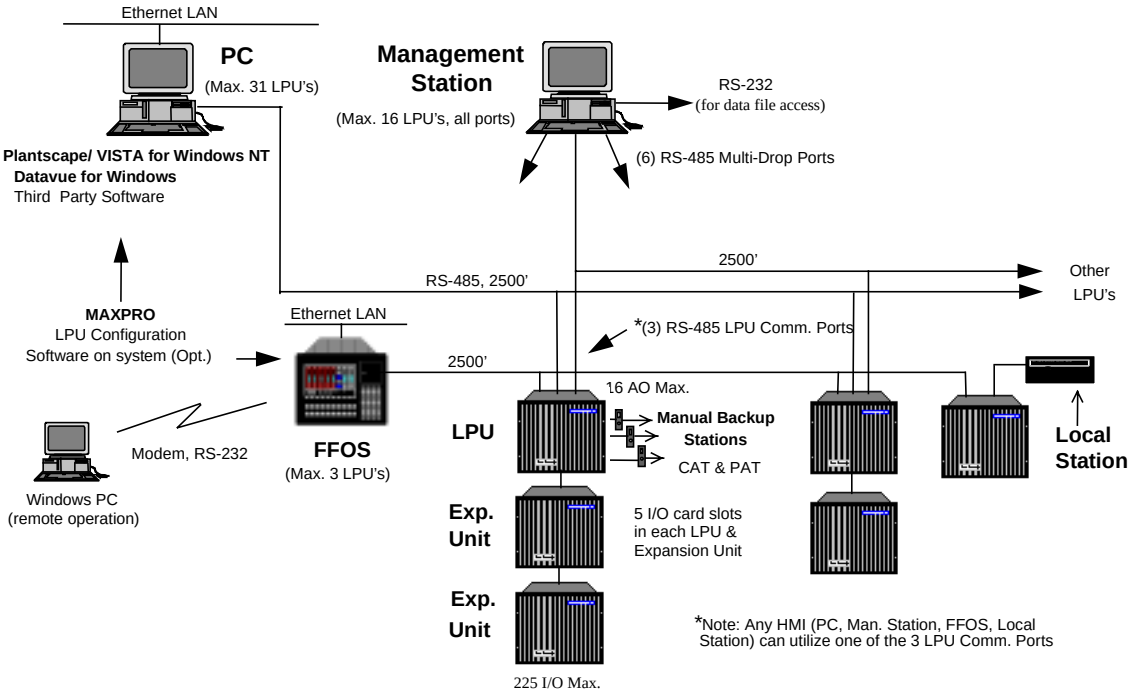
Micromax® 2 Technical Overview Specification



Overview

Honeywell's Micromax 2 is a family of products for implementing a cost-effective control and data acquisition system to improve productivity and process performance. It is designed to supervise small to medium-sized batch or continuous processes in largely thermal-based applications plus utility data acquisition. Built-in features streamline process control (loop and logic) configuration, recipe setup for thermal batch applications, and operator interface setup for data acquisition and supervisory control.

Micromax 2 integrates control loop, PLC, and data acquisition functions using two major parts:

1. ***Local Processing Unit (LPU)*** plus 1 or 2 ***Expansion Units*** if needed - NEMA4-enclosed intelligent field controller which connects to the process. This unit provides:

- Up to 225 I/O, dependent on I/O card mix (up to 75 I/O in LPU plus up to 75 I/O in each Expansion Unit)
- 16 control loops including carbon potential, ratio, cascade
- Control outputs - CAT, DAT, PAT (8 only), Dual Output, On-Off
- 4 setpoint programmers - 32 step, 16 event output
- 250 pseudo points (function blocks)
- Up to 200-300 ladder logic rungs, (4) 16 step, 16 event output drum sequencers, 80 timers/counters.
- (3) RS-485 communications ports

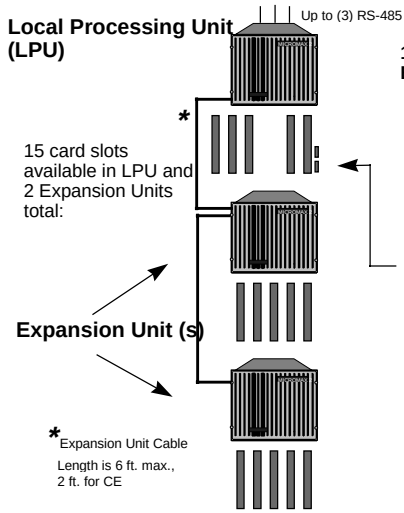
2.Selection of User Interfaces:

- **Factory Floor Operator Station** with LPU Configuration available and supporting 3 LPUs.
- **Management Station** with LPU Configuration available and supporting 16 LPUs.

- **Plantscape/VISTA for Windows NT** with LPU Configuration available***** and supporting 31 LPUs.
  Third Party S/W (Wonderware, etc.) with LPU Configuration available***** and supporting ≈31 LPUs.

*****Using Maxpro LPU Configuration Software which is DOS-based (not functional in Windows NT), used in PC-only applications where no other supervisory interface such as Factory Floor Operation Station or Management Station is utilized on another LPU communications port.

The LPU's expansion to 3 communications ports allows interface to one or more of the user interfaces listed above.



16 card types to choose from for LPU and Expansion Units:

- **Analog Input Cards**
  - 10 universal inputs / 0.5 sec. (T/C, V, mV,
  - 15 universal inputs / 0.75
  - 15 universal inputs / 0.75 sec. (high noise
  - 8 high level voltage,mA / 0.25
  - 10 RTD (10, 100 ohm), 0.5
  - 10 pulse frequency, 0.5
- **Analog Output Base Card (2 max. per LPU)**
  - Optional Base card contains up to 8 4*dual* output cards of the following Current (mA), Volt, Motor Positioning, or Proportioning
- **Discrete Input Cards**
  - 15 DC SSR
  - 15 AC SSR
  - 7 inputs / 8 outputs, AC or DC
- **Discrete Output Cards**
  - 10 AC SSR
  - 10 DC SSR
  - 10 SPDT relays

Local Processing Unit Overview

The MICROMAX 2 Local Processing Unit (LPU) provides local intelligence and input/output execution at field locations for greater efficiency and reduced installation costs. Its industrial packaging and operating temperature allows the LPU to be mounted near the process without the need for special cabinets. Each LPU contains a CPU and five input/output cards for applications ranging from exclusively low-level data acquisition to fully integrated control involving both loop and logic functions. Universal, isolated input cards provide 15 bit resolution and range assignment on a point by point basis - TC, mV, V or mA (through resistor shunts).

Once configured from the Management Station, FFOS (with MAXPRO software) or MAXPRO PC-based software, an LPU functions independent of it and all other LPUs. Each unit provides local input scanning, signal conditioning, linearization, alarming, calculation, function processing, multiloop control, logic control and setpoint ramp/soak program generation.

The LPU has up to 3 serial communication ports. This allows field distribution via independent RS-485 networks at up to 2500 feet to a variety of user interface or supervisory functions. Manual Stations may also be added for backup.

The LPU Expansion Units may be connected locally to an LPU (up to 6 feet apart (24" (61 cm) for CE)) to add analog inputs and discrete I/O capability (up to 150, depending on the card mix). Expansion Units have the same environmental specifications as the LPU.

All connections and servicing of the LPU are accessed through the front of the case. The LPU can be panel, rack, or wall mounted, and the NEMA 4 construction means no special cabinets are required. The circuit card file cage may be unplugged and removed, which provides free access to field wiring connections for easy installation. The input terminal blocks are designed for heavy duty industrial use and accept 14 through 24 AWG gage solid wire. All I/O cards can be removed without disturbing the field wiring.

Local Processing Unit Specifications

I/O Capacity	
I/O Module Configuration	One 5-card LPU plus one or two 5-card Expansion units. Up to 15 I/O cards maximum of any type except analog outputs (up to 2 analog output base cards - only in LPU).
Analog Inputs	225 “universal”, 150 RTD (including Expansion Units)
Analog Outputs	16 - 8 dual output cards, maximum of 4 motor dual position proportioning (PAT)
Discrete I/O	225 (including Expansion Units)
Pulse Frequency Inputs	75 (including Expansion Units)

Control	
Loops	16
Loops Types	Simple, Medium, Complex, Cascade, Ratio, Dual Output (Heat/Cool), Carbon Potential, On-Off
Output Types	Current (CAT), Voltage (VAT), Time Proportioning (DAT), Position (PAT)
Update Rate	250 ms, 500ms, or 750 ms (dependent on input card point count -8, 10 or 15)

Pre-Programmed Functions	
Pseudo Point function Library	40+ functions plus user-defined calculator
Pseudo Points	250 configurable
Update Rate	250 ms, 500ms, or 750 ms (dependent on input card point count -8, 10 or 15)

Setpoint Programming	
Programmers	Four 16- or 32-step, 16-event output programmers
Soak Time	To 99:59:59 hours
Elapsed Time	To 999:59:59 hours
Ramp Rate	0 to 10,000 units/minute
Calculation/Loop Update Rate	250 ms, 500 ms or 750 ms (dependent on input card scan rate)
Alarms	150, selectable as Hi, Lo, hi Rate, Lo Rate, or Deviation. Logic alarms independently programmable.

