FOXBORO®

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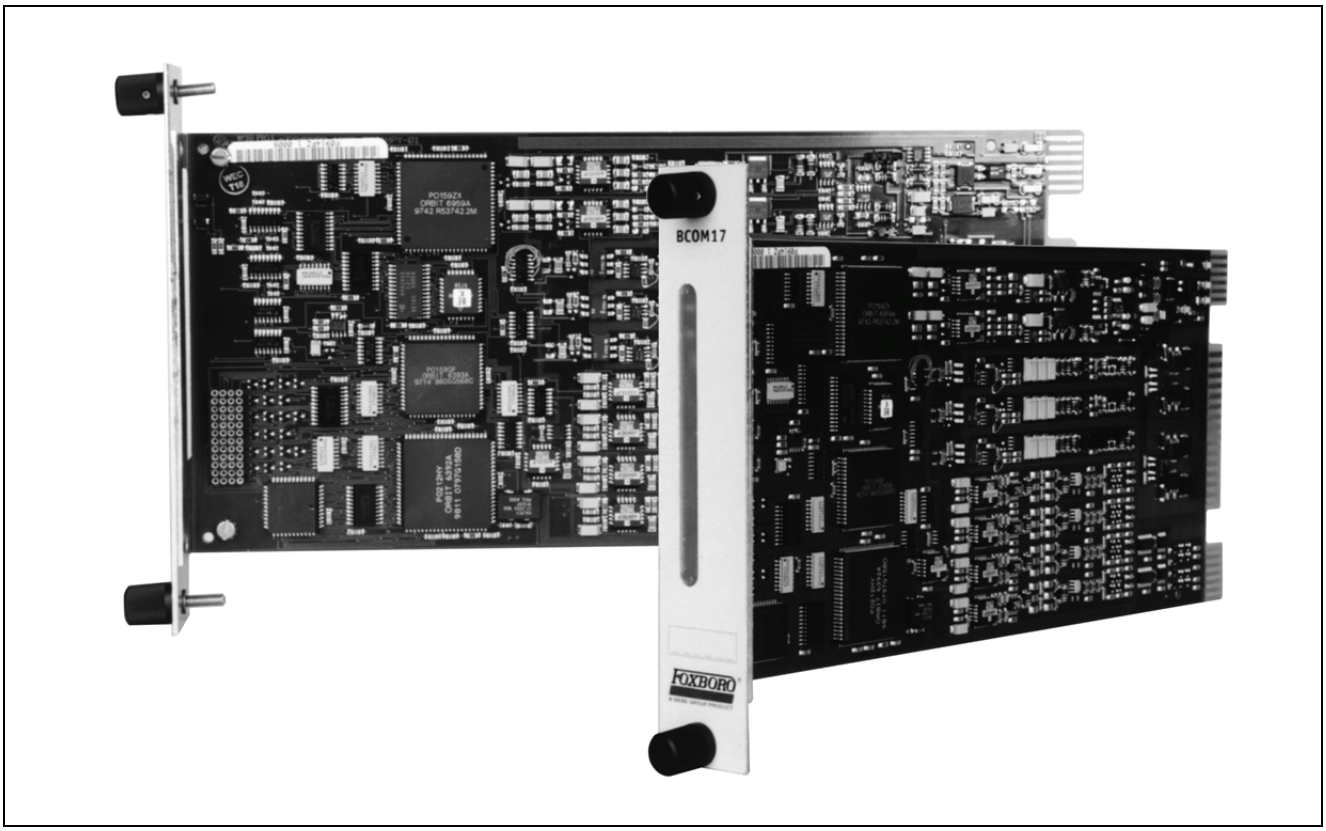
I/A Series® Hardware
DCS Integrator for Bailey® Systems



The I/A Series DCS Integrator for use with Bailey Network 90 and INFI 90 systems is a translator that plugs directly into an existing electronic nest to replace controller and slave module cards. This achieves significant advantages:

- Migration from proprietary DCS to a state-of-the-art open I/A Series system.
- Advanced I/A Series control with single point of configuration.
- More direct control performance than any gateway device offers.
- Single vendor service and supply.

The I/A Series DCS Integrator family provides a migration path from the Bailey systems process input and output components to I/A Series display and supervisory functions. This can save significant cost over total system replacement by preserving existing process interface and wiring, and by minimizing process downtime.

