Foxboro®

by Schneider Electric

Foxboro Evo™
Process Automation System

# DCS Fieldbus Modules for Fisher PROVOX® Controller Series System User's Guide



B0400AR

Rev F
December 18, 2014

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# *Preface*

This manual describes all aspects of the DCS Fieldbus Modules for Fisher PROVOX® Controller Series system migration kits, including:

- Configuration
- Installation
- Maintenance

The manual is intended for use by process engineering and operations personnel.

## Audience

This manual is intended for the use of process control engineers and operators, and other qualified and authorized personnel involved in setting up a system to accommodate the Foxboro Evo™ or I/A Series® equipment.

## What You Should Know

Prior to using this manual, you should be familiar with the Foxboro Evo and I/A Series system. Detailed information for the software and the hardware is found in the full documentation set for Foxboro Evo and I/A Series systems. See “Workstation Types” below.

## How to Use This Book

This manual is organized in a way that reflects a typical sequence of actions in setting up a system. The appendices consolidate equipment specifications.

## Safety Considerations

Safe use of this product depends largely upon proper installation, use, and maintenance by you, the customer. This manual provides the information needed to properly install, use, and maintain the DCS Fieldbus Modules subsystem.

## Revision Information

For this release of the document (B0400AR-F), the following changes were made:

**Global**

- Updated the document to implement new corporate and product branding.

# Workstation Types

You should be aware of the various types of workstations and their definitions as indicated below.

| Term | Definition |
|---|---|
| Foxboro Evo workstation | Any workstation installed with a Foxboro Evo software component, including Control Core Services, Control Software, Wonderware Historian, I/A Series software, FCS or any combination of thereof. |
| Control Core Services workstation | Any Foxboro Evo workstation installed with Control Core Services or I/A Series software. This workstation is connected to the Mesh network. |
| non-Control Core Services workstation | Any Foxboro Evo workstation that does not have Control Core Services or I/A Series software installed. This type of workstation is not connected to the Mesh network, but can have Control Software installed on it. |
| Control Software workstation | Any Foxboro Evo workstation installed with Control Software components, including Control Editors, Control HMI, Wonderware Historian, or other components installed as part of Control Software. This workstation may or may not also be a Control Core Services workstation. |

# Reference Documents

In addition to various Fisher PROVOX documents associated with the Series 10 control system, you should be familiar with the Foxboro Evo and I/A Series documents listed below:

- *Field Control Processor 280 (FCP280) User's Guide* (B0700FW)
- *Field Control Processor 280 (FCP280) Upgrade Guide* (B0700GC)
- *Field Control Processor 270 (FCP270) User's Guide* (B0700AR)
- *Z-Module Control Processor 270 (ZCP270) User's Guide* (B0700AN)
- *Control Processor 60 and Control Processor 60S Installation and Maintenance* (B0400FB)
- *Integrated Control Block Descriptions* (B0193AX)
- *I/A Series Configuration Component (IACC) User's Guide* (B0700FE)
- *Integrated Control Configurator* (B0193AV)
- *Control Processor 270 (CP270) and Field Control Processor 280 (CP280) Integrated Control Software Concepts* (B0700AG)
- *Integrated Control Software Concepts* (B0193AW) - For CP60 or earlier control processors
- *Network Cable Systems Installation and Maintenance* (B0193UW)
- *System Manager* (B0750AP)
- *Process Operations and Displays* (B0193MM)

- *Software Installation (Solaris® Platform)* (B0193JG)
- *System Definition: A Step-by-Step Procedure* (B0193WQ)
- *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA)
- *System Equipment Installation* (B0193AC)
- *System Management Displays* (B0193JC)
- *The MESH Control Network Architecture Guide* (B0700AZ).

Most of these documents are available on the Foxboro Evo Electronic Documentation media (K0173WT). The latest revisions of each document are also available through our Global Customer Support at *https://support.ips.invensys.com.*

# 1. Introduction

*This chapter provides an overview of the DCS Fieldbus Module subsystem.*

The DCS Fieldbus Modules for Fisher PROVOX Controller Series Systems enable you to migrate the control of loops from the Controller Series equipment to a Foxboro Evo or I/A Series system, while preserving existing process I/O terminations and wiring. The newly installed DCS Fieldbus Modules interchange process measurement and output signals and digital input/output signals directly with the Foxboro Evo or I/A Series control system.

All process signals are fully integrated into the process automation system, allowing direct system monitoring and control of the process. Operating in conjunction with the control and management software, the DCS Fieldbus Module subsystem provides advanced plant-wide control, display, history, alarming, and information management capabilities.

The newly installed DCS Fieldbus Modules are connected to the Foxboro Evo control station via one or more Fieldbuses, which can be implemented in either a single or redundant configuration. The DCS Fieldbus Module subsystem can exist as a single entity on a Fieldbus, or can be combined with other Fieldbus-based process interface subsystems.

Major components that are common to all implementations of the DCS Fieldbus Module subsystem include:

- DCS Fieldbus Modules operate in conjunction with the Foxboro Evo control station to replace the I/O functions performed by the Controller Series cards, while the control function is off-loaded to the open-system Foxboro Evo environment. There are three DCS Fieldbus Module types:
  - FRM701 replaces the CL7001 Configurable Controller Assembly.
  - FRM711 upgrades the CL7011 or CL7002 Computing Controller Assembly.
  - FRMMPU Microprocessor Unit is installed with the FRMJMP Jumper Card in various combinations to replace CL6011 Interactive Controller configurations.
- Electrical isolation between the Fieldbus and the newly installed DCS Fieldbus Modules is provided by FRSFBI Fieldbus Isolators for each Fieldbus channel installed in the first converted card file. There is one FRSFBI for each Fieldbus channel. The FRSFBI communicates with the DCS Fieldbus Modules via the Fisher backplane and with other upgraded card files via a cable connection to Fieldbus Extender modules in the other card files.
- FRSFBE Fieldbus Extender cards are mounted in additional card files on the Fieldbus, instead of the FRSFBI Fieldbus Isolators. The FRSFBI extends the electrical and communications link between the Fisher backplane and the Fieldbus.

In addition to these major components, various supporting hardware items, such as local Fieldbus cables, equipment labels, and termination cable assemblies are included in the DCS Fieldbus Module subsystem.

Figure 1-1 shows a Fisher PROVOX chassis that was originally populated with a 4-wide Interactive Controller (in slots 1 through 4) and four Configurable Controllers (in slots 5 through 8). These modules have been replaced with the appropriate DCS Fieldbus Modules, while the Fisher PROVOX Power Cards have been replaced by dual FRSFBI Fieldbus Isolator modules.

The cable connections at the top of the FRSFBIs connect the card file to the redundant Foxboro Evo Fieldbus, while the cable connections in the middle of the card edge connect the Fieldbus to another card file. Note that the original field terminations above the converted card file have not been altered.

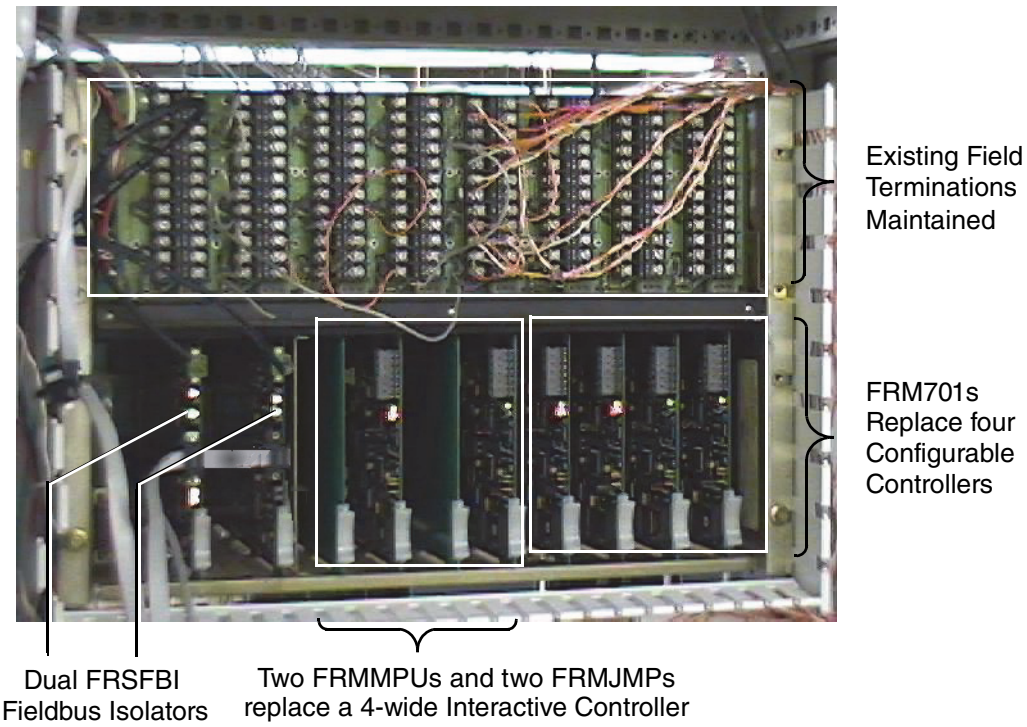



**Figure 1-1. DCS Fieldbus Module Subsystem Implementation**

# Subsystem Implementation

PROVOX Controller Series modules are replaced on a card-file-by-card-file basis. Each Foxboro® migration kit provides all the components necessary to convert a single card file, based on your specification of single or redundant Fieldbus, controller types to be upgraded, and connection to other Fisher chassis to be upgraded. Chapter 2 “Product Application” describes the selection of optional components in the migration kit. After identifying the kit components, implementation of DCS Fieldbus Module subsystems includes:

- System Configuration, as described in Chapter 3 “Configuration”
- Integrated Control Configuration, as described in Chapter 3 “Configuration”
- Fieldbus cable connections, as described in Chapter 4 “Equipment Installation”.

# Terminology

This document uses certain terms specific to the DCS Fieldbus Module subsystem and the Foxboro Evo system. Understanding these terms is essential to understanding this document.

| | |
|---|---|
| Control Station | Any Foxboro Evo or I/A Series system module, application workstation, or subsystem that effects process control via the Foxboro Evo Fieldbus. Examples include the Field Control Processor 280 (FCP280), Field Control Processor 270 (FCP270), Z-Module Control Processor 270 (ZCP270), Control Processor (CP60), and Control Processor 40 (CP40). The station controls process variables using algorithms contained in functional control blocks configured by on-site process engineers to implement the desired control strategies. |
| FBM | Fieldbus Modules (FBMs) provide the interface between the process sensors/actuators and the Fieldbus in a standard Foxboro Evo system. Each FBM is represented in the Foxboro Evo control database by an Equipment Control Block (ECB). The DCS Fieldbus Modules were designed to appear to the Foxboro Evo control system as a group of existing FBMs: an FBP10, one or two FBM17s, and if required by the application, and an FBM01. |
| Fieldbus | An optionally redundant serial bus conforming to the EIA standards' general requirements for RS-485. The Fieldbus carries data communications on a twinaxial cable between the Foxboro Evo input/output modules on the Fieldbus (Fieldbus Modules and DCS Fieldbus Modules, for example), and their associated control stations. |
| IACC | I/A Series Configuration Component. |
| Letterbug | In a Foxboro Evo or I/A Series system, a letterbug is a plastic character that interlocks with other plastic characters to form a six-character module identifier. Letters printed on the front are read visually by the user. Pin connectors at the back are read electronically by the computer. |
| TCA | A termination cable assembly provides a means of attaching the Fieldbus to various devices – for example, to the Foxboro Evo control station at one end, and a DCS Fieldbus Module Fieldbus Isolator at the other. |

# Planning Ahead

Personnel who should be involved with the planning process include sales support personnel, system engineers, software engineers, and process control engineers. For throughput and sizing information tailored to your system, consult your Foxboro engineering or sales support representative. There are three major areas of concern when planning a system:

- System Configuration

  During system configuration (or system definition) you select and define the hardware and software for the system. The end product of this configuration is a disk that defines the network equipment packaging, documents the configuration, provides a list of material for the quotation system, and enables software installation. Prior to undertaking this configuration. You should determine:

  - Number and types of loops and blocks in the process control scheme
  - Memory and throughput requirements based on block definition, scan rates, and other block-related functions that can affect the number and selection of hardware items.

- Process Control Configuration

  With the Foxboro Evo Control Editors (hereinafter referred to as Control Editors), Integrated Control Configurator (ICC) or I/A Series Configuration Component (IACC), you define compounds, continuous and sequential control blocks, and ladder logic. You lay out the schemes for your compounds and blocks prior to actually performing a configuration on the system. You then use the resulting information, in conjunction with information on the system configuration worksheets, to arrive at a final plan for hardware and software, and a final process control strategy.

- Equipment Installation

  Equipment installation does not require special tools. However, it does require a basic knowledge of I/A Series Nodebus and Fieldbus hardware concepts. This knowledge can be attained by reviewing *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA) and *System Equipment Installation* (B0193AC).

# 2. Product Application

*This chapter describes how the DCS Fieldbus Module subsystem is used to replace the various Fisher PROVOX Controller Series units.*

The DCS Fieldbus Modules are installed as direct replacements for the following Fisher PROVOX Controller Series units:

- CL7001 Computing Controllers
- CL7011/CL7002 Configurable Controllers, including controllers with Discrete I/O (set to either plug position)
- CL6011 Interactive Controllers in 2-wide, 3-wide, and 4-wide configurations.

The PROVOX Controller modules are removed and the DCS Fieldbus Modules are installed in the same slot positions in the Fisher card file. The DCS Fieldbus modules plug into the backplane when replacing Computing Controllers and Configurable Controllers, and into the appropriate Interconnect Assembly when replacing Interactive Controllers.

The new DCS Fieldbus Modules are modified Fieldbus Modules (FBMs) in a Fisher PROVOX form factor. Addressing is accomplished by standard letterbugs.

Process measurement and output signals pass to and from one or more control processors to provide Foxboro Evo control in place of the Fisher PROVOX controllers.

The Fieldbus Isolators plug directly into existing Fisher PROVOX card files in place of the PROVOX power cards. These modules communicate with the DCS Fieldbus Modules over the Fisher PROVOX backplane and provide cable connections to the Fieldbus. The FRSFBI (in a single channel or redundant pair configuration) can support up to 40 DCS Fieldbus Modules.

DCS Fieldbus Modules in multiple card files can be connected to the same local fieldbus cables with the use of Fieldbus Extender modules installed instead of Fieldbus Isolators in the second and subsequent card files. The number of card files connected on the fieldbus is limited by the 40-module limit of the FRSFBI Fieldbus Isolators.

Controller Series migration to the Foxboro Evo system is accomplished on a nest-by-nest basis, that is, all Controller Series equipment in a given card file must be replaced at the same time. You cannot mix Fisher and Foxboro modules in the same card file.

## Control processor and System Software Compatibility

The DCS Fieldbus Module subsystem can be configured to interface with any standard Foxboro Evo control station, including Control Processors (CP30 or higher). It connects to a standard Fieldbus and can coexist with other Foxboro Evo Fieldbus devices, provided control station loading constraints are observed.

The DCS Fieldbus Module subsystem requires the following:

- Foxboro Evo Control Core Services software v9.0 (hereinafter referred to as Control Core Services software v9.0) (or higher) is required for FCP280.
- I/A Series software v8.1.1 (or higher) is required for FCP270 and ZCP270.

- I/A Series software v6.3.1(or higher) is required for CP60.
- I/A Series software v4.1 (or higher) is required for CP30 and CP40.

# DCS Fieldbus Module Subsystem Implementation

This section describes how DCS Fieldbus Modules are configured to replace various Controller Series cards.

## Replacing the CL7001 Configurable Controller

The FRM701 DCS Fieldbus Module replaces the Type CL7001 Configurable Controller Assembly. The CL7001 is removed from the card file and the FRM701 is plugged directly into the same slot. The FRM701 connects the existing I/O to the CP using the Fisher backplane, the Fieldbus Isolator, and the Foxboro Evo local and remote fieldbus cables.

The FRM701 is represented in the Foxboro Evo control database as an FBP10 and two FBM17s.

The controller measured variables, process outputs, and discrete inputs and outputs are mapped to points on the two FBM17s, as shown in Table 2-1.

**Table 2-1. I/O Mapping for Configurable Controller Upgrade**

| CL7001 I/O Connection | FRM701 |
|---|---|
| Measured Variable 1 | FBM17 #1 PNT1 |
| Measured Variable 2 | FBM17 #1 PNT2 |
| Measured Variable 3 | FBM17 #1 PNT3 |
| Measured Variable 4 | FBM17 #1 PNT4 |
| Current Output 1 | FBM17 #1 PNT5 |
| Discrete Input 1 | FBM17 #1 PNT7 |
| Discrete Input 2 | FBM17 #1 PNT8 |
| Discrete Output 1 | FBM17 #1 PNT11 |
| Discrete Output 2 | FBM17 #1 PNT12 |
| Discrete Output 3 | FBM17 #1 PNT13 |
| Discrete Output 4 | FBM17 #1 PNT14 |
| Discrete Output 5 | FBM17 #2 PNT11 |
| Discrete Output 6 | FBM17 #2 PNT12 |
| Discrete Output 7 | FBM17 #2 PNT13 |

# Replacing the CL7011 Computing Controller

The FRM711 DCS Fieldbus Module replaces the Type CL7002 and Type CL7011 Computing Controller Assemblies. The CL7002/CL7011 is removed from the card file and FRM711 is plugged directly into the same slot. The FRM711 connects the existing I/O to the CP using the Fisher backplane and the Foxboro Evo local and remote fieldbus cables.

The FRM711 is represented in the Foxboro Evo control database as an FBP10 and two FBM17s.

The controller measured variables and discrete points (DI and DO) are mapped to points in the two FBM17s, as shown in Table 2-2.

**Table 2-2. I/O Mapping for Computing Controller Upgrade**

| CL7011 I/O Connection | FRM711 |
|---|---|
| Measured Variable 1 | FBM17 #1 PNT1 |
| Measured Variable 2 | FBM17 #1 PNT2 |
| Measured Variable 3 | FBM17 #1 PNT3 |
| Measured Variable 4 | FBM17 #1 PNT4 |
| Measured Variable 5 | FBM17 #2 PNT1 |
| Current Output 1 | FBM17 #1 PNT5 |
| Voltage Output 1 | FBM17 #2 PNT5 |
| Discrete Input 1 | FBM17 #1 PNT7 |
| Discrete Input 2 | FBM17 #1 PNT8 |
| Discrete Input 3 | FBM17 #1 PNT9 |
| Discrete Input 4 | FBM17 #1 PNT10 |
| Discrete Output 1 | FBM17 #1 PNT11 |
| Discrete Output 2 | FBM17 #1 PNT12 |

# Replacing Type CL6011 Interactive Controllers

The Fisher PROVOX Type CL6011 Interactive Controllers are configured in a two-card configuration that plugs into the CL7016 Interconnect Assembly, and in three-card and four-card configurations that plug into the CL7006 Interconnect Assembly. The Interconnect Assemblies are mounted on the Fisher PROVOX backplane. The Foxboro Evo migration replaces these cards with combinations of the model FRMMPU Microprocessor Unit and the FRMJMP Jumper Card. The Foxboro Evo modules are plugged into the CL7016 or CL7006 Interconnect Assembly.

Table 2-3 through Table 2-10 show the slot assignments in the Interconnect Assembly for the original Controller Series cards and their DCS Fieldbus Module replacements, and the mapping of I/O to the FBMs. The slot number in these tables refers to the position on the Interconnect Assembly and not the slot number in the card file. The 2-wide configuration described in Table 2-3 can occupy slots 1 and 2, 3 and 4, 5 and 6, or 7 and 8 in the card file.

## *2-Wide*

Table 2-3 lists replacement modules for a 2-wide Interactive Controller configuration.

**Table 2-3. Interactive Controller: 2-Wide**

| CL7016 Interconnect Assembly | Fisher PROVOX Controller Card | DCS Fieldbus Module |
|---|---|---|
| Slot 2 (left) | CL7005/CL7015 Process I/O Assembly | FRMJMP |
| Slot 1 (right) | Microprocessor Assembly | FRMMPU |

The FRMMPU is represented in the Foxboro Evo control database as an FBP10, two FBM17s, and one FBM01.

The controller measured variables, process outputs, and discrete points inputs and outputs are mapped to the FBM17 and FBM01 points, as shown in Table 2-4.

**Table 2-4. I/O Mapping for 2-Wide Interactive Controller Upgrade**

| Interactive Controller I/O Connection | FRMMPU |
|---|---|
| Measured Variable 1 | FBM17 #1 PNT1 |
| Measured Variable 2 | FBM17 #1 PNT2 |
| Measured Variable 3 | FBM17 #1 PNT3 |
| Measured Variable 4 | FBM17 #1 PNT4 |
| Measured Variable 5 | FBM17 #2 PNT1 |
| Measured Variable 6 | FBM17 #2 PNT2 |
| Measured Variable 7 | FBM17 #2 PNT3 |
| Measured Variable 8 | FBM17 #2 PNT4 |
| Measured Variable 9 | FBM01 #1 PNT1 |
| Measured Variable 10 | FBM01 #1 PNT2 |
| Current Output 1 | FBM17 #1 PNT5 |
| Current Output 2 | FBM17 #1 PNT6 |
| Voltage Output 1 | FBM17 #2 PNT5 |
| Discrete Input 1 | FBM17 #1 PNT7 |
| Discrete Input 2 | FBM17 #1 PNT8 |
| Discrete Input 3 | FBM17 #1 PNT9 |
| Discrete Input 4 | FBM17 #1 PNT10 |
| Discrete Output 1 | FBM17 #1 PNT11 |
| Discrete Output 2 | FBM17 #1 PNT12 |
| Discrete Output 3 | FBM17 #1 PNT13 |
| Discrete Output 4 | FBM17 #1 PNT14 |

## *3-Wide with Discrete I/O*

Table 2-5 lists replacement modules for a 3-wide Interactive Controller configuration with Discrete I/O.

**Table 2-5. Interactive Controller: 3-Wide with Discrete I/O**

| CL7006 Interconnect Assembly | Fisher PROVOX Controller Card | DCS Fieldbus Module |
|---|---|---|
| Slot 4 (left) | blank | blank |
| Slot 3 | CL7004/CL7014 Discrete I/O Assembly | FRMMPU |
| Slot 2 | CL7005/CL7015 Process I/O Assembly | FRMJMP |
| Slot 1 (right) | Microprocessor Assembly | FRMMPU |

Each FRMMPU is represented in the Foxboro Evo control database as an FBP10, two FBM17s, and one FBM01. The controller points for slots 2 and 1 are mapped to the first set of FBM17 and FBM01 points, as shown on the right side of Table 2-6. The points in slot 3 are mapped to the second set of FBMs, as shown on the left side of Table 2-6.

**Table 2-6. I/O Mapping for Upgrades to 3-Wide Interactive Controller with Discrete I/O**

| Interactive Controller I/O Connection | FRMMPU in Slot 3 | Interactive Controller I/O Connection | FRMMPU in Slot 1 |
|---|---|---|---|
| | | Measured Variable 1 | FBM17 #1 PNT1 |
| | | Measured Variable 2 | FBM17 #1 PNT2 |
| | | Measured Variable 3 | FBM17 #1 PNT3 |
| | | Measured Variable 4 | FBM17 #1 PNT4 |
| | | Measured Variable 5 | FBM17 #2 PNT1 |
| | | Measured Variable 6 | FBM17 #2 PNT2 |
| | | Measured Variable 7 | FBM17 #2 PNT3 |
| | | Measured Variable 8 | FBM17 #2 PNT4 |
| | | Measured Variable 9 | FBM01 #1 PNT1 |
| | | Measured Variable 10 | FBM01 #1 PNT2 |
| | | Current Output 1 | FBM17 #1 PNT5 |
| | | Current Output 2 | FBM17 #1 PNT6 |
| | | Voltage Output 1 | FBM17 #2 PNT5 |
| Discrete Input 5 | FBM17 #1 PNT7 | Discrete Input 1 | FBM17 #1 PNT7 |
| Discrete Input 6 | FBM17 #1 PNT8 | Discrete Input 2 | FBM17 #1 PNT8 |
| Discrete Input 7 | FBM17 #1 PNT9 | Discrete Input 3 | FBM17 #1 PNT9 |
| Discrete Input 8 | FBM17 #1 PNT10 | Discrete Input 4 | FBM17 #1 PNT10 |
| Discrete Output 5 | FBM17 #1 PNT11 | Discrete Output 1 | FBM17 #1 PNT11 |
| Discrete Output 6 | FBM17 #1 PNT12 | Discrete Output 2 | FBM17 #1 PNT12 |
| Discrete Output 7 | FBM17 #1 PNT13 | Discrete Output 3 | FBM17 #1 PNT13 |
| Discrete Output 8 | FBM17 #1 PNT14 | Discrete Output 4 | FBM17 #1 PNT14 |

### *3-Wide with Process I/O*

Table 2-7 lists replacement modules for a 3-wide Interactive Controller configuration with Process I/O.

**Table 2-7. Interactive Controller: 3-Wide with Process I/O**

| CL7006 Interconnect Assembly | Fisher PROVOX Controller Card | DCS Fieldbus Module |
|---|---|---|
| Slot 4 (left) | CL7005/CL7015 Process I/O Assembly | FRMMPU |
| Slot 3 | blank | blank |
| Slot 2 | CL7005/CL7015 Process I/O Assembly | FRMJMP |
| Slot 1 (right) | Microprocessor Assembly | FRMMPU |

Each FRMMPU is represented in the Foxboro Evo control database as an FBP10, two FBM17s, and one FBM01. The controller points for slots 2 and 1 are mapped to the first set of FBM17 and FBM01 points, as shown on the right side of Table 2-8. The points in slot 4 are mapped to the second set of FBMs, as shown on the left side of Table 2-8.

**Table 2-8. I/O Mapping for Upgrades to 3-Wide Interactive with Process I/O**

| Interactive Controller I/O Connection | FRMMPU in Slot 3 | Interactive Controller I/O Connection | FRMMPU in Slot 1 |
|---|---|---|---|
| | | Measured Variable 1 | FBM17 #1 PNT1 |
| | | Measured Variable 2 | FBM17 #1 PNT2 |
| | | Measured Variable 3 | FBM17 #1 PNT3 |
| | | Measured Variable 4 | FBM17 #1 PNT4 |
| | | Measured Variable 5 | FBM17 #2 PNT1 |
| Measured Variable 16 | FBM17 #1 PNT1 | Measured Variable 6 | FBM17 #2 PNT2 |
| Measured Variable 17 | FBM17 #1 PNT2 | Measured Variable 7 | FBM17 #2 PNT3 |
| Measured Variable 18 | FBM17 #1 PNT3 | Measured Variable 8 | FBM17 #2 PNT4 |
| Measured Variable 19 | FBM01 #1 PNT4 | Measured Variable 9 | FBM01 #1 PNT1 |
| Measured Variable 20 | FBM01 #2 PNT1 | Measured Variable 10 | FBM01 #1 PNT2 |
| | | Current Output 1 | FBM17 #1 PNT5 |
| | | Current Output 2 | FBM17 #1 PNT6 |
| | | Voltage Output 1 | FBM17 #2 PNT5 |
| | | Discrete Input 1 | FBM17 #1 PNT7 |
| | | Discrete Input 2 | FBM17 #1 PNT8 |
| | | Discrete Input 3 | FBM17 #1 PNT9 |
| | | Discrete Input 4 | FBM17 #1 PNT10 |
| | | Discrete Output 1 | FBM17 #1 PNT11 |
| | | Discrete Output 2 | FBM17 #1 PNT12 |
| | | Discrete Output 3 | FBM17 #1 PNT13 |
| | | Discrete Output 4 | FBM17 #1 PNT14 |

### *4-Wide*

Table 2-9 lists replacement modules for a 4-wide Interactive Controller configuration.

**Table 2-9. Interactive Controller: 4-Wide**

| CL7006 Interconnect Assembly | Fisher PROVOX Controller Card | DCS Fieldbus Module |
|---|---|---|
| Slot 4 (left) | CL7005/CL7015 Process I/O Assembly | FRMJMP |
| Slot 3 | CL7004/CL7014 Discrete I/O Assembly | FRMMPU |
| Slot 2 | CL7005/CL7015 Process I/O Assembly | FRMJMP |
| Slot 1 (right) | Microprocessor Assembly | FRMMPU |

Each FRMMPU is represented in the Foxboro Evo control database as an FBP10, two FBM17s, and one FBM01. The controller points for slots 2 and 1 are mapped to the first set of FBM17 and FBM01 points, as shown on the right side of Table 2-10. The points in slots 4 and 3 are mapped to the second set of FBMs, as shown on the left side of Table 2-10.

**Table 2-10. I/O Mapping for Upgrades to 3-Wide Interactive Controller with Discrete I/O**

| Interactive Controller I/O Connection | FRMMPU in Slot 3 | Interactive Controller I/O Connection | FRMMPU in Slot 1 |
|---|---|---|---|
| Measured Variable 11 | FBM17 #1 PNT1 | Measured Variable 1 | FBM17 #1 PNT1 |
| Measured Variable 12 | FBM17 #1 PNT2 | Measured Variable 2 | FBM17 #1 PNT2 |
| Measured Variable 13 | FBM17 #1 PNT3 | Measured Variable 3 | FBM17 #1 PNT3 |
| Measured Variable 14 | FBM17 #1 PNT4 | Measured Variable 4 | FBM17 #1 PNT4 |
| Measured Variable 15 | FBM17 #2 PNT1 | Measured Variable 5 | FBM17 #2 PNT1 |
| Measured Variable 16 | FBM17 #2 PNT2 | Measured Variable 6 | FBM17 #2 PNT2 |
| Measured Variable 17 | FBM17 #2 PNT3 | Measured Variable 7 | FBM17 #2 PNT3 |
| Measured Variable 18 | FBM17 #2 PNT4 | Measured Variable 8 | FBM17 #2 PNT4 |
| Measured Variable 19 | FBM01 #1 PNT1 | Measured Variable 9 | FBM01 #1 PNT1 |
| Measured Variable 20 | FBM01 #1 PNT2 | Measured Variable 10 | FBM01 #1 PNT2 |
| Current Output 5 | FBM17 #1 PNT5 | Current Output 1 | FBM17 #1 PNT5 |
| Current Output 6 | FBM17 #1 PNT6 | Current Output 2 | FBM17 #1 PNT6 |
| Voltage Output 2 | FBM17 #2 PNT5 | Voltage Output 1 | FBM17 #2 PNT5 |
| Discrete Input 5 | FBM17 #1 PNT7 | Discrete Input 1 | FBM17 #1 PNT7 |
| Discrete Input 6 | FBM17 #1 PNT8 | Discrete Input 2 | FBM17 #1 PNT8 |
| Discrete Input 7 | FBM17 #1 PNT9 | Discrete Input 3 | FBM17 #1 PNT9 |
| Discrete Input 8 | FBM17 #1 PNT10 | Discrete Input 4 | FBM17 #1 PNT10 |
| Discrete Output 5 | FBM17 #1 PNT11 | Discrete Output 1 | FBM17 #1 PNT11 |
| Discrete Output 6 | FBM17 #1 PNT12 | Discrete Output 2 | FBM17 #1 PNT12 |
| Discrete Output 7 | FBM17 #1 PNT13 | Discrete Output 3 | FBM17 #1 PNT13 |
| Discrete Output 8 | FBM17 #1 PNT14 | Discrete Output 4 | FBM17 #1 PNT14 |

## Sample Configurations

Figure 2-1 and Figure 2-2 illustrate implementation of the DCS Fieldbus Module subsystem in a Controller Series equipment rack. The card file in Figure 2-1 is the first of several connected on a redundant local Fieldbus, and thus has two FRSFBI Fieldbus Isolators, one in each power card slot. The other card files on this local Fieldbus (not illustrated) would have FRSFBE Fieldbus Extenders in these slots.