Logic	
Scan Rate	100 ms (Management Station expands configuration to 3000 elements)
Elements	1500 or 3000 (Management Station expands configuration to 3000 elements)
Rungs	200-300 (Management Station expands configuration to 300 rungs) Normally open contact = 1 element
Timers/Counters	80 (Each take 12 elements)
Drum Sequencers	(4) 16-step, 16 output, time or event-driven
Programming	Standard ladder logic conventions, 10x10 matrix, one output/rung

Physical Characteristics	
Power Requirements	120 VAC (100 to 132), 50/60 Hz, 40 W average, 240 VAC (216 to 254), 50/60 Hz or 85 -264 VAC, 50/60 Hz
Weight	45 lb. (20.4 kg) maximum (LPU and Expansion Unit)
Dimensions	17.5 in. (445 mm) H x 19.0 in. (483 mm) W x 14.8 in. (375 mm) D (LPU and Expansion Unit)
Non-Volatile Memory	Lithium battery-backed RAM (2-year battery life with unpowered LPU, 5-year battery life with powered LPU)

Environmental

	Rated Operation	Storage
Temperature	-10°C to 55°C	-30°C to 70°C
Humidity	10° to 90° RH, non-condensing	

Vibration: Tested to SAMA PMC 31.1

	5 to 15 Hz	15 to 150 Hz	150 to 2000 Hz
Wall/Panel Mount Control Room	1 mm peak to peak	0.5 G	N/A
Panel Mount Field Area	2 mm peak to peak	1 G	0.5 G

Analog Inputs

Card Types		Max. Scan Rate*
	10 Universal Inputs	0.50 sec
	15 Universal Inputs	0.75 sec
	8 Hi-level Voltage Inputs	0.25 sec
	10 RTD Inputs	0.50 sec
	5 Pulse Frequency Inputs	

*determined by input card with most inputs

Universal and Hi-Level Voltage Input Cards

Input Types	Thermocouple, mV, V, mA (via shunt) carbon potential (O_2 probe), radiation sensors. Current inputs use terminal board-mounted shunt resistors.

Range, Accuracy, and Resolution

	Range	Accuracy* (25 ±2°C for 1 year)	Resolution
Volts	Selectable between -2.000 V and +5.00 V. Minimum span: 10 mV.	0.1% of reading +10 µV.	0.01%
Hi-level Volts	Selectable between -2.000 V and +10.000 V. Minimum span: 4 mV.	± 0.1% +4 mV.	0.01%
TC	E -450 to 2200F -276 to 1200C J -350 to 2190F -212 to 1195C K -450 to 2800F -267 to 1535C T -450 to 760F -267 to 400C N -8 to 2372F 0 to 1300C W5 - W26 0 to 3980F -18 to 2194C Plat II -100 to 2500F -74 to 1372C B 300 to 4540F 149 to 2504C R -50 to 3210F -45 to 1765C S -50 to 3640F -45 to 2004C	±0.1% of reading +10 µV.	0.1° minimum

* A single point on range can be calibrated to ±0.01% of reading (or display resolution).

	High End of Range (in mV)	**Zero Accuracy (in µ V)**
Zero Accuracy	0 to 10	±15
	10 to 24.999	±20
	25 to 49.999	±30
	50 to 99.999	±60
	100 to 249.99	±100
	250 to 499.99	±200
	500 to 999.99	±500
	1000 to 2499.9	±1000
	2500 to 4999.9	±2000

RAYOTUBE and SPECTRAY Ranges (former L&N equipment)			
		~ 1 to 24 mV	**(RAYOTUBE)**
18890	18890-3302	750 to 1600F	399 to 871C
	18890-0073	800 to 1800F	427 to 982C
	18890-0074	1100 to 2300F	594 to 1260C
	18890-0035	1200 to 2600F	649 to 1426C
	18890-0412	1375 to 3000F	747 to 1648C
	18890-0075	1500 to 3300F	816 to 1815C
	18890-1729	1650 to 3600F	899 to 1982C
	18890-0643	1850 to 4000F	1010 to 2204C
	18890-0216	2110 to 4600F	1155 to 2537C
	18890-5423	2210 to 5000F	1210 to 2760C
	18890-0163	200 to 1000F	94 to 537C
		~ 0 to 10 mV	
18894/18899	18899-8814	340 to 1800F	172 to 982C
	18894-9014	752 to 2552F	400 to 1400C
	*18894-0579	753 to 2552F	401 to 1400C
		~ 0 to 125 mV	
18885/18886 (SPECTRAY)	18885	1832 to 3452F	1000 to 1900C
	18886	1833 to -3452F	1001 to 1900C
	18885-1	1292 to 2912F	700 to 1600C
	18885-2	806 to 1400F	430 to 760C
	*18886-1	1293 to 2912F	701 to 1600C
FIBERAY®		**~ 1 to 5 V**	
	070701	1472 to 2372F	800 to 1300C
	070705	2192 to 2912F	1200 to 1600C
	070703	1832 to 2732F	1000 to 1500C
		~ 1 to 5 V	
18874/18875	18874 to 0578	752 to 2552F	400 to 1400C
	*18875 to 0579	753 to 2552F	401 to 1400C
* indicates 1 degree change in range limit to allow uniqueness.			

Carbon Potential Control Probe Characteristics and Constants			
	Error in Absolute Units		
Probe Type	Temp Range of Equation	Worst Case	Mean
Furnace Control Corp.	1500 to 1900F	±.01%	±.003%
Advanced Atmosphere Control Corp.	1500 to 1900F	±.04%	±.013%
Corning	1500 to 1800F	+.02%/-.03%	±.008%
Marathon Monitors	1500 to 200F	+.03/-.04%	±.012%
Cambridge Instruments	1500 to 2000F	+.04/-.04%	±.012%
Barber Colman	1400 to 1900F	+.04/-.03%	±.016%

Custom Linearization	One range per LPU, up to 300 segments, mV or ohm, unequal segments enterable.
Range Suppression	Limits not imposed. % of reading accuracy based on zero reference.
Input Impedance	20 megohms
Maximum Source Resistance	15K ohm (8-point card is 1 K ohm)
Source Effects	0.3 µV/100 ohms
Point-to-point Isolation	200 Volts peak
Common Mode Rejection	120 dB (100 ohm source, 100 V maximum) 50 or 60 Hz
Normal Mode Rejection	60 dB (50 or 60 Hz, 100% span maximum)
Input Switching	Low thermal reed relay, 500 million operations rating
Open Input check	Selectable on per point basis with alarm actions
Reference Junction Error	0.25C (0.45F)

RTD Input Card

Input Types	10-ohm copper, 100-ohm platinum (alpha=.00385 Ω/Ω/°C), 1000-ohm platinum (alpha=.00375 Ω/Ω/°C). All 10 point, 3 lead.

Range, Accuracy, Resolution

	Range	**Accuracy**	**Resolution**
Cu, 10 ohm	-50°C to 150°C	±0.15% +.25°C	0.1° min.
Pt, 100 ohm	-180°C to 850°C	±0.15% +.04°C	0.1° min.
Pt, 1000 ohm	-184°C to 537°C	±0.15% +.003°C	0.1° min.

Conformity Error	0.3°C (0.5°F)
Temperature Stability	1.5 µV/°C
Excitation Current	1 mA
Maximum Compensation for Lead Resistance	5 ohms
Point-to-point Isolation	200 volts peak
Common Mode Rejection	120 dB (50 or 60 Hz, 100% span maximum)
Input Switching	Low thermal reed relay, 500 million operations rating

Pulse Frequency Input Card

Frequency Range	10 Hz to 10 kHz
Maximum level	5 V or 25 V, peak to peak, open collector
Waveform	Sine to square wave
Duty Cycle	50 or 60%

Analog Outputs

Number of Cards	2 output base cards maximum for 16 outputs total. Second output base card does not accept PAT.
Card Types	
Base Card	Accepts 1 to 4 dual output plug-in cards of any type for a maximum of 8 outputs. Isolation dual output card to dual output card is 480 VRMS.

Dual Output Card Types

	Range/Limits	**Resolution**
Current Output (CAT)	0-20 mA or 4-20 mA into 600 ohms; 0-5 mA or 1-5 mA into 2400 ohms.	11 bits, 0.05%
Time Proportioning (DAT)	Adjustable for 0 and 100% to full on-off.	4.5 msec
Position Proportioning (PAT)	Range adjustability: 80-100%.	
Dual Voltage (VAT)	0-5 V; 1-5 V; 0-10 V at 10 mA max.	12 bits, 0.025%

Dual Current (CAT) Output Card	
Assignment	From PID or other functions
Isolation	Input to output, 240 VRMS
Dual Time Proportioning (DAT) Output Card	
Output Type	2 independent of same type (relay or Triac)
Triac Type	1A, 24 to 120 VAC, 50 mA minimum load
Relay Type	2A at 120 VAC, 1A at 240 VAC
Time Base	1 to 300 sec.
Dual Position Proportioning (PAT) Output Card	
Type	1A Triac
Slidewire Voltage Power Supply	5 V for 100-1000 ohm slidewires (2 100-ohm slidewires maximum)
Slidewire Feedback	Directed to analog input
Slew Rate	Adjustable from 1 to 100 sec to match motor response
Sensitivity	Adjustable to prevent oscillation
Dual Voltage (VAT) Output Card	
Isolation	Input to output, 240 VRMS

Discrete I/O	
Card Types	
	Voltage Range
15 AC/DC Inputs	90 to 140 VAC/DC; 180 to 280 VAC/DC
15 DC Inputs	10 to 32 VDC
10 AC Outputs	24 to 280 VAC
10 DC Outputs	5 to 60 VDC; 5 to 200 VDC
10 Relay Outputs	
7 AC Inputs/8 AC Outputs	Inputs: 90 to 140 VAC/DC Outputs: 5 to 60 VDC @ 1 A
7 DC Inputs/8 DC Outputs	Inputs: 10 to 32 VDC/AC Outputs: 5 to 60 VDC @ 1 A
NOTE: All SSR (Solid-State Relay) discrete input/output cards use single plug-in modules for each point. Isolation of all solid-state relay modules is 4 KVRMS, input to output. All SSR output modules are individually fused. Maximum output limit is 70 A per LPU Expansion Unit.	

