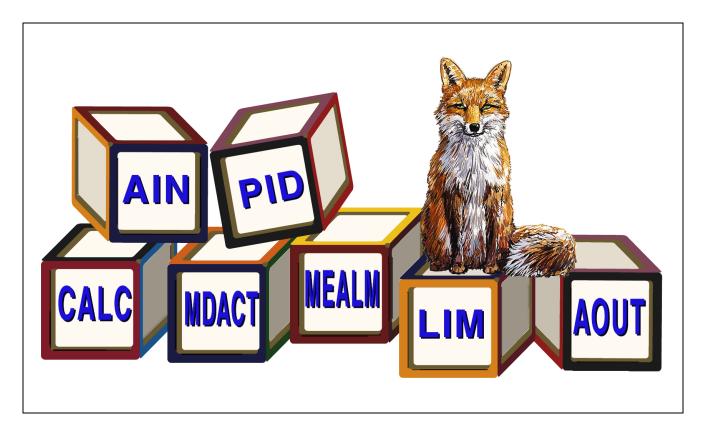**FOXBORO**®

I/A Series® Hardware
MicroPack Integrated Control Software

The MicroPack Control Processor is an optionally fault-tolerant station which, together with connected Fieldbus Modules and Integrated Control software, performs regulatory, logic, timing, and sequential control. It also performs data acquisition (via the Fieldbus Modules), alarm detection and notification, and may optionally serve as an interface for one or more Panel Display Stations. The non-fault-tolerant version of the MicroPack Control Processor is a single-width processor module; the fault-tolerant version consists of two single-width processor modules.

This software includes a full range of Foxboro process control function blocks that provide:

• Full capability for any application, with combined regulatory, batch and discrete functions

• Powerful, full featured algorithms and advanced control

• Advanced input/output capability

• Fast, reliable processing

• Object orientation of blocks with display connections to the blocks.

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Product Specifications

Additional supported functions include:

- Data acquisition
- Alarm detection and notification
- Regulatory, logic, and timing control
- Advanced mathematical computations
- Automatic detail displays.

Process variables are controlled using time-proven algorithms (mathematical computations performing specific functions), including the EXACT^{TM} algorithm and the EXACT MV family of algorithms. The algorithms are contained in functional control blocks, which are configured by on-site process engineers to implement the desired control strategies.

The versatility of the algorithms, coupled with the variety of Fieldbus Modules available, provides control capabilities suited to a broad range of process control management and applications including continuous, batch and discrete control schemes. Control strategies ranging from simple feedback and cascade control to highly sophisticated feedforward, nonlinear, and complex characterization control schemes are readily implemented.

Specific functions performed by the MicroPack Control Processor, listed in Table 1 on page 3, are supported by Fieldbus Modules FBM01 to FBM46, Fieldbus Cluster I/O, and certain other devices. For a detailed description of the various block types, refer to the Integrated Control Software Product Specification Sheet 21S-3B1 B3.

Blocks can be configured by FoxCAE^{TM} for up-front project engineering, or by the Integrated Control Configurator for on-line maintenance. The display and adjustment of control parameters are implemented through operator interface devices such as video monitors, keyboards, touchscreens in the I/A Series system SoftPack^{TM} workstations. The Control Processor interacts with these devices by communicating with the Workstation Processors and Application Processors to which they are connected. Communication takes place via the Nodebus. Various other system stations also communicate with each other over these links.

Software Licensing

The software application for the MicroPack Control Processor is called Integrated Control software. Integrated Control software provides a wide variety of Foxboro preprogrammed and user programmable function block types, as listed in Table 1 on page 3.

A flexible method of software licensing allows you to choose from several function block capacities to match your application in both fault-tolerant and non-fault-tolerant versions most economically. Each function block type is assigned a functional point value in Integrated Control Software value points. For example, an AIN block for a single process variable is assigned 1 value point, while a MAIN block for up to 8 process variables is assigned 3 value points. Many of the Equipment Control Blocks (ECBs) that run the I/O modules are assigned a weight of 0 value points, if they do not display values to process operators.