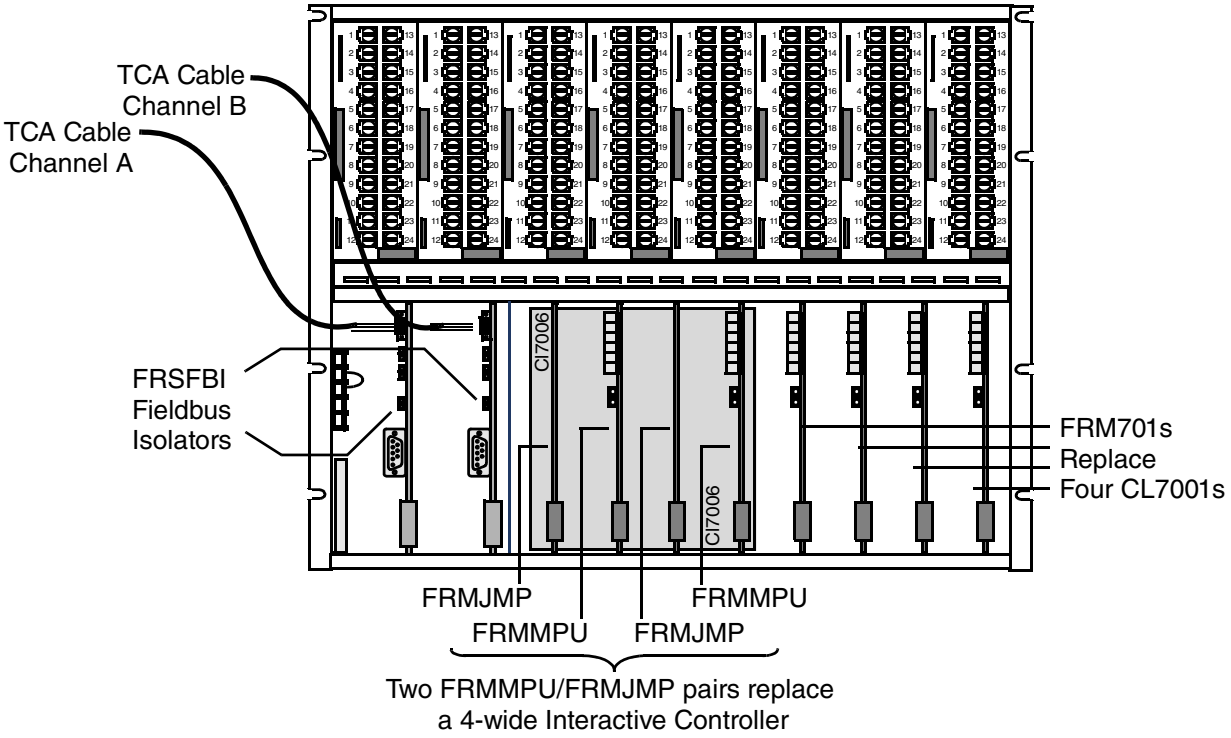



**Figure 2-1. Sample Converted Card File**

Figure 2-2 illustrates conversion of a Fisher PROVOX card file with two Interactive Controllers, a 3-wide with Discrete I/O, and a 3-wide with Process I/O. The card file in this example is the only converted card file on a non-redundant Fieldbus, and thus has a single FRSFBI Fieldbus Isolator, which is installed in the left power card slot.

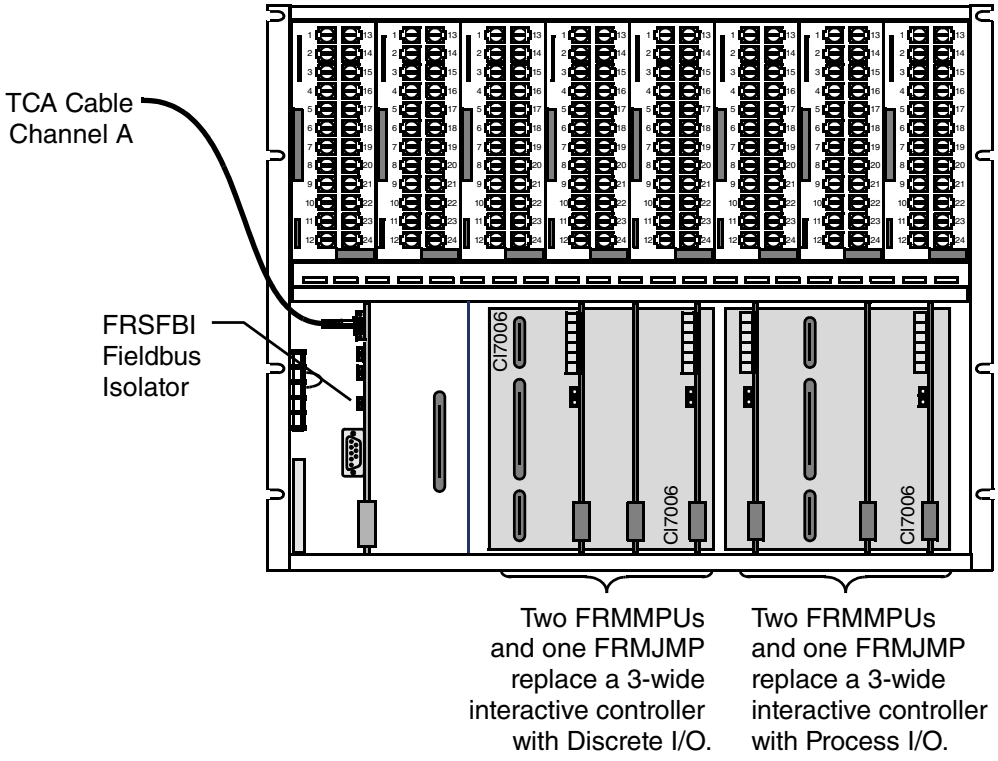



**Figure 2-2. Sample Card File Conversion with Two Interactive Controllers**

# Power and Fieldbus Connections

The Fieldbus connects the converted card file to the Foxboro Evo control station. The Fieldbus can be a single cable or a redundant connection. The Fieldbus cables are plugged into connectors at the top of the FRSFBIs in the first converted card file. The set of connectors near the middle of the card edge are for extending the Fieldbus to another card file using local Fieldbus extension cables, which can be up to 15 feet long.

Each Fieldbus Module has an on-board dc-to-dc converter, which provides all power required for I/O functions.

The Fieldbus cables, FRSFBIs, and FRSFBEs provide a data highway between the DCS Fieldbus Modules and the Foxboro Evo control station.

Figure 2-3 shows the data communications for two converted card files. DCS Fieldbus Modules are not shown.

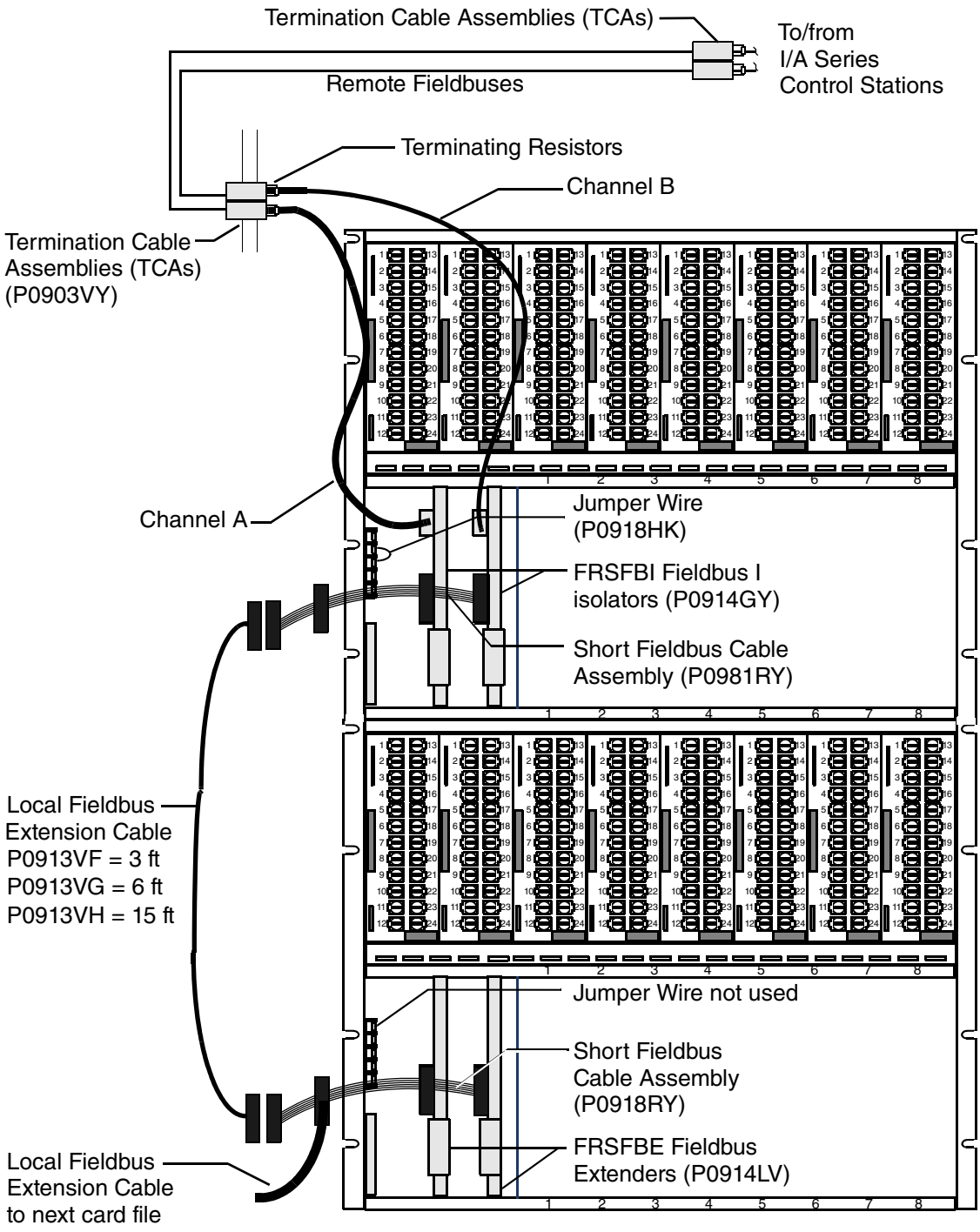



**Figure 2-3. Fieldbus Connections for Two Converted Card Files**

# Fisher PROVOX Controller Series Migration Kit

Table 2-11 lists the components comprising the Controller Series Migration Kit. The Fisher file unit, Field Termination Assemblies (FTAs), and equipment rack are reused, and all I/O wiring remains connected to the FTAs.

**Table 2-11. Controller Series Migration Kit (P0915XX)**

| Foxboro Part Number | Description | Quantity | Physically Replaces |
|---|---|---|---|
| P0903AN | Migration Kit Label | 1 | N/A |
| P0918HK | Jumper Wire<br>(Used only in first card file on Fieldbus) | 0 or 1 | PROVOX Alarm Cabling |
| P0918EU | General Information Label<br>("I/A Plugged In") | 2 | N/A |
| P0903VY | Termination Cable Assembly (TCA) | 1 | PROVOX Communication Cable |
| P0903PN | DIN Rail, 7.175 in | 1 | N/A |
| X0127DH | Screw, Pan Head, 0.190-32 x 0.75 | 2 | N/A |
| X0143AT | Washer, Plain, 0.190 | 2 | N/A |
| X0143SC | Lock washer, 0.190 | 2 | N/A |
| X0167LF | Nutclip, 0.190 | 2 | N/A |
| **Optional Selections** | | | |
| P0914GY | FRSFBI Fieldbus Isolator | 1 or 2 | CL7202 Power Cards |
| P0914LV | FRSFBE Fieldbus Extender | 1 or 2 | CL7202 Power Cards |
| P0914KQ | FRM711 DCS Fieldbus Module<br>(Configurable Controller) | Up to 8 | CL7011, CL7012 |
| P0914KP | FRM701 DCS Fieldbus Module<br>(Computing Controller) | Up to 8 | CL7001, CL7002 |
| P0914KR | FRMMPU DCS Fieldbus Module | Up to 4 | CL6011, CL6001, CL7015, CL7014, CL005, CL7004. See Table 2-3 through Table 2-7. |
| P0914WG | FRMJMP Jumper Card | Up to 4 | |
| P0913VF | Local Fieldbus Extens. Cable, 0.9 m (3 ft) | 0, 1, or 2 | N/A |
| P0913VG | Local Fieldbus Extens. Cable, 1.8 m (6 ft) | | N/A |
| P0913VH | Local Fieldbus Extens. Cable, 4.5 m (15 ft) | | N/A |
| P0918RY | Short Fieldbus Cable Assembly | 0, 1, or 2[1] | N/A |

1. Two assemblies are required for the second card file on the Fieldbus. The third and subsequent card files require one each.

# 3. Configuration

*This chapter provides System Configuration information (System Definition) and Control Configuration information (Integrated Control Configuration).*

In general, "configuration" means specifying to the Control Core Services the types of hardware and software modules that comprise the newly added DCS Fieldbus Module subsystem, and the control blocks to be used in conjunction with it. Prior to configuring the modules, you must develop loop drawings to determine the control scheme, and a detailed equipment plan that identifies all the equipment required to control the process.

## System Configuration

System Configuration (or System Definition) is the process of selecting and identifying the hardware and software for a particular Foxboro Evo system. It is initially performed prior to installation of the system equipment, and it is updated with any hardware/software system changes.

- For a step-by-step procedure for defining a Foxboro Evo system configuration using the System Definition (SysDef) software, refer to *System Definition: A Step-By-Step Procedure* (B0193WQ).
- IACC allows you to import system configuration information from a Foxboro Evo system using SysDef Export media created with a previous instance of the System Definition configuration application. For importing procedures, refer to *I/A Series System Configuration Component (IACC) User's Guide* (B0700FE).
- To use the Control Editors to define the system, refer to the "System Development" and "Security" manuals listed under "Foxboro Evo Documentation" in *Foxboro Evo Control Software Deployment Guide* (B0750BA). Refer to *Foxboro Evo Process Automation System Hardware Configuration User's Guide* (B0750BB) to define the Foxboro Evo system hardware.

Reports produced by System Configuration or System Definition define the network, define the overall packaging of the system, and provide information that may be used in conjunction with equipment installation and system quotation. You can update the System Configuration database at any time to reflect changes made to the initial hardware layout.

To minimize interruption of the process, perform System Configuration (or System Definition) prior to installing the DCS Fieldbus Module subsystem equipment, as described in Chapter 4 "Equipment Installation" on page 33.

If the host Foxboro Evo system is on-line controlling the process, it may be desirable to perform Integrated Control Configuration on-line prior to updating the System Configuration. With this approach, that process control using the DCS Fieldbus Module subsystem equipment can commence immediately following equipment installation, with the System Configuration update being deferred until a more convenient time.

When it comes time to perform control configuration, perform Integrated Control Configuration on-line, referring to "On-Line Integrated Control Configuration" on page 25.

## I/A Series Software v4.1 and v4.2 vs. v6.x

Execution of System Configuration (or System Definition) is, in part, a function of the software release for your I/A Series system.

With I/A Series software v4.1 and v4.2, configure your system using the I/A Series System Configurator. With I/A Series software v6.x or later, use the System Definition utility. Either of these software packages is accessed from an I/A Series workstation or server.

## Letterbug Assignments

Before including the DCS Fieldbus Module subsystem in a Foxboro Evo system, module identifiers must be assigned to the DCS Fieldbus Modules.

In the Foxboro Evo system, a module identifier can be any combination of six alphanumeric characters. You typically enter these characters, or letterbugs, during System Configuration or System Definition, and attach physical letterbugs to the modules as part of the equipment installation process (see "Letterbug Installation" on page 64).

The DCS Fieldbus Modules for Fisher PROVOX Controller Series employ the physical letterbugs, used throughout the Foxboro Evo system, and virtual letterbugs that the DCS Fieldbus Modules recognize and respond to. This scheme allows the Foxboro Evo system to recognize the modules as standard Foxboro Evo FBMs.

Follow these rules when assigning letterbugs:

- Create a unique letterbug for each FRM701, FRM711, and FRMMPU.

  In a 3-wide and 4-wide configuration, there are two letterbugs, one for each FRMMPU. There are no letterbugs installed on the FRMJMP.
- The last character of each physical letterbug must be **0**.
- Install this letterbug on the DCS Fieldbus Module and assign it to the FBP10 during System Definition.
- Change the last character of the letterbug to **1** when assigning the letterbug to the first FBM17 associated with the module.
- If a second FBM17 is required, change the last character of the letterbug to **2** when assigning the letterbug to the second FBM17.
- If an FBM01 is required, change the last character of the letterbug to **3** when assigning it to the FBM01.

## Creating FBMs

To identify the hardware to be used in the Controller Series upgrade:

1. Access the appropriate Foxboro Evo configuration tool.
   - For I/A Series software v4.0, v4.1, or v4.2, refer to *System Configurator* (B0193JH).
   - For I/A Series software v6.0 or higher, refer to *System Definition; A Step-by-Step Procedure* (B0193JG).
   - For I/A Series software v7.x or higher, refer to *System Definition: A Step-By-Step Procedure* (B0193WQ).
2. From the selections available, configure or define the FBMs for each DCS Fieldbus Module as specified in Table 3-1.

**— NOTE**

To minimize control station loading, do not create FBMs that are not actually required by the application

**Table 3-1. Required FBMs**

| Original PROVOX Configuration | DCS Fieldbus Module | Required FBMs | Remarks |
|---|---|---|---|
| Configurable Controller without Discrete I/O | FRM701 | One FBP10<br>One FBM17 | |
| Configurable Controller with seven Discrete Outputs | FRM701 | One FBP10<br>Two FBM17s | |
| Configurable Controller with Two Discrete Inputs and Three Discrete Outputs | FRM701 | One FBP10<br>One FBM17 | |
| Computing Controller | FRM711 | One FBP10<br>Two FBM17s | Second FBM17 not needed if MV5 is used |
| 2-Wide Interactive Controller | FRMMPU | One FBP10<br>Two FBM17s<br>One FBM01 | FBM01 not needed if MV9 and MV10 not used |
| 3-Wide Interactive Controller with Discrete I/O | 1st FRMMPU | One FBP10<br>Two FBM17s<br>One FBM01 | FBM01 not needed if MV9 and MV10 not used |
| | 2nd FRMMPU | One FBP10<br>One FBM17 | |
| 3-Wide Interactive Controller with Process I/O | 1st FRMMPU | One FBP10<br>Two FBM17s<br>One FBM01 | FBM01 not needed if MV9 and MV10 not used |
| | 2nd FRMMPU | One FBP10<br>Two FBM17s | Second FBM17 not needed if MV20 not used |
| 4-Wide Interactive Controller | 1st FRMMPU | One FBP10<br>Two FBM17s<br>One FBM01 | FBM01 not needed if MV9 and MV10 not used |
| | 2nd FRMMPU | One FBP10<br>Two FBM17s<br>One FBM01 | FBM01 not needed if MV19 and MV20 not used |

When you have completed System Configuration or System Definition, perform one of the following operations:

- If this is a new (as opposed to existing) Foxboro Evo system, install the system software (Refer to the appropriate Control Core Services software installation document - all these documents are available on the Global Customer Support website (*https://support.ips.invensys.com*)).

- If this is an existing (previously configured) Foxboro Evo system, specify to the currently installed system software that hardware items have been added to the system. (Refer to the appropriate Control Core Services software installation document - all these documents are available on the Global Customer Support website (*https://support.ips.invensys.com*)).

# Integrated Control Configuration

The Control Editors (formerly known as IEE/Foxboro Control Software (FCS) Configuration Tools), IACC, and I/A Series Integrated Control Configurator (ICC) allow you to integrate Fisher PROVOX Controller Series I/O points into existing control schemes, as well as to create entirely new Foxboro Evo based applications. The software interface between the control logic and the process is provided by Equipment Control Blocks (ECBs) specific to the DCS Fieldbus Module subsystem, and control blocks used throughout the Foxboro Evo system.

Actual control of the process is performed by compounds, consisting of control blocks which you configure.

Figure 3-1 shows an application of control blocks using I/O an FRM711 installed in the Fisher PROVOX card file in to replace a CL7002 Computing Controller. The FRM711 reads and writes to the process using the existing wiring and connects these points to a Foxboro Evo control compound, EXAMPLE, which communicates with the FRM711 as an FBM17. In the compound, two AIN blocks connect a process variable (MV1) and its remote setpoint (MV2) to a PID block, which determines a new valve setting. That output is directed to the process via an AOUT block to the current output (CO). The PID is also connected to an ALM block, which communicates high and low alarm conditions back to the process using COUT (Contact Out) blocks connected to the discrete output terminations (DO1 and DO2).

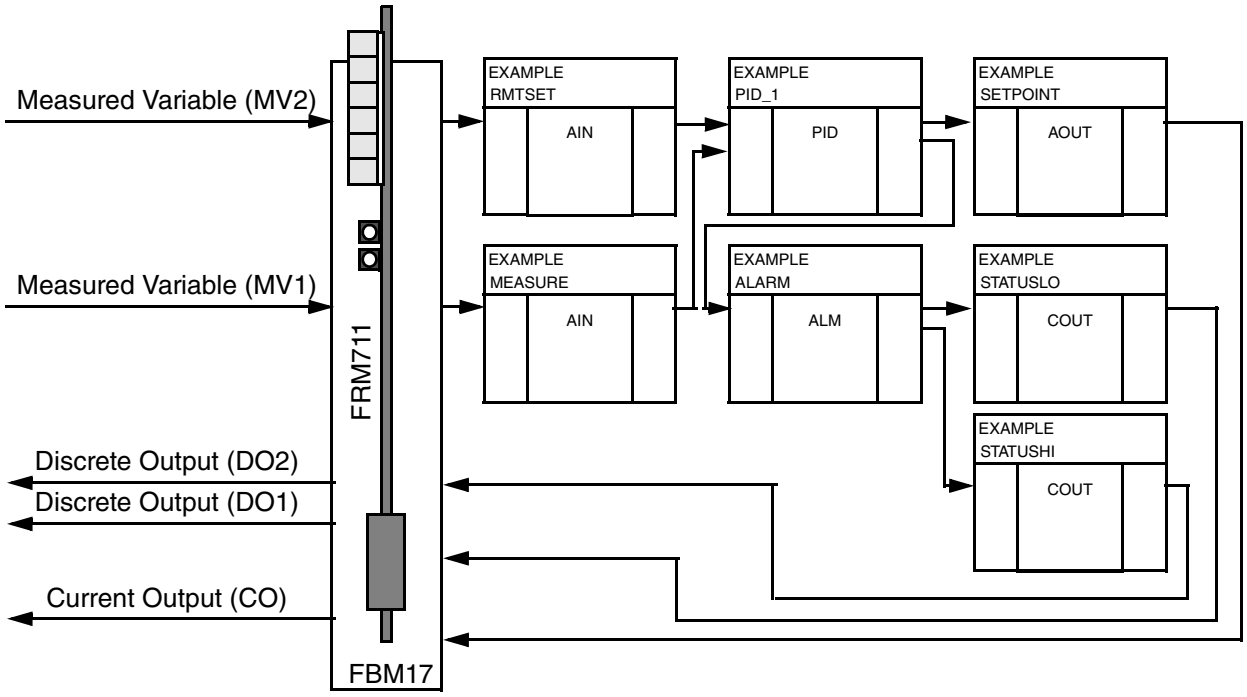



**Figure 3-1. Typical Control Scheme Using DCS Fieldbus Module Subsystem**

The Foxboro Evo system offers a wide range of control blocks, providing solutions for a broad spectrum of process control applications. For details on the selection and usage of control blocks, refer to *Integrated Control Block Descriptions* (B0193AX).

**— NOTE**

This section presents Integrated Control Configuration information that is specific to the DCS Fieldbus Module subsystem.

For more comprehensive information regarding integrated control configuration, refer to:

- ICC - *Integrated Control Configurator* (B0193AV) and associated Help files
- IACC - *I/A Series Configuration Component (IACC) User's Guide* (B0700FE)
- Control Editors - see *Block Configurator User's Guide* (B0750AH) and *Hardware Configuration User's Guide* (B0700BB).

To implement a control program via the DCS Fieldbus Modules via ICC, proceed as follows:

1. Access the Integrated Control Configurator through the process engineer's environment at a Control Core Services workstation.
2. Configure control blocks relating to the DCS Fieldbus Module subsystem equipment by creating a compound name under which the blocks are created and run, and then creating and integrating the desired control blocks.
3. For each DCS Fieldbus Module, create an ECB9 for each FBM17 and an ECB1 for each FBM01 required by the application.

   The ECB serves as a "holding place" for the device's software data.

**— NOTE**

To minimize control station loading, do not create FBMs that are not actually required by the application. Refer to Table 3-1 for the required FBMs for various DCS Fieldbus Module application.

4. Configure the necessary control blocks and compounds for the desired control scheme.

The Control Configurator lets you modify configuration data for on-line stations such as off-line library volumes. A library volume is a dummy configuration which may be loaded into the CP when creation and editing are completed. As a compound/block editor, the Control Configurator provides compound/block-building templates, along with a full range of editing functions.

Integrated control configuration for the DCS Fieldbus Module subsystem is divided into two separate procedures:

- Off-Line Integrated Control Configuration (directly following) is used when a new system is being configured – typically, when the DCS Fieldbus Module subsystem is being included in the new system configuration.
- On-Line Integrated Control Configuration (on page 25) is used when a previous Foxboro Evo configuration is being updated to include the DCS Fieldbus Module subsystem.

**— NOTE —**

If the host Foxboro Evo system is on-line (currently controlling the process), it may be desirable to perform Integrated Control Configuration on-line, prior to updating the System Configuration. If this is the case, perform the procedure under "On-Line Integrated Control Configuration" on page 25.

# Off-Line Integrated Control Configuration

To perform off-line integrated control configuration, refer to *Integrated Control Configurator* (B0193AV) for details and proceed as follows:

**— NOTE —**

1. This procedure assumes that System Configuration has been performed. See "System Configuration" on page 17.
2. This procedure is intended for use with I/A Series software v4.1 or higher. If your system has software of a previous version, refer to the appropriate version of *Integrated Control Configurator* (B0193AV), and configure the DCS Fieldbus Modules.

1. Using the System Management displays accessible at a Control Core Services workstation, boot up the CP to which the DCS Fieldbus Module subsystem equipment is to be attached.

   This creates two compounds, deriving the compound and block names from the station's letterbug (<*CPLBUG*>):

   - Station compound <*CPLBUG*>**_STA** containing the station block <*CPLBUG*>**_STA:STATION**.
   - ECB compound <*CPLBUG*>**_ECB** containing the primary ECB <*CPLBUG*>**_ECB:PRIMARY_ECB**.

2. From the Process Engineer's environment, select **Config > Control_Cfg.** to access the Integrated Control Configurator.
3. Select the primary ECB (<*CPLBUG*>**_ECB:PRIMARY_ECB**) and set the MPOLL parameter to **0**.
4. Use the Integrated Control Configurator's Fix All function to create ECBs for the DCS Fieldbus Modules added previously with either the System Configurator or System Definition.

   The Integrated Control Configurator creates four ECBs for each DCS Fieldbus Module in the system configuration, that is, one each for the FBP10, the two FMB17s and the FBM01. For example, for a module with the letterbug FRM710, the Integrated Control Configurator creates the ECBs shown in Table 3-2.

**Table 3-2. Sample ECBs Created by the Fix All Function**

| Letterbug | FBM type | ECB Name | ECB Type | HWTYPE | SWTYPE |
|---|---|---|---|---|---|
| FRM710 | FBP10 | FRM710 | ECB47 | 52 | 57 |
| FRM711 | FBM17 (1) | FRM711 | ECB9 | 17 | 17 |
| FRM712 | FBM17 (2) | FRM712 | ECB9 | 17 | 17 |
| FRM713 | FBM01 | FRM713 | ECB1 | 1 | 1 |

For information on other ECB parameters, refer to *Integrated Control Block Descriptions* (B0193AX).

5. If required, edit the FBM17 and FBM01 ECBs, if the default parameters provided are not satisfactory.
6. Access the editing display for the newly created FBM17 or FBM01 (see Figure 3-2 through Figure 3-4 for examples) and set the parameters.
7. Choose **Show > Legal FBM/ECB Combos**.

   The Integrated Control Configurator displays a window to the right of the editing display which provides ECB parameter information.

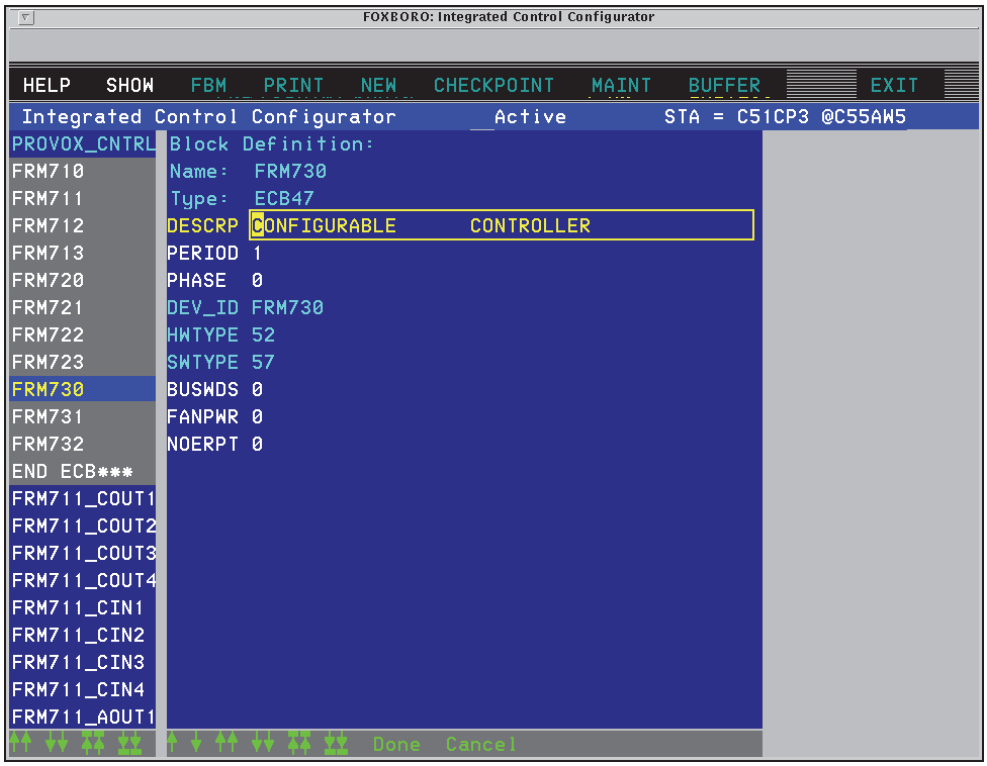



**Figure 3-2. Configuring FBP10 for an FRM701 Configurable Controller**

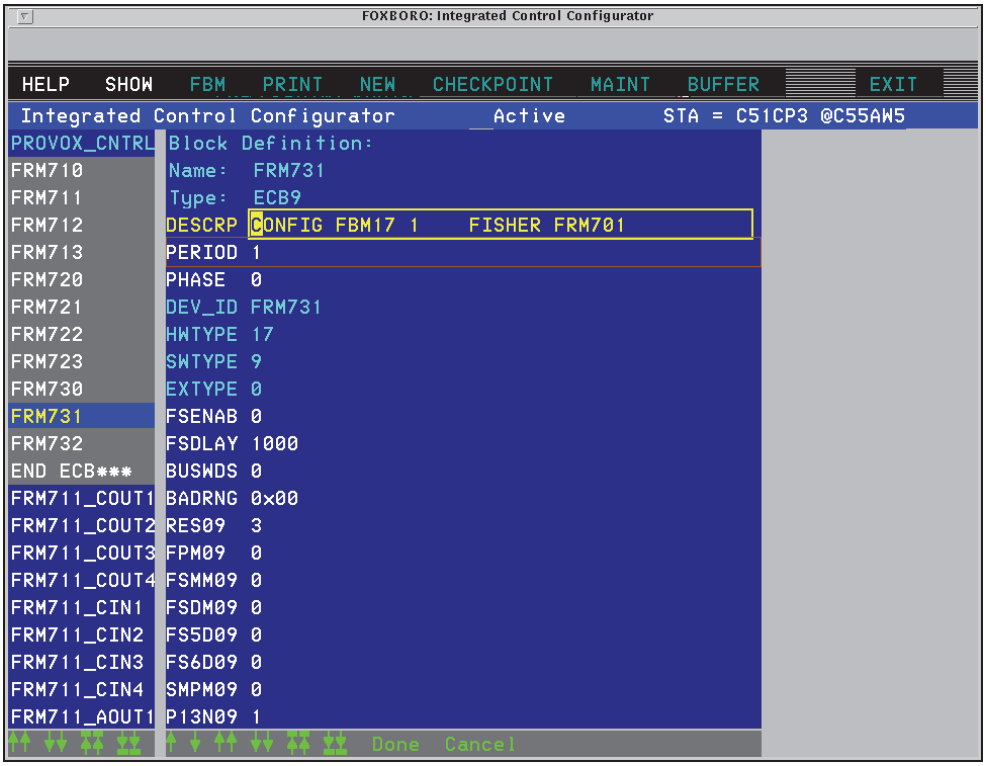



**Figure 3-3. Configuring the First FBM17 for an FRM701 Configurable Controller**

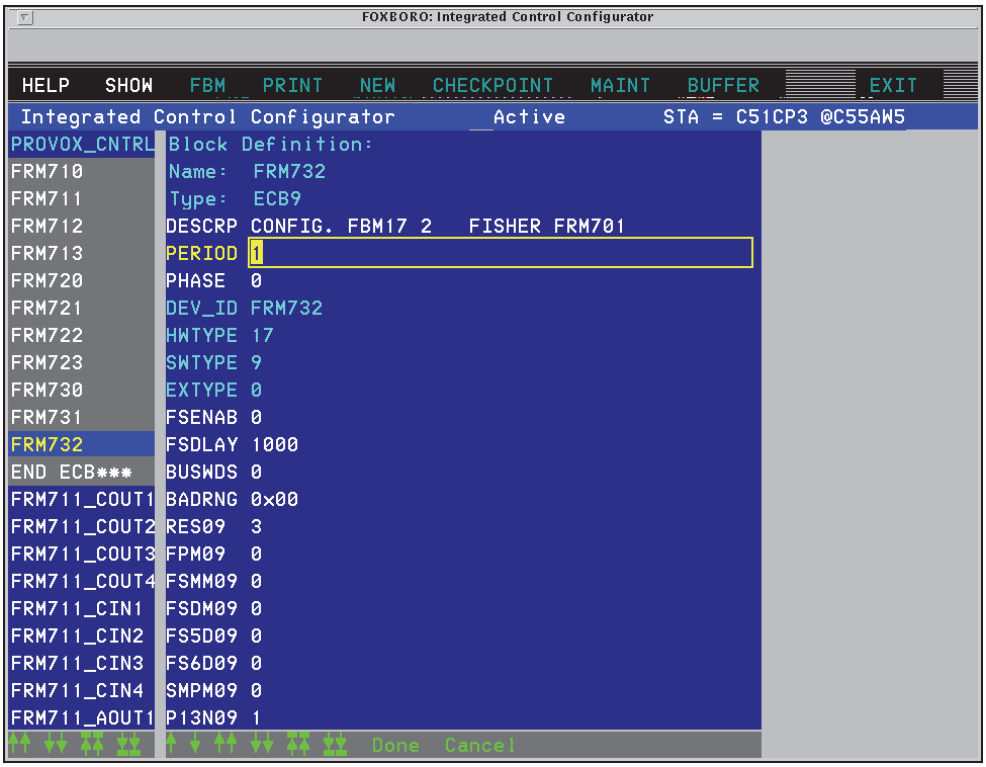



**Figure 3-4. Configuring the Second FBM17 for an FRM701 Configurable Controller**

8. Referring to *Control Processor 270 (CP270) and Field Control Processor 280 (CP280) Integrated Control Software Concepts* (B0700AG), *Integrated Control Software Concepts* (B0193AW) (for CP60 or earlier), and *Integrated Control Block Descriptions* (B0193AX), configure the necessary compounds and blocks for the desired control scheme:
   - Refer to Figure 3-5 through Figure 3-8 for typical editing displays of AIN, AOUT, PID, and COUT blocks.
   - Refer to "Fail-Safe Operation" on page 29 for information on setting the fail-safe parameters.
   - Refer to Appendix B "I/O Connections" for mapping Fisher PROVOX I/O points to Foxboro Evo FBMs.