15-Point AC/DC Input Card	
Input Current	12 mA maximum (8 mA for 180 to 280 VAC/DC)
Turn On/Off Time	20 ms
15-Point DC Input Card	
Input Current	35 mA maximum
Turn On/Off Time	5 ms
10-Point AC Output Card	
Current Rating	1 amp
Minimum Current	20 mA
Switching	Zero-crossing
10-Point DC Output Card	
Current Rating	1 amp (0.4 A for 5 to 200 VDC)
Turn-On Time	500 ms
Turn-Off Time	750 ms
10-Point Relay Output Card	
Type	SPDT Form C relays, plug-in
Contact Rating	3A (11 A limit/card) at 120/240 VAC

Specifications

Communications			
Port Types			
Number	**Type**	**Configuration**	**Function**
1	RS-485	Standard on LPU CPU board	Management Station, FFOS, PC Interface
2	RS-485	Optional plug-in module for LPU CPU board	Interfaces to FFOS, PC, Supervisory Station, Local Station, DEC computer, Windows NT
3	RS-485	Optional plug-in module for LPU CPU board	NOTE: Only ports 2 or 3 can be used for Local Station Interface.
Management Station, FFOS, PC Interface	RS-485, 9600, 19.2KB or 38.4 KB, asynchronous binary protocol via twisted pair cable with common, shielded LN P/N 837052 or Belden 8723 or 8728.		
Optional RS-232/485 Ports	Binary async proprietary protocol 1200, 9600, 19,200, or 38,400-baud transmission rates) providing access to all dynamic variables in LPU.		

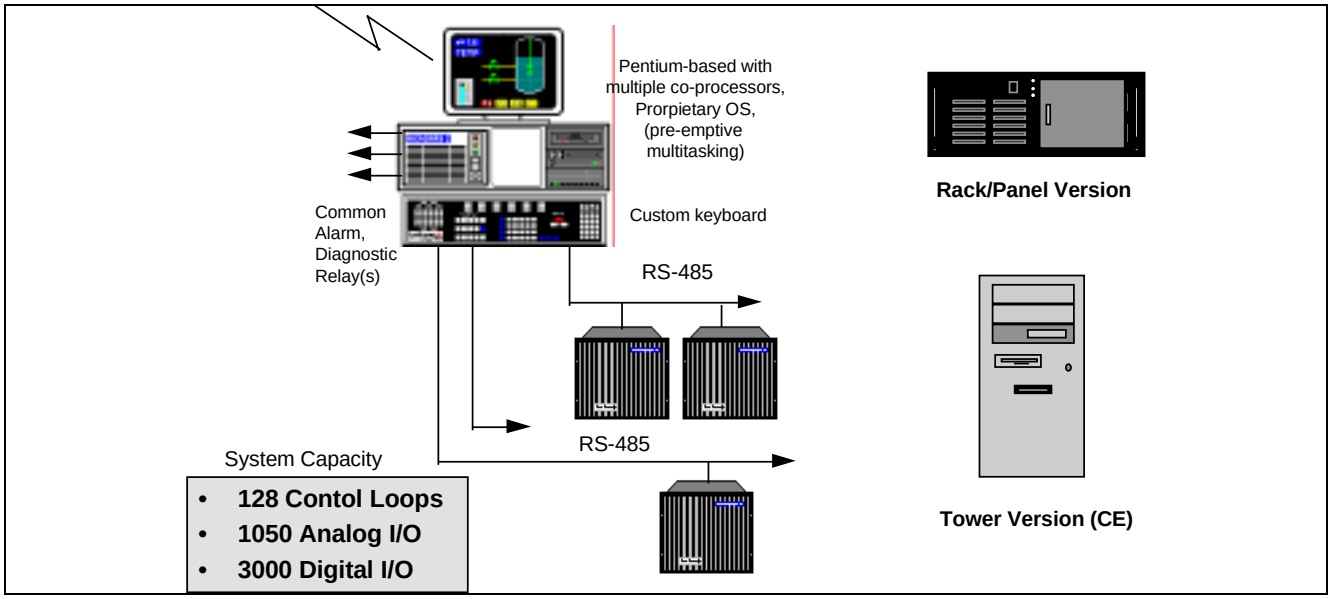
Pseudo Point Function Library	
Calculations	
Calculator - Operations include: +, -, x, /, square root, log, natural log, exponential, natural exponential, absolute value	30 arguments, 10 levels of parenthesis
Single-Point Time Average	40 functions/LPU - 10 to 3600 sec
Multiple Input Average	Up to 25 Inputs
Totalizer (Hours or Minutes)	Totalizes input -has reset input, analog and discrete output
High/Low Peak Picking	Hi or Low value over 1-900 sec
Mass Flow (with square root)	uses dP, P, and T inputs
Pressure Compensated Drum Level	Utility application
Rate of Change	Detects input rate of change
Signal Conversion	
Scaling	Custom scaling of input to function
PAT Scale	For scaling slidewire feedback
Function Generator	5 non-equal length breakpoints
Scaled Square Root	for linearizing flow inputs
Signal Clamp	clamps value if exceeded, + or -
Duty Cycle	creates a time proportioning discrete output
BCD Translator	translates 15 DI card “bits” to BCD
Signal Selection	
2-Input Signal Selector	Selection based on discrete input
10 Input rotary switch	Based on analog input, routes selected input to the output based on a number
High/Low Signal Select	Routes highest or lowest of up to 25 inputs to output
Comparison	
2-Input Compare	Compare for: =, <, >, <=, >=, discrete output (CR or DO)
Integer Compare	Compares integer value of floating point
Single Input Deviation	Compares input to a reference value, such as a setpoint, within a +/- deviation band, provides discrete output if deviation exceeded - use for guaranteed soak
Multiple Input Deviation	Compares up to 15 inputs to a reference within a +/- deviation - discrete output - use for temperature uniformity

Time Compare (Real-Time)	Compares value to LPU real-time clock in Hrs, Min, Sec - discrete pulse output
Logic	
AND, OR, XOR, NOT	2-input logic with discrete output (CR, DO)
Other	
Lead/Lag	Digital filter, time constants enterable
Slew (Ramp)	Causes output to ramp to input value at defined rate, continuous function
Resettable Slew (Ramp)	Has inputs for analog value, slew (ramp) rate, reset, hold - can be used for ramp/soak
Sample and Hold	Holds value based on discrete input status
Logic Imposed Signal Limiter	For limiting value based on 2 logic input status
Sterilization Factor (F0)	For pharmaceutical applications
Hill-climbing (Optimizer)	Special algorithm for combustion control

Loop Function Library	
Loop Type	***Function***
Simple PID	Provides standard PID control, including: Remote and local setpoints Gain, rate, reset Manual reset Direct and reverse control Hi/Low PV and SP limits PV/RSP tracking for local setpoint SP slew (rate of change) limit Approach High and Low (batch preload) for minimizing overshoot on batch cold start
Medium PID	Provides two sets of tuning constants, feedforward, error-squared control. Also accommodates use of discrete inputs to force control functions: Force to manual Mode (with preset output) Force to Local setpoint (from Remote) Change control action (direct/reverse) Use alternate set of tuning constants
Complex PID	Provides additional control, including inputs to place a loop in tracking mode where a forceback input=loop output for backup.
Ratio PID	Provides ratio PID control, including: Ratio setpoint Bias 1 and 2 (fixed or based on input)
Cascade PID	Sets up 2 control loops in a cascade arrangement with internal feedback for manual and setpoint actions to maintain control
Dual (Split) Output (Heat/Cool)	Drives two final control elements. Control automatically reverses at 50%. Selectable output types - CAT, DAT, PAT, etc.
On/Off	Turns final control element on and off. Adjustments include: Output deadband Force Output off
Carbon Potential	Controls % carbon (by weight) in carburizing and hardening furnace atmospheres. Works with popular probes. Adjustments include: Auto or manual CO compensation Furnace Factor (trim to match shim stock) Sooting Factor (adjusts %C to prevent sooting)

Note: The LPU PID algorithm is adjusted for bumpless transfer to assure a smooth process transition from operations such as auto to manual transfer, selection of alternate tuning constants, and output tracking for backup control.

Logic Function Library		
Symbol	**Function**	**Description**
	**Normally Open Contact**	Examines discrete input (DI), discrete output (DO), or control relay (CR) for on state.
	**Normally Closed Contact**	Examines DI, Do or CR for off state.
	**Transitional Contact**	DI, DO or CR that stays active for one PLC scan cycle.
	**Interfacing Coil**	CR that stays active for a minimum of one LPU analog scan cycle.
	**Positive Output Coil**	Normally off DO or CR that turns on when the logic path to it is true.
	**Negative Output Coil**	Normally on DO or CR that turns on when the logic path to it is true.
	**Latch coil**	CR whose output stays on (latched) after its input goes off.
	**Unlatch Coil**	CR that releases the latched coil of the same number.
	**Retentive Output**	DO or CR that stores its output state on power down and retains that state for one PLC scan cycle on power up.
COUNTER	**Up/Down Counter**	Counts up to or down from preset (maximum count is 32767).
ON TIMER	**Retentive On Delay Timer**	Turns on when timer equals preset value (maximum tine = 999.99 min/sec).
OFF TIMER	**Retentive Off Timer**	Delay turns off when timer equals preset value.
- - - (MCR)	**Master Control Relay**	Controls outputs of subsequent field of logic, turning off all outputs up to the rung containing End MCR output.
- - - (EMCR)	**End MCR**	Defines end of control field for an MCR.
- - - (SKIP)	**Skip Logic**	Skips subsequent field of logic-holding the status of all rung outputs-up to rung containing End Skip output.
- - - (ESKIP)	**End Skip**	Defines end of control field for a Skip.