This licensing method allows you to use any of the available function block types. A message is displayed when your application approaches 90% of the licensed Integrated Control Software value points. When 100% of the licensed capacity is reached, you must purchase an upgrade to the next larger license to add additional function blocks to your database. A larger license can be added to any system without reconfiguring the existing control scheme.

NOTE

Resource constraints, for example, maximum database memory, maximum block per second throughput and maximum number of FBMs, may limit the application before reaching the licensed Integrated Control Software value point limit. This is particularly true for the largest license capacity.

Table 1. Integrated Control Software Function Blocks with Value Points

Integrated Control Software Set of Function Blocks with Value Points			
Input/Output		**Sequence**	
AIN - Analog Input	1	DEP - Dependent	3
AINR - Redundant Analog Input	1	EXC - Exception	3
AOUT - Analog Output	1	IND - Independent	3
AOUTR - Redundant Analog Output	1	MON - Monitor	1
CIN - Contact Input	1	TIM - Timer	1
COUT - Contact Output	1	**Motor**	
MAIN - Multiple Analog Input	3	GDEV - General Device	1
MCIN - Multiple Contact Input	3	MDACT - Motor Driven Actuator	3
MCOUT - Multiple Contact Output	3	MTR - Motor Controller	1
Control		MOVLV - Motor-Operated Valve	1
ACCUM - Accumulator	1	VLV - Valve On/Off Controller	1
BIAS - Bias Computation	1	**Alarm**	
BOOL - Boolean Data Variable	1	ALMPRI - Alarm Priority Change	1
CALC - Calculator	3	BLNALM - Boolean Alarm	1
CALCA - Advanced Calculator	3	MEALM - Measurement Alarm	1
CHARC - Characterizer	1	MSG - Message Alarm	1
DGAP - Differential Gap	1	PATALM - Pattern Alarm	1
DPIDA - Distributed Controller	3	REALM - Real Alarm	1
DTIME - Dead Time Compensator	1	STALM - State Alarm	1
FBTUNE - Feedback Self-Tuner	3	**Miscellaneous**	
FFTUNE - Feedforward Self-Tuner	3	EVENT - Event Reporting	3
LIM - Limiter	1	PLB - Programmable Logic Block	3
LLAG - Lead/Lag	1	**Optional**	
LOGIC - Logic	1	DSI - Panel Display Station Interface	1
LONG - Long Integer Data Variable	1	AMSSEC - Gas Chromatograph	1
MATH - Mathematics	1	**Window Equipment Control Blocks**	
OUTSEL - Output Select	1	AMSPRI - Gas Chromatograph	1
PACK - Packed Long Integer Variable	1	ECB13 - Hydrostatic Tank Gauge	3
PATT - Pattern Match	1	ECB18 - Intelligent Transmitter	1
PID - Proportional, Integral, Derivative	3	ECB22 - Mass Flow Transmitter	1
PIDA - Advanced PID	3		
PIDE - PID w/ EXACT Tuning	3		
PIDX - PID Extended	3		
PIDXE - PID Extended, w/ EXACT Tuning	3		
PTC - Proportional Time Control	3		
RAMP - Multi-Ramp Sequence	1		
RATIO - Ratio Computation	1		
REAL - Real Data Variable	1		
SIGSEL - Signal Selector	1		
STATE - State	3		
STRING - String Data Variable	1		
SWCH - Switch Position Selector	1		

NOTE

Additional Equipment Control Blocks are available. They are assigned a value point rating of zero.

PERFORMANCE SPECIFICATIONS

Memory Allocation for Blocks
650 Kb (1,000 blocks at 650 bytes, average)

Number of FBMs Supported
64 (excluding expansion modules)

Minimum Block Processing Cycle (BPC)
100 ms

Configurable Block Periods
0.1, 0.2, 0.5, 0.6, 1, 2, 5, 6, 10, 30 seconds
1, 10, 60 minutes

Basic Processing Cycle
0.1, 0.2, 0.5, 1.0, or 2.0 seconds, selectable at
system configuration time

IPC Connections
51

Object Manager (OM) Lists (Maximum)
60

Block Executions Per Second
600 blocks/second, typical

Memory Allocation for OM Scanner Points
100 K bytes

Maximum OM Scanner Data Base
2,000 points

Sequence Block Size
32 K bytes maximum for each block

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