# On-Line Integrated Control Configuration

The On-line Integrated Control Configuration procedure is intended for use with a Foxboro Evo or I/A Series system using I/A Series software v4.0 or Control Core Services software v9.0 or higher. Refer to the appropriate document:

- ICC - *Integrated Control Configurator* (B0193AV) and associated Help files
- IACC - *I/A Series Configuration Component (IACC) User's Guide* (B0700FE)
- Control Editors - see *Block Configurator User's Guide* (B0750AH) and *Hardware Configuration User's Guide* (B0700BB).

Then configure the DCS Fieldbus Modules as you would equivalent FBM17s and FBM01s.

To perform on-line integrated control configuration, refer to *Integrated Control Configurator* (B0193AV) for details and proceed as follows:

1. Using the System Management displays accessible at an I/A Series or Control Core Services workstation, boot up the CP to which the DCS Fieldbus Module subsystem equipment is attached.

   This creates two compounds, deriving compound and block names from the station's letterbug (<*CPLBUG*>):
   - Station compound <*CPLBUG*>**_STA** containing the station block <*CPLBUG*>**_STA:STATION**
   - ECB compound <*CPLBUG*>**_ECB** containing the primary ECB <*CPLBUG*>**_ECB:PRIMARY_ECB**.
2. Change to the Process Engineer's environment and choose **Config > Control_Cfg.** to Open the Control Configurator.
3. Select the primary ECB (<*CPLBUG*>**_ECB:PRIMARY_ECB**) and set the MPOLL parameter to **0**.
4. Choose **New Block/ECB** to create ECBs for each FBM that represents the DCS Fieldbus Module.

   For example, for a module with the letterbug FRM720, create the ECBs shown in Table 3-3.

**Table 3-3. Sample ECBs Created During On-Line Configuration**

| Letterbug | FBM type | ECB Name | ECB Type | HWTYPE | SWTYPE |
|---|---|---|---|---|---|
| FRM720 | FBP10 | FRM720 | ECB47 | 52 | 57 |
| FRM721 | FBM17 (1) | FRM721 | ECB9 | 17 | 17 |
| FRM722 | FBM17 (2) | FRM722 | ECB9 | 17 | 17 |
| FRM723 | FBM01 | FRM723 | ECB1 | 1 | 1 |

For information on other ECB parameters, refer to *Integrated Control Block Descriptions* (B0193AX).

5. Access the editing display for the newly created FBM17s or FBM01 (see Figure 3-2 through Figure 3-4 for examples) and set the parameters.
6. Choose **Show** > **Legal FBM/ECB Combos**.

   The Integrated Control Configurator displays a window to the right of the editing display which provides ECB parameter information.
7. Referring to *Control Processor 270 (CP270) and Field Control Processor 280 (CP280) Integrated Control Software Concepts* (B0700AG), *Integrated Control Software Concepts* (B0193AW) (for CP60 or earlier), and *Integrated Control Block Descriptions* (B0193AX), configure the necessary compounds and blocks for the desired control scheme:
   - Figure 3-5 through Figure 3-9 show typical editing displays for AIN, AOUT, PID, MCIN, and MCOUT blocks.
   - For information on setting the fail-safe parameters, refer to “Fail-Safe Operation” on page 29.

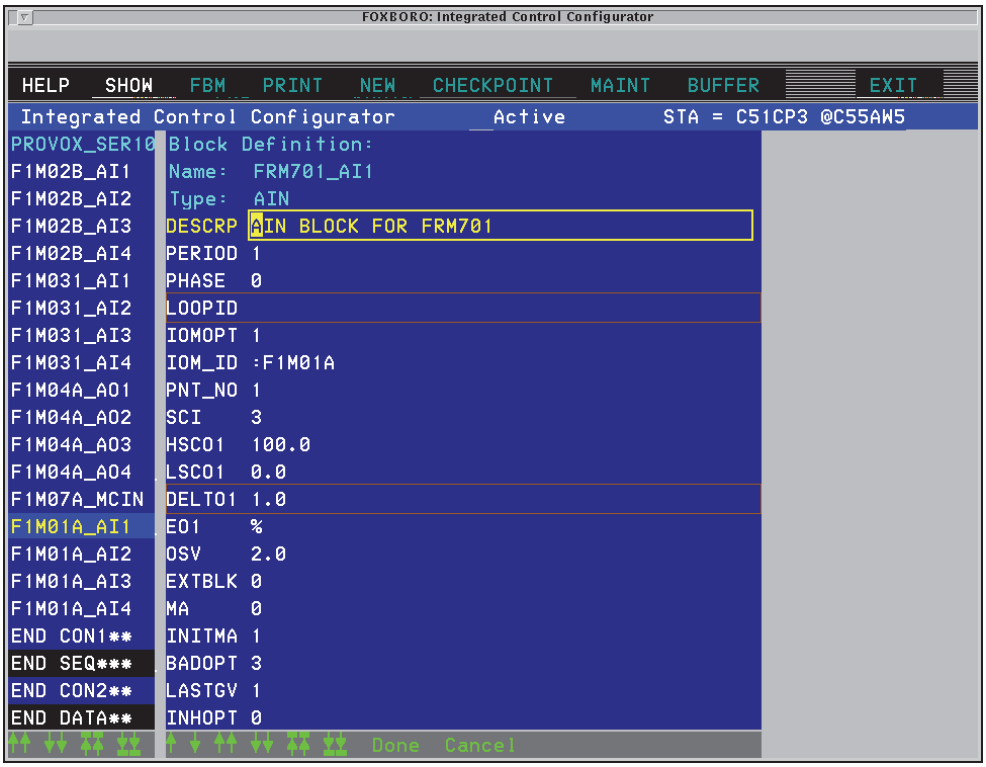



**Figure 3-5. Typical Editing Display for an AIN Block**

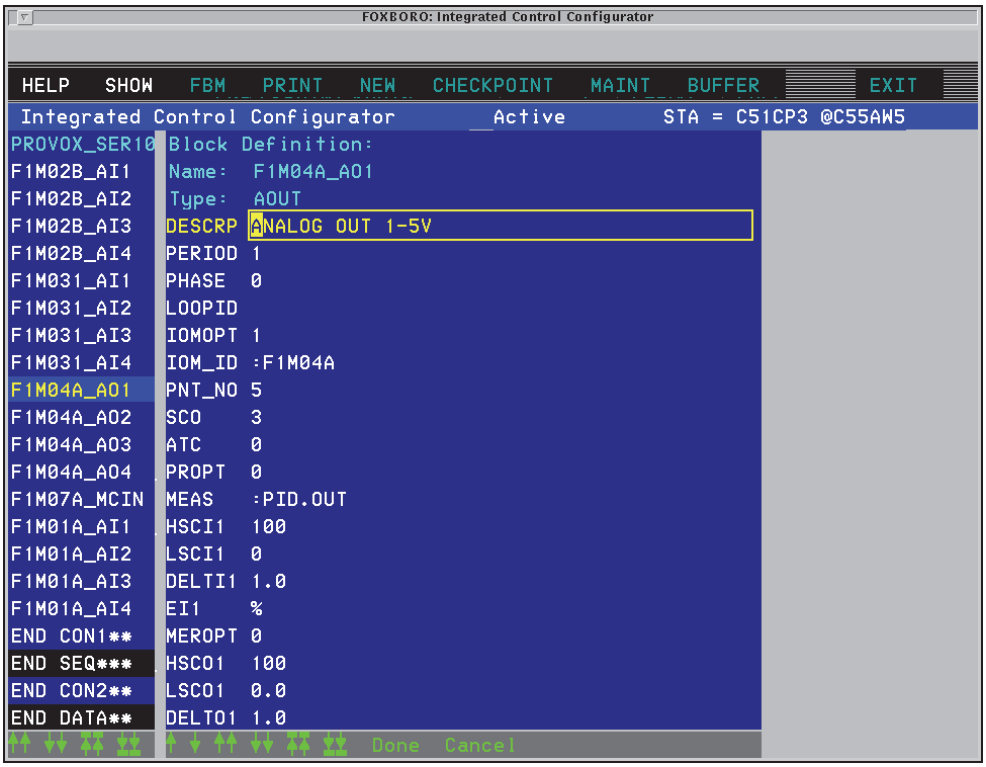



**Figure 3-6. Typical Editing Display for an AOUT Block**

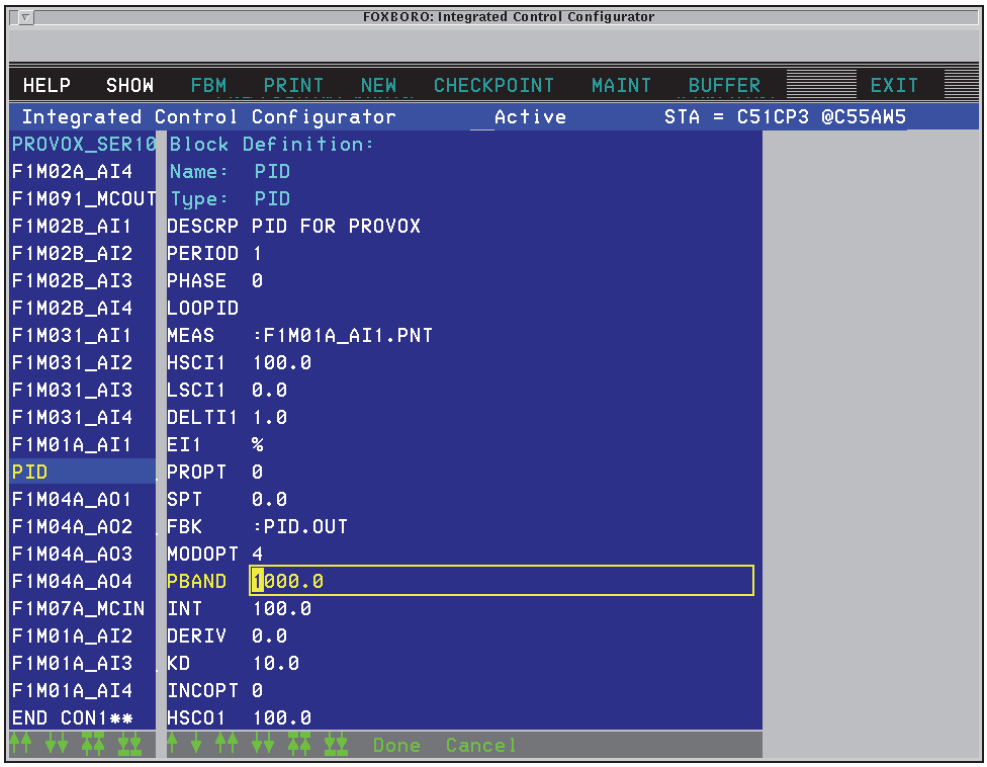



**Figure 3-7. Typical Editing Display for a PID Block**

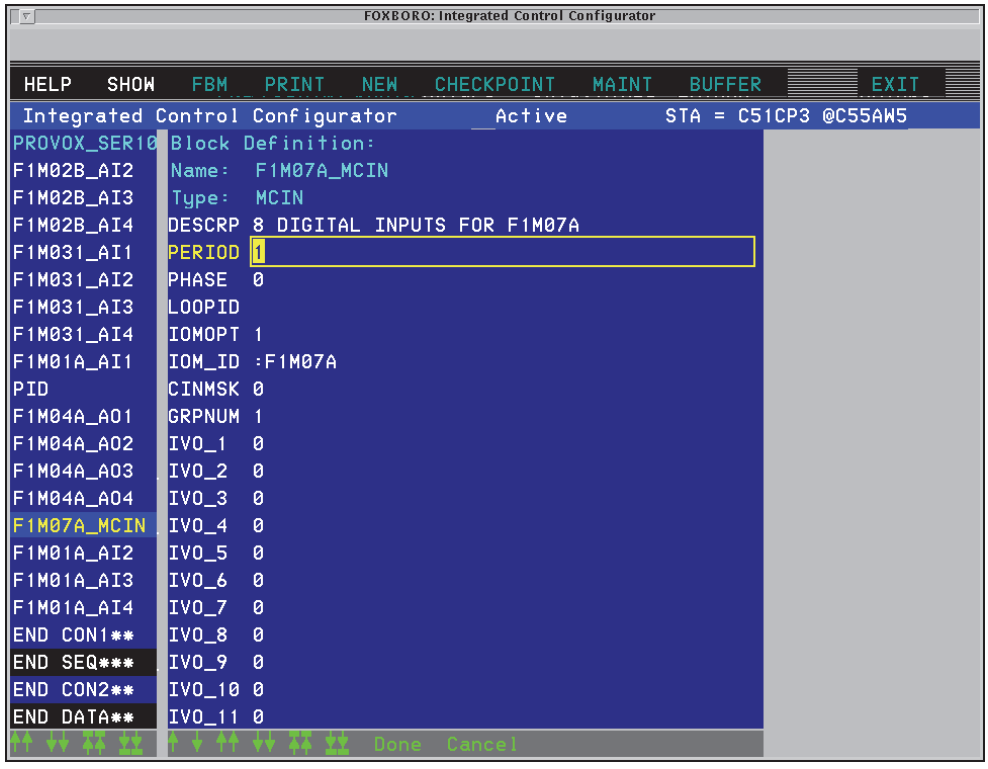



**Figure 3-8. Typical Editing Display for an MCIN Block**

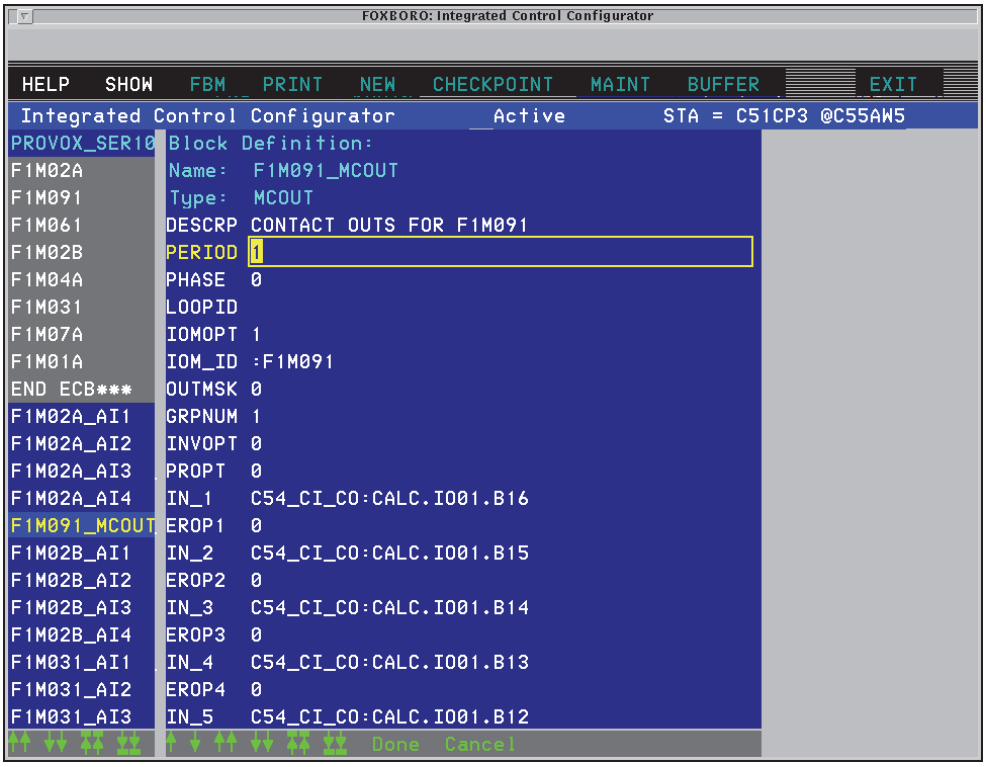



**Figure 3-9. Typical Editing Display for an MCOUT Block**

# Fail-Safe Operation

Fail-safe parameters in the controlling ECBs specify the outputs of the associated DCS Fieldbus Module in the event of a break in communication with the CP. All fail-safe operations are initiated by the DCS Fieldbus Module.

Each time the DCS Fieldbus Module receives a write request, it resets a fail-safe timer for its ECB. The DCS Fieldbus Module asserts a fail-safe condition for the ECB if it does not receive another output command within a specified time. The fail-safe condition can be either of the following:

- Hold Current Value – Holds the value sent in the most recent output command from the CP.
- Use Fallback Value – Uses a value specified for the output (specified in the ECB).

The ECBs for the DCS Fieldbus Modules include parameters for enabling and disabling fail-safe and for setting a fail-safe delay for the outputs. These parameters are downloaded to the DCS Fieldbus Module's database from the CP each time the subsystem is initialized or reconfigured, and each time you execute a download command from the System Management display. If fail-safe is enabled for a specific output, the DCS Fieldbus Module asserts fail-safe actions.

When normal operation resumes, the current output values are read by the CP and stored in the ECBs. These values in turn are used by the I/O blocks as the starting point for new output commands.

# Fail-Safe Functionality

What the DCS Fieldbus Module does during various failed conditions is dependent upon the configuration of several fail-safe parameters, as well as the type of failure. Two basic types of DCS Fieldbus Module failures can occur:

- Conditions that cause the DCS Fieldbus Module to fail, such as DCS OFF-LINE, DCS DOWNLOAD, or DCS EEPROM UPDATE
- Loss of communications (COMM FAIL).

## *Fail-Safe for Type 1 Failures – DCS Fieldbus Module FAIL*

Two parameters, fail-safe mask (FSMM1) and fail-safe data (FSD0n), determine what action the DCS Fieldbus Module takes when a Type 1 failure occurs. FSMM1, configured for a particular output, determines what state is asserted at the output, Fallback Value or Hold Current Value. The default setting of the fail-safe mask parameter is zero to assert the fallback values. The mask can be set so that some outputs hold while others fall back. FSD0n, also configured for a particular output, determines the fallback value. The default value for analog outputs is zero, and the default value for digital values is false.

## *Fail-Safe for Type 2 Failures – COMM FAIL*

In addition to the fail-safe mask and fail-safe data parameters, there are two other parameters, FSENAB and FSDLAY, that affect the DCS Fieldbus Module's response to communications failures. FSENAB determines whether the output simply holds (FSENAB = 0) its output value during the communications failure until the communications failure ceases, or if it delays fail-safe action (FSENAB = 1) for the time specified by FSDLAY, and then responds in the same way as Type 1 failures.

# Fail-Safe Examples

The following examples are fail-safe operations for an analog type I/O ECB with two outputs. The operation is performed for the first output point, which is point number 1. An AOUT block is used, and the output is driven at a value of 75% of full scale. The Fallback Value is configured to be 25% of full scale (FSD01 = 16000). FSDLAY is set to 1000, which is equal to a delay time of 10 seconds.

Example 1: FSENAB = 0 and FSMM1 = 0X00

**a.** Cause: Type 1 failure.
Result: Output immediately goes to 25%.

**b.** Cause: Type 2 failure.
Result: Output holds at 75%.

Example 2: FSENAB = 0 and FSMM1 = 0X10

**a.** Cause: Type 1 failure.
Result: Output holds at 75%.

**b.** Cause: Type 2 failure.
Result: Output holds at 75%.

Example 3: FSENAB = 1 and FSMM1 = 0X00

**a.** Cause: Type 1 failure.
Result: Output immediately goes to 25%.

**b.** Cause: Type 2 failure.
Result: Output holds at 75% for 10 seconds, then goes to 25%.

Example 4: FSENAB = 1 and FSMM1 = 0X10

**a.** Cause: Type 1 failure.
Result: Output holds at 75%.

**b.** Cause: Type 2 failure
Result: Output holds at 75% for 10 seconds, then continues to hold at 75%.

# 4. Equipment Installation

*This chapter describes procedures for installing the DCS Fieldbus Module subsystem.*

Installation of a DCS Fieldbus Module subsystem involves removal of the Fisher PROVOX power cards and controllers, and the following steps:

- Connecting Fieldbus cables at the Foxboro Evo control station
- Making Fieldbus cable connections at the equipment rack
- Plugging in the letterbug module identifiers on the DCS Fieldbus Modules
- Installing FRSFBI Fieldbus Isolators and FRSFBE Fieldbus Extenders in the PROVOX power card slots, and connecting the modules to Fieldbus
- Plugging the DCS Fieldbus Modules into the Fisher PROVOX backplane
- Booting up the DCS Fieldbus Module subsystem and downloading the module image and control database.

## Pre-Installation Requirements

Before starting the actual equipment installation:

1. Perform the System Configuration for the new DCS Fieldbus Module subsystem (refer to "System Configuration" on page 17).
2. Perform the Integrated Control Configuration for the new DCS Fieldbus Module subsystem (refer to "System Configuration" on page 17).
3. Determine the letterbugs that identify the DCS Fieldbus Modules.

   Refer to "Letterbug Assignments" on page 18 and the configuration reports.
4. Perform an orderly shutdown of the process associated with the equipment to be modified, and remove ac power from the equipment racks.

## Fieldbus Cabling at the CP30 or CP40

Fieldbus cable installation involves the use of Termination Cable Assemblies (TCAs) and twinaxial cable to provide connection between the CP30/40 and the FRSFBI Fieldbus Isolators. For a Control Processor based subsystem, three Fieldbus cabling configurations are possible at the CP30/40:

- Non-fault-tolerant CP30/40 and single Fieldbus channel (Figure 4-2)
- Non-fault-tolerant CP30/40 and redundant Fieldbus (Figure 4-3)
- Fault-tolerant CP30/40 and redundant Fieldbus (Figure 4-4).

**NOTE**

For simplicity, only Fieldbus connections for the CP30/40-based configurations are shown here. Fieldbus connections for other Foxboro stations are similar, except for connections to the CP60. For Fieldbus connections to the CP60, refer to "Fieldbus Cabling at the CP60" on page 36.

To make the Fieldbus cable connections at the CP:

1. For each Fieldbus channel:
   a. Assemble the termination block associated with the CP TCA.
   b. Snap the block onto the mounting DIN rail in the Foxboro Evo rack.
   c. Connect the earth wire (Figure 4-1).

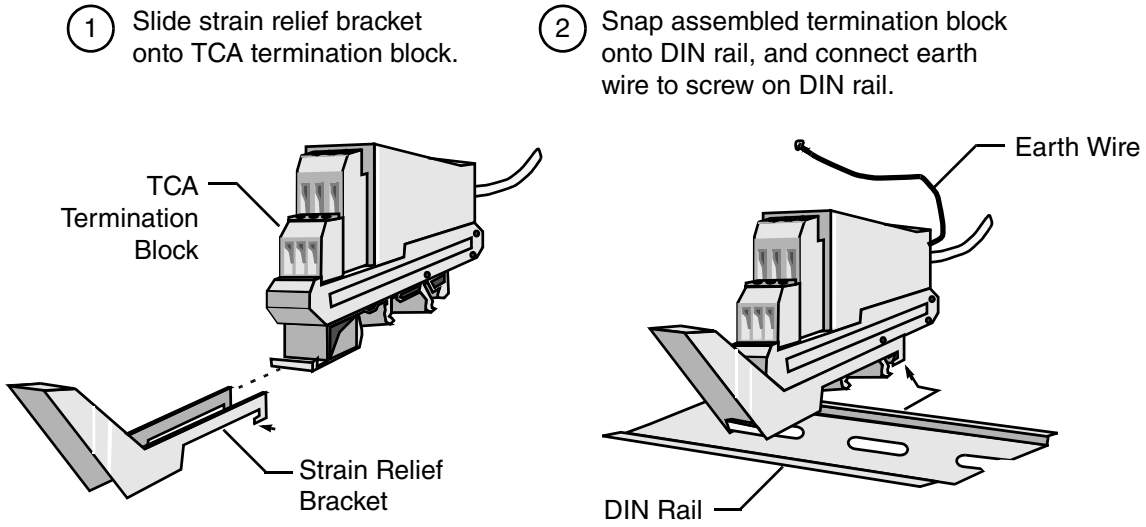



**Figure 4-1. TCA Termination Block Assembly and Mounting**

2. Connect the Fieldbus cable to the TCA as shown in Figure 4-2, Figure 4-3, or Figure 4-4.
3. Add the termination resistor supplied with each TCA, as shown in Figure 4-2, Figure 4-3, or Figure 4-4, if the resistor is not already in place.