No additional communication devices are required. No multi-vendor communication software licensing is required. The I/A Series DCS Integrator family replaces the Bailey controller and/or slave module devices. Once integrated, the process is controlled entirely by the advanced I/A Series algorithm set. Bailey DCS control devices are disconnected upon migration, so there is no undesirable interaction caused by the decommissioned system.

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Product Specifications

The I/A Series DCS Integrator product includes appropriate connectors to enable integration of original process signals to I/A Series system while keeping the field interface and wiring. It provides access to all process signals connected to the Bailey system by providing the connection between the Field Termination Units (FTU) and the I/A Series system. All process signals become fully integrated into the I/A Series system. Process data is used for operator display, history, alarming and control.

Operator functions and engineering configuration is accomplished by the I/A Series system at any I/A Series operator workstation. Because all process values become part of the I/A Series system, all configuration data is maintained by the system as native I/A Series configurations.

This migration path provides plant operations with the power and flexibility of the I/A Series system. All process values can be used plant wide for control, display, history, alarming, and information management from a single vendor source.

BENEFITS OF INTEGRATION

- Cost effective migration
- Existing I/O and field wiring retention
- Immediate addition of advanced control to existing process immediately
- Single point of configuration
- No gateway bottlenecks and constraints.

FUNDAMENTAL PRINCIPLE

Foxboro believes that it is only acceptable to interface with competing manufacturers' operating systems in two ways:

- through high level public gateways
- at the lowest level directly to field devices without communicating with proprietary buses or components.

The Foxboro migration product offerings adhere to this principle.

PRODUCT DESCRIPTIONS

I/A Series DCS Integrators for Bailey systems allow migration to I/A Series control, display, and application products while retaining original process terminations and field I/O wiring. All original process I/O capability of the Bailey Controller Module (CM), Analog Slave Module (ASM), Analog Output Module (AOM), Digital Slave Module (DSM), Controller Interface Slave Module (CIS), and Multifunction Controller Module (MFC) functions is replaced by direct I/A Series Control Processor (CP) scanning and control.

I/A Series DCS Integrators plug directly into existing Bailey module mounting units in place of Bailey controller and slave module cards. These pass process measurement and output signals to and from an I/A Series CP. The I/A Series CP provides control in place of the Bailey controllers. This saves customers significant cost over a total system replacement by preserving existing process interfaces and wiring, and by minimizing process downtime.

Controller Module (CIS01, CIS02, COM01, COM02, COM03, COM04, QRC01, QRS01, QRS02)

A Controller Module connects directly to an Analog Controller Termination Unit. The Controller Module processor card is removed and replaced by an I/A Series Integrator. This provides original I/O functionality of high level analog input, analog output, contact input, and contact output. The Integrator is powered by the original module mounting unit power bus.

Analog Master (AMM) and Slave Modules (ASI, ASM, ASO)

Analog Master Modules are no longer needed and are removed. The Analog Slave Modules are removed and replaced by a corresponding I/A Series Integrator. This provides original I/O functionality of high level analog input, low level analog thermocouple input, and low level analog RTD input. The Integrator is powered by the original power bus.

Analog Output Module (AOM)

Analog Output Modules are removed and replaced by a corresponding I/A Series Integrator. This provides original I/O functionality of the analog output. The Integrator is powered by the original power bus.

Logic Master Module (LMM)

Logic Master Modules provide contact inputs and contact outputs directly to termination units. Additional I/O is provided to the LMM by Digital Slave Modules and Contact Input Slave Modules. LMMs are removed and replaced by a corresponding I/A Series Integrator. This provides original I/O functionality of the LMM. The Integrator is powered by the original power bus.

Digital Slave Modules (DSI, DSM, DSO)

Digital Slave Modules are removed and replaced by a corresponding I/A Series Integrator. This provides original I/O functionality of the digital input and/or output. The Integrator is powered by the original power bus.

Multifunction Controller Module (MFC01, MFC02, MFC03)

A Multifunction Controller Module connects to various slave modules for process input and output. The MFC processor card is no longer needed and removed. Associated slave modules (ASM, DSM, PIM) are replaced as described in other sections of this document.

Pulse Input Slave Modules (PIM)

Pulse Input Slave Modules are removed and replaced by a corresponding I/A Series Integrator. This provides original I/O functionality of the pulse inputs. The Integrator is powered by the original module mounting unit power bus.