Overview

The Management Station, comprised of an electronics or system unit, color monitor, and a custom keyboard provides supervisory, data acquisition, and configuration functions for up to 16 LPU's located up to 2500 ft. away - through one or more serial ports. The station is a second generation unit, utilizing a pre-emptive, multitasking operating system powered by a Pentium-based CPU and 2 co-processor cards containing up to 6 processors. The result is a powerful workstation to support the throughput demanded of larger Micromax 2 systems, allowing configuration of an LPU while collecting data and alarms from all others. The station has a wide array of built-in features to minimize configuration time and provide flexibility:

- Over 120 pre-formatted displays, user-assignable for "Quick View" access. For data acquisition, control, setpoint program, alarms, setup, configuration
- Graphical programming for: Analog/loop functions Ladder Logic
- On-line access and monitoring of graphic programs
- Custom keyboard with both configuration/operator keys with dedicated keys for:
  - Control loop interface
  - Setpoint programmer interface
- Alarm and event handling plus printout
- Multiple report formats with on-line development for:
  - Free-form management reports
  - Log (line) reports
  - Batch tickets (event-driven reports)
- Active/historical trending - multiple format
- Recipe Management
- Optional mouse-driven process graphics - on-line configuration
- Scheduled Data Storage to disk and to tape media
- Selectable printout to one or two printers
- Serial RS-232 interface to remote PC via modem (data file transfer)
- DIF file conversion (to spreadsheet format on floppy)
- 3 1/2 in. floppy disk configuration storage/loading for station and each LPU, graphics, recipes
- Uninterrupible Power Supply (UPS) for power backup and orderly shutdown
- Y2K compliant

The Management Station is available for bench mounting with desk-top or tower (CE-approved) arrangements. CRT monitors are available in 15 in., 17 in., or 19 in. versions. For panel/rack mounting the electronics/system unit has a slide-out rail design. A 14 in. panel CRT monitor is also available.

The station utilizes a SCSI hard drive for system storage including current trend files, recipes, graphics and another partition for data storage including historical data files. A 150-MB tape may be added for removable media storage of data files. The keyboard, suited for industrial environments, is a custom monoplanar touch panel for operation and configuration. Normally sloped downward for desktop use, it may be reversed for panel mounting with the keyboard sloped outward. A QWERTY keyboard, connected at the front of the unit, is also supplied for entering tags, labels, and text strings for reports.

The station has two RS-422/485 serial communications ports for connection to Local Processing Units. Up to 4 optional ports (dependent on model) may be added to support:

- LPU's at different locations (total number for all links is 16)
- Speedomax 25000 recorders on same communications link
- Older Electromax V PLUS controllers and Speedomax 2500 Recorders for monitoring on Management Station displays, up to 30 units.

The standard discrete I/O feature provides three discrete Form A relay outputs and 1 contact input. The outputs are assignable for system indications of common alarm status, resettable common alarm output (via ACK key), diagnostic status and open thermocouple input. The discrete input, powered by the station, accepts contact closure from a UPS output and, optionally, a remote acknowledge switch. The system has been designed to discriminate between the two assignments for input actions.

Each Management Station must have an Uninterrupible Power Supply (UPS) to insure orderly shutdown in case of power loss. A UPS option is provided for 120VAC operation and a model recommended for 220/240 VAC operation (Europe). The UPS switches-in during a power loss and provides contact closure to the station, which starts a 2-minute timer. If after this time power is still lost, the station will be shutdown in an orderly manner. The UPS also provides power conditioning and surge suppression.

The Serial Communications option provides data access from a PC using standard remote communications software via an RS-232 port in the Management Station. The user may use a PC with a modem to access the station (requires external modem) to interrogate data plus convert a selected report, trend, or data file to spreadsheet format with transfer to the PC.

Supervisory Station

This station is an operator-only Management Station, used as a secondary or redundant operator interface connected via a separate RS-485 serial communications network to a series of LPU's. There is a software selection (user-directed) enabled to prevent LPU configuration. Otherwise, operation and features are the same as for a Management Station. A Management Station database may be loaded directly by floppy disk into this station where it can be modified for its specific use as a process interface.

Specifications

Environmental	
Operating Temperature Limits	Electronics Unit, Desktop, Tower: 0 to 40C Electronics Unit, Rack/Panel Mount: 0 to 50C Monitor, Desktop and Panel Mount: 0 to 40C
Non-Operating Temperature Limits	Storage: -10 to 55C Transit: -40 to 65C Max Gradient: 15C/Hr
Operating Relative Humidity Limits (all non-condensing)	Electronics Unit: 20 to 80% Monitor: 10 to 95%
Non-Operating Relative Humidity Limits (all non-condensing)	Storage: 10 to 80% Transit: 5-90%
Altitude Limit	-1000 feet to +10,000 Feet
Vibration Limits	Tested to SAMA specifications for control room environment. -0.5G, 15-150 Hz

Management Station-based System Capacities		
Function	**Quantity per Field Station (Including Local Processing Unit and Expansion Units)**	**Quantity Per Management Station-based System**
Control Loops	16	128
I/O Analog Inputs Analog Outputs Digital Inputs/Outputs Max Digital Outputs Analog Scan Time	 225 16 225 140 0.25, 0.50 or 0.75 sec*	 1050* 256 3600 2240 -
Logic Relay Ladder Logic Program 1500 Elements 200 Rungs 75 Screens Timers/Counters Update Rate	 1 80 100 msec	 16 1280 -
Set Point Programs	4	64
Recipes	4 executing	64 executing 999 stored (100 without storage disk)
Alarms	150	2400
Pseudo Points (calculated variables resulting from math functions and formulas)	250	4000
Data Displays (19 types)		
Reports (5 types) Management Reports Line (Log) Reports Batch Ticket Reports		 16 16 16
Trends (7 types)		up to 60 screens plus 64 loop screens maximum 240 trend values
Graphic Screens (up to 100)		
Display/Reporting Groups (up to 120)		

*Depends on type of analog card selected

Electronics (System) Unit Specifications

Physical Characteristics	
Dimensions **Desktop** **Tower (CE)** **Rack Mount**	 6 ½" (165 mm) H x 21 1/8" (537 mm) W x 17 5/16" (439 mm) D (requires 2" cable turnaround) 16.4" (41.66 cm) H x 7.75" (19.69 cm) W x 17.40" (44.20 cm) D 8 ¾" (221 mm) H x 19" (483 mm) W x 21" (533 mm) D (includes space for cables in back)
Weight **Desktop** **Tower (CE)**	 40 lb. (18.1 kg) 32 lb. (14.52 kg)
Power Requirements	120 VAC (95-135V), 50/60 Hz, 200 W or 220/240 VAC (190-270V), 50/60 Hz, 200 W 90 - 135 VAC @ 60 Hz, 180 - 265 VAC @ 50 Hz, 230 W (Tower, CE)
Mounting	Desktop or 19" rack or panel mount

Platform	Pentium Processor @ 75 - 133 MHz (dependent on model)
Memory	8 MB (16 MB for Tower (CE) model)
Memory Retention	Lithium battery, 1 year estimated life, changeable without loss of memory
Standard Slot Cards	
VGA Graphics Card	
3 Channel Communications Card Standard	2 RS422 and 1 RS422/RS232 Capable of 300 baud to 38.4 kbaud as needed for particular port applications. Used for: LPU Communication @ 19.2 or 38.4 kbaud Speedomax 25000 communications @ 19.2 kbaud Speedomax 2500 communications @ 9600 baud Electromax V Plus communications @ 9600 baud
Multifunction I/O Card	2 serial (RS232) for mouse and optional serial communications option and 2 parallel (Centronics) ports; DI/O drives; software security device
SCSI Controller:	Controls floppy, all drives and tape as required
Optional Slot Cards	
3 Channel Communications Card	2 RS422 and 1 RS232/RS422; same as standard communications card
Drives (internal)	
Floppy Disk	3 ½". Formatted capacity 1.44 Mbytes
Hard Disks	1 GB SCSI (one 32 MB System partition and one 32 MB data storage partition (optional)
Tape	150 MB SCSI (optional)
I/O Ports	
Standard	Micromax Operator's Keyboard Connector (rectangular plug on back of unit) Text Entry Keyboard (AT style plug on front or back of unit) Main Comm Port #1 - RS422 (2 piece screw type connector, 5 wire, max distance 2500 ft.) Main Comm Port #2 - RS422 (2 piece screw type connector, 5 wire, max distance 2500 ft.) Main Printer - parallel Centronics (26 pos D), accepts standard parallel printer cable Monitor (15 pin D) Serial port for Mouse/Trackball (9 pin D)
Optional	Main Comm Port #3 - RS422 (2 piece screw type connector, 5 wire), max distance 2500 ft., or RS232 (9 pin D), max distance 50 ft.***** Main Comm Port #4 - RS422 (2 piece screw type connector, 5 wire), max distance 2500 ft Main Comm Port#5 - RS422 (2 piece screw type connector, 5 wire) max distance 2500 ft Main Comm Port#6 - RS422 (2 piece screw type connector, 5 wire), max distance 2500 ft., or RS232 (9 pin D), max distance 50 ft.***** DI/O connections (2 piece screw type connector) Aux Printer - parallel Centronics (26 pos D), accepts standard parallel printer cable *****not available in some models
Keyboard Jack	On front or rear of unit (dependent on model)
Video Output Port	VGA
External Devices	
Printer	Epson Model 1170 wide carriage graphic printer
Mouse	Microsoft 2 button mouse. Optional for graphics programming
Monitor	Standard VGA
DO	3 relay outputs, NO contact, 1 amp max. @ 120/240 VAC
1 DC Contact Input for Alarm Acknowledge	Performs same functions as red ACK key on keyboard, and/or is used in conjunction with an UPS for orderly shutdown; voltage supplied by station, 35 mA maximum