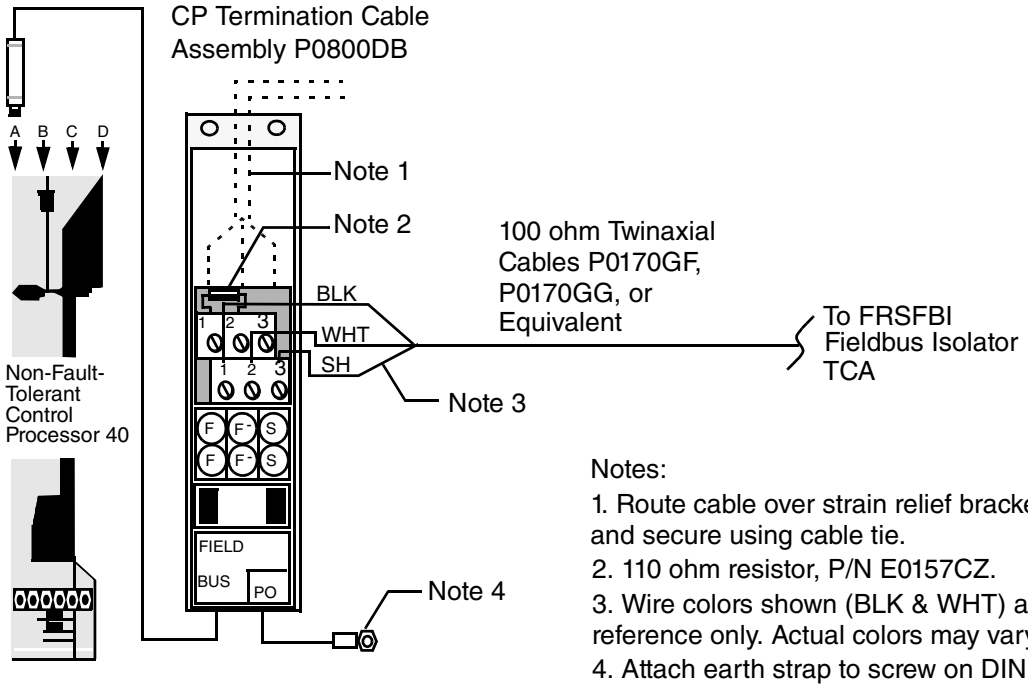



**Figure 4-2. Connecting a Non-Fault-Tolerant CP40 and a Single-Channel Fieldbus Cable**

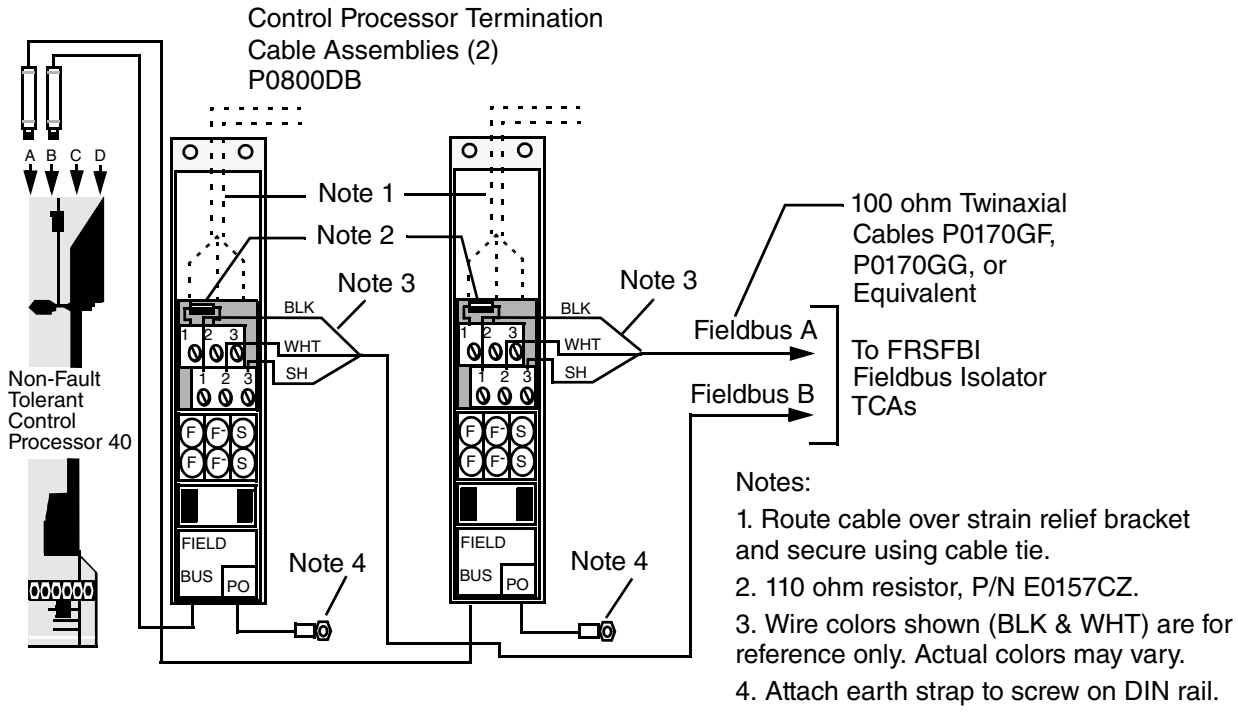



**Figure 4-3. Connecting a Non-Fault-Tolerant CP40 and Redundant Fieldbus Cables**

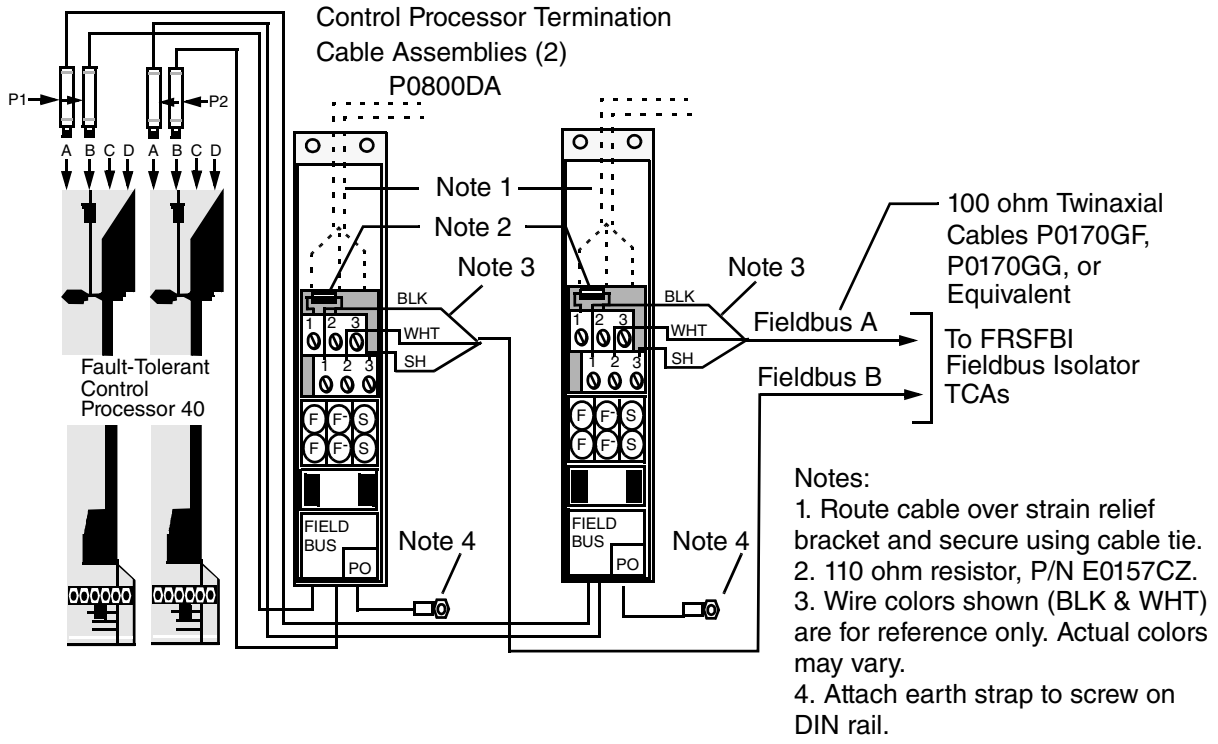
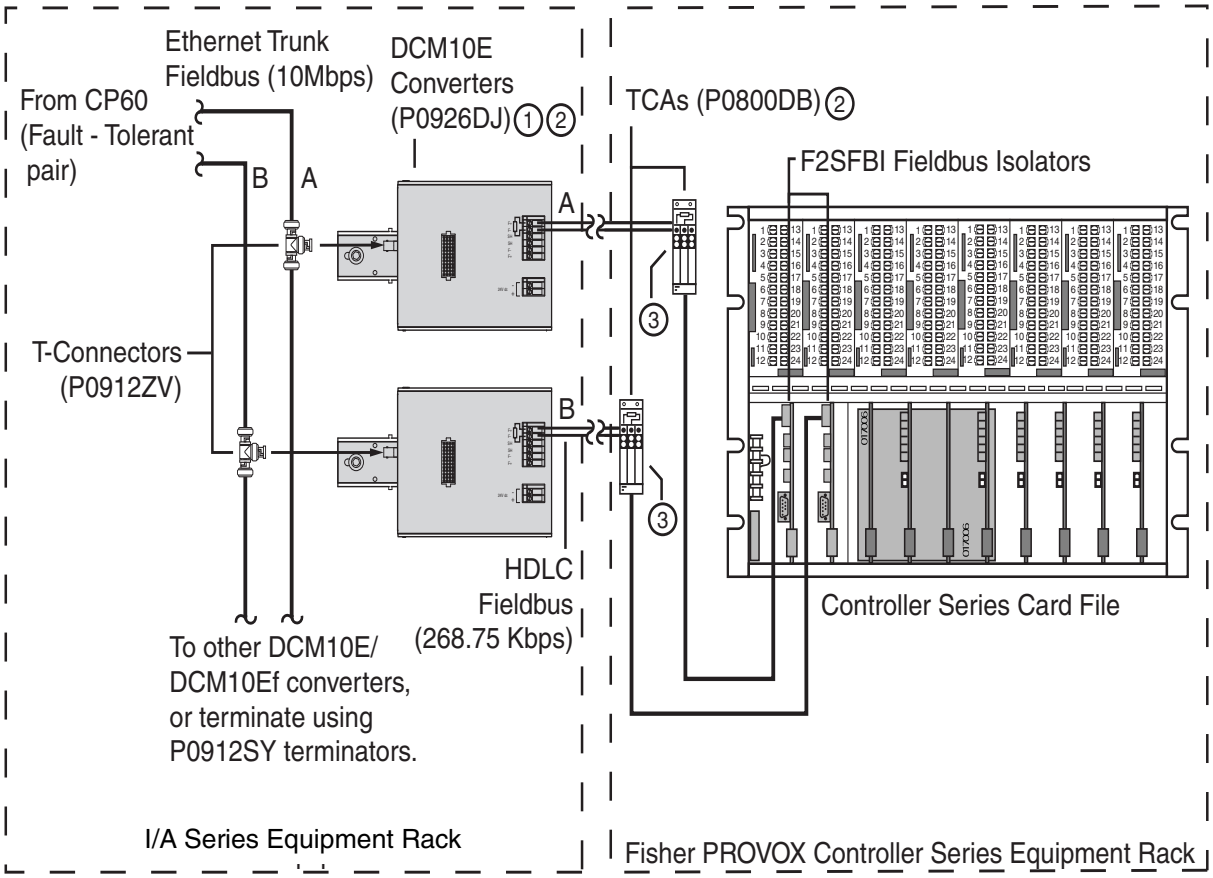



**Figure 4-4. Connecting a Fault-Tolerant CP40 and Redundant Fieldbus Cables**

# Fieldbus Cabling at the CP60

Interfacing of the upgraded Fisher PROVOX Controller Series system to the CP60 (via the Fieldbus) is accomplished using DCM10E or DCM10Ef converters, as shown in Figure 4-5. For detailed information on making the cable connections, refer to *Control Processor 60 and Control Processor 60S Installation and Maintenance* (B0400FB).




① A configuration using DCM10Ef converters (P0926DP) is similar, but with the Ethernet Trunk fiber optic cables connecting to the ST-type connectors on the units.

② Terminating resistors, included with the DCM10E/DCM10Ef converters and the corresponding TCAs, are used only if these devices exist at the ends of the Fieldbus run.

③ If the TCAs are the last TCAs in the Fieldbus run, the Fieldbus shields must be connected to the earth bus bar in the equipment rack (which, in turn, must be connected to solid earth ground). Check to ensure that these connections are in place.

**Figure 4-5. Fieldbus Cabling to the CP60 (Typical)**

# Fieldbus Cabling at the FCP280

Cabling an FCP280 baseplate to the Fieldbus Isolators (FRSFBIs) consists of extending the remote 268 Kbps fieldbus from the isolators (see Figure 4-6). This extension, used between enclosures, involves the use of termination cable assemblies (TCAs) and twinaxial cable to provide cable connections between primary and extended fieldbus segments, for a maximum fieldbus length of 1 Km (3200 ft). If the fieldbus is non-redundant, only one TCA is connected to the FCP280 baseplate.

The Fieldbus splitter (part number RH928CV) consists of a connector for any Fieldbus port on the FCP280 baseplate, and a TCA termination block similar to two of the P0903VY termination assemblies connected together. It has a 3 m (9.8 ft) cable between the connector and the block. The termination blocks on the splitter's TCAs each include a strain relief bracket, nylon cable tie, and labels for bus A and B. You must install the label to the termination block on each TCA. Refer to "Fieldbus Splitter (RH928CV)" in *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA) and *Field Control Processor 280 (FCP280) User's Guide* (B0700FW) for details.

**NOTE**

The Fieldbus splitter (RH928CV) is used instead of the two legacy TCAs (P0903VY) and the Extended Fieldbus Splitter/Terminator (P0926LC), which are used with legacy control processors for their twinaxial cabling.

Before starting this procedure, plan which Fieldbus port on the FCP280 baseplate you will connect the TCA cable to. The FCP280 considers the DCS Fieldbus Modules as 100 Series FBMs (an FBP10, two FBM17s, and one FBM01), so it must connect to the FRSFBIs from a Fieldbus port on the FCP280 baseplate which is dedicated to 268 Kbps HDLC fieldbus connections. Each fieldbus port on the FCP280 baseplate may connect to either 100 Series or 200 Series modules exclusively - not both.

You can mount the FCP280 module(s) on either the two-position, vertical standard 200 Series baseplate (RH924YF) or the two-position, horizontal standard 200 Series baseplate (RH924YL). For FCP280 baseplate mounting procedures, refer to *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA). For FCP280 installation procedures, refer to *Field Control Processor 280 (FCP280) User's Guide* (B0700FW).

To connect an FCP280 baseplate to the Fieldbus Isolator TCAs, proceed as follows:

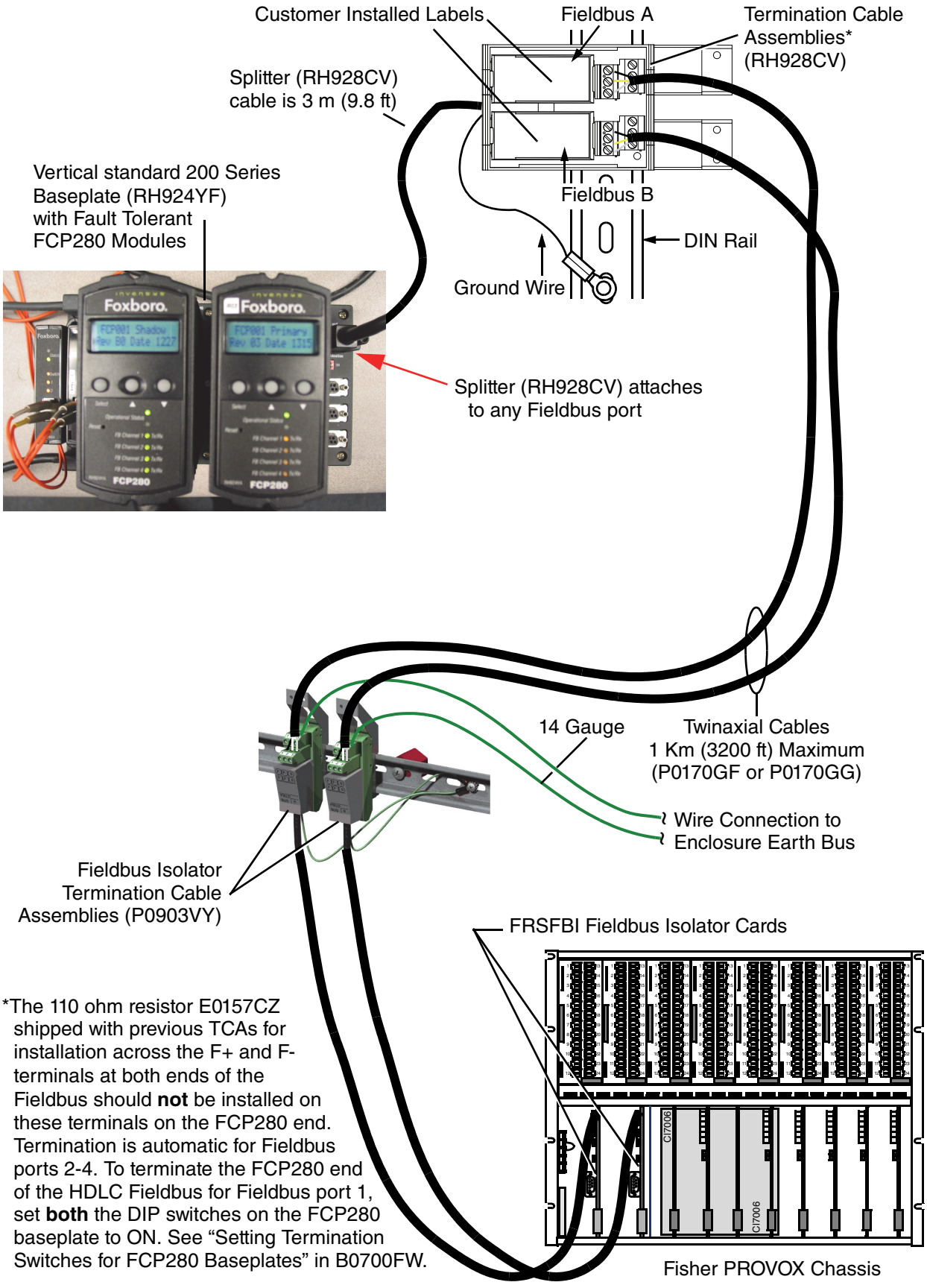
1. Referring to Figure 4-7 on page 41, assemble the termination blocks on the termination cable assembly end of the RH928CV splitter (RH928CV). Snap them onto the mounting rails (DIN rails) in the enclosure, and connect the ground wires. (For future reference, Figure 4-8 illustrates how to remove the TCA termination blocks.)

**NOTE**

If you intend to use an FBI200 to extend the twinaxial cabling to the Fieldbus Isolator TCA from the FCP280 baseplate, refer to *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA) for site planning and installation instructions.

2. Connect the splitter (RH928CV) to the appropriate port on the FCP280 baseplate. The splitter includes both a plug for the Fieldbus port and the TCA termination block which you installed in the previous step (see Figure 4-6). Refer to "Fieldbus Splitter (RH928CV)" in *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA) for instructions on how to make this connection.
   If you are upgrading a legacy control processor with an FCP280 and the site has two P0903VY TCAs on it, be sure to remove the P0903VY TCA termination blocks before installing the splitter, as explained in Figure 4-8.

   Finish making the cable connection(s) to the fieldbus splitter/terminator or fieldbus splitter as shown in Figure 4-6.
3. Make the fieldbus cable connections between termination cable assemblies (see Figure 4-9 on page 42).
4. Terminate the HDLC fieldbus according to the following rules:
   - Terminating resistors are used only at the Fieldbus isolator TCA end of the bus. Add the terminating resistors (supplied with the termination cable assemblies) to the P0903VY termination cable assemblies as shown in Figure 4-6.
   - To terminate Fieldbus port 1 in the FCP280 baseplate end of the HDLC fieldbus (if needed), set **both** the termination DIP switches on the FCP280 baseplate to "ON", as described in "Setting Termination Switches for FCP280 Baseplates" in *Field Control Processor 280 (FCP280) User's Guide* (B0700FW).
     Fieldbus ports 2-4 in the FCP280 baseplate are terminated internally and do not require any external hardware for termination. No action is needed to terminate the FCP280 baseplate end of the HDLC fieldbus for Fieldbus ports 2-4.
   - The Fieldbus can be extended in two directions from the FCP280. (Refer to Figure 4-10 on page 43.)
5. Connect an insulated 14 AWG green wire between connection point 3 (shield) on the last Fieldbus Isolator termination cable assembly (or assemblies) and the earth bus in the enclosure. For Foxboro Evo system earthing requirements, refer to *Power, Earthing (Grounding), EMC and CE Compliance* (B0700AU).




*The 110 ohm resistor E0157CZ shipped with previous TCAs for installation across the F+ and F- terminals at both ends of the Fieldbus should **not** be installed on these terminals on the FCP280 end. Termination is automatic for Fieldbus ports 2-4. To terminate the FCP280 end of the HDLC Fieldbus for Fieldbus port 1, set **both** the DIP switches on the FCP280 baseplate to ON. See “Setting Termination Switches for FCP280 Baseplates” in B0700FW.

**Figure 4-6. Cabling Fieldbus Isolator Cards to an FCP280 Baseplate**

1. Slide strain relief bracket(s) onto TCA termination block. (RH928CV has two brackets, not shown.)
2. Snap assembled termination block onto DIN rail.
3. Connect ground wire to DIN rail using screw, lock washer and nut (customer supplied).

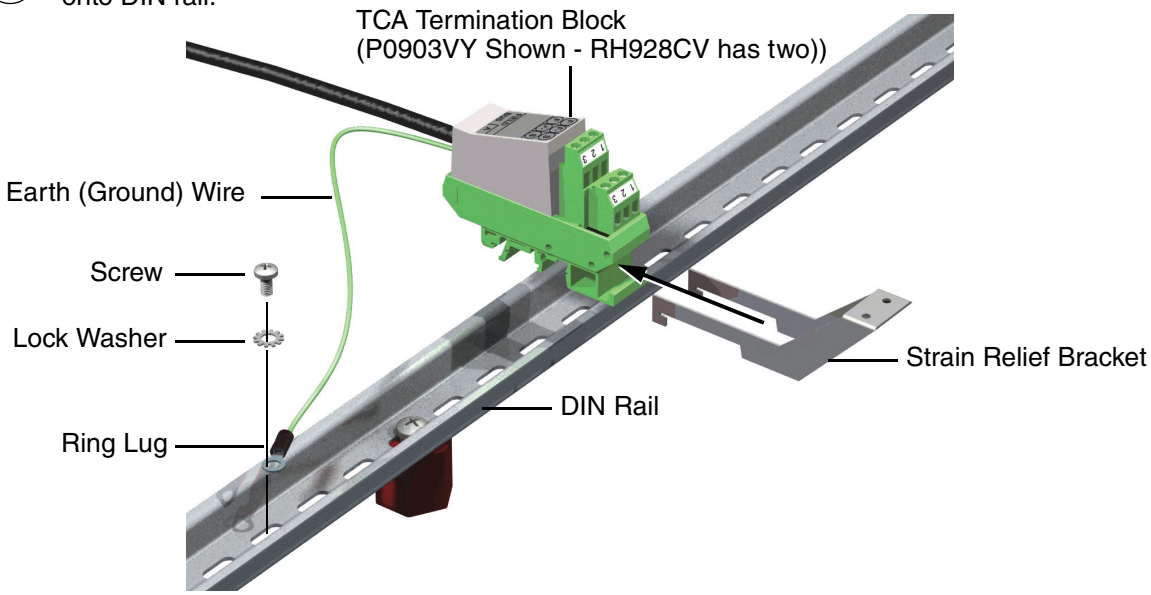



**Figure 4-7. TCA Termination Block Assembly Mounting**

1. Disconnect the earth wire from from the DIN rail.

2a. For each strain relief bracket, insert a medium-size flat-head screwdriver as shown.

2b. Move the screw drive handle in the direction shown, while lifting the TCA termination block from the DIN rail. For RH928CV, repeat for the other strain relief bracket.

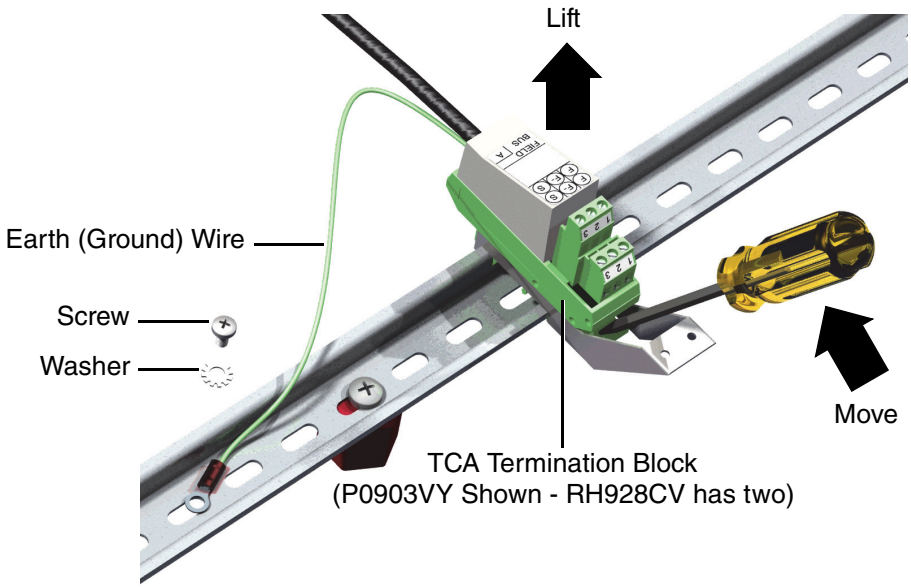
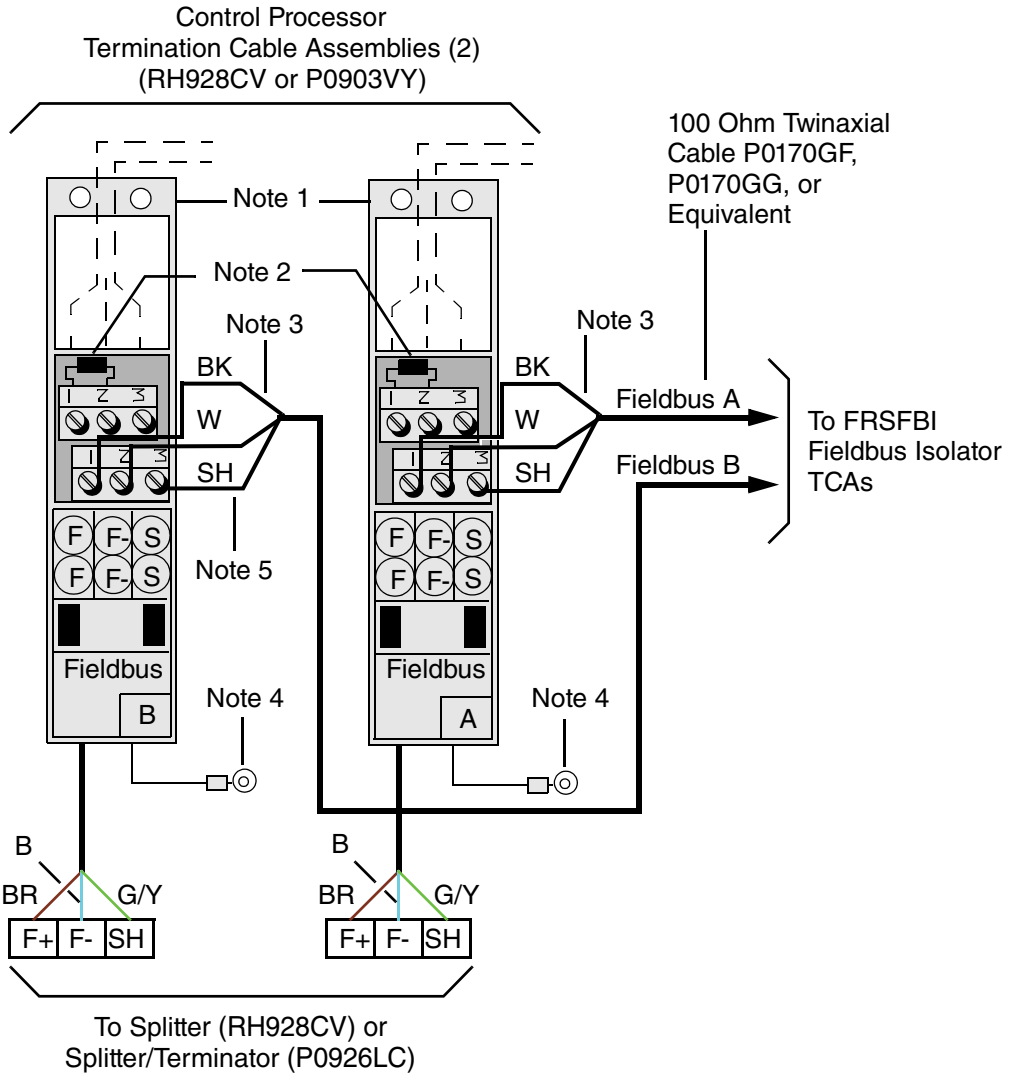



**Figure 4-8. TCA Termination Block Removal**




Notes:

1. For cable strain relief, it is recommended that the Fieldbus cable(s) be routed over the strain relief bracket and secured using nylon cables ties.
2. TCAs can be daisy chained as indicated by the dashed cable lines, but terminating resistors (110 ohms) must be installed on the Fieldbus Isolator TCA end of the fieldbus (not the FCP280 end). For the FCP280 end of the fieldbus, Fieldbus ports 2-4 are auto-terminated internally. Fieldbus port 1 is terminated with the DIP switches on the FCP280's baseplate as described in "Setting Termination Switches for FCP280 Baseplates" in *Field Control Processor 280 (FCP280) User's Guide* (B0700FW).
3. Wire colors shown (BK and W) are for reference purposes only.
4. Earth (ground) the surge protection network contained within the TCAs by attaching the green earth wire to a screw on the DIN rail connected to system earth. For more information on earthing, refer to *Power, Earthing (Grounding), EMC and CE Compliance* (B0700AU). Splitter (RH928CV) has only one green earth wire.
5. The shield of the twinaxial cable (terminal 3) should be earthed at the farthest end from the FCP280 baseplate. The fieldbus shield must be earthed at one end only. (See text for earthing instructions.)

**Figure 4-9. Remote Redundant Fieldbus Cabling (FCP280 End)**

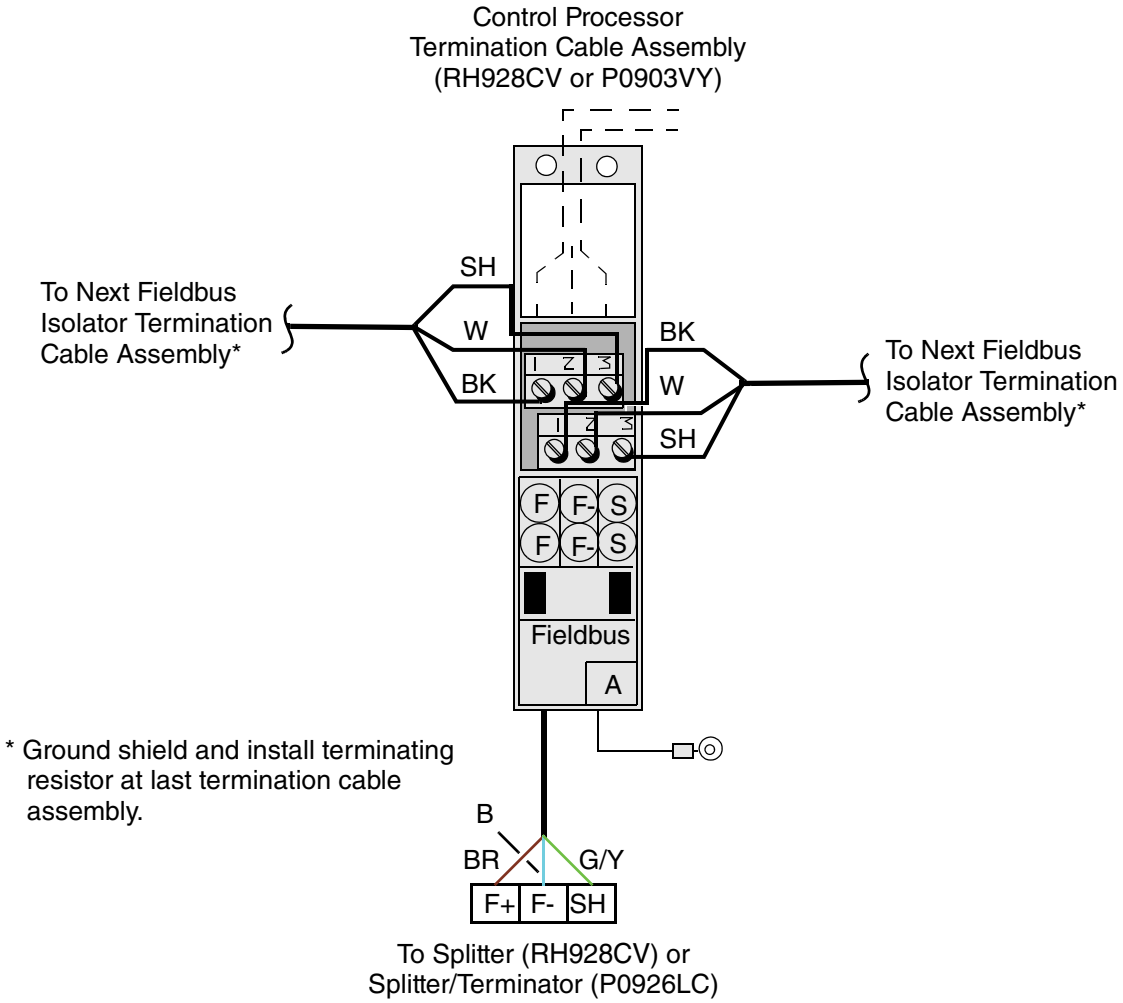



**Figure 4-10. Example of Extending Fieldbus in Two Directions from FCP280**

# Fieldbus Cabling at the FCP270

Cabling an FCP270 baseplate to the Fieldbus Isolators (FRSFBIs) consists of extending the remote 268 Kbps fieldbus from the isolators (see Figure 4-11). This extension, used between enclosures, involves the use of termination cable assemblies (TCAs) and twinaxial cable to provide cable connections between primary and extended fieldbus segments, for a maximum fieldbus length of 1 Km (3200 ft). If the fieldbus is non-redundant, only one TCA is connected to the fieldbus splitter/terminator (P0926LC) which is shown in Figure 4-12. TCA part number P0903VY includes a strain relief bracket, nylon cable tie, labels for bus A and B, and 110 ohm terminating resistor. You must install the label to the TCA.

You can mount the FCP270 module(s) on either the two-position, vertical standard 200 Series baseplate (P0926HW) or the two-position, horizontal standard 200 Series baseplate (P0926HC). For FCP270 baseplate mounting procedures, refer to *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA). For FCP270 installation procedures, refer to *Field Control Processor 270 (FCP270) User's Guide* (B0700AR).

To connect an FCP270 baseplate to the Fieldbus Isolator TCAs, proceed as follows:

1. Referring to Figure 4-13, assemble the termination blocks associated with the termination cable assemblies (P0903VY) for the FCP270 baseplate, snap them onto the mounting rails (DIN rails) in the enclosure, and connect the ground wires. (For future reference, Figure 4-14 illustrates how to remove the TCA termination blocks.)
2. Connect the fieldbus splitter/terminator (P0926LC) to the "Fieldbus and Time Strobe" connector on the FCP270 baseplate (see Figure 4-11).
3. Make the cable connection(s) to the fieldbus splitter/terminator as shown in Figure 4-12.
4. Make the fieldbus cable connections between termination cable assemblies (see Figure 4-15).
5. Add the terminating resistors (supplied with the termination cable assemblies) according to the following rules:
   - Terminating resistors are used only at the ends of the bus.
   - The Fieldbus can be extended in two directions from the FCP270. (Refer to Figure 4-16.)
6. Connect an insulated 14 AWG green wire between connection point 3 (shield) on the last Fieldbus Isolator termination cable assembly (or assemblies) and the earth bus in the enclosure. For Foxboro Evo system earthing requirements, refer to *Power, Earthing (Grounding), EMC and CE Compliance* (B0700AU).