Programmable Logic Controller Module (MPC01, MPC02)

A Programmable Logic Controller Module connects to the same slave modules for process input and output as the Multifunction Controller Module. The MPC processor card is no longer needed and removed. Associated slave modules (ASM, DSM, PIM, CIS) are replaced as described in other sections of this document.

Other Devices

Network communications functions, PLC interfaces, operator and computer interfaces are all replaced by standard I/A Series functions of interfaces. The original Bailey devices are decommissioned and removed from the original mounting units.

BAOM37 FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
+5 V dc ±5%, ±15 V dc ±5%
CONSUMPTION
15.4 W
HEAT DISSIPATION
9.4 W

Communication
Redundant IEEE P1118 Fieldbus

Analog Output Channels (8 Channels)
RANGE
1 to 5 V dc, 4 to 20.4 mA dc
RATED MEAN ACCURACY
±0.05% of span (monotonic)
RESOLUTION
12 bits
OUTPUT LOAD
735 Ω
COMPLIANCE VOLTAGE
18.6 dc nominal at 20 mA at I/O field terminals
SETTLING TIME
100 ms to settle within 1% band of steady state

BASI01 FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
+5 V dc ±5%, ±15 V dc ±5%
CONSUMPTION
5.75 W
HEAT DISSIPATION
4.6 W

Communication
Redundant IEEE P1118 Fieldbus

Analog Input Channels (15 Channels)
RANGE
1 to 5 V dc, 4 to 20 mA dc
RATED MEAN ACCURACY
±0.05% of span
RESOLUTION
12 to 15 bits, programmable (see Table 1)

BASI03 FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
+5 V dc ±5%, ±15 V dc ±5%
CONSUMPTION
6.0 W
HEAT DISSIPATION
4.8 W

Communication
Redundant IEEE P1118 Fieldbus

Analog Input Channels (16 Channels)
RANGE
1 to 5 V dc, 4 to 20 mA dc, TC, RTD (jumper selectable)
RATED MEAN ACCURACY
±0.05% of span
RESOLUTION
12 to 15 bits, programmable (see Table 1)

BASM01 FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
+5 V dc ±5%, ±15 V dc ±5%
CONSUMPTION
5.75 W
HEAT DISSIPATION
4.6 W

Communication
Redundant IEEE P1118 Fieldbus

Analog Input Channels (16 Channels)
RANGE
1 to 5 V dc, 4 to 20 mA dc
RATED MEAN ACCURACY
±0.05% of span
RESOLUTION
12 to 15 bits, programmable (see Table 1)

BASM02 FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
+5 V dc ±5%, ±15 V dc ±5%
CONSUMPTION
6.0 W
HEAT DISSIPATION
4.8 W

Communication
Redundant IEEE P1118 Fieldbus

Analog Input Channels (8 Channels)
RANGE
TC
RATED MEAN ACCURACY
±0.05% of span
RESOLUTION
12 to 15 bits, programmable (see Table 1)

BASM03 FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
+5 V dc ±5%, ±15 V dc ±5%
CONSUMPTION
6.0 W
HEAT DISSIPATION
4.8 W

Communication
Redundant IEEE P1118 Fieldbus

Analog Input Channels (8 Channels)
RANGE
RTD
RATED MEAN ACCURACY
±0.05% of span
RESOLUTION
12 to 15 bits, programmable (see Table 1)

BASM33 FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
+5 V dc ±5%, ±15 V dc ±5%
CONSUMPTION
3.4 W
HEAT DISSIPATION
3.0 W

Communication
Redundant IEEE P1118 Fieldbus

Analog Input Channels (8 Channels)
RANGE
RTD, 10 Ω Cu
RATED MEAN ACCURACY
±0.05% of span
RESOLUTION
12 to 15 bits, programmable (see Table 1)

BASO37 FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
+5 V dc ±5%, ±15 V dc ±5%
CONSUMPTION
15.4 W
HEAT DISSIPATION
9.4 W

Communication
Redundant IEEE P1118 Fieldbus

Analog Output Channels (14 Channels)
RANGE
4 to 20.4 mA dc
RATED MEAN ACCURACY
±0.05% of span (monotonic)
RESOLUTION
12 bits
OUTPUT LOAD
735 Ω
COMPLIANCE VOLTAGE
18.6 dc nominal at 20 mA at I/O field terminals
SETTLING TIME
100 ms to settle within 1% band of steady state