Monitor Specifications

Graphics Adapter	VGA
Screen Size	15” (CE) diagonal (17” or 19” diagonal optional) low glare screen
Resolution	640 x 480 pixels
Scanning Frequency	31.45 kHz
Front Controls	
15” Monitor (Panel) **15” Monitor** **17” Monitor** **19” Monitor**	Power on/off,(at rear), front controls (via door), color/brightness, sizing Power on/off, contrast and brightness, digital controls Power on/off, digital controls Power on/off, degauss, gain and brightness
Video Cable	8 ft
Mounting	Desktop, or panel mount
Dimensions	
15” Desk Top **15” Panel Mount** **17” Desk Top** **19” Desk Top**	14” (354 mm) H x 14” (354 mm) W x 15 3/8” (390 mm) D 15 1/8” (384 mm) H x 17” (430 mm) W x 14 ¾” (373 mm) D 20 3/8” (517 mm) H x 19” (482 mm) W x 20 ½” (520 mm) D 20 1/8” (511 mm) H x 22 ¾” (578 mm) W x 19 ¾” (500 mm) D
Weight	
15” Monitor **15” Monitor (panel)** **17” Monitor** **19” Monitor**	25 lb. 25 lb. 42 lb. 68 lb.
Power	
15” Monitor **15” Monitor (panel)** **17” Monitor** **19” Monitor**	120 VAC (95-135V), or 220/240 VAC (190-270B), 50/60 Hz, 95 W 120/240 VAC, 50/60 Hz 120 VAC, (95-135V), 50/60 Hz, 100W 120 VAC (95-135V), or 220/240 VAC (190-270V), 50/60 Hz, 110 W

Keyboard Specifications

Type	
Standard	Monoplanar, sealed (reversible for panel mounting). Tactile feel, embossed, dome-type keys. 6 ft. cable
Optional	101 key QWERTY-style performs all the functions of the standard keyboard. 6 ft. cable
Dimensions	
Standard	3” (76 mm) H x 20” (508 mm) W x 9” (229 mm) D
Text Entry (QWERTY)	2” (50 mm) H x 18 ¼” (464 mm) W x 8 ¼” (207 mm) D
Weight	
Standard	6 lb (2.7 kg)
Text Entry (QWERTY)	3 lb (1.4 kg)
Mounting	Desktop or panel mount

Micromax 2 Printer Specifications

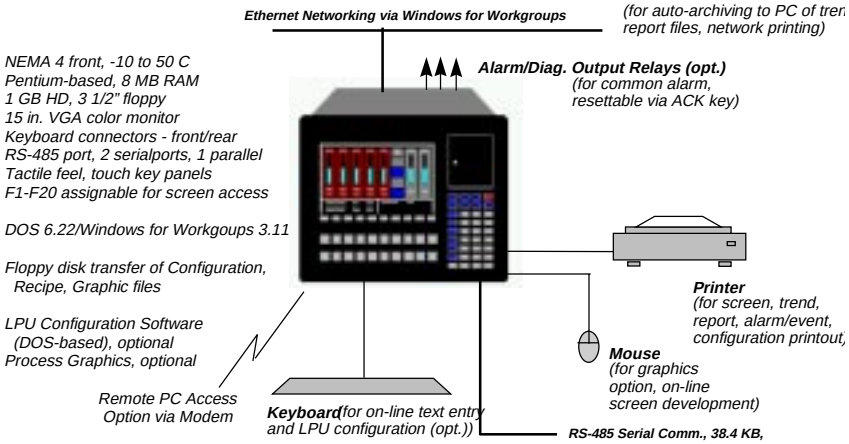
Recommended Printer	Epson 1170 wide carriage
Type	Impact dot matrix
Memory Buffer	8k
Temperature Limits	5 to 35C (41 to 95F)
Relative Humidity Limits	10-80% RH
Power Requirements	120 VAC, ±10%, 49.5 to 60.5 Hz, 70 W; or 240 VAC ±10%, 49.5 to 60.5 Hz, 70 W
Dimensions	5.9” (150 mm) H x 24.8 (630 mm) W x 14.2” (361 mm) D
Weight	27.5 lb. (12.5 kg)

Factory Floor Operator Station Overview

Micromax 2 Factory Floor Operator Station is a powerful and cost effective field mounted control and data acquisition interface for the Micromax 2 control system. The station interfaces directly with the Local Processing Units (LPUs) to provide remote supervision for larger systems, or it may be used with only the LPU to provide total control for smaller processes. Standard operating displays are provided to simplify start-up and operation, and a full graphical interface is available to satisfy custom interface needs.

With the Factory Floor Operator Station (FFOS), operators can access the Local Processing Unit's powerful control algorithms, monitor analog inputs and logic I/O. The FFOS can be specified with Local Processing Unit configuration software (Maxpro) to provide a complete unit process control system, or DOS-based Maxpro configuration software may be specified separately. The FFOS unit is designed to work in harsh factory floor environments and is easily panel or rack mounted.

The Factory Floor Operator Station can provide supervision of up to 3 LPUs. For larger systems, central management of up to 16 LPUs or more can be accomplished with the Management Station or PC-based software such as SCAN3000 for Windows NT, while the Factory floor Operator Station may be used to satisfy remote operator interface needs.



Features

- Withstands harsh factory floor environments - rugged NEMA 4 front panel has gasketed cast bezel.
- Easy installation in panels or 19" racks - front mounting access.
- Standard displays simplify start-up and operation.
- Process graphics option for fully customized displays.
- Built-in recipe manager for error-free batch loading.
- Robust data trending features eliminate the need for separate multi-point recorders.
- Simplified display access with user defined function keys and labels.
- Custom batch report features and standard printer ports automate documentation needs
- Alarm monitoring with common resettable alarm output (Ack'd)
- Networking option (under Windows for Workgroups) allows report and trend files to be automatically sent to a PC in a spreadsheet - compatible format over Ethernet.
- Remote modem communications option to remotely control FFOS operation.
- CE approved

Options

Enhanced Data Acquisition Option provides more opportunity for data collection with increase of the following:

- Trend Screens (20 Historical files per trend files), up to 10 pts/trend
- 32 Loop Trend Screens (20 Historical Files)
- 32 Report Screens, with up to 24 pts logged per report

The **Enhanced Data Acquisition Option** also introduces new screens:

The Vertical Dual Trend is a twelve variable split chart vertical trend display, six points per trend, with color coded trend lines, color coded numerical trace ID, billboard type scrolling display, alarm and pointer indicator.

The Deviation Screen is a twelve point display indicating the deviation of each of the twelve points from another point, the Compare point. This screen

displays the actual values of the points and a deviation bar graph of each of the twelve points. The user can determine deviation from the compare point for several points from one screen.

The Rotating Table is a sequencing, multi-page tabular display of group data in large text with distinctive background colors. This screen allows the user to monitor points from a distance.

The **Networking Option** consists of two major parts:

1) Network Archival Storage and Printing function is implemented by Windows for Workgroups 3.11 (WFW). It provides the necessary network file services (NFS) to allow file transfer and access over the network. Report and trend files can be selected for auto-archival to a Windows 3.11 PC over Ethernet, automatically converted to spreadsheet format (CSV or DIF) with auto-restart for next file. Also WFW will provide network printing.

2) Windows Utility Package, WINSNOOP, allows access of the FFOS data over the network for conversion of stored data to Data Interchange Format (DIF) or Comma Separated Variable (CSV) formats on a Windows based PC.

The **Remote Access Option** installs 33.6 kbps modem with host remote access software (Norton-Lambert Close-Up) for remote operation of FFOS screens, LPU configuration software (Maxpro) and file transfer via a PC.