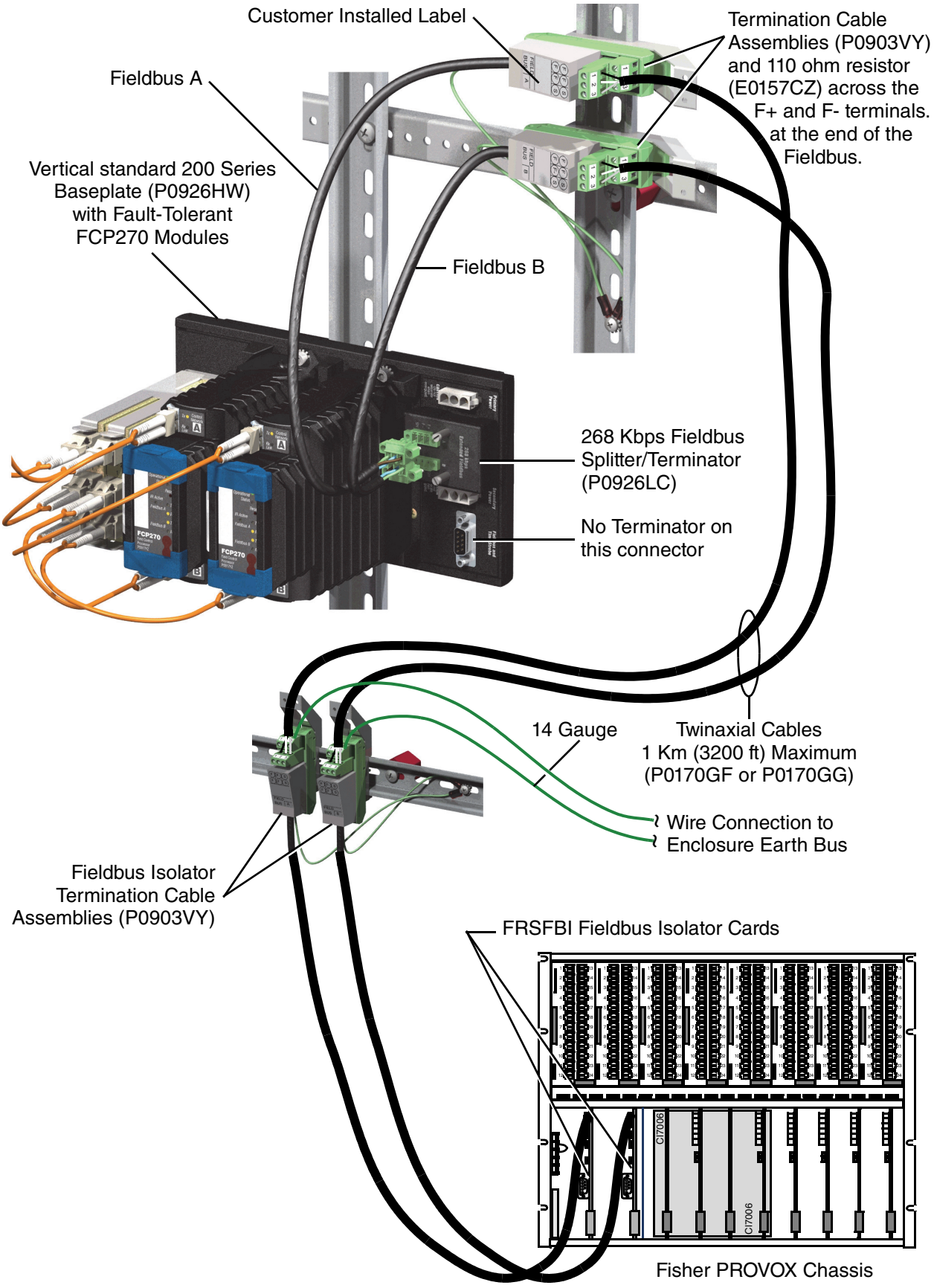



**Figure 4-11. Cabling Fieldbus Isolator Cards to an FCP270 Baseplate**

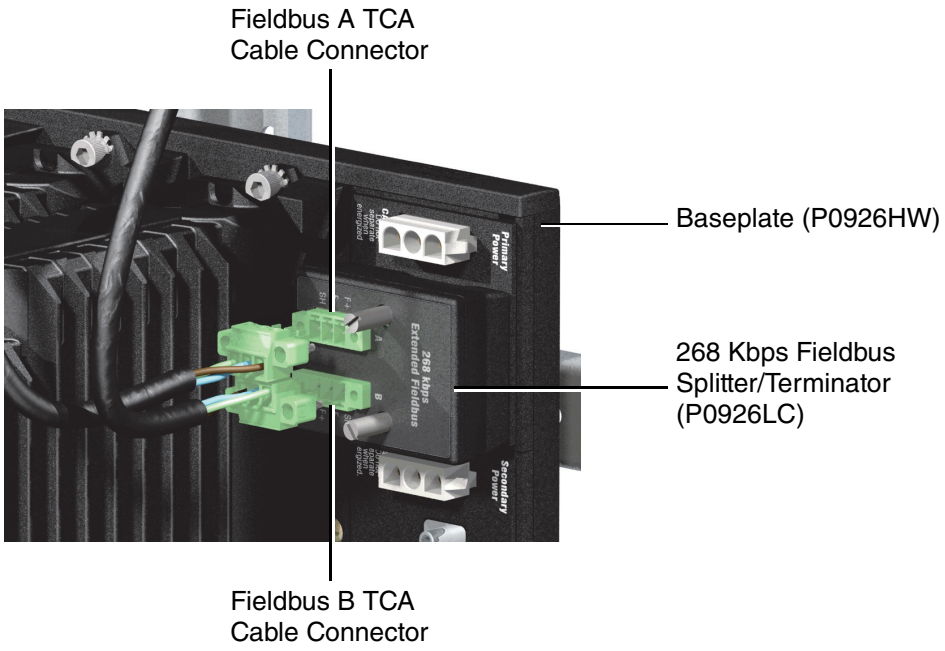



**Figure 4-12. TCA Cable Connection to 268 Kbps Fieldbus Splitter/Terminator**

1. Slide strain relief bracket onto TCA termination block.
2. Snap assembled termination block onto DIN rail.
3. Connect ground wire to DIN rail using screw, lock washer and nut (customer supplied).

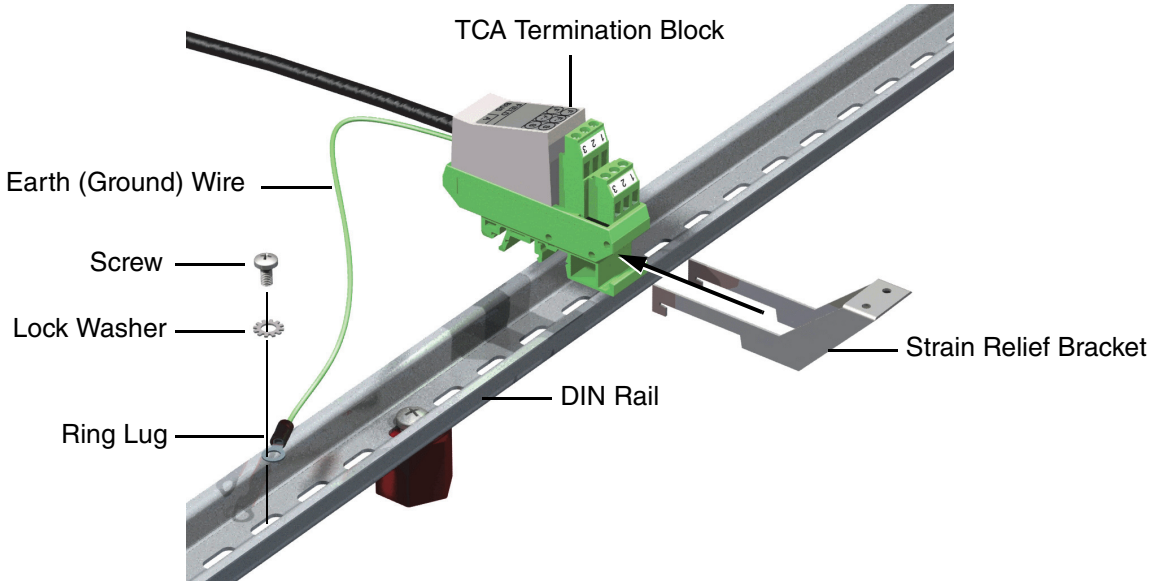



**Figure 4-13. TCA Termination Block Assembly Mounting**

1. Disconnect the earth wire from from the DIN rail.
2. Insert a medium-size flat-head screw driver as shown.
3. Move the screw drive handle in the direction shown, while lifting the TCA termination block from the DIN rail.

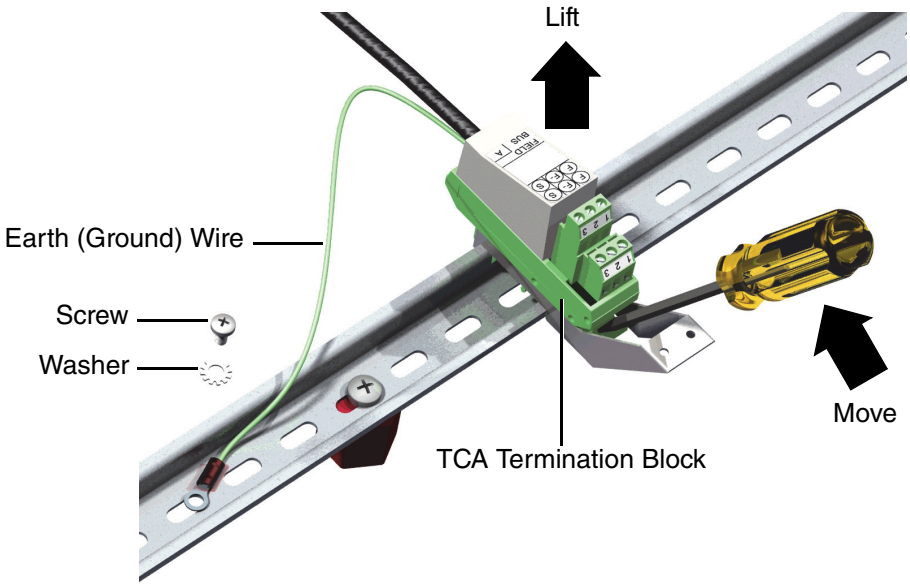
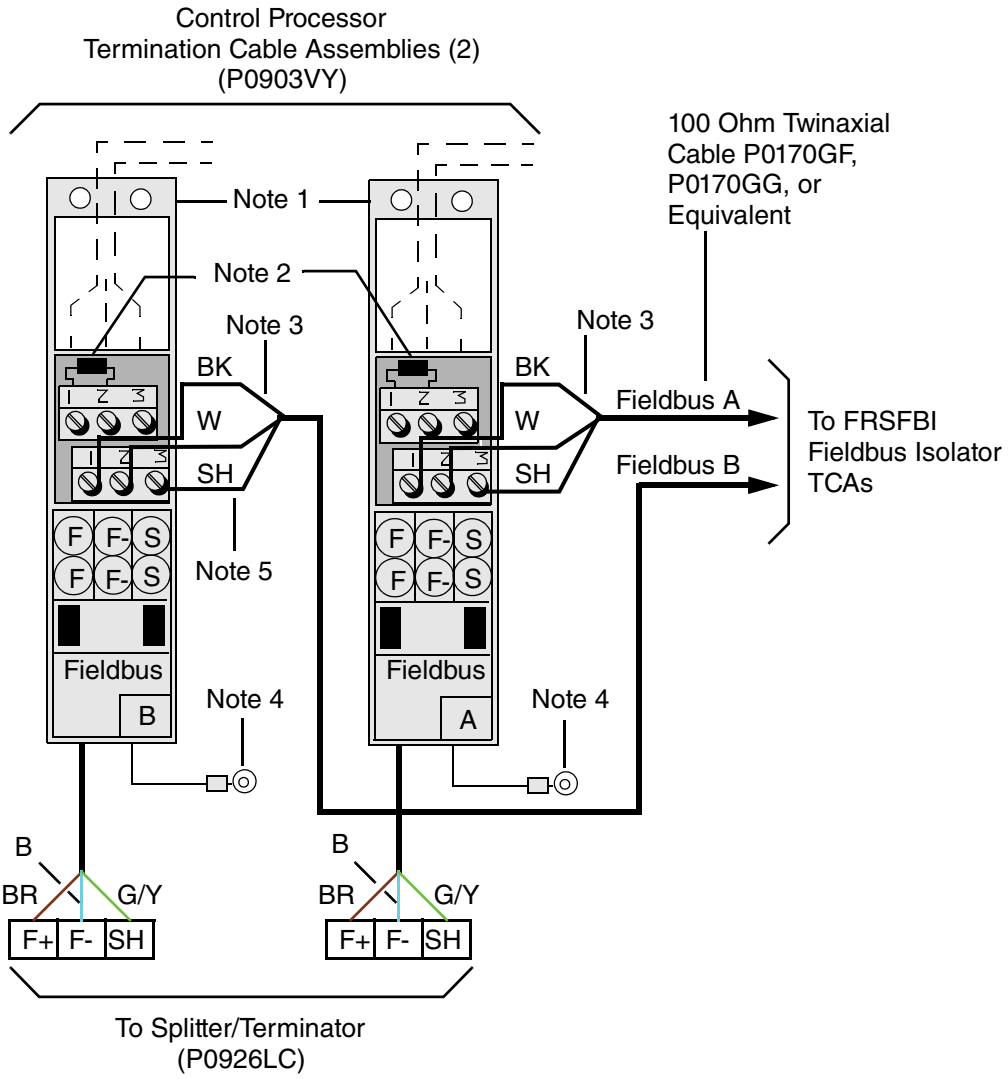



**Figure 4-14. TCA Termination Block Removal**




Notes:

1. For cable strain relief, it is recommended that the Fieldbus cable(s) be routed over the strain relief bracket and secured using nylon cables ties.
2. TCAs can be daisy chained as indicated by the dashed cable lines, but terminating resistors (110 ohms) must be installed at the ends of the fieldbus.
3. Wire colors shown (BK and W) are for reference purposes only.
4. Earth (ground) the surge protection network contained within the TCAs by attaching the green earth wire to a screw on the DIN rail connected to system earth. For more information on earthing, refer to *Power, Earthing (Grounding), EMC and CE Compliance* (B0700AU).
5. The shield of the twinaxial cable (terminal 3) should be earthed at the farthest end from the FCP270 baseplate. The fieldbus shield must be earthed at one end only. (See text for earthing instructions.)

**Figure 4-15. Remote Redundant Fieldbus Cabling (FCP270 End)**

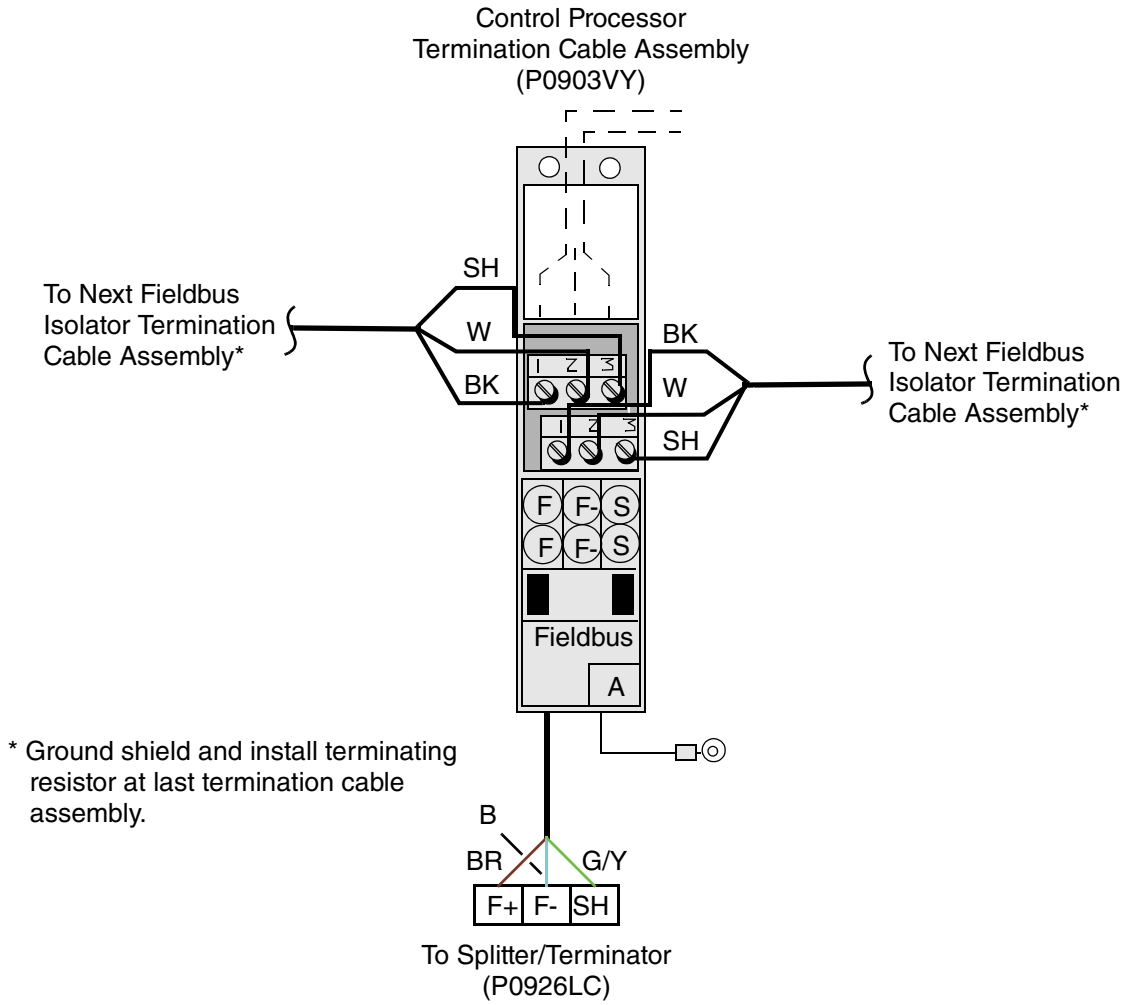



**Figure 4-16. Example of Extending Fieldbus in Two Directions from FCP270**

# Fieldbus Cabling at the ZCP270

**— NOTE**

Refer to Appendix F "ZCP270 Upgrade" for information regarding control processor upgrades from CP30, CP40, or CP60 to ZCP270. If upgrading from a CP60 to ZCP270, no special procedure is necessary.

Connections between a redundant ZCP270 to the Fieldbus Isolators (FRSFBIs) requires the following to facilitate communications:

- ZCP270 connects to a redundant pair of DIN rail mounted Fieldbus Communications Module 100Es (FCM100Es) via fiber optic cabling, either directly with standard LC to LC cables or indirectly via the Foxboro Evo Control Network (hereinafter referred to as the control network)
- The FCM100Es connect to the Fieldbus Isolators (FRSFBIs)

Cabling a FCM100E baseplate to the Fieldbus Isolators (FRSFBIs) consists of extending the remote 268 Kbps fieldbus from the isolators (see Figure 4-19). This extension, used between enclosures, involves the use of termination cable assemblies (TCAs) to provide cable connections between primary and extended fieldbus segments, for a maximum fieldbus length of 1830 m (6000 ft). If the fieldbus is non-redundant, only one TCA is connected to the fieldbus splitter/terminator (P0926LC) which is shown in Figure 4-20. TCA part number P0903VY includes a strain relief bracket, labels for bus A and B, and a 110 ohm terminating resistor (E0157CZ) which should be installed across the F+ and F- terminals at the end of the Fieldbus. You must install one of the labels on the TCA (see Figure 4-19 for label orientation)

You can mount the FCM100E module(s) on either the two-position, vertical standard 200 Series baseplate (P0926KE) or the two-position, horizontal standard 200 Series baseplate (P0926KH). For FCM100E installation procedures, refer to *Z-Module Control Processor 270 (ZCP270) User's Guide* (B0700AN).

## ZCP270 Direct Connection to FCM100E

**⚠ WARNING**

Prior to connecting the direct connect cables to the FCM100E, install the letterbug into the ZCP270. Refer to the *Letterbug Configurator User's Guide* (B0700AY).

Non-redundant or redundant FCM100Es can be connected directly to a ZCP270 through two splitter/combiners (on each for Bus A and Bus B).

Figure 4-17 shows a redundant FCM100E connection to a redundant ZCP270. Figure 4-18 shows how the connections are made. Use the cables listed in Table 4-1 to make the connections.

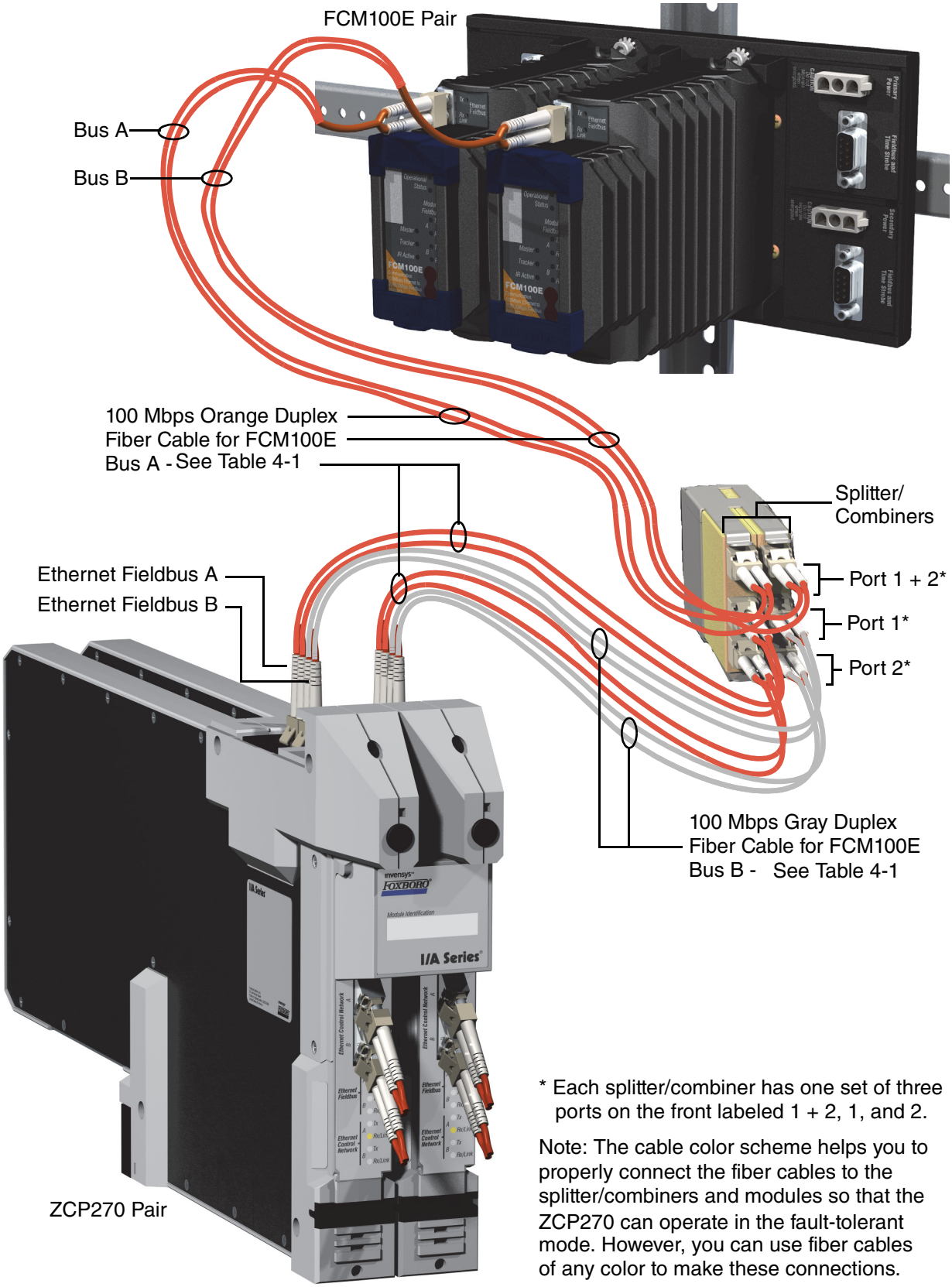



**Figure 4-17. FCM100E to Splitter/Combiner to ZCP270 Cabling - Direct Connection - Overview**

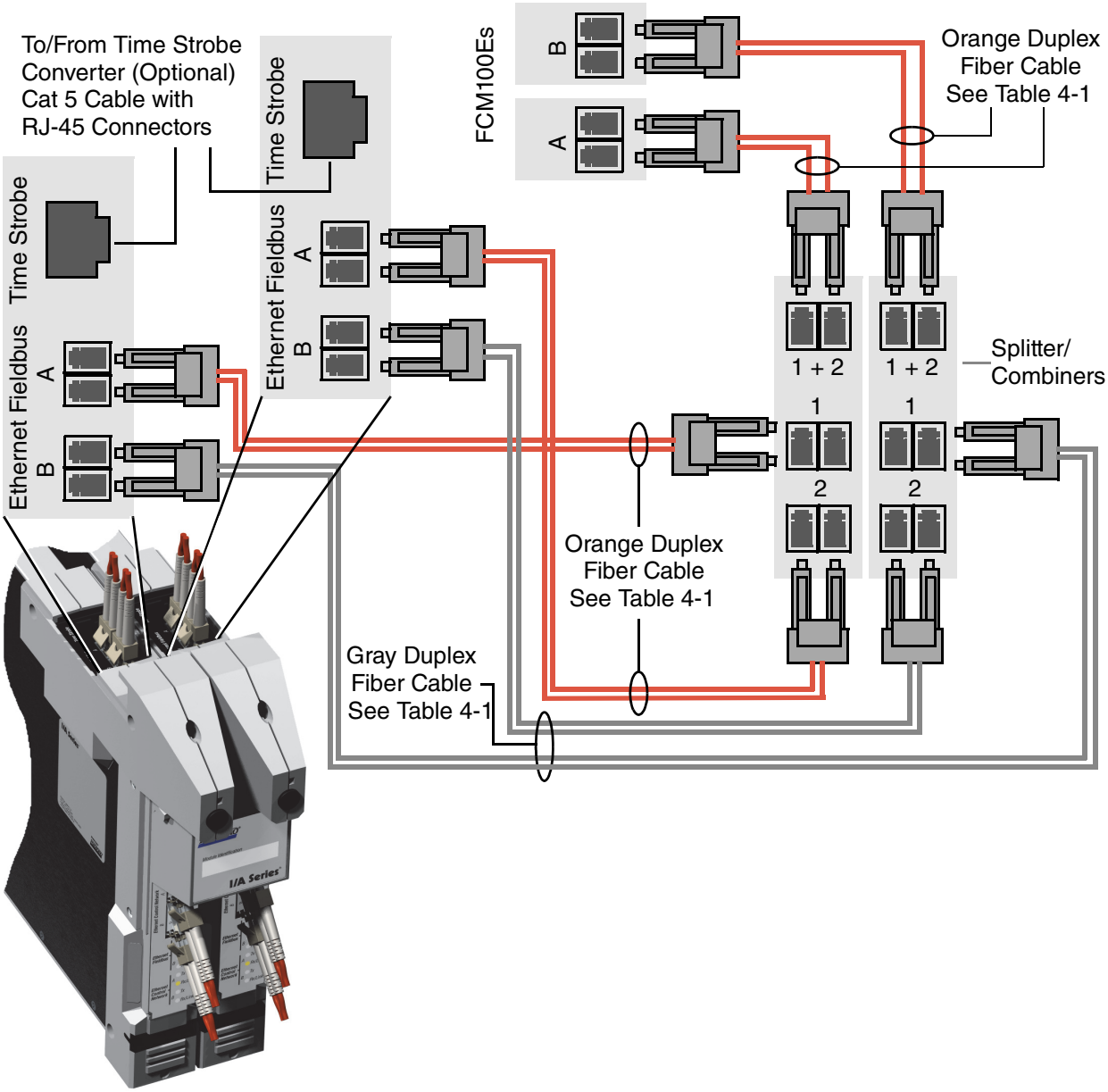



**Figure 4-18. FCM100E to Splitter/Combiner to ZCP270 Cabling - Direct Connection - Wiring**

**Table 4-1. Cables for Connections between the Splitter/Combiners and the FCM100E/ZCP270**

| Part Number | Length | Material | Use |
|---|---|---|---|
| P0972UN | 0.5 m (1.65 ft) | MMF 62.5/125 micron, gray riser. LC connectors on each end. | Fiber Optic Splitter mounted on DIN rail or shelf mounted to ZCP270. Recommended for use on the "B" network. |
| P0972VG | 0.5 m (1.65 ft) | MMF 62.5/125 micron, orange riser. LC connectors on each end. | Fiber Optic Splitter mounted on DIN rail or shelf mounted to ZCP270. Recommended for use on the "A" network. |
| P0972UJ | 1.0 m (3.3ft) | MMF 62.5/125 micron. LC connectors on each end. | Fiber Optic Splitter mounted on DIN rail or shelf mounted to ZCP270. |
| P0972TN | 3.0 m (9.9 ft) | MMF 62.5/125 micron. LC connectors on each end. | Fiber Optic Splitter mounted on DIN rail or shelf mounted to ZCP270. |
| P0972TP | 15 m (49.5 ft) | MMF 62.5/125 micron. LC connectors on each end. | Fiber Optic Splitter mounted on DIN rail or shelf mounted to FCM100E or ZCP270. |
| P0972TQ | 50 m (164 ft) | MMF 62.5/125 micron. LC connectors on each end. | Fiber Optic Splitter mounted on DIN rail or shelf mounted to FCM100E or ZCP270. |

After you have installed and cabled the FCM100E module, you need to assign their letterbugs through the infrared port using the Letterbug Configurator. For information on using this device and procedures for assigning letterbugs, see the *Letterbug Configurator User's Guide* (B0700AY).

## ZCP270 Connection to FCM100E via the Foxboro Evo Control Network

Refer to the "Installing a Single or Primary ZCP270 Module", "Cabling a Single (Non-Fault-Tolerant) ZCP270" and/or "Cabling a Fault-Tolerant ZCP270 Module Pair" sections in *Z-Module Control Processor 270 (ZCP270) User's Guide* (B0700AN) for instructions on connecting the ZCP270 to the control network.

Fiber optic connecting cables require a MTRJ connector on the Ethernet 100 Mbps switch and an LC connector on the FCM100E end. The maximum optical insertion loss though each connector must be equal to or less than 0.5 db. For the Ethernet equipment used in the control network, refer to *The MESH Control Network Architecture Guide* (B0700AZ).

After you have installed and cabled the FCM100E module, you need to assign their letterbugs through the infrared port using the Letterbug Configurator. For information on using this device and procedures for assigning letterbugs, see the *Letterbug Configurator User's Guide* (B0700AY).

## Cabling FCM100E Baseplate to Fieldbus Isolators (FRSFBIs)

Remote fieldbus extension cable connections are implemented as shown in Figure 4-19 and Figure 4-24.

To connect an FCM100E baseplate to the Fieldbus Isolators (FRSFBIs):

1. Referring to Figure 4-20, assemble the termination blocks associated with the termination cable assemblies (P0903VY) for the FCM100E Modular Baseplate, snap them onto the mounting rails (DIN rails) in the enclosure, and connect the ground wires. (For future reference, Figure 4-21 illustrates how to remove the TCA termination blocks.)
2. Connect the fieldbus splitter/terminator (P0926LC) to the "Fieldbus and Time Strobe" connector on the FCM100E baseplate (see Figure 4-19).
3. Make the cable connection(s) to the fieldbus splitter/terminator as shown in Figure 4-20.
4. Make the fieldbus cable connections between termination cable assemblies (see Figure 4-22).
5. Add the terminating resistors (supplied with the termination cable assemblies) according to the following rules:
   - Terminating resistors are used only at the ends of the bus.
   - The Fieldbus can be extended in two directions from the FCM100E. (Refer to Figure 4-24.)
6. Connect an insulated 14 AWG green wire between connection point 3 (shield) on the last Fieldbus Isolator termination cable assembly (or assemblies) and the earth bus in the enclosure. For Foxboro Evo system earthing requirements, refer to *Power, Earthing (Grounding), EMC and CE Compliance* (B0700AU).