BCOM17 FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
+5 V dc ±5%, +15 V dc ±5%, -15 V dc ±5%
CONSUMPTION
5.75 W
HEAT DISSIPATION
4.6 W

Communication
Redundant IEEE P1118 Fieldbus

Analog Input Channels (4 Channels)
RANGE
1 to 5 V dc, 4 to 20 mA dc
RATED MEAN ACCURACY
±0.05% of span
RESOLUTION
15 to 15 bits, programmable (see Table 1)

Discrete Input Channels (3 Channels)
APPLIED VOLTAGE
24 V dc, 125 V dc, 120 V ac
ON-STATE LOAD CURRENT
0.25 A (maximum)
OFF-STATE LEAKAGE CURRENT
10 μa at 24 V dc, 10 μa at 125 V dc,
1.6 μa at 120 V ac

Analog Output Channels (2 Channels)
RANGE
1 to 5 V dc, 4 to 20.4 mA dc
RATED MEAN ACCURACY
±0.05% of span (monotonic)
RESOLUTION
12 bits
OUTPUT LOAD
735 Ω
COMPLIANCE VOLTAGE
18.6 dc nominal at 20 mA at I/O field terminals
SETTLING TIME
100 ms to settle within a 1% band of steady state

Discrete Output Channels (4 Channels)
Isolated Solid State Switch
APPLIED VOLTAGE
21 to 27 V dc
LOAD CURRENT
0.25 A (maximum)
OFF-STATE LEAKAGE CURRENT
0.25 mA

BDSI07 FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
+5 V dc ±5%, ±15 V dc ±5%
CONSUMPTION
5.75 W
HEAT DISSIPATION
4.6 W

Communication
Redundant IEEE P1118 Fieldbus

Discrete Input Channels (16 Channels)
APPLIED VOLTAGE
24 V dc, 125 V dc, 120 V ac
ON-STATE LOAD CURRENT
0.25 A maximum
OFF-STATE LEAKAGE CURRENT
10 μa at 24 V dc, 10 μa at 125 V dc,
1.6 μa at 120 V ac

BDSM06 FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
+5 V dc ±5%, ±15 V dc ±5%
CONSUMPTION
4.5 W
HEAT DISSIPATION
3.6 W

Communication
Redundant IEEE P1118 Fieldbus

Analog Input Channels (8 Channels)
CONTACT RANGE
Open (off) and Closed (on)
OPEN CIRCUIT VOLTAGE
24 V dc or 48 V dc (externally supplied)
SHORT CIRCUIT CURRENT
4.5/9 mA (24/48 V dc)
ON-STATE RESISTANCE
1 kΩ (maximum)
OFF-STATE RESISTANCE
100 kΩ (minimum)
COUNTER RANGE
0 to 50 K counts per second

BDSM09 FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
+5 V dc ±5%, ±15 V dc ±5%
CONSUMPTION
2.3 W
HEAT DISSIPATION
2.3 W

Communication
Redundant IEEE P1118 Fieldbus

Discrete Output Channels (16 Channels)
Isolated
APPLIED VOLTAGE
21 to 27 V dc
LOAD CURRENT
0.25 A (maximum)
OFF-STATE LEAKAGE CURRENT
0.25 mA

BDSM9A FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
+5 V dc ±5%, ±15 V dc ±5%
CONSUMPTION
2.3 W
HEAT DISSIPATION
2.3 W

Communication
Redundant IEEE P1118 Fieldbus

Discrete Input Channels (8 Channels)
Isolated
APPLIED VOLTAGE
24 V dc, 125 V dc, 120 V ac
ON-STATE LOAD CURRENT
0.25 A (maximum)
OFF-STATE LEAKAGE CURRENT
10 μa at 24 V dc, 10 μa at 125 V dc, 1.6 μa at 120 V ac

Discrete Output Channels (8 Channels)
Isolated
APPLIED VOLTAGE
21 to 27 V dc
LOAD CURRENT
0.25 A (maximum)
OFF-STATE LEAKAGE CURRENT
0.25 mA

BDSM9B FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
+5 V dc ±5%, ±15 V dc ±5%
CONSUMPTION
2.3 W
HEAT DISSIPATION
2.3 W

Communication
Redundant IEEE P1118 Fieldbus

Discrete Input Channels (16 Channels)
APPLIED VOLTAGE
24 V dc, 125 V dc, 120 V ac
ON-STATE LOAD CURRENT
0.25 A (maximum)
OFF-STATE LEAKAGE CURRENT
10 μa at 24 V dc, 10 μa at 125 V dc, 1.6 μa at 120 V ac