Specifications

Environmental	
Operating Temperature Limits	0-50C (32-122F)
Non-Operating Temperature Limits	Storage: -10 to 55C Transit: -40 to 65C Max Gradient: 15C/Hr
Operating Relative Humidity Limits (all non-condensing)	Electronics Unit: 20 to 90%
Non-Operating Relative Humidity Limits (all non-condensing)	Storage: 10 to 90% Transit: 5-90%
Altitude Limit	-1000 feet to +10,000 Feet
Vibration Limits	Tested to SAMA specifications for control room environment. - 0.5G, 15-150 Hz
Standard Compliance	FCC Part 15, Class A
Operating Vibration	SAMA PMC 31.1 control room; 1mm, 5-15 Hz; 0.5G, 1-150 Hz
Operating Shock	15G, 11 msec, duration (MIL SPEC 810)
Personal Safety	ANSI/ISA 862

Physical Characteristics	
Dimensions	15.718” (399 mm) H x 19” (483 mm) W x 17.438” (443 mm) D (includes space for cables in back)
Weight	71 lb. (32.2 kg)
Power Requirements	120 VAC (90-135V), 50/60 Hz, 100 W or 220/240 VAC (180-264V), 50/60 Hz, 100 W
Enclosure	Sheet metal with cast aluminum bezel
Keyboard	Sealed membrane with tactile feedback
Mounting	19” rack or panel mount
Power Supply	200 Watts, self-contained with fan
Washdown	NEMA 4/12 rating from front panel only when properly mounted in panel. Access to disk drive and QWERTY keyboard connection is via a sealed door. Monitor is protected by a clear protective shield. A software keyboard lockout feature is provided to prevent accidental key action during washdown.
Operating System	DOS 6.22, Windows for Workgroups 3.11
Networking Environment	Windows for Workgroups 3.11 or upward compatible Windows 95/NT
Other Software (optional)	Close-up 6.5 Remote communications (Host)

Hardware - Electronics Unit

Platform	Pentium Processor @ 166 MHz (dependent on model)
Memory	8 MB
Memory Retention	Lithium battery, 1 year estimated life, changeable without loss of memory
Standard Slot Cards	
VGA Graphics Card	16 bit half size card with 256K memory
Multifunction I/O Card	Keyboard controller, 1 serial RS232 port, 1 serial RS422 port, 1 parallel (Centronics) port; DI/O control; software security device
Drives (internal)	
Floppy Disk	3 ½". Formatted capacity 1.44 Mbytes
Hard Disks	1.6 GB IDE
Discrete I/O (optional)	
1 Discrete Input **3 Discrete outputs**	Screw type connector, 10 positions
Input	DC solid state input, contact closure
Outputs	Normally open contacts, 120/240 VAC, 1 amp max., for common alarm, common resettable alarm (via ACK key), and diagnostic indication.
Optional Slot Cards	
Ethernet Network Card	10base2, thin coax
Modem (V.34)	33.6 kbps for remote access
External Devices (optional)	
Black & White Printer	Epson Model FX1170 wide carriage graphic dot matrix printer
Mouse	3 button mouse. Optional for graphics programming
QWERTY Keyboard	Standard 101 keyboard
Uninterruptible Power Supply	660 VA (10 min. type) with line conditioner, surge protection

Monitor Internal

Graphics Adapter	SVGA
Screen Size	15" diagonal low glare screen
Resolution	640 x 480 pixels (.28 dot pitch)
Scanning Frequency	31.45 kHz
Controls	Rear of unit - brightness/contrast, other internal

Key Panels

Type	Monoplanar, sealed (reversible for panel mounting). Tactile feel, embossed, dome-type keys. 6 ft. cable
Keys	Pre-assigned plus user-assignable function keys 20 (F1-F20) and 3 sub-menus of 20 each

QWERTY Keyboard

Type	101 key QWERTY style for configuration and text entry, emulates all FFOS key panel operations.
Dimensions	2" (50 mm) H x 18 ¼" (464 mm) W x 8 ¼" (207 mm) D
Weight	3 lb (1.4 kg)
Mounting	Desktop or panel mount

Printer (optional)

Recommended Printer	Epson wide carriage
Type	Impact dot matrix
Memory Buffer	8k
Temperature Limits	5 to 35C (41 to 95F)
Relative Humidity Limits	10-80% RH
Power Requirements	120 VAC, ±10%, 49.5 to 60.5 Hz, 70 W; or 240 VAC ±10%, 49.5 to 60.5 Hz, 70 W
Dimensions	5.9" (150 mm) H x 24.8 (630 mm) W x 14.2" (361 mm) D
Weight	27.5 lb. (12.5 kg)

File Data Conversion

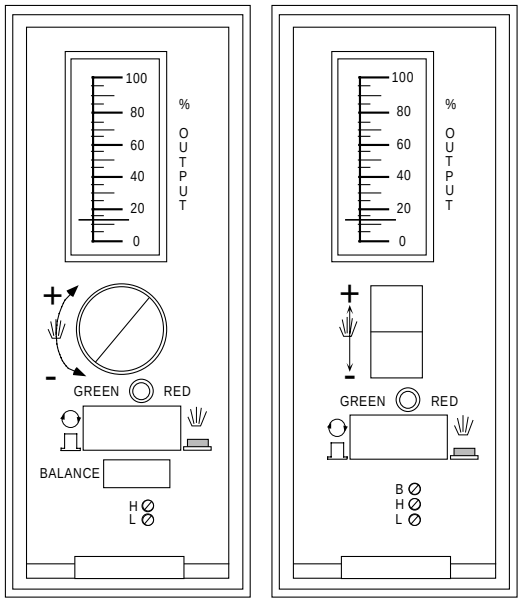
Selectable	DIF (Data Interchange Format) or CSV (Common Separated Variable ASCII) to floppy disk or automatic conversion over Ethernet network.

FFOS Capacities		
Function	**Quantity**	**With Data Acquisition (DAQ) Option**
Data Acquisition Points	300 typical	300 typical
Maximum Number of control Loops	16/LPU	16/LPU
Recipes	1000 typical	1000 typical
Standard Screen Formats	over 25	over 25
Summary Tables		
Active alarms, Active Events	150 each	150 each
Historical alarms, Historical Events	150 each	150 each
Diagnostic	150	150
Trends (optional)		
Types: Horizontal, Vertical, Dual Vertical Loop Formats		
Max. Number of Screens Assignable	16	32
Max. Number of Loop Trends Assignable	24	32
Number of Points/Screen - Horizontal Format	6	6
Number of Points/Screen - Vertical Format	10	10
Number of Points/Screen - Dual Vertical Format	n/a	12
Number of Points/Screen - Control Loop Format	1 (PV)	1 (PV)
Trend Screen Size (Hours)	1 to 99	1 to 99
Number of Pages/Trend File (scrolled via up/down arrow keys)	up to 9	up to 9
Number of Historical Files Trend	3	20
Reports (optional)		
Types: Management Summary, Tabular, and Management/Tabular		
Number of Reports	12	32
Max. Number of Data Columns/Report (Line Report)	10 to 3600	10 to 3600
Sample Rate (Sec) for Data Log	1 to 100	1 to 100
file Length (# of Data Samples)	up to 26 files	up to 26 files
Number of Historical files/Report	of each report	of each report
Stored on Hard disk	100	100
Archived to Network		
Standard Screen Formats (FFOS operation)	over 25	over 25
Overview - for loop data, SP program, discrete status	6	6
Interactive data - user-definable	30 typ.	30 typ.
Control Loop (trend optional)	1/loop	1/loop
Setpoint Programmer/16 Event Annunciator	1/program	1/program
16 Panel Annunciator	30 typ.	30 typ.
Data, Logic constant Tables	Depends on DB size	Depends on DB size
Deviation Bar (opt) - 12 deviation bar graphs	N/A	N/A
Rotating table (opt.) - 8 pts/page, 10 - pages	N/A	N/A
Alarm/Event Messages (at bottom of screen)		
Message Length (characters)	40	40
Alarm Target Screens Assignable	1/alarm	1/alarm
Graphic screens	*****30 typ.	*****30 typ.

*****250 if graphic function keys used for screen hierarchy

Manual Station Overview

The Micromax 2 Manual Station is housed in a DIN-sized molded plastic case designed for panel mounting. It provides basic process control security through a hard-manual output to the final control element. Two version of the station are available: a current output station and a motor position station.



Description

Current Output Station - designed for end elements such as electropneumatic converters or SCR power packages, has selectable current ranges of either 0 - 5mA or 0 - 20 mA, with 25% offset adjustment from zero or full scale to obtain 1 - 5 mA or 4 - 20 mA outputs. A balance key and a control knob located on the face panel enable you to adjust the output from the station to match the control output before switching over from automatic to manual operation.

Motor Position Output Station - designed for control loops using electric drive units, displays on its percent output meter the actual drive unit position as sensed by a feedback slidewire input to the station. It displays the driver unit slide wire voltage-selectable from 0.5 V, 5 V or 15 V to match slidewire voltage supplied by the Micromax 2 Local Processing Unit-in both automatic and manual control modes. Automatic/manual transfer is inherently bumpless and balanceless.

Features

- Security against process upsets
- Low-cost aid for process startup and shutdown
- Hard-manual backup for single and multiloop controllers

Accuracy	
Manual Mode	Meter to Output-3.0% of span ±0.25% per C
Automatic Mode	3.0% of span ±0.25% per C
Output	Local Processing Unit accuracy applies
Environmental	
Temperature	4C to 55C (40F to 131F)
Humidity	90% at 40C, non-condensing
Vibration	5 to 60Hz at 0.6 G
Shock	Up to 1 G for 30 ms
Supply Voltage	120/220 VAC ±10%, 47 to 63 Hz
Radio Frequency Interference	Less than 0.5% output disturbance at a distance of 1 meter (3.1ft) from front of unit: 27 MHz at 4 Watts; 154 MHz at 5 Watts; 461 MHz at 5 Watts
Dimensions	5.7” H x 1.9” W x 5.5” D (144 mm x 48 mm x 139 mm)
Weight	19 oz (0.53 kg)
Mounting	By way of clamps at top and bottom onto panels from 1/8” to ¾” thick

Physical Specifications Model 074825 (C.A.T.)	
Current Output Ranges	4 to 20 mA into 0 to 600 ohm load. 0 to 20 mA into 600 ohm load. 1 to 5 mA into 0 to 2400 ohm load. 0 to 5 mA into 0 to 2400 ohm load.
Insertion Loss	Current Output Station requires 2.1 volts from current loop for meter circuit
Meter Display	Local Processing Unit or Station output from 0 to 100% of adjusted span
Manual Output control	Ten-turn control knob
Balance Key	Permits adjustment of Manual Station output to match Local Processing Unit output
Calibration	Meter can be adjusted to 25% of span from upper and lower limits by way of high and low trimpots in order to match high and low end outputs
Current Output ranges	0 to 5 mA or 0 to 20 mA as selected, with 25% offset adjustment from zero to full scale. Minimum 3% overrange adjustment available at span limits with 25% span offset.
Auto/Man VAC Status Outputs	120 VAC, 0.45 A resistive
Model 074826 (P.A.T.)	
Motor Position Output	Output drive-50 mA to 1 A at 120/240 VAC, 50/60 Hz
Slidewire Loading	100 to 1000 ohms
Meter Display	True position of drive unit in % of span
Manual Output control	Double-throw rocker-type switch with spring return
Calibration	Meter can be adjusted to 25% of span from upper and lower limits by way of high and low trimpots in order to match high and low end outputs. The station's slidewire power supply output can be matched to that provided by the primary controller by way of a balance trimpot.
Drive Unit Slidewire Voltages	0.5 V, 5 V or 15 V as selected to conform to the slidewire voltage supplied by the Local Processing Unit.
Auto/Manual Status Outputs	120 VAC, 1.0 A resistive

MAXPRO Configuration Software Overview

The Honeywell Maxpro Configuration Software turns any DOS/VGA-based PC into a configuration station for Micromax and Micromax 2 Local Processing Units (LPU). Menus and table formats make Maxpro software easy to use for configuring data acquisition functions, loop functions, process calculations or ladder logic Built-in configuration and testing aids simplify the design and configuration.

Description

Maxpro Configuration Software guides you through LPU configuration step by step:

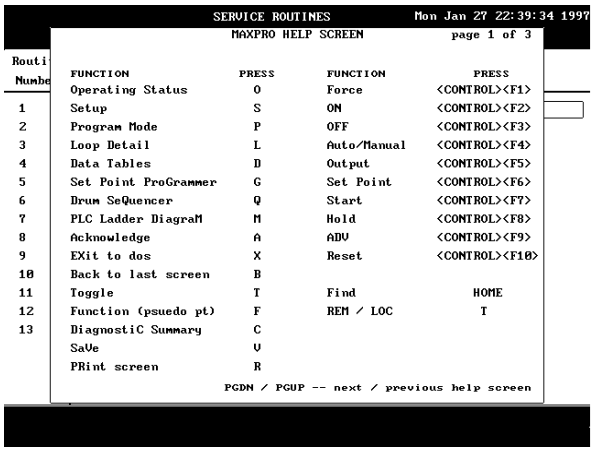
- An on-line Help screen explains menu selections and function keys. Twelve function keys give you access to most configuration functions with a single keystroke.
- Preformatted screens and cursor-selected fields let you configure the LPU simply by filling in blanks.

Configuration ON- or Off-line
Maxpro Configuration Software lets you create complete LPU configurations without a Local Processing Unit in place. Simply use the I/O Card Selection Screen to describe the analog and digital inputs and outputs of the imaginary LPU you intend to configure. Then proceed through normal LPY configuration. The resulting configuration database can be stored on hard or floppy disk. To copy the configuration to an actual Local Processing Unit, connect the LPU to your computer and transfer the configuration files via the serial port.

For on-line configuration, use an RS-485 network to connect one or more Local Processing Units to a personal computer running Maxpro. (You can also configure LPUs remotely via a modem connection.) When you're ready to create an LPU configuration database, use Maxpro to "read" the LPU's I/O configuration into the preformatted I/O screens. A choice of numbering systems is available—either terminal position or the Honeywell numbering system that's compatible with Micromax HMI's.

Once you've created an LPU configuration database, you can copy it to any LPU with a compatible hardware configuration. Control and data acquisition configurations can then be modified as necessary. (Maxpro can support an entire network of LPUs because it handles multiple databases.)

Automatic Documentation
Generate hardcopy configuration documentation by printing any configuration screen including I/O, PID control loops, pseudo points, analog outputs, ladder logic and set point programs.



Help Screen

Sample LPU Configuration

Setting up the LPU to perform an integrated control strategy is easy with Maxpro's fill-in-the-blanks configuration screens. This configuration example shows how furnace temperature can control which thermocouple functions as the input to the PID control function:

- At the beginning of the furnace's batch process cycle, a higher accuracy but lower temperature "K" thermocouple type (AI1) is routed to the loop PV input via "signal selector" PP1 and also routed to a "compare function" PP2.
- After the process temperature rises to 1000°F, CR5 goes to logic high (1), thereby selecting a higher range "5" thermocouple (AI2) for the PV input.

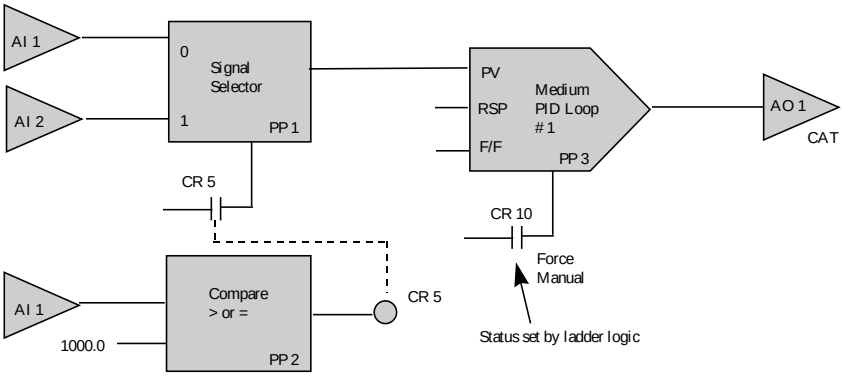
The following Maxpro screens show the actual LPU configuration for this example.

Analog Input Screen (Figure 1**)**

- Provides listing of I/O range assignment per point.
- Offers choice of I/O numbering (terminal position or Honeywell HMI format).
- Allows you to assign any of up to 60 ranges on a per point basis.
- Configurable open input detection for thermocouples and mV ranges.

Analog Ranges (Figure 2)

- All linearization ranges built-in and selectable.
- Selectable engineering spans—engineering unit spans can be entered directly for transmitter (mA) and pulse frequency inputs.
- Custom ranges available for non-standard sensors.



Sample Configuration

Unit 99 — ANALOG INPUT PROGRAMMING — Mon Jan 27 21:53:37 1997 — page 1 of 1

AI No.	Skip	Range Cur	Range No.	Range Low	Range High	Range Units	Open Input Chk	Open Input Default	Description	Tag
1		Yes	1	0.0000	2300.0		Yes	2300.0	--	
2		Yes	2	800.00	3200.0		Yes	3200.0	--	
3		Yes	3	0.0000	1480.0		Yes	1500.0	--	
4		Yes	3	0.0000	1480.0		Yes	1500.0	--	
5		Yes	3	0.0000	1480.0		Yes	1500.0	--	
6		Yes	3	0.0000	1480.0		Yes	1500.0	--	
7		Yes	4	0.0000	5.0000		No	0.0000	--	
8		Yes	6	0.0000	2.5000		No	0.0000	--	
9		Yes	5	0.0000	300.00		No	unused	--	
10		Yes	1	0.0000	2300.0		No	unused	--	
11		Yes	1	0.0000	2300.0		Yes	2300.0	--	
12		Yes	1	0.0000	2300.0		Yes	2300.0	--	
13		Yes	1	0.0000	2300.0		Yes	2300.0	--	
14		Yes	1	0.0000	2300.0		Yes	2300.0	--	
15		Yes	1	0.0000	2300.0		Yes	2300.0	--	

Figure 1

ANALOG RANGE PROGRAMMING — Mon Jan 27 21:30:37 1997 — PAGE 1 OF 4

Rng.	Input Type	Displayed Range Low	Displayed Range High	F/C	Dir/ Ind	Electrical Range Low	Electrical Range High	Elect. Units
1	Type K TC	0.0000	2300.0	deg F	Dir	0.0000	0.0000	V
2	Type B TC	800.00	3200.0	deg F	Dir	0.0000	0.0000	V
3	Type S TC	0.0000	1480.0	deg C	Dir	0.0000	0.0000	V
4	Volts	0.0000	5.0000	deg C	Dir	0.0000	0.0000	V
5	Volts	0.0000	300.00	deg C	Ind	1.0000	5.0000	V
6	Volts	0.0000	2.5000	deg C	Dir	0.0000	0.0000	V
7	Type E TC	0.0000	1100.0	deg F	Dir	0.0000	0.0000	V
8	Millivolt	0.0000	1000.0	deg C	Ind	0.0000	100.00	mV
9	10 ohm cu	0.0000	150.00	deg C	Dir	0.0000	0.0000	V
10	NO INPUT	0.0000	0.0000	deg C	Dir	0.0000	0.0000	V
11	NO INPUT	0.0000	0.0000	deg C	Dir	0.0000	0.0000	V
12	NO INPUT	0.0000	0.0000	deg C	Dir	0.0000	0.0000	V
13	NO INPUT	0.0000	0.0000	deg C	Dir	0.0000	0.0000	V
14	NO INPUT	0.0000	0.0000	deg C	Dir	0.0000	0.0000	V
15	NO INPUT	0.0000	0.0000	deg C	Dir	0.0000	0.0000	V
16	NO INPUT	0.0000	0.0000	deg C	Dir	0.0000	0.0000	V

Figure 2

PID Loop Detail (Figure 3)

- Permits “indirects”—references to pseudo point values and other parameters.
- Provides loop status interaction with ladder logic for startup, shutdown, and interlocks.

Pseudo Point Specification List (Figure 4)

- Provides listing of pseudo point functions in support of control strategy including free-form calculator. Pseudo point functions are soft key selected.
- Permits the configuration of “smart” I/O and derived measurements.
- Provides upper and lower range limits.
- Assures proper sequence of indirects.
- Provides interaction with logic via control relays.

Analog Outputs (Figure 5)

- Supports all control and analog output types: CAT, PAT, DAT, volts.
- Provides output ranging and limit clamps.

Ladder Logic Diagram (Figure 6)

- Uses standard PLC format in a 10 x 10 matrix per rung.
- Permits timer and counter references anywhere.
- Provides element FIND and INSERT or DELETE LINE range functions.
- Permits free-form text entries for program documentation.

Testing Aids

Maxpro Configuration Software provides on-line screens to help you simulate and test LPU configurations prior to process startup.

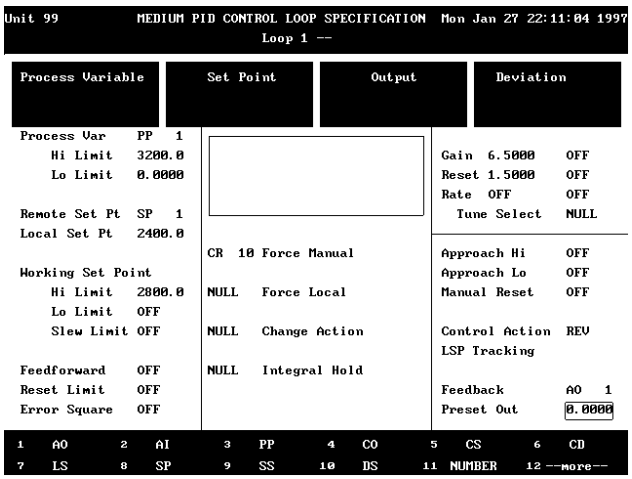


Figure 3

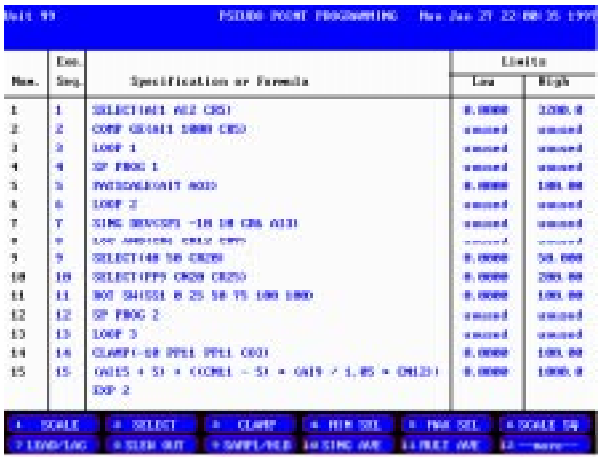


Figure 4

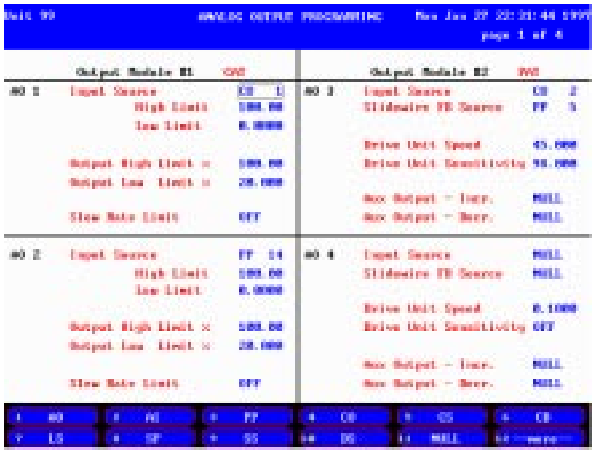


Figure 5

Analog Data Table

- Shows actual values for analog inputs and pseudo point outputs.
- Allows you to “value adjust” analog inputs to allow testing without live input.

Logic Data Table

- Displays on/off statues of discrete inputs and outputs.
- Permits forcing of discrete I/O on and off.

Ladder Logic Diagram

- Shows power flow by element color change and on/off labels.
- Provides FIND key for locating element types and numbers.
- Permits forcing of discrete I/O on and off, timer/counter preset entry.
- Drum sequencer indicates step status.

“Live” Loop Configuration Screens

- Loop control interface permits adjustments to set point, auto/manual, remote local set point, output, ratio, bias, tuning constants, etc.
- Set point programmer interface allows program execution—start, hold, reset, and advance—as well as adjustments to current active step soak time, soak value, ramp rate and on-line re-configuration of a stopped program while the LPU is running other programs.

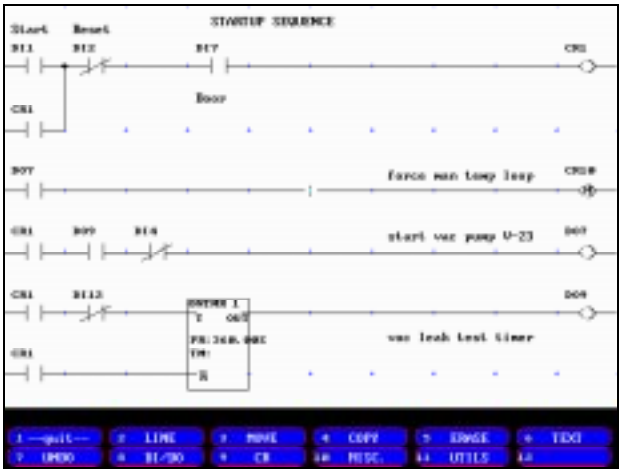
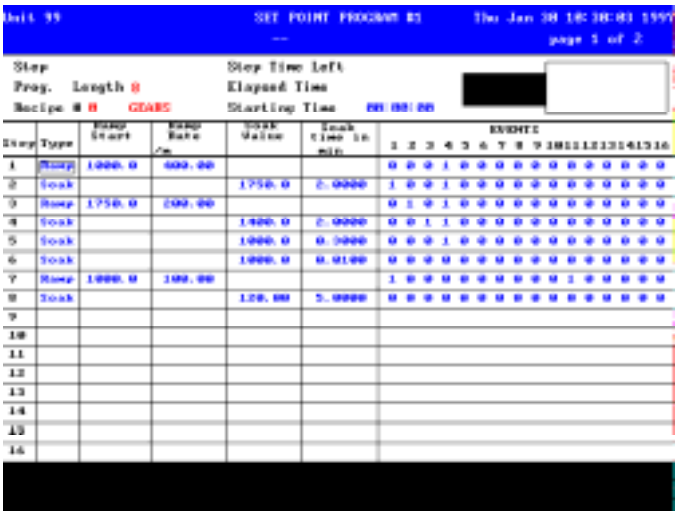


Figure 6



Setpoint Programmer Screen

Constant Table

- Constant table permits process parameter entry to alter or adjust process operations.

UNIT 99 CONSTANT ENTRY TABLE Mon Jan 27 22:47:32 1997
PAGE 1 OF 2

Constant Number	Description	Value	Constant Number	Description	Value
1	--	1500.0	17	--	2300.0
2	--	3200.0	18	--	0.0000
3	--	15.000	19	--	unused
4	--	20.000	20	--	75.500
5	--	100.00	21	--	unused
6	--	68.000	22	--	unused
7	--	760.00	23	--	unused
8	--	0.1500	24	--	unused
9	--	12.000	25	--	unused
10	--	2200.0	26	--	unused
11	--	14.238	27	--	unused
12	--	95.000	28	--	unused
13	--	5.5000	29	--	unused
14	--	1.5000	30	--	unused
15	--	1.2000	31	--	unused
16	--	0.0000	32	--	unused

Constant Entry Table

Maxpro Specifications

LPU Configuration Screens/Function	LPU I/O card assignment Analog input linearization/range assignment per point Custom linearization for non-standard ranges Pseudo Point Functions (pre-programmed algorithms and freeform calculations) PID Loop control Setpoint Program Control Ladder Logic Drum Sequencer Control Constant tables for “central” process parameter entry Analog and Control Output Assignment Independent alarm and diagnostic output
PC Requirements	IBM PC-AT Compatible (386, 486, Pentium) 4 MB RAM, 610K min. conventional memory, use disk caching software for faster logic processing Floppy Disk (3 ½” 1.44 MB HD) 2 MB Hard Disk available VGA graphics and monitor 1 serial port (RS-485 direct or RS-232 with external RS-232/422 converter) 1 parallel port
Design and Configuration Aids	On or off-line configuration LPU configuration copy to disk LPU configuration download LPU configuration printout
Testing Aids	“Live” analog and digital table tables with adjustable parameter values Interactive, live loop configuration screens Interactive, live ladder logic programs Force On and Off of DIO, release Force-on ladder and logic tables Interactive, live set point programmer, drum sequencer and constant tables
Help Features	Fill-in-the-blank screen formats and soft key selections HELP screen PLC and pseudo point FIND feature Assignments lists showing I/O and Pseudo point usage

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