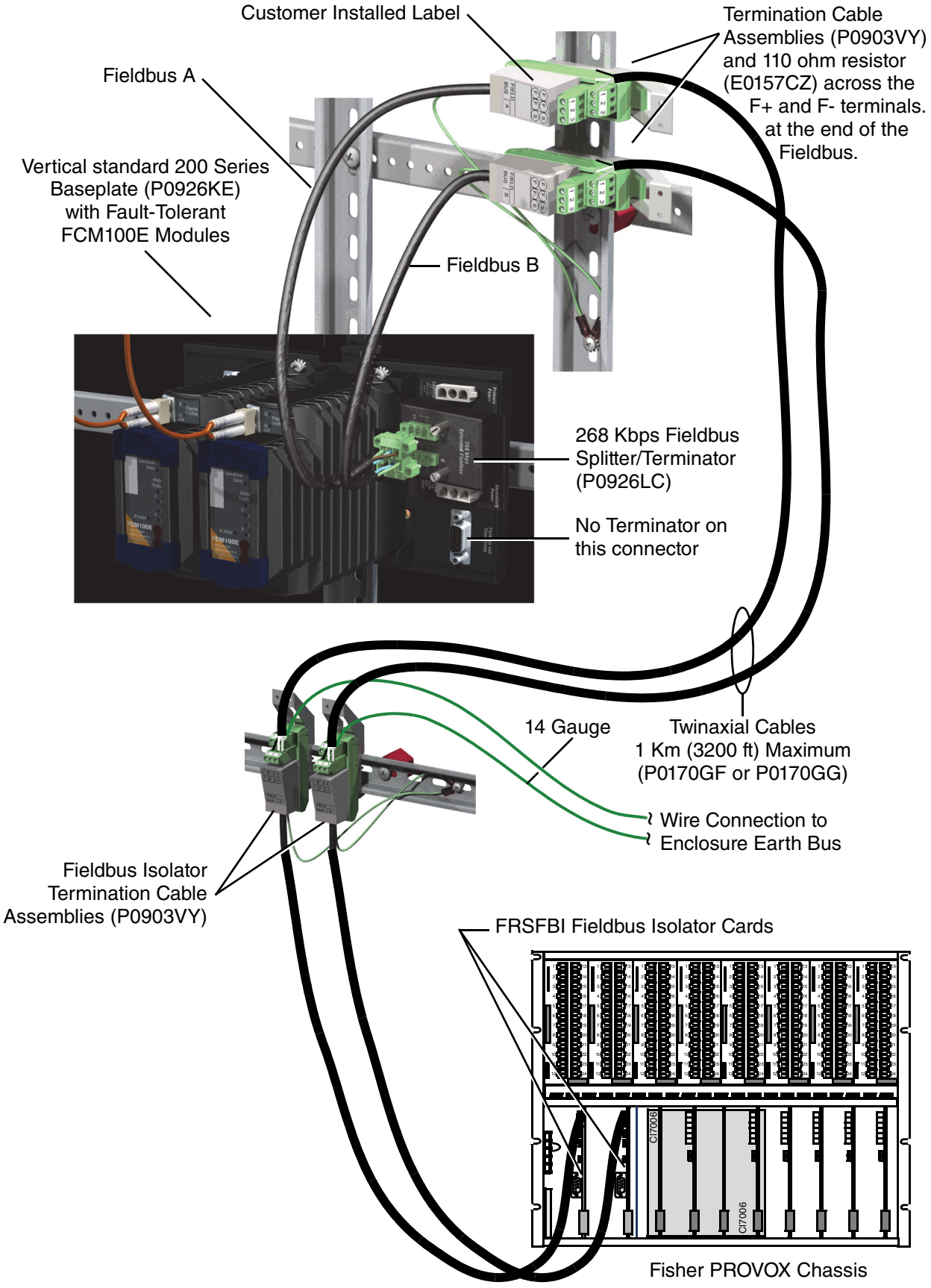



**Figure 4-19. Cabling Fieldbus Isolator Cards to an FCM100E Baseplate**

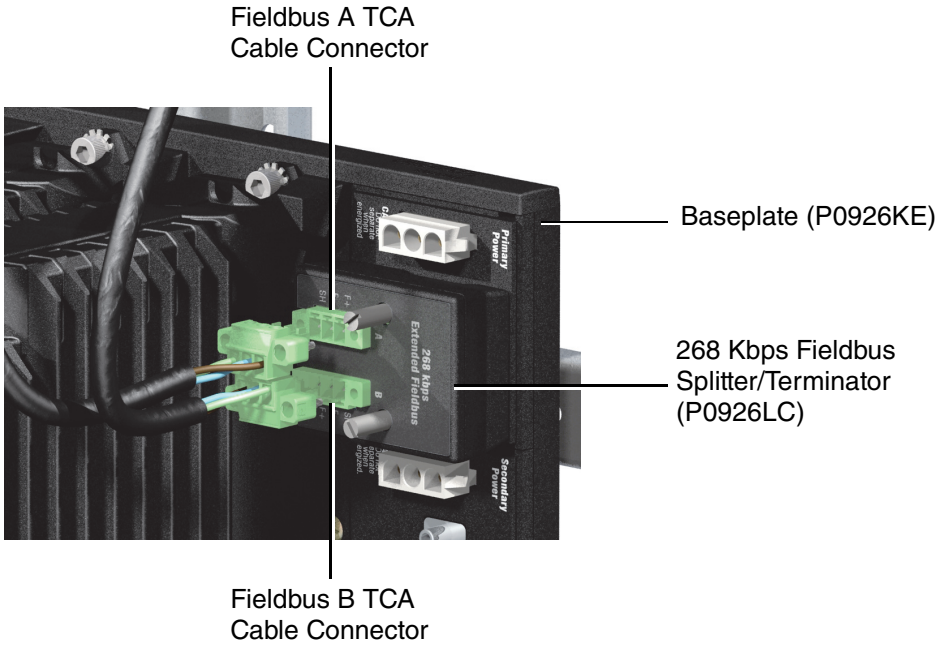



**Figure 4-20. TCA Cable Connection to 268 Kbps Fieldbus Splitter/Terminator**

1. Slide strain relief bracket onto TCA termination block.
2. Snap assembled termination block onto DIN rail.
3. Connect ground wire to DIN rail using screw, lock washer and nut (customer supplied).

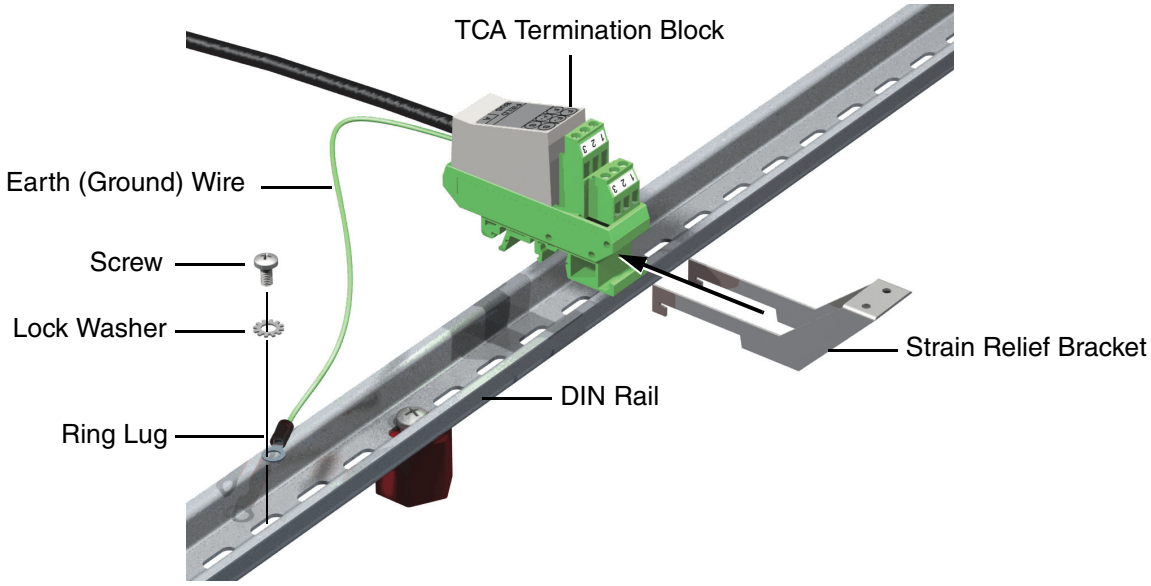



**Figure 4-21. TCA Termination Block Assembly Mounting**

1. Disconnect the earth wire from from the DIN rail.
2. Insert a medium-size flat-head screw driver as shown.
3. Move the screw drive handle in the direction shown, while lifting the TCA termination block from the DIN rail.

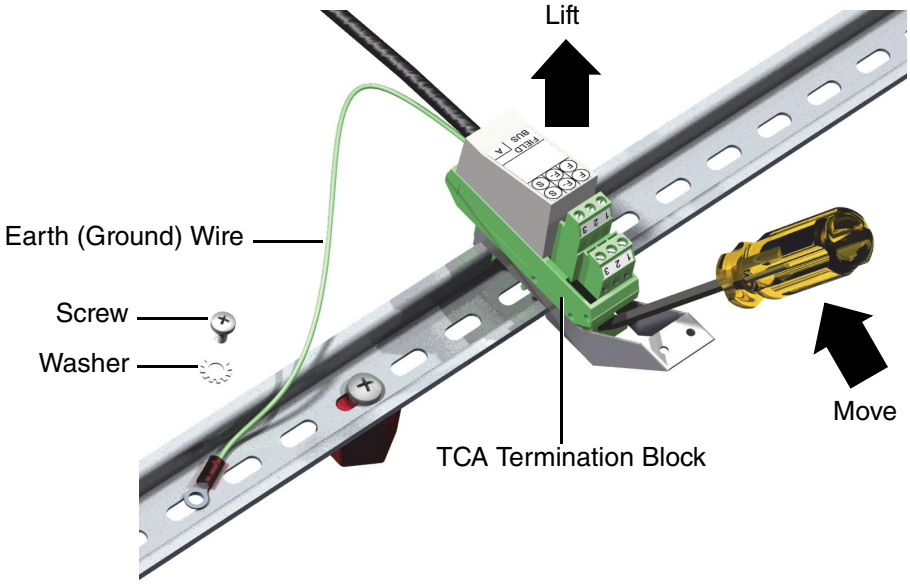
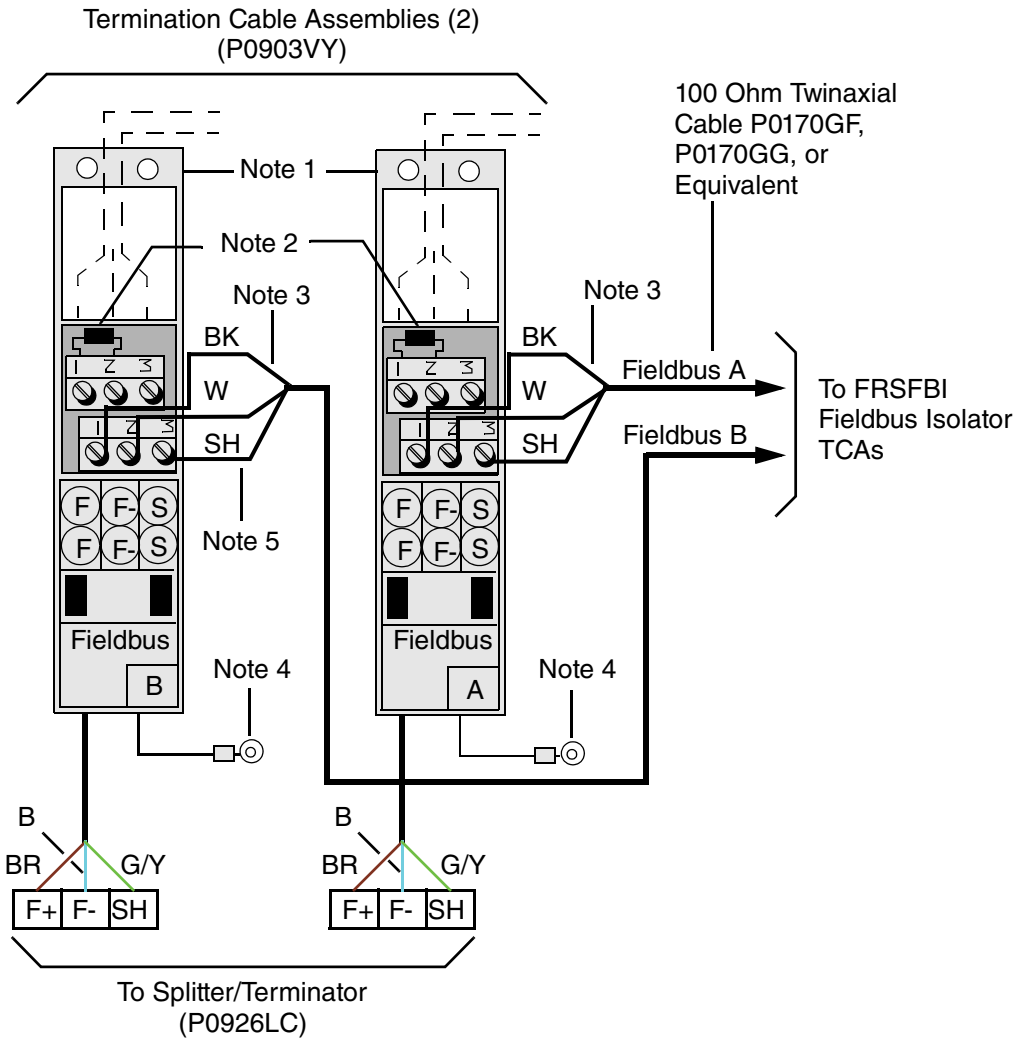



**Figure 4-22. TCA Termination Block Removal**




Notes:

1. For cable strain relief, it is recommended that the Fieldbus cable(s) be routed over the strain relief bracket and secured using nylon cables ties.
2. TCAs can be daisy chained as indicated by the dashed cable lines, but terminating resistors (110 ohms) must be installed at the ends of the fieldbus.
3. Wire colors shown (BK and W) are for reference purposes only.
4. Earth (ground) the surge protection network contained within the TCAs by attaching the green earth wire to a screw on the DIN rail connected to system earth. For more information on earthing, refer to *Power, Earthing (Grounding), EMC and CE Compliance* (B0700AU).
5. The shield of the twinaxial cable (terminal 3) should be earthed at the farthest end from the FCM100E Modular Baseplate. The fieldbus shield must be earthed at one end only. (See text for earthing instructions.)

**Figure 4-23. Remote Redundant Fieldbus Cabling (FCM100E End)**

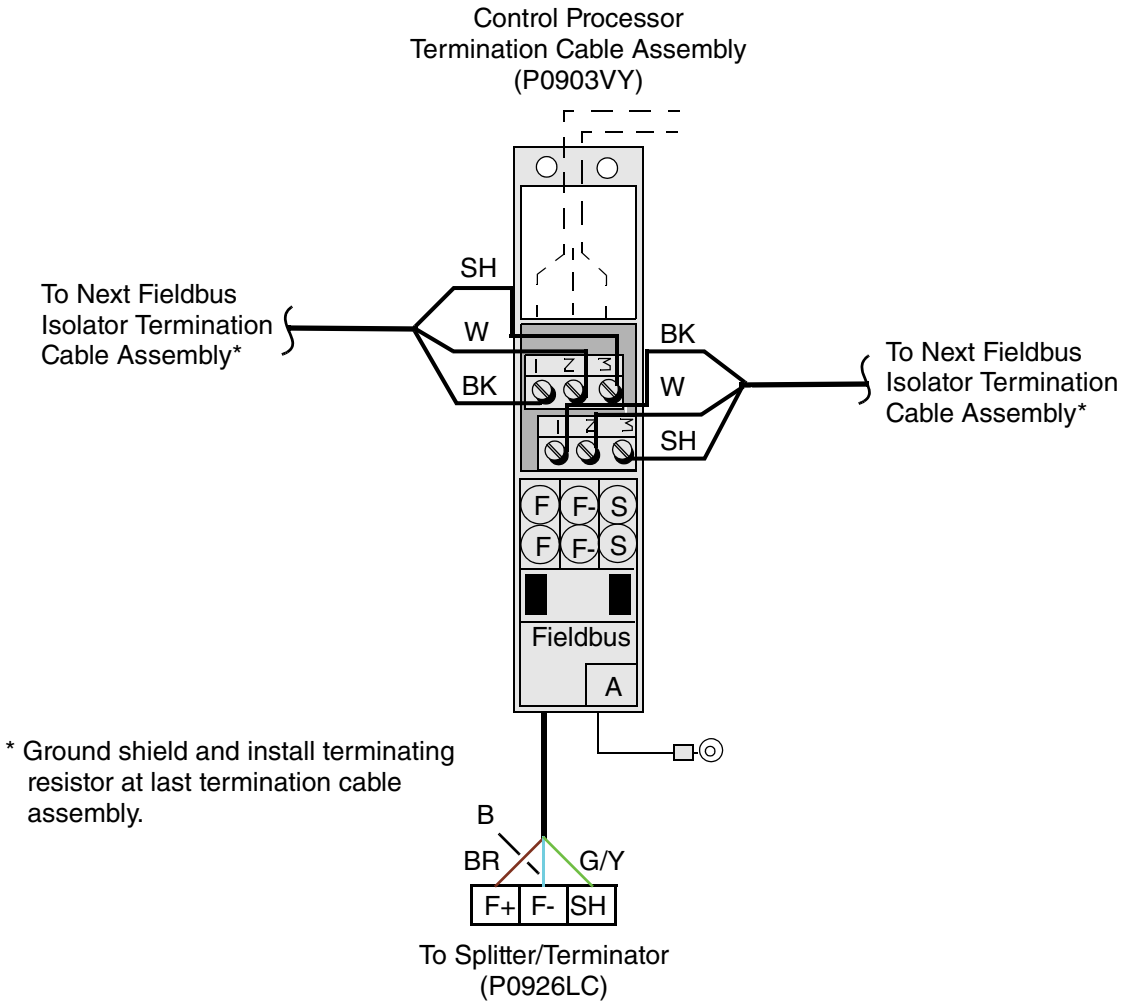



**Figure 4-24. Example of Extending Fieldbus in Two Directions from FCM100E**

# Fieldbus Cabling at the DCS Fieldbus Module Subsystem

Fieldbus cabling at the DCS Fieldbus Module subsystem involves making Fieldbus connections to the TCAs (P0903VY) associated with the FRSFBI Fieldbus Isolators.

**NOTE**

1. Connections at the DCS Fieldbus Module Subsystem end are the same regardless of the type of control processor is used (CP30 or higher).
2. The following procedure assumes that a redundant Fieldbus is being employed. If you are installing a non-redundant Fieldbus, omit the Fieldbus B connections.

1. Install the DIN rail (P0903PN) in the equipment rack using the hardware provided.

   Placement of the DIN rail in the rack is limited only by the length of the P0903VY TCA cable, which is 72 in (1828 mm).

2. Referring to Figure 4-1, assemble the TCA termination blocks, snap them onto the DIN rail, and connect the TCA earth wires.
3. Connect the Fieldbus A and B cables to the two FRSFBI Fieldbus Isolator TCAs, as shown in Figure 4-25.
4. If the TCAs are the last TCAs on the Fieldbus run:
   a. Add the 110 ohm terminating resistors (E0157EZ) packaged with the TCAs.
   b. Connect an insulated 14 AWG wire between connection point 3 (shield) on each of the last Fieldbus TCAs and the earth bus bar in the equipment rack.
5. Dress the Fieldbus cables and 14 AWG earth wire for neatness and security.

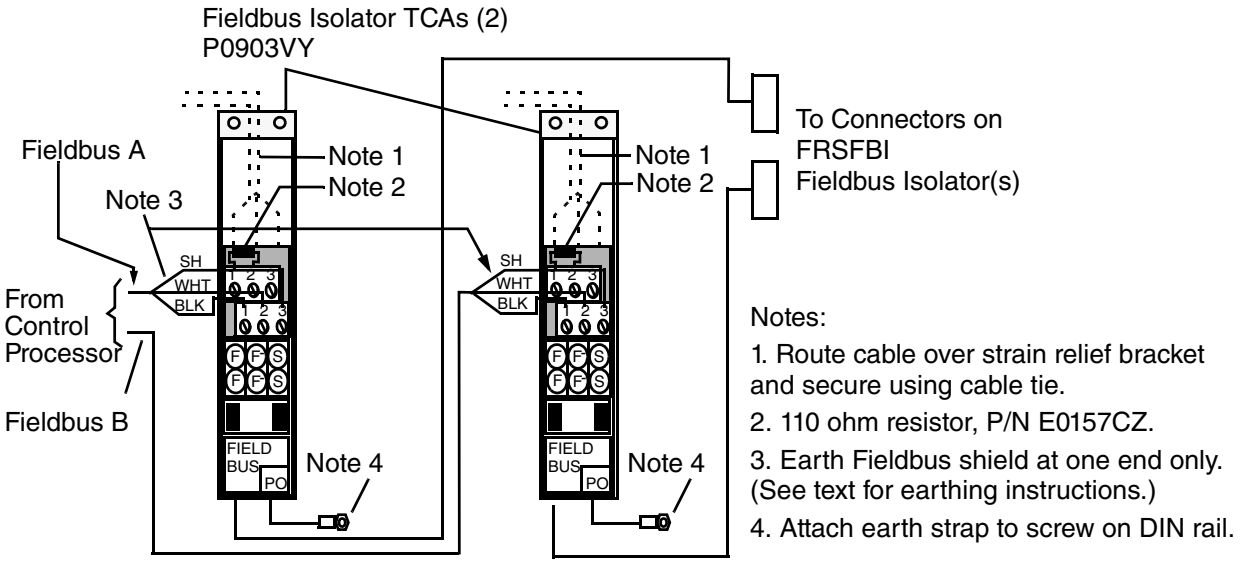



**Figure 4-25. Fieldbus Cabling at the DCS Fieldbus Module Subsystem End**

# Fieldbus Connections

This section describes installing FRSFBI Fieldbus Isolators to replace the Fisher PROVOX power cards in the first Fisher PROVOX card file to be converted and connected to the Foxboro Evo Fieldbus, and installation of the FRSFBE Fieldbus Extenders in any additional card files on the Fieldbus.

The Fieldbus Isolators are the start of the Local Fieldbus, which can be extended to additional card cages and even to other equipment racks to connect DCS Fieldbus Modules to the CP, all within the following limits:

- You can connect up to 40 DCS Fieldbus Modules (FRM701s, FRM711s, and FRMMPUs) on a Local Fieldbus, whether single-channel or redundant.
- The total number of DCS Fieldbus Modules may be further limited by loading on the host CP.
- The maximum length of the Local Fieldbus is 9 m (30 ft).
- When connecting modules in multiple equipment racks on the same Local Fieldbus, make sure all of the racks share a common earth point.

The instructions and illustrations assume installation on a redundant Fieldbus. If you are installing the equipment on a single-channel Fieldbus, install the Fieldbus Isolator and Extender cards in the first Power Card slot (that is, the left-most slot in the card file) and connect the modules with cables as shown for Channel A.

**⚠ CAUTION**

The following procedure assumes that power has been removed from the equipment rack containing the Fisher PROVOX Controller Series system to be upgraded. Before switching off the power to the equipment rack, ensure that such action will not adversely affect the process.

## Fieldbus Isolators

To install Fieldbus connections to the first card file on the Fieldbus:

1. Remove all Fisher PROVOX controller and power cards from the card file.

   Do not remove any Interconnect Assemblies on the Fisher backplane.

2. Locate the PROVOX Alarm Cabling terminal strip on the inside left wall of the card file, and remove all wires from the terminal strip (Figure 4-26).

3. Connect COM and 1 on the terminal strip using the Migration Kit Jumper Wire (P0918HK) (Figure 4-26).

   This jumper designates the FRSFBI Fieldbus Isolator to be installed in the left power card slot as Fieldbus Channel A.

4. Install the migration kit label (P0903AN) on the inside right wall of the card file in the approximate position shown in Figure 4-26.

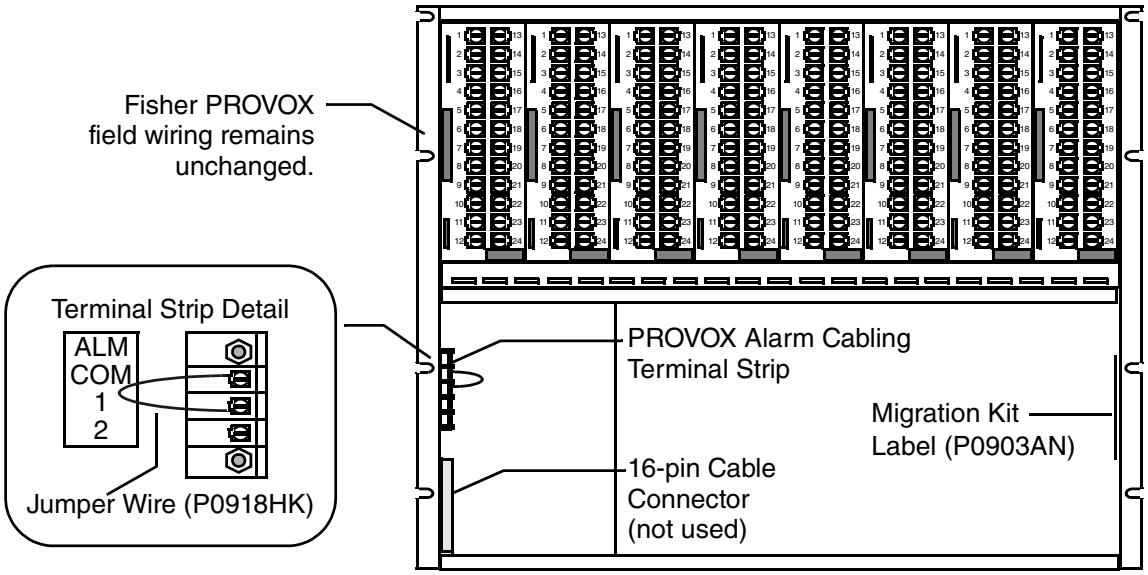



**Figure 4-26. Installation of the Jumper Wire and Migration Kit Label**

5. Install the FRSFBI Fieldbus Isolators in the power card slots.

   The cards are properly oriented when the connectors and LEDs are on the left.

6. Connect the TCA cables to the FRSFBI Fieldbus Isolators using the connectors at the top of the card edge, as shown in Figure 4-27.
7. If another upgraded card file is to be connected to the same Fieldbus:
   a. Connect the two FRSFBIs using the Short Fieldbus Cable Assembly (P0918RY), as shown in Figure 4-27.

      The two female connectors at the end of the assembly attach to the 9-pin connectors on the FRSFBIs.

   b. Attach the Local Fieldbus Extension Cable (P0913VF/VG/VH) to the Short Fieldbus Cable Assembly, as shown in Figure 4-27 below.

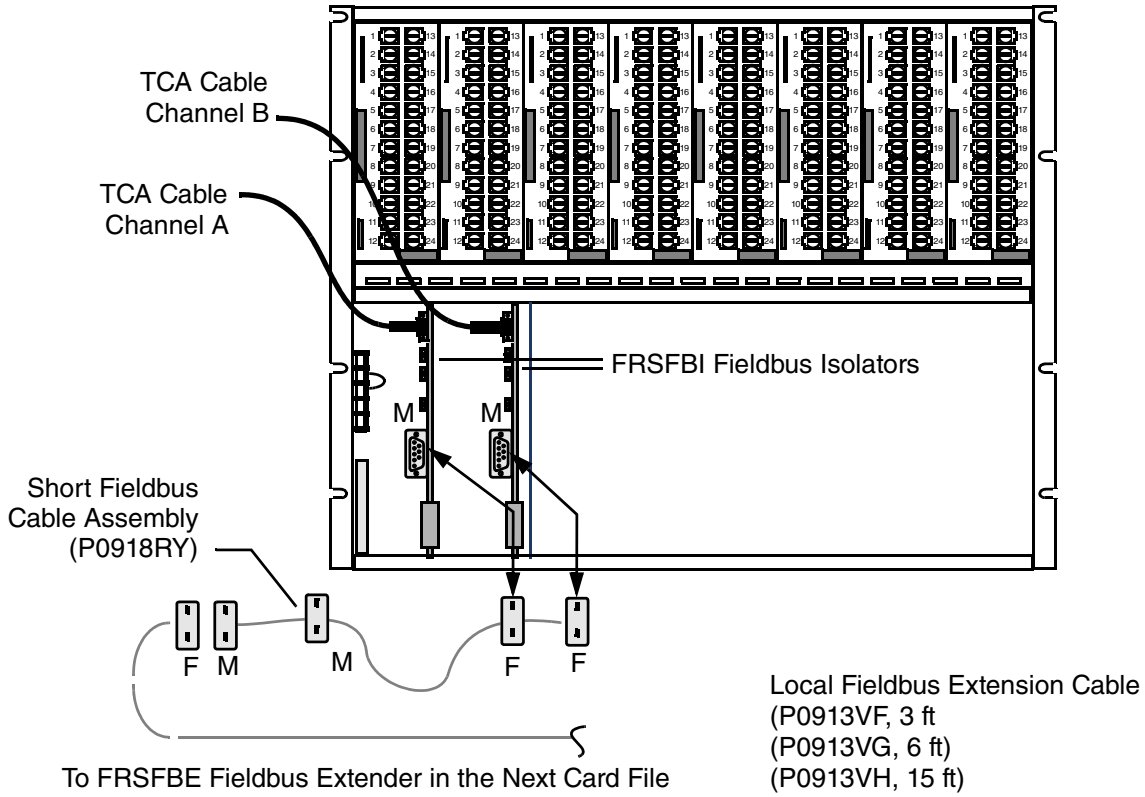



**Figure 4-27. Installation of FRSFBI Field Isolators in the Fisher PROVOX Card File**

8. Install the general information ("Plugged In") labels (P0918EU) on the inside of the rack's front and rear doors.

   Install the labels directly below any existing labels or equipment name plate. The original descriptive name plates should be removed to avoid maintenance confusion. If there are no name plates, place the labels at about eye level.

## Fieldbus Extenders

To extend Fieldbus connections to the second or a later card file on the Fieldbus:

1. Remove all Fisher PROVOX controller and power cards from the card file.

   Do not remove any Interconnect Assemblies on the Fisher backplane.

2. Locate the PROVOX Alarm Cabling terminal strip on the inside left wall of the card file, and remove all wires from the terminal strip (Figure 4-26).

3. Install the migration kit label (P0903AN) on the inside right wall of the card file in the approximate position shown in Figure 4-26.

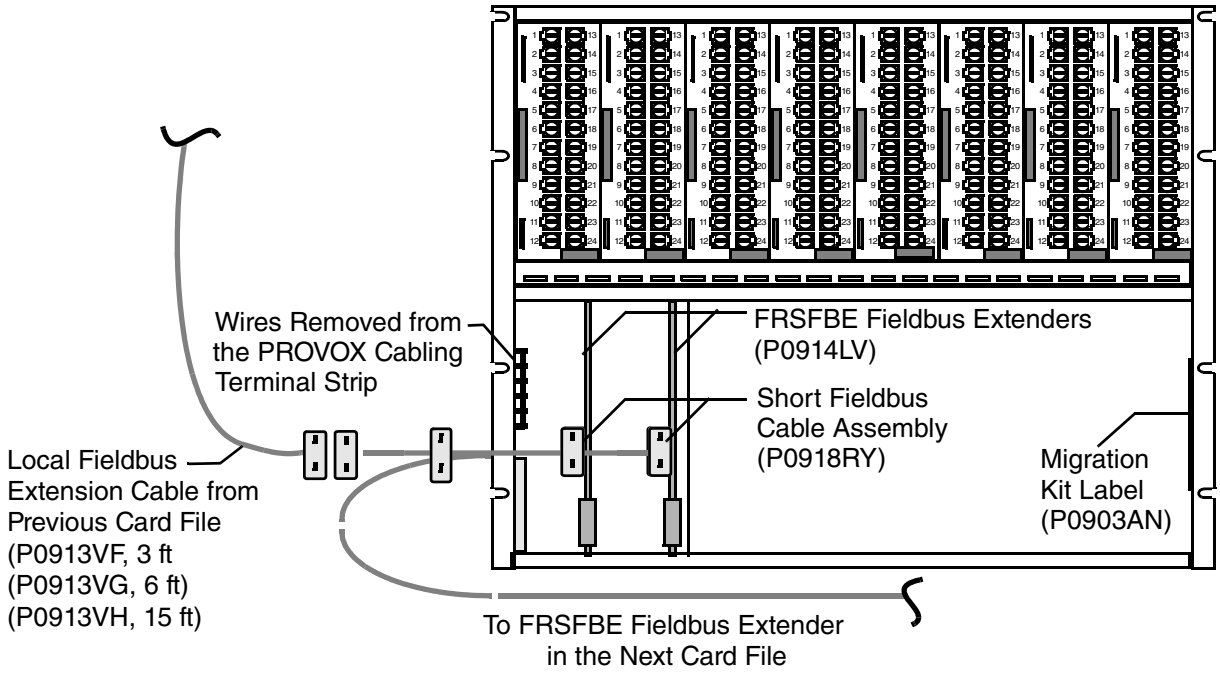



**Figure 4-28. Installation of FRSFBE Field Extenders in the Fisher PROVOX Card File**

4. Install the FRSFBE Fieldbus Extenders in the power card slots.

   The cards are properly oriented when the connectors are on the left.

5. Connect the two FRSFBEs using the Short Fieldbus Cable Assembly (P0918RY), as shown in Figure 4-28.

   The two female connectors at the end of the assembly attach to the 9-pin connectors on the FRSFBEs.

6. Attach the Local Fieldbus Extension Cable (P0913VF/VG/VH) from the previous card file to the Short Fieldbus Cable Assembly, as shown in Figure 4-28.

7. If another card file is to connect to the Fieldbus, connect another Local Fieldbus Extension Cable (P0913VF/VG/VH) to the remaining connector on the Short Fieldbus Cable Assembly, as shown in Figure 4-28.

   The extension cable for the next card file must be connected to the male connector closest to the Channel A Fieldbus Extender, that is, the FRSFBI installed in the left power card slot.

8. Install the general information (“Plugged In”) labels (P0918EU) on the inside of the rack’s front and rear doors.

   Install the labels directly below any existing labels or equipment name plate. The original descriptive name plates should be removed to avoid maintenance confusion. If there are no name plates, place the labels at about eye level.

# Letterbug Installation

A module identifier, composed of six letterbugs, is used to provide physical, user-assigned labels on the DCS Fieldbus Modules. Each letterbug is a small plastic device with a single character embossed on the front surface. Six interlocking letterbugs form a module identifier, which plugs into a receptacle on the DCS Fieldbus Module. The rear surface of each letterbug contains pins arranged in a unique configuration corresponding to a particular character or symbol. The required sets of letterbugs, as specified per system configurator/autoquote references, are shipped packaged with the DCS Fieldbus Modules.

**⚠ CAUTION**

It is important to wear a properly connected electrostatic discharge (ESD) wrist strap while removing, handling, and installing the DCS Fieldbus Module cards. Connect the ESD strap to the rack ground bar.
It is also a good practice to observe the following points when handling electronic circuitry:
1. Use the static shielding bags supplied with the DCS Fieldbus Module.
2. Ground the bag before opening.
3. Avoid touching the DCS Fieldbus Module circuitry.

Figure 4-29 shows the assembly of the letterbugs to form a module identifier and the insertion of the module identifier into the DCS Fieldbus Module.

To assemble and install module identifiers:

1. Determine the module identifier (letter/number combination) that pertains to the DCS Fieldbus Modules in question.

   The letterbug must be unique and must end in zero, as described in “Letterbug Assignments” on page 18.
2. Gather the six letterbugs that form the module identifier and assemble them by inserting the dovetail end of one letterbug into the mating end of the next, until all six letterbugs have been assembled in the proper order (see Figure 4-29).
3. Insert the assembled module identifier into the receptacle on the DCS Fieldbus Module. Exercise care, ensuring that the pins properly align with the holes in the receptacle.

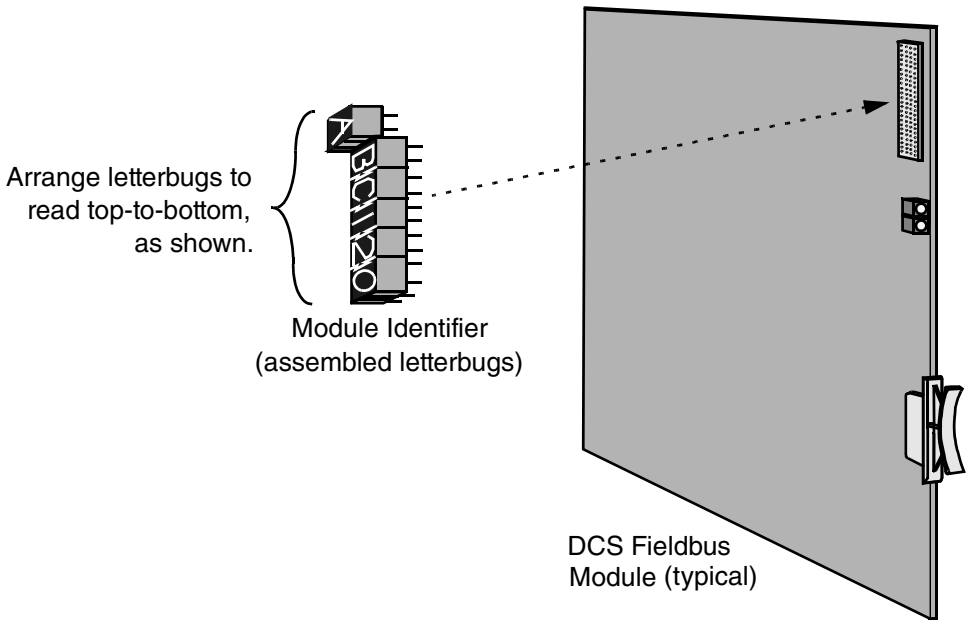



**Figure 4-29. Letterbug Assembly and Insertion**

4. Repeat Steps 1 through 3 for all DCS Fieldbus Modules to be installed.

   Two separate letterbugs must be installed on the two FRMMPUs used when upgrading 3-wide and 4-wide Interactive Controllers.

   Letterbugs are not installed on the FRMJMP Jumper Cards.

# DCS Fieldbus Module Installation

## FRM701

FRM701 DCS Fieldbus Modules are installed in the same slot as the Configurable Controllers they replace.

The PROVOX controller can be configured for Discrete I/O with the addition of an I/O module mounted on the controller card. A jumper plug on the discrete I/O module determines whether the Configurable Controller supports seven discrete outputs and no discrete inputs (plug position A) or three discrete outputs and two discrete inputs (plug position B). The selector plug (component S1)is located at in the lower left corner of the digital I/O board when the controller card edge is on the right and the front edge terminal strip is on the right, as shown in Figure 4-30.

- Inspect the Configurable Controller when you remove it from the Fisher PROVOX card file to determine if it is configured for discrete I/O, and if so whether the selector plug is in position A or position B.

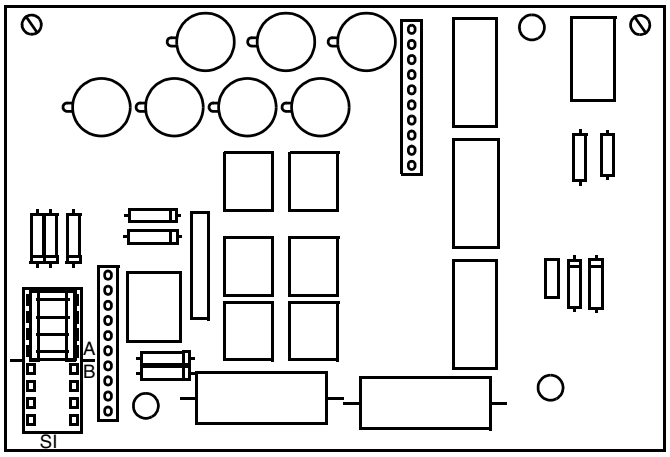



**Figure 4-30. Position of Selector Plug on the Discrete I/O Module**

The FRM 701 also uses jumpers to configure support for discrete I/O. The jumper pin positions are located in the upper left corner of the FRM701 when the card is oriented, as shown in Figure 4-31, with the letterbug in the upper right.

To check the jumper settings:

1. Take the precautions against electrostatic discharge (ESD), as described in the Caution on page 64.
2. Set the FRM701 on a workbench or other flat surface and orient the card, as shown in Figure 4-31.
3. Locate the four rows of pins shown in Figure 4-31.

   Four black plastic jumpers connect the pins in row 1 with the pins in row 2, or the pins in row 3 with the pins in row 4. The pin numbers are printed above the pins, that is, between the pins and the card edge.

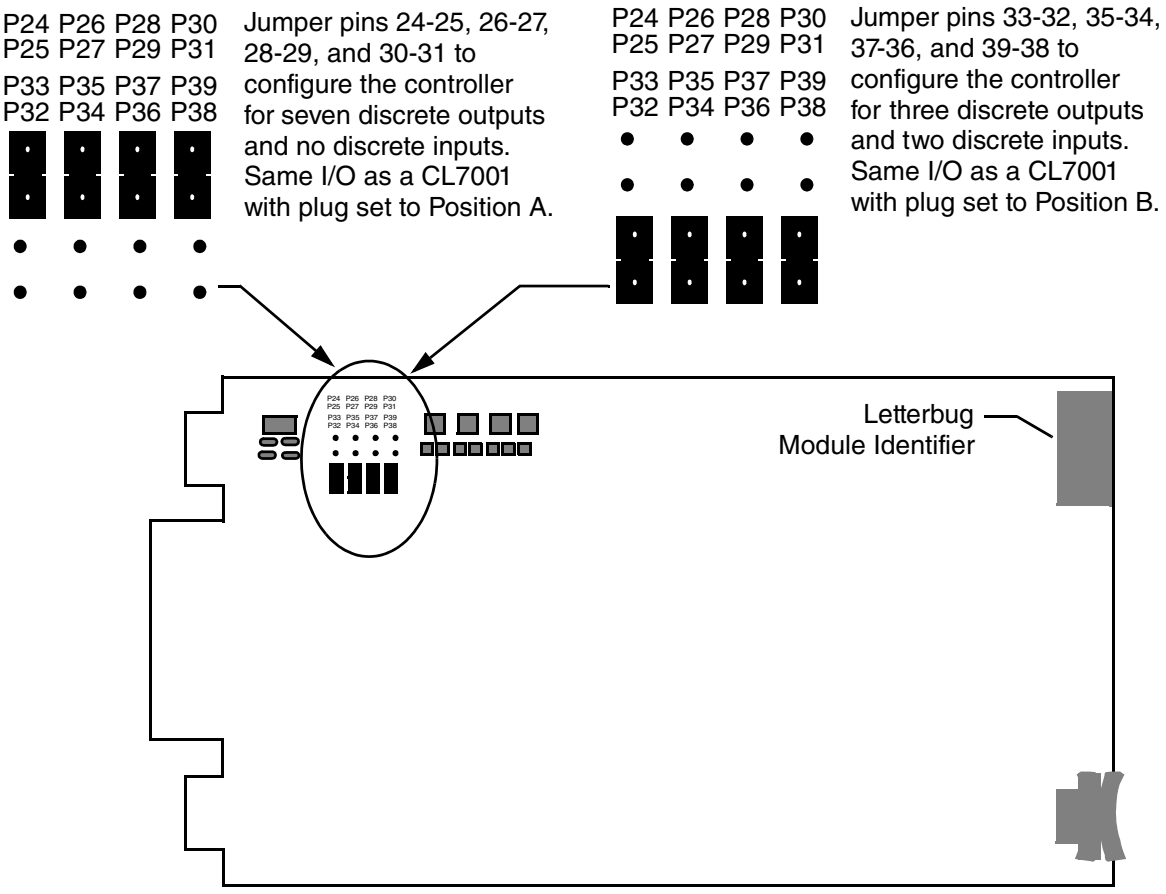



**Figure 4-31. Jumper Pins on the FRM701**

If the original CL7001was configured for seven Discrete Outputs, the following pins should be connected:

- P24 to P25 to enable Discrete Out 4
- P26 to P27 to enable Discrete Out 5
- P28 to P29 to enable Discrete Out 6
- P30 to P31 to enable Discrete Out 7.

If the original CL7001was configured for three discrete outputs and two discrete inputs, the following pins should be connected:

- P33 to P32 and P35 to P34 to enable Discrete In 1
- P37 to P36 and P39 to P38 to enable Discrete In 2.

4. If necessary, change the jumper settings by gently lifting the plastic jumper straight up and using the jumper to connect pins in the other rows.

## FRM711

FRM711 DCS Fieldbus Modules are installed in the same slots in the Fisher PROVOX card file as the Computing Controllers they replace.

## FRMMPU

FRMMPU DCS Fieldbus Modules and the associated FRMJMP Jumper Cards are installed in the same slots in the CL7006 or CL7016 Interconnect Assembly of the original Interactive Controller card set, as shown in Table 4-2.

**Table 4-2. FRMMPU and FRMJMP Placements**

| Slot | Fisher PROVOX Controller Card | I/A Series DCS Fieldbus Module |
|---|---|---|
| **2-Wide Interactive Controller** (CL7016 Interconnect Assembly) | | |
| Slot 2 (left) | CL7005/CL7015 Process I/O Assembly | FRMJMP |
| Slot 1 (right) | Microprocessor Assembly | FRMMPU |
| **3-Wide Interactive Controller with Discrete I/O** (CL7006 Interconnect Assembly) | | |
| Slot 4 (left) | blank | blank |
| Slot 3 | CL7004/CL7014 Discrete I/O Assembly | FRMMPU |
| Slot 2 | CL7005/CL7015 Process I/O Assembly | FRMJMP |
| Slot 1 (right) | Microprocessor Assembly | FRMMPU |
| **3-Wide Interactive Controller with Process I/O** (CL7006 Interconnect Assembly) | | |
| Slot 4 (left) | CL7005/CL7015 Process I/O Assembly | FRMMPU |
| Slot 3 | blank | blank |
| Slot 2 | CL7005/CL7015 Process I/O Assembly | FRMJMP |
| Slot 1 (right) | Microprocessor Assembly | FRMMPU |
| **4-Wide Interactive Controller** (CL7006 Interconnect Assembly) | | |
| Slot 4 (left) | CL7005/CL7015 Process I/O Assembly | FRMJMP |
| Slot 3 | CL7004/CL7014 Discrete I/O Assembly | FRMMPU |
| Slot 2 | CL7005/CL7015 Process I/O Assembly | FRMJMP |
| Slot 1 (right) | Microprocessor Assembly | FRMMPU |

To install the DCS Fieldbus Modules:

1. Verify that the module is the appropriate model to replace the Fisher PROVOX controller type, and that the letterbug is properly installed.
2. Orient the card so that the components are on the left and fingers are pointing in toward the backplane.
3. Slide the card into the slot and gently push the card into the backplane or interconnect assembly.

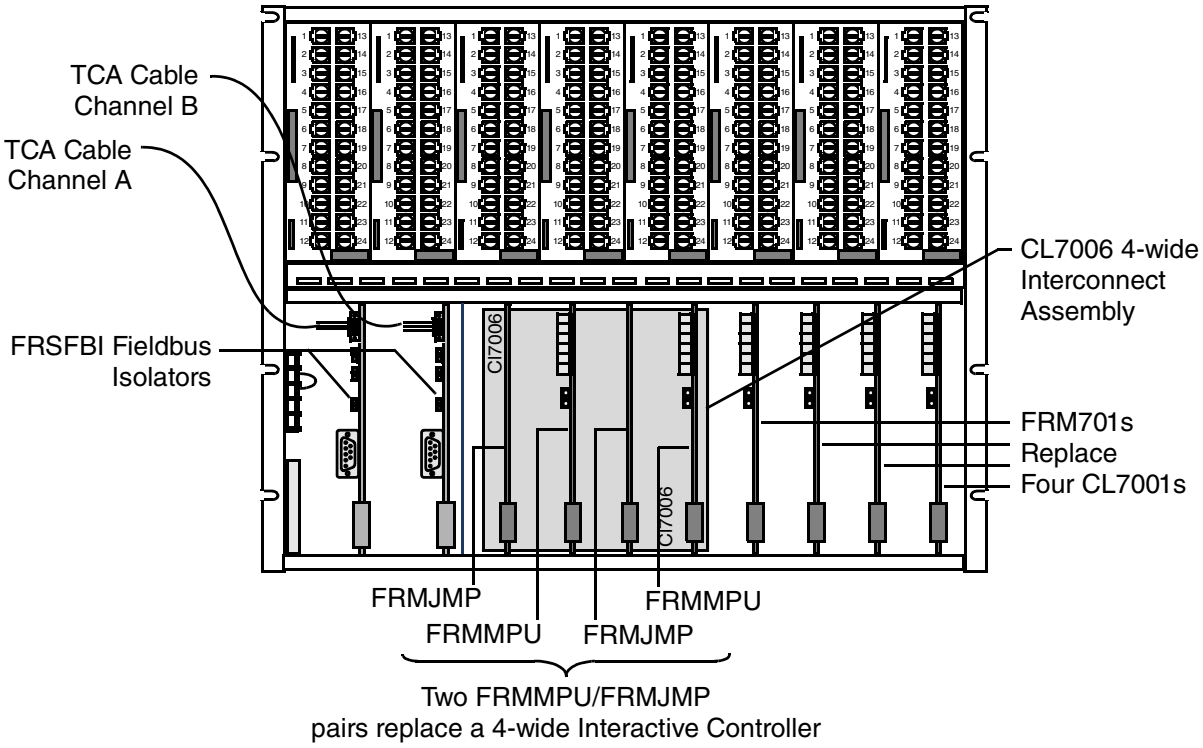



**Figure 4-32. Upgraded Fisher PROVOX Card File**

# Final Installation Operations

Final installation operations include:

- Power Switch On
- Download
- Cable Dressing

## Power Switch-On

Power to the equipment racks may be switched on after all associated equipment has been installed. The DCS Fieldbus Modules and Fieldbus Isolators have status indicators that report operating conditions. When power is first applied, each DCS Fieldbus Module undergoes a power-on self-diagnostic test that tests its operating status. The Fieldbus Isolators have no self-diagnostics, but LEDs indicate the run/fail status and any local/remote Fieldbus activity.

### *Operating Status*

The operating status of the DCS Fieldbus Modules is reported by the Control Core Services software using on-screen messages. The Control Core Services software regards each DCS Fieldbus Module as a cluster of standard Foxboro Evo Fieldbus devices, consisting of an FBP10 Fieldbus Processor with two FBM17s, and one FBM01.

Refer to the following documents for information on the reporting of equipment operating status and errors:

- *System Maintenance* (B0193AD)
- *System Manager* (B0750AP)
- *System Management Displays* (B0193JC).

## LED Indicators

LED indicators at the front of the FRSFBI Fieldbus Isolator and the DCS Fieldbus Module indicate the operational status of these devices (Figure 4-33). The functions of the FRSFBI LEDs are as follows:

| | |
|---|---|
| Fieldbus A | When illuminated, indicates that the card is communicating on Fieldbus A. |
| Fieldbus B | When illuminated, indicates that the card is communicating on Fieldbus B. |
| Run | When illuminated (green), indicates that the Fieldbus Isolator is operational (running). |
| Fail | When illuminated (red), indicates that the Fieldbus Isolator has failed. |

Remote Fieldbus Activity

When illuminated (yellow), indicates the existence of communication activity on the remote Fieldbus that is external to the Fisher PROVOX equipment rack. This activity consists of requests from the control station.

Local Fieldbus Activity

When illuminated (yellow), indicates the existence of communication activity on the local Fieldbus that is internal to the Fisher PROVOX equipment rack. This activity consists of responses from the DCS Fieldbus Modules.

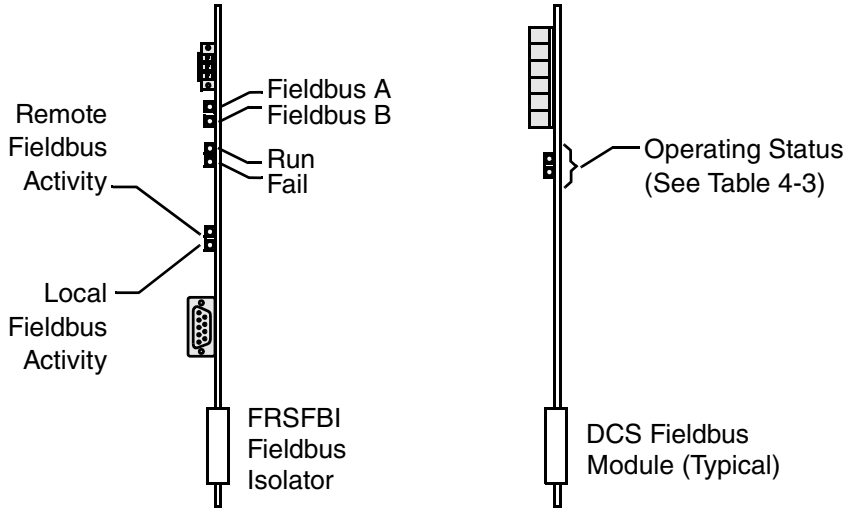



**Figure 4-33. LED Indicators**

A red and a green LED at the front of each DCS Fieldbus Module provide indications of operating status, as listed in Table 4-3. The LEDs illuminate red and green, respectively, when they are on. They appear white when they are off.

**Table 4-3. DCS Fieldbus Module Operating Status LEDs**

| Red LED | Green LED | Status |
|---|---|---|
| Off | Off | Power to the card failed. |
| On | Off | Diagnostic run-time failure occurred. |
| On | On | DCS Fieldbus Module has passed diagnostics and is ready to be brought on-line by the CP. This is the normal offline functional state. |
| Off | On | DCS Fieldbus Module is on-line and functional. This is the normal run state. |

## Download Operation

Once the DCS Fieldbus Module subsystem equipment has been installed and power is applied to the equipment racks, you must perform a download from the Control Core Services workstation module. This action loads the DCS Fieldbus Module's image and database, and restarts the DCS Fieldbus Module software. Prior to the download, you must have performed integrated control configuration and "Fix All," otherwise the System Management Display Handler does not recognize the DCS Fieldbus Module.

**— NOTE**

Do not perform an EEPROM Update for the Controller Series modules (FRM7701, FRM711, and FRMFPU), as all necessary software has been loaded during manufacturing. For these modules, EEPROM Updating is only necessary when specifically required by a Control Core Services software update.

The Download operation is performed on each DCS Fieldbus Module using the System Manager or System Management Display Handler (SMDH) Equipment Change Displays.

To perform these operations from the System Manager, refer to the "Equipment Change Actions" section of the "Fieldbus Modules" chapter in *System Manager* (B0750AP).

For detailed information on the use of the System Management Displays, refer to *System Management Displays* (B0193JC).

To perform the Download operation from SMDH, proceed as follows:

1. Access the Equipment Change Display for the DCS Fieldbus Module:
   a. Choose **`Sys`** > **`Sys_Mgmt.`** from the top menu bar.
   b. Select the appropriate System Monitor.
   c. Click the letterbug of the CP to which the DCS Fieldbus Module is attached.

      The SMDH displays the PIO Bus Display (Figure 4-34).

   The DCS Fieldbus Modules are portrayed in System Management displays as an FBP10, two FBM17s, and one FBM01. In Figure 4-34, a DCS Fieldbus Module with the letterbug FRM730 is represented by an FBP10 with the letterbug FRM730, two

FBM17s with the final character of the letterbug changed to 1 and 2 respectively, and an FBM01 with the letterbug FRM733.

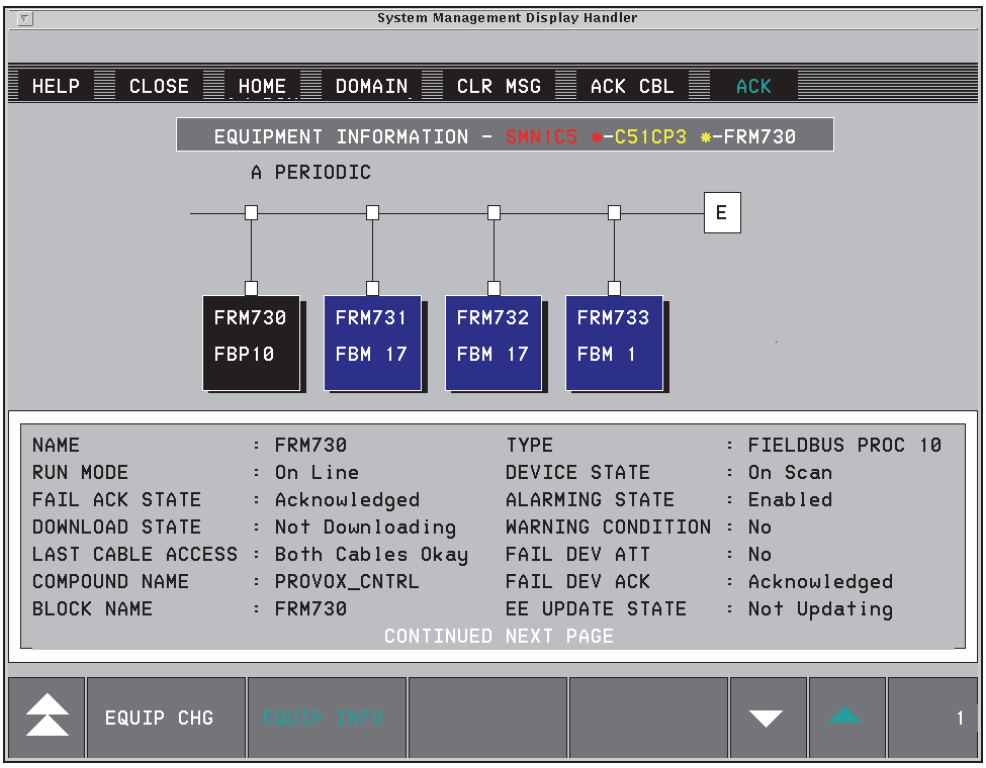



**Figure 4-34. PIO Bus Display (Typical SMDH)**

2. Select the DCS Fieldbus Module, and click **EQUIP CHG**.

   The action raises the Equipment Change display. The currently enabled actions are displayed in white (Figure 4-35).


**Figure 4-35. Equipment Change Display (SMDH)**

3. Click **DOWNLOAD**.

   A Download Successful message appears in the message line, and the DCS Fieldbus Module goes on-line.

4. Checkpoint the file in the CP to preserve the on-line state of the DCS Fieldbus Module in the checkpoint file:

   a. Access the Equipment Change display for the host CP.

   b. Click **CHECKPOINT COMMAND**.

5. Repeat Steps 2 through 4 for each DCS Fieldbus Module in the subsystem.

## Cable Dressing

When all DCS Fieldbus Module subsystem equipment has been installed and the subsystem is operational, dress all excess local and remote Fieldbus cables for neatness using the rack wireways.

# Installation Checklist

| | |
|---|---|
| ❑ | Fieldbus Isolators, Fieldbus Extenders, and DCS Fieldbus Modules installed. |
| ❑ | Original wiring removed from the PROVOX Alarm Cabling Terminal Strip. |
| ❑ | Jumper wire installed on the PROVOX Alarm Cabling Terminal Strip in the first card file on the Fieldbus. |
| ❑ | Local and Remote Fieldbus cabling installed and connected. |
| ❑ | Remote Fieldbus shields earthed at last device on Fieldbus. |
| ❑ | Remote Fieldbus termination resistors installed at last device on Fieldbus. |
| ❑ | Strain relief provided for Fieldbus cables near Fieldbus isolators. |
| ❑ | Module identifiers (letterbugs) installed in all DCS Fieldbus Modules. |
| ❑ | System configuration and integrated control configuration completed. |
| ❑ | Downloading of the DCS Fieldbus Module has been performed. |
| ❑ | Cable dressing is completed. |
| ❑ | Power to rack is switched on and DCS Fieldbus Module LEDs indicate a GO condition. |

# 5. Process Displays and System Management Displays

*This chapter provides information on the process displays and System Management displays used with the DCS Fieldbus Module subsystem.*

## Process Displays

The Foxboro Evo system provides the following types of displays for performance of process control operations:

- Select Screen Display (compound and block overview display)
- Group Displays
- User-Generated Displays
- Block Detail Displays
- Compound Detail Displays
- Station Displays

For information on these displays, refer to *System Manager* (B0750AP) and *Process Operations and Displays* (B0193MM).

## System Management Displays

The System Manager and System Management Display Handler (SMDH) obtain current and historical information about the system, display it, and allow you to intervene in system operations and perform diagnostics. System Manager and SMDH provide the following displays for managing the DCS Fieldbus modules:

- The Fieldbus-level PIO Bus display shows the DCS Fieldbus Module subsystem, along with the host CP and any other Fieldbus devices.

  The DCS Fieldbus Modules are portrayed in the System Management displays as an FBP10, two FBM17s, and one FBM01.

  Figure 5-1 is an example of a PIO Bus display with the first element of the DCS Fieldbus Module display selected. An Equipment Information overlay has been raised for this FBP10.

- Provides detailed Equipment Information overlays and pages.

  Figure 5-2 is an Equipment Information page raised from the first FBM17 in the display.

- Provides Equipment Change displays for each DCS Fieldbus Module.

  Figure 5-3 is an Equipment Change display for FRM730 raised from any of its first FBM17s (FRM731) in the PIO Bus display.

For detailed information on using System Manager, including Equipment Information and Equipment Change actions for the DCS FBMs, refer to *System Manager* (B0750AP).

For detailed information on the use of the System Management displays, refer to *System Management Displays* (B0193JC).

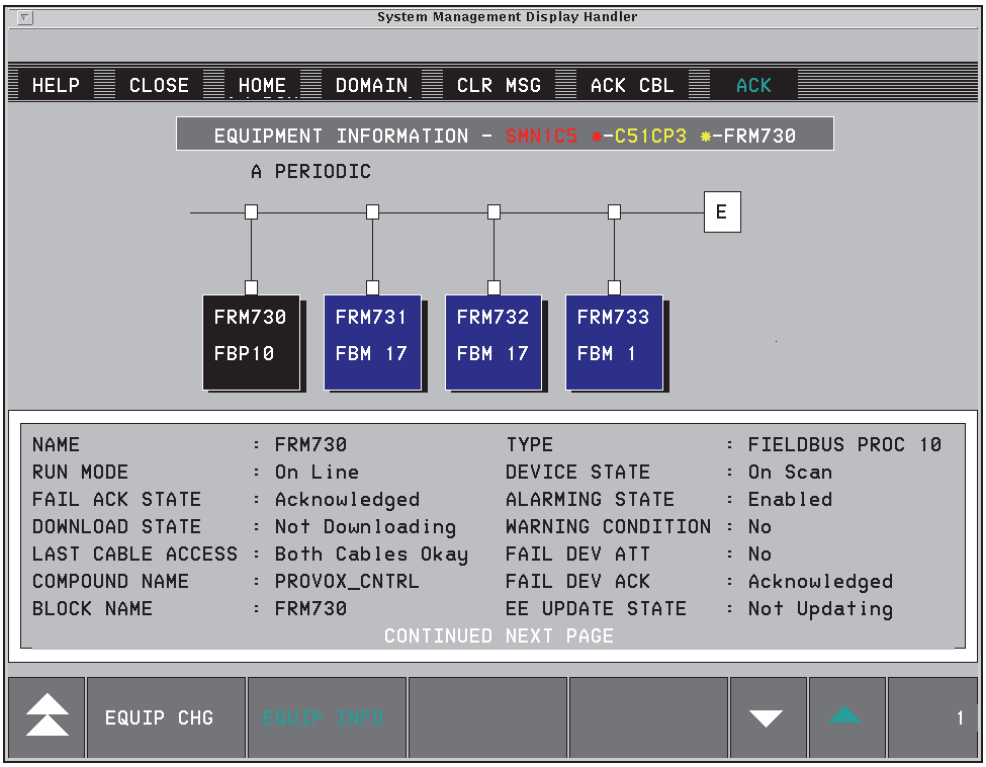



**Figure 5-1. Sample PIO Bus Display with Equipment Information Overlay (SMDH)**

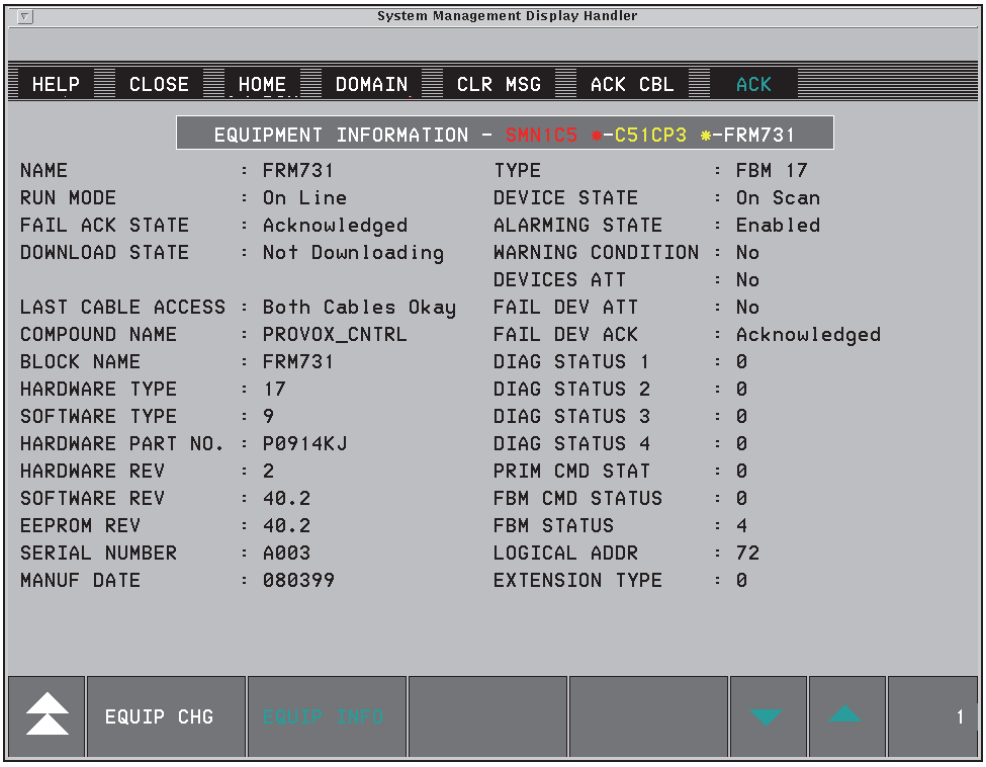



**Figure 5-2. Equipment Information Display Selected for the First FBM17 (SMDH)**


**Figure 5-3. Equipment Change Display Selected from the First FBM17 (SMDH)**

# 6. Maintenance

*This chapter provides maintenance information for the DCS Fieldbus Module subsystem.*

The original maintenance and preventive maintenance philosophies for the Fisher PROVOX Controller Series equipment racks are maintained. This includes periodic inspection and cleaning, checking the status of LED indicators, and checking for loose cable connections.

## Operating Status

The operating status of DCS Fieldbus Modules is reported by the Control Core Services software using on-screen messages. The Control Core Services software regards each DCS Fieldbus Module as a cluster of standard Foxboro Evo Fieldbus devices, consisting of an FBP10 Fieldbus Processor with two FBM17s and one FBM01.

Refer to the following documents for information on the reporting of equipment operating status and errors:

- *System Maintenance* (B0193AD)
- *System Manager* (B0750AP)
- *System Management Displays* (B0193JC).

## LED Indicators

LED indicators at the front of the FRSFBI Fieldbus Isolator and the DCS Fieldbus Module indicate the operational status of these devices (Figure 6-1). The functions of the FRSFBI LEDs are as follows:

| | |
|---|---|
| Fieldbus A | When illuminated, indicates that the card is communicating on Fieldbus A. |
| Fieldbus B | When illuminated, indicates that the card is communicating on Fieldbus B. |
| Run | When illuminated (green), indicates that the Fieldbus Isolator is operational (running). |
| Fail | When illuminated (red), indicates that the Fieldbus Isolator has failed. |
| Remote Fieldbus Activity | When illuminated (yellow), indicates the existence of communication activity on the remote Fieldbus that is external to the Fisher PROVOX equipment rack. This activity consists of requests from the control station. |

Local Fieldbus Activity

When illuminated (yellow), indicates the existence of communication activity on the local Fieldbus that is internal to the Fisher PROVOX equipment rack. This activity consists of responses from the DCS Fieldbus Modules.

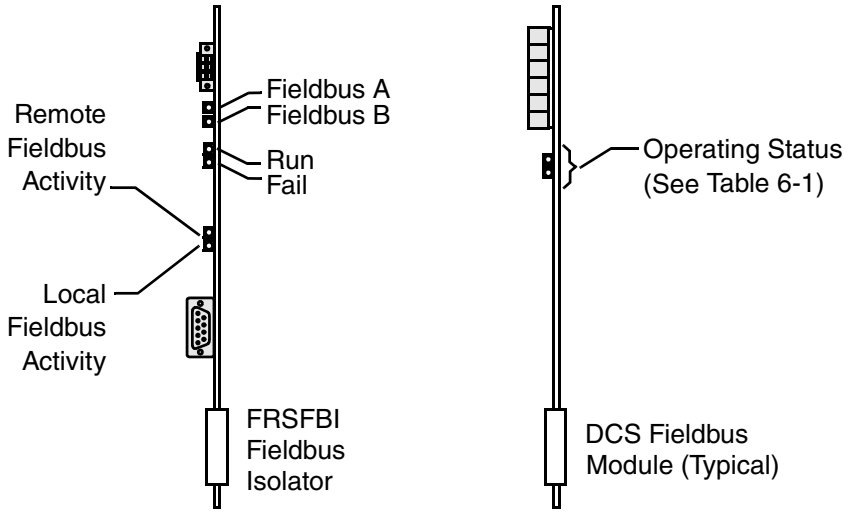



**Figure 6-1. LED Indicators**

A red and a green LED at the front of each DCS Fieldbus Module provide indications of operating status, as listed in Table 6-1. The LEDs illuminate red and green, respectively, when they are on. They appear white when they are off.

**Table 6-1. DCS Fieldbus Module Operating Status LEDs**

| Red LED | Green LED | Status |
|---|---|---|
| Off | Off | Power to the card failed. |
| On | Off | Diagnostic run-time failure occurred. |
| On | On | DCS Fieldbus Module has passed diagnostics and is ready to be brought on-line by the CP. This is the normal offline state. |
| Off | On | DCS Fieldbus Module is on-line and functional. This is the normal run state. |

# Technical Support

If technical support is needed, call Global Product Support (GPS) at 1-866-746-6477 or visit *https://support.ips.invensys.com.*

# Module Return Procedure

Contact the Global Product Support for a Return Authorization Number and the shipping address.

# *Appendix A. Hardware Specifications*

*This appendix provides hardware specifications for the Controller Series DCS Fieldbus Modules and the Fieldbus Isolator.*

## FRM701 Configurable Controller FBM

The FRM701 DCS Fieldbus Module replaces the Type CL7001 Configurable Controller Assembly. The CL7001 is removed from the card file and FRM701 is plugged directly into the same slot. The FRM701 connects the existing I/O to the CP using the Fisher backplane, the Fieldbus Isolator, and the Foxboro Evo local and remote Fieldbus cables.

Power Requirements

| | |
|---|---|
| Input Voltage | 21.0 to 29.0 V dc |
| Consumption | 3.8 W |

Communication

Redundant IEEE P1118 Fieldbus

Input Channels

| | |
|---|---|
| Analog | Four channels, single ended |
| Signal Range | 4 to 20.0 mA, 1 to 5 V dc |
| Rated Mean Accuracy | ±0.05% of span |
| Resolution | 12 bits |
| Discrete | Zero, one or two channels, optically isolated, configured by on-board jumpers |
| Applied Voltage | 24 V dc nominal |
| On-Sate | 24 V dc nominal |
| On-State Resistance | 1.0 KΩ (maximum) |
| Off-State Resistance | 100 KΩ (maximum) |

Output Channels

| | |
|---|---|
| Analog | One channel |
| Signal Range | 4 to 20.0 mA |
| Rated Mean Accuracy | ±0.05% of span |
| Resolution | 12 bits |
| Output Load | Current 735 Ω (maximum) |
| Compliance Voltage | 18.6 V dc nominal at 20 mA at FTA terminals |
| Settling Time | 100 ms to settle within a 1% band of steady state for 10% to 90% input step change |
| Discrete | Three to seven channels, optically isolated, configured by on-board jumpers |
| Applied Voltage | 21 to 29 V dc, 24 V dc nominal |
| On-State Load Current | 60 mA maximum |
| Off-State Leakage | 0.25 mA maximum |

# FRM711 Computing Controller FBM

The FRM711 DCS Fieldbus Module replaces the Type CL7011 and Type CL7002 Computing Controller Assembly. The CL7011/CL7002 is removed from the card file and the FRM711 is plugged directly into the same slot. The FRM711 connects the existing I/O to the CP using the Fisher backplane and the Foxboro Evo local and remote fieldbus cables.

Power Requirements

| | |
|---|---|
| Input Voltage | 21.0 to 29.0 V dc |
| Consumption | 3.8 W |

Communication

Redundant IEEE P1118 Fieldbus

Input Channels

| | |
|---|---|
| Analog | Five channels, single ended |
| Signal Range | 4 to 20.0 mA, 1 to 5 V dc |
| Rated Mean Accuracy | ±0.05% of span |
| Resolution | 12 bits |
| Discrete | Four channels, optically isolated, configured by on-board jumpers |
| Applied Voltage | 24 V dc nominal |
| On-State | 24 V dc nominal |
| On-State Resistance | 1.0 KΩ (maximum) |
| Off-State Resistance | 100 KΩ (maximum) |

Output Channels

| | |
|---|---|
| Analog | Two channels |
| Signal Range | 4 to 20.0 mA (one channel)<br>1 to 5 V dc (one channel) |
| Rated Mean Accuracy | ±0.05% of span |
| Resolution | 12 bits |
| Output Load | Current 735 Ω (maximum)<br>Voltage 3 KΩ (minimum) |
| Compliance Voltage | 18.6 V dc nominal at 20 mA at FTA terminals |
| Settling Time | 100 ms to settle within a 1% band of steady state for 10% to 90% input step change |
| Discrete | Two channels, optically isolated |
| Applied Voltage | 21 to 29 V dc, 24 V dc nominal |
| On-Sate Load Current | 60 mA maximum |
| Off-State Leakage | 0.25 mA maximum leakage current |

# FRMMPU

The Fisher PROVOX Type CL6003 Interactive Controllers are configured in two, three and four card configurations that plug into an interconnect assembly mounted on the Fisher PROVOX backplane. The Foxboro Evo system migration replaces these cards with combinations of the model FRMMPU Microprocessor Unit and the FRMJMP Jumper Card. The Foxboro Evo system modules are plugged into the Interconnect Assembly.

Power Requirements

| | |
|---|---|
| Input Voltage | 21.0 to 29.0 V dc |
| Consumption | 3.8 W |

Communication

Redundant IEEE P1118 Fieldbus

Input Channels

| | |
|---|---|
| Analog | Ten channels, single ended |
| Signal Range | 4 to 20.0 mA, 1 to 5 V dc |
| Rated Mean Accuracy | ±0.05% of span |
| Resolution | 12 bits |
| Discrete | Four channels, optically isolated |
| Applied Voltage | 24 V dc nominal |
| On-State | 24 V dc nominal |
| On-State Resistance | 1.0 KΩ (maximum) |
| Off-State Resistance | 100 KΩ (maximum) |

Output Channels

| | |
|---|---|
| Analog | Three channels |
| Signal Range | 4 to 20.0 mA (two channels)<br>1 to 5 V dc (one channel) |
| Rated Mean Accuracy | ±0.05% of span |
| Resolution | 12 bits |
| Output Load | Current 735 Ω (maximum)<br>Voltage 3 KΩ (minimum) |
| Compliance Voltage | 18.6 V dc nominal at 20 mA at FTA terminals |
| Settling Time | 100 ms to settle within a 1% band of steady state |
| Discrete | Four channels, optically isolated |
| Applied Voltage | 21 to 29 V dc, 24 V dc nominal |
| On-State Load Current | 60 mA maximum |
| Off-State Leakage | 100 µA maximum leakage current |

# FRSFBI Fieldbus Isolator

The FRSFBI Fieldbus Isolator module provides the Fieldbus connections for the DCS Fieldbus Modules. The FRSFBI modules are used in the first converted card file on the Foxboro Evo system Fieldbus. A single FRSFBI is installed in the first Power Card slot for a single-channel Fieldbus. FRSFBIs are installed in both slots for a redundant Fieldbus. The FRSFBIs use the Fisher PROVOX backplane to communicate with the Fieldbus Modules installed in the same card file. FRSFBE Fieldbus Extenders are installed (in single-channel and redundant configurations) in the power card slots in other converted card files on the Fieldbus to provide communication to the other backplanes. The FRSFBI for each channel is connected to the FRSFBEs via a local Fieldbus extension cable.

| | |
|---|---|
| Maximum number of DCS Fieldbus Modules driven | 40 |
| Maximum length of local bus | 9 m (30 ft) |
| Maximum input power voltage | 30 V dc |
| Maximum power dissipation | 2.75 W |
| Maximum isolation voltage | 2000 V rms |

# Appendix B. I/O Connections

*The tables in this appendix show the input/output connections made at the Field Termination Assembly (FTA) termination points and the corresponding FBM point in the Foxboro Evo control system.*

Use the tables in this appendix to relate the FBM17 and FBM01 points in the Foxboro Evo control program to points on the Fisher PROVOX Card File Terminal strips. The tables include the connection point, as numbered on the strip, the I/O type using Fisher PROVOX terminology, and the FBM points you reference in order to access the point.

The tables use the following abbreviations:

| | |
|---|---|
| CO | Current Output in the Fisher PROVOX system, referred to as an analog output in the Foxboro Evo system. |
| DO | Discrete Output in the Fisher PROVOX system, referred to as a digital or contact output in the Foxboro Evo. |
| DI | Discrete Input in the Fisher PROVOX system, referred to as a digital or contact input in the Foxboro Evo. |
| FBM17 (1) | The first of two FBM17s to represent the I/O in the Foxboro Evo system. For a DCS Fieldbus Module with the letterbug FRM730, the first FBM would be FRM731. |
| FBM17 (2) | The second of two FBM17s to represent the I/O in the Foxboro Evo system. For a DCS Fieldbus Module with the letterbug FRM730, the FBM would be FRM732. |
| FBM01 | The single FBM01 to represent the I/O in the Foxboro Evo system. For a DCS Fieldbus Module with the letterbug FRM730, the FBM would be FRM733. |
| FTA | Field Termination Assembly. Original Fisher PROVOX field wiring block with 24 terminations. There are eight blocks immediately above the card file. |
| MV | Measured Variable in the Fisher PROVOX system, referred to as an analog input in the Foxboro Evo. |
| SC | Signal Common. |
| VO | Voltage Output in the Fisher PROVOX system, referred to as an analog output in the Foxboro Evo system. |

# Terminal Wiring for FRM701DCS Fieldbus Modules

The FRM701 replaces the CL7001 Configurable Controller. The signal connections depend on how the original controller was configured:

- Table B-1 shows the Foxboro Evo connections when the original controller was configured without discrete I/O.
- Table B-2 shows the Foxboro Evo connections when the original controller was configured to support seven discrete outputs and no discrete inputs, that is, the selector plug was in position A.
- Table B-3 shows the Foxboro Evo connections when the original controller was configured to support three discrete outputs and two discrete inputs, that is, the selector plug was in position B.

**Table B-1. FBM Points for an FRM701 without Discrete I/O**

| FTA | Type | I/A Series Point |
|---|---|---|
| 1 | SC | |
| 2 | MV1+ | FBM17 (1) PNT 1 |
| 3 | +24 | |
| 4 | MV2+ | FBM17 (1) PNT 2 |
| 5 | SC | |
| 6 | SC | |
| 7 | MV3+ | FBM17 (1) PNT 3 |
| 8 | SC | |
| 9 | MV4+ | FBM17 (1) PNT 4 |
| 10 | SC | |
| 11 | SC | |
| 12 | | |
| 13 | +24 | |
| 14 | | |
| 15 | | |
| 16 | | |
| 17 | | |
| 18 | | |
| 19 | | |
| 20 | | |
| 21 | | |
| 22 | | |
| 23 | SC | |
| 24 | CO+ | FBM17 (1) PNT 5 |

**Table B-2. FBM Points for an FRM701 with Seven Discrete Outputs and No Discrete Inputs**

| FTA | Type | I/A Series Point |
|---|---|---|
| 1 | SC | |
| 2 | MV1+ | FBM17 (1) PNT 1 |
| 3 | +24 | |
| 4 | MV2+ | FBM17 (1) PNT 2 |
| 5 | SC | |
| 6 | SC | |
| 7 | MV3+ | FBM17 (1) PNT 3 |
| 8 | SC | |
| 9 | MV4+ | FBM17 (1) PNT 4 |
| 10 | SC | |
| 11 | SC | |
| 12 | | |
| 13 | +24 | |
| 14 | DO1+ | FBM17 (1) PNT 11 |
| 15 | DO2+ | FBM17 (1) PNT 12 |
| 16 | DO- | |
| 17 | DO3+ | FBM17 (1) PNT 13 |
| 18 | DO4+ | FBM17 (1) PNT 14 |
| 19 | DO5+ | FBM17 (2) PNT 11 |
| 20 | DO6+ | FBM17 (2) PNT 12 |
| 21 | DO7+ | FBM17 (2) PNT 13 |
| 22 | DO- | |
| 23 | SC | |
| 24 | CO+ | FBM17 (1) PNT 5 |

**Table B-3. FBM Points for an FRM701 with Two Discrete Inputs and Three Discrete Outputs**

| FTA | Type | I/A Series Point |
|---|---|---|
| 1 | SC | |
| 2 | MV1+ | FBM17 (1) PNT 1 |
| 3 | +24 | |
| 4 | MV2+ | FBM17 (1) PNT 2 |
| 5 | SC | |
| 6 | SC | |
| 7 | MV3+ | FBM17 (1) PNT 3 |
| 8 | SC | |
| 9 | MV4+ | FBM17 (1) PNT 4 |
| 10 | SC | |
| 11 | SC | |
| 12 | | |
| 13 | +24 | |
| 14 | DO1+ | FBM17 (1) PNT 11 |
| 15 | DO2+ | FBM17 (1) PNT 12 |
| 16 | DO- | |
| 17 | DO3+ | FBM17 (1) PNT 13 |
| 18 | DI1+ | FBM17 (1) PNT 7 |
| 19 | DI1- | |
| 20 | DI2+ | FBM17 (1) PNT 8 |
| 21 | DI2- | |
| 22 | DO- | |
| 23 | SC | |
| 24 | CO+ | FBM17 (1) PNT 5 |

# Terminal Wiring for FRM711DCS Fieldbus Modules

The FRM711 replaces the CL7002 and CL7011 Computing Controllers. Table B-4 shows the Foxboro Evo connections to reference for access to the points handled by the original controller.

**Table B-4. FBM Points for an FRM711**

| FTA | Type | I/A Series Point |
|---|---|---|
| 1 | SC | |
| 2 | MV1+ | FBM17 (1) PNT 1 |
| 3 | +24 | |
| 4 | MV2+ | FBM17 (1) PNT 2 |
| 5 | SC | |
| 6 | SC | |
| 7 | MV3+ | FBM17 (1) PNT 3 |
| 8 | +24 | |
| 9 | MV4+ | FBM17 (1) PNT 4 |
| 10 | SC | |
| 11 | SC | |
| 12 | MV5+ | FBM17 (2) PNT 1 |
| 13 | +24 | |
| 14 | DO1+ | FBM17 (1) PNT 11 |
| 15 | DO2+ | FBM17 (1) PNT 12 |
| 16 | DO- | |
| 17 | DI1- | FBM17 (1) PNT 7 |
| 18 | DI2- | FBM17 (1) PNT 8 |
| 19 | DI3- | FBM17 (1) PNT 9 |
| 20 | DI4- | FBM17 (1) PNT 10 |
| 21 | DI+ | |
| 22 | VO+ | FBM17 (1) PNT 6 |
| 23 | SC | |
| 24 | CO+ | FBM17 (1) PNT 5 |

# Terminal Wiring for FRMMPU Fieldbus Modules

The FRMMPU DCS Fieldbus Module is paired with the FRMJPM Jumper card in various combinations to replace CL6003 Interactive controllers.

The FRMMPU and FRMJMP are plugged directly into the original Interconnect Assembly, which is mounted on the Fisher backplane.

**— NOTE**

Slots on the CL7006 and CL7016 Interconnect Assemblies are numbered from right to left.

## Terminal Wiring for 2-Wide Interactive Controllers

When upgrading a 2-wide controller, the FRMJMP replaces the Process I/O Assembly in slot 2 (on the left) of the CL7016 Interconnect Assembly, and the FRMMPU is installed in the slot 1 (on the right) in place of the Fisher PROVOX Microprocessor Assembly. Table B-5 relates the FBM points to the original terminal strip assignments from slot 2 on the left and slot 1 on the right.

**Table B-5. FRMMPU Points for 2-Wide Configuration**

| FTA | Type | Foxboro Evo Point | | FTA | Type | Foxboro Evo Point |
|---|---|---|---|---|---|---|
| **CL7016 Slot 2: FRMJMP** | | | | **CL7016 Slot 1: FRMMPU** | | |
| 1 | SC | | | 1 | SC | |
| 2 | MV6+ | FBM17 (2) PNT 2 | | 2 | MV1+ | FBM17 (1) PNT 1 |
| 3 | +24 | | | 3 | +24 | |
| 4 | MV7+ | FBM17 (2) PNT 3 | | 4 | MV2+ | FBM17 (1) PNT 2 |
| 5 | SC | | | 5 | SC | |
| 6 | SC | | | 6 | SC | |
| 7 | MV8+ | FBM17 (2) PNT 4 | | 7 | MV3+ | FBM17 (1) PNT 3 |
| 8 | +24 | | | 8 | +24 | |
| 9 | MV9+ | FBM01 PNT 1 | | 9 | MV4+ | FBM17 (1) PNT 4 |
| 10 | SC | | | 10 | SC | |
| 11 | SC | | | 11 | SC | |
| 12 | MV10+ | FBM01 PNT 2 | | 12 | MV5+ | FBM17 (2) PNT 1 |
| 13 | +24 | | | 13 | +24 | |
| 14 | DI1+ | FBM17 (1) PNT 7 | | 14 | DO1+ | FBM17 (1) PNT 11 |
| 15 | DI1- | | | 15 | DO1- | |
| 16 | DI2+ | FBM17 (1) PNT 8 | | 16 | DO2+ | FBM17 (1) PNT 12 |
| 17 | DI2- | | | 17 | DO2- | |
| 18 | DI3+ | FBM17 (1) PNT 9 | | 18 | DO3+ | FBM17 (1) PNT 13 |
| 19 | DI3- | | | 19 | DO3- | |
| 20 | DI4+ | FBM17 (1) PNT 10 | | 20 | DO4+ | FBM17 (1) PNT 14 |
| 21 | DI4- | | | 21 | DO4- | |
| 22 | | | | 22 | VO+ | FBM17 (1) PNT 6 |
| 23 | SC | | | 23 | SC | |
| 24 | CO2+ | FBM17 (2) PNT 5 | | 24 | CO1+ | FBM17 (1) PNT 5 |

# Terminal Wiring for 3-Wide with Discrete I/O

When replacing a 3-wide controller configured with discrete I/O, the DCS Fieldbus Modules are configured as follows:

- Slot 4 (the left slot in the CL7006 Interconnect Assembly) is left blank.
- An FRMMPU replaces the Discrete I/O Assembly in slot 3.
- An FRMJMP is installed in slot 2 in place of the Process I/O Assembly.
- A second FRMFPU replaces the Fisher Microprocessor Assembly originally installed in slot 1 (the right slot in the CL7006 Interconnect Assembly).

The new configuration is represented in the Foxboro Evo system as two devices, each consisting of an FBP10, two FBM17s, and one FBM01. The I/O originally handled by the Discrete I/O Assembly in slot 3 is accessed through the first FBP10, as shown in Table B-6. The I/O from slots 2 and 1 is accessed through the second FBP10, as shown in Table B-7.

Table B-6 and Table B-7 relate the FBM points to the original terminal strip assignments from slots 2, 3, and 4, respectively.

**Table B-6. Points for 3-Wide Configuration with Discrete I/O: Slots 4 and 3**

| FTA | | FTA | Type | Foxboro Evo Point |
|---|---|---|---|---|
| **CL7006 Slot 4** | | **CL7006 Slot 3: FRMMPU** | | |
| Slot 4 is left blank. | | 1 | SC | |
| | | 2 | | |
| | | 3 | +24 | |
| | | 4 | | |
| | | 5 | SC | |
| | | 6 | SC | |
| | | 7 | | |
| | | 8 | +24 | |
| | | 9 | | |
| | | 10 | SC | |
| | | 11 | SC | |
| | | 12 | | |
| | | 13 | +24 | |
| | | 14 | DO5+ | FBM17 (1) PNT 11 |
| | | 15 | DO5- | |
| | | 16 | DO6+ | FBM17 (1) PNT 12 |
| | | 17 | DO6- | |
| | | 18 | DO7+ | FBM17 (1) PNT 13 |
| | | 19 | DO7- | |
| | | 20 | DO8+ | FBM17 (1) PNT 14 |
| | | 21 | DO8- | |
| | | 22 | | |
| | | 23 | SC | |
| | | 24 | | |

**Table B-7. FRMMPU Points for 3-Wide Configuration with Discrete I/O: Slots 2 and 1**

| FTA | Type | Foxboro Evo Point | | FTA | Type | Foxboro Evo Point |
|---|---|---|---|---|---|---|
| **CL7006 Slot 2: FRMJMP** | | | | **CL7006 Slot 1: FRMMPU** | | |
| 1 | SC | | | 1 | SC | |
| 2 | MV6+ | FBM17 (2) PNT 2 | | 2 | MV1+ | FBM17 (1) PNT 1 |
| 3 | +24 | | | 3 | +24 | |
| 4 | MV7+ | FBM17 (2) PNT 3 | | 4 | MV2+ | FBM17 (1) PNT 2 |
| 5 | SC | | | 5 | SC | |
| 6 | SC | | | 6 | SC | |
| 7 | MV8+ | FBM17 (2) PNT 4 | | 7 | MV3+ | FBM17 (1) PNT 3 |
| 8 | +24 | | | 8 | +24 | |
| 9 | MV9+ | FBM01 PNT 1 | | 9 | MV4+ | FBM17 (1) PNT 4 |
| 10 | SC | | | 10 | SC | |
| 11 | SC | | | 11 | SC | |
| 12 | MV10+ | FBM01 PNT 2 | | 12 | MV5+ | FBM17 (2) PNT 1 |
| 13 | +24 | | | 13 | +24 | |
| 14 | DI1+ | FBM17 (1) PNT 7 | | 14 | DO1+ | FBM17 (1) PNT 11 |
| 15 | DI1- | | | 15 | DO1- | |
| 16 | DI2+ | FBM17 (1) PNT 8 | | 16 | DO2+ | FBM17 (1) PNT 12 |
| 17 | DI2- | | | 17 | DO2- | |
| 18 | DI3+ | FBM17 (1) PNT 9 | | 18 | DO3+ | FBM17 (1) PNT 13 |
| 19 | DI3- | | | 19 | DO3- | |
| 20 | DI4+ | FBM17 (1) PNT 10 | | 20 | DO4+ | FBM17 (1) PNT 14 |
| 21 | DI4- | | | 21 | DO4- | |
| 22 | | | | 22 | VO+ | FBM17 (1) PNT 6 |
| 23 | SC | | | 23 | SC | |
| 24 | CO2+ | FBM17 (2) PNT 5 | | 24 | CO1+ | FBM17 (1) PNT 5 |

# Terminal Wiring for 3-Wide with Process I/O

When replacing a 3-wide controller configured with Process I/O, the DCS Fieldbus Modules are configured as follows:

- An FRMMPU replaces the Process I/O Assembly in slot 4 (the left slot in the CL7006 Interconnect Assembly).
- Slot 3 is left blank.
- An FRMJMP is installed in slot 2 in place of the second Process I/O Assembly.
- Another FRMFPU replaces the Fisher Microprocessor Assembly originally installed in slot 1 (the right slot in the CL7006 Interconnect Assembly).

The new configuration is represented in the Foxboro Evo system as two devices, each consisting of an FBP10, two FBM17s and one FBM01. The I/O originally handled by the Process I/O Assembly in slot 4 is accessed through the first FBP10, as shown in Table B-8. The I/O from slots 2 and 1 is accessed through the second FBP10, as shown in Table B-9.

**Table B-8. FRMMPU Points for 3-Wide Configuration with Process I/O: Slots 4 and 3**

| FTA | Type | Foxboro Evo Point | | FTA |
|---|---|---|---|---|
| **CL7006 Slot 4: FRMMPU** | | | | **Slot 3** |
| 1 | SC | | | Slot 3 is left blank. |
| 2 | MV16+ | FBM17 (1) PNT 1 | | |
| 3 | +24 | | | |
| 4 | MV17+ | FBM17 (1) PNT 2 | | |
| 5 | SC | | | |
| 6 | SC | | | |
| 7 | MV18+ | FBM17 (1) PNT 3 | | |
| 8 | +24 | | | |
| 9 | MV19+ | FBM17 (1) PNT 4 | | |
| 10 | SC | | | |
| 11 | SC | | | |
| 12 | MV20+ | FBM17 (2) PNT 1 | | |
| 13 | +24 | | | |
| 14 | | | | |
| 15 | | | | |
| 16 | | | | |
| 17 | | | | |
| 18 | | | | |
| 19 | | | | |
| 20 | | | | |
| 21 | | | | |
| 22 | | | | |
| 23 | SC | | | |
| 24 | CO4+ | FBM17 (2) PNT 5 | | |

**Table B-9. FRMMPU Points for 3-Wide Configuration with Process I/O: Slots 2 and 1**

| FTA | Type | Foxboro Evo Point | | FTA | Type | Foxboro Evo Point |
|---|---|---|---|---|---|---|
| **CL7006 Slot 2: FRMJMP** | | | | **Slot 1: FRMMPU** | | |
| 1 | SC | | | 1 | SC | |
| 2 | MV6+ | FBM17 (2) PNT 2 | | 2 | MV1+ | FBM17 (1) PNT 1 |
| 3 | +24 | | | 3 | +24 | |
| 4 | MV7+ | FBM17 (2) PNT 3 | | 4 | MV2+ | FBM17 (1) PNT 2 |
| 5 | SC | | | 5 | SC | |
| 6 | SC | | | 6 | SC | |
| 7 | MV8+ | FBM17 (2) PNT 4 | | 7 | MV3+ | FBM17 (1) PNT 3 |
| 8 | +24 | | | 8 | +24 | |
| 9 | MV9+ | FBM01 PNT 1 | | 9 | MV4+ | FBM17 (1) PNT 4 |
| 10 | SC | | | 10 | SC | |
| 11 | SC | | | 11 | SC | |
| 12 | MV10+ | FBM01 PNT 2 | | 12 | MV5+ | FBM17 (2) PNT 1 |
| 13 | +24 | | | 13 | +24 | |
| 14 | DI1+ | FBM17 (1) PNT 7 | | 14 | DO1+ | FBM17 (1) PNT 11 |
| 15 | DI1- | | | 15 | DO1- | |
| 16 | DI2+ | FBM17 (1) PNT 8 | | 16 | DO2+ | FBM17 (1) PNT 12 |
| 17 | DI2- | | | 17 | DO2- | |
| 18 | DI3+ | FBM17 (1) PNT 9 | | 18 | DO3+ | FBM17 (1) PNT 13 |
| 19 | DI3- | | | 19 | DO3- | |
| 20 | DI4+ | FBM17 (1) PNT 10 | | 20 | DO4+ | FBM17 (1) PNT 14 |
| 21 | DI4- | | | 21 | DO4- | |
| 22 | | | | 22 | VO1+ | FBM17 (1) PNT 6 |
| 23 | SC | | | 23 | SC | |
| 24 | CO2+ | FBM17 (2) PNT 5 | | 24 | CO1+ | FBM17 (1) PNT 5 |

## Terminal Wiring for 4-Wide Interactive Controllers

When replacing a 4-wide controller, the DCS Fieldbus Modules are configured as follows:

- An FRMMPU replaces the Process I/O Assembly in slot 4 (the left slot in the CL7006 Interconnect Assembly).
- An FRMMPU replaces the Discrete I/O Assembly in slot 3.
- A second FRMJMP is installed in slot 4 in place of the Process I/O Assembly.
- A second FRMFPU replaces the Fisher Microprocessor Assembly originally installed in slot 1 (the right slot in the CL7006 Interconnect Assembly).

The new configuration is represented in the Foxboro Evo system as two devices, each consisting of an FBP10, two FBM17s and one FBM01. The I/O originally handled by the Process I/O Assembly in slot 4, and the Discrete I/O Assembly in slot 3, is accessed through the first FBP10, as shown in Table B-10. The I/O from slots 2 and 1 is accessed through the second FBP10, as shown in Table B-11.

**Table B-10. FRMMPU Points for 4-Wide Configuration: Slots 4 and 3**

| FTA | Type | Foxboro Evo Point | | FTA | Type | Foxboro Evo Point |
|---|---|---|---|---|---|---|
| **CL7006 Slot 4: FRMJMP** | | | | **CL7006 Slot 3: FRMMPU** | | |
| 1 | SC | | | 1 | SC | |
| 2 | MV16+ | FBM