Discrete Output Channels (16 Channels)
Channels 16 maximum in groups of 8
APPLIED VOLTAGE
21 to 27 V dc
LOAD CURRENT
0.25 A (maximum)
OFF-STATE LEAKAGE CURRENT
0.25 mA

BDSO10 FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
+5 V dc ±5%, ±15 V dc ±5%
CONSUMPTION
2.6 W
HEAT DISSIPATION
2.4 W

Communication
Redundant IEEE P1118 Fieldbus

Discrete Output Channels (8 Channels)
Isolated
APPLIED VOLTAGE
24 to 240 V ac
LOAD CURRENT
1.0 A at 70°C
OFF-STATE LEAKAGE CURRENT
17.5 mA at 240 V ac 25°C

BDSO26 FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
+5 V dc ±5%, ±15 V dc ±5%
CONSUMPTION
3.0 W
HEAT DISSIPATION
2.4 W

Communication
Redundant IEEE P1118 Fieldbus

Discrete Output Channels (8 Channels)
Isolated
APPLIED VOLTAGE
5 to 50 V dc
LOAD CURRENT
1.5 A at 75°C
OFF-STATE LEAKAGE CURRENT
1.0 mA at 70°C

BDSO41 FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
+5 V dc ±5%, ±15 V dc ±5%
CONSUMPTION
3.0 W
HEAT DISSIPATION
2.4 W

Communication
Redundant IEEE P1118 Fieldbus

Discrete Output Channels (8 Channels)
Isolated
APPLIED VOLTAGE
5 to 160 V dc
LOAD CURRENT
0.5 A at 70°C
OFF-STATE LEAKAGE CURRENT
2.0 mA at 70°C

Table 1. Input Specifications

Conversion Time	Settling Time(a)	Linearity Error(b) (% of Range)	Resolution
0.1 seconds	0.25 seconds	0.0125	12 bits
0.2 seconds	0.5 seconds	0.0075	13 bits
0.5 seconds	1.0 seconds	0.005	14 bits
1.0 seconds	2.0 seconds	0.005	15 bits

(a) Output settles within a 1% band of steady state for a 10 to 90% input step change.
(b) Monotonic; assures that the signal for Fieldbus communications either increases or remains the same for increasing analog input signals.

BFBE2 (FIELDBUS A/B SWITCH EXTENDER) FUNCTIONAL SPECIFICATIONS

Maximum Number of DCS Integrators Driven
40

Maximum Length of Local Bus
9 m (30 ft)

Maximum Input Power Voltage (Normal Operation)
+30 V dc

Maximum Operating Current at -5%
500 mA

Maximum Power Dissipation at +5%
2.75 W

Minimum Isolation Voltage
2500 V rms

Holdup Time at 24 V dc
250 ms

BFBI (FIELDBUS ISOLATOR) FUNCTIONAL SPECIFICATIONS

Maximum Number of DCS Integrators Driven
40

Maximum Length of Local Bus
9 m (30 ft)

Maximum Input Power Voltage (Normal Operation)
+30 V dc

Maximum Operating Current at -5%
500 mA

Maximum Power Dissipation at +5%
2.75 W

Minimum Isolation Voltage
2500 V rms

Holdup Time at 24 V dc
250 ms

Input Signal Voltage, External Bus Side (Normal Operation)

Difference between HI and LO level for signals FBEX or FBEX', as referenced to isolated ground (EXTREF).	0.33 to 3.0 V P-P
Differential across signals FBEX and FBEX'.	0.66 to 6.0 V P-P
Absolute input limits before damage, as referenced to isolated ground (EXTREF) for FBI w/o termination cable assembly.	-7 to +7 V dc
Output common mode range.	-1 to +3 V
External bus output signal voltage (nominal differential, terminated with 55 Ω).	6.0 V P-P

Input Signal Voltage, Local Bus Side (Normal Operation)

Difference between HI and LO level for signals FBEX or FBEX', as referenced to ground (GND).	1.2 to 3.0 V P-P
Differential across signals FBEX and FBEX'.	2.4 to 6.0 V P-P
Absolute input limits before damage, as referenced to GND.	-7 to +12 V dc
Output common mode range.	-1 to +3 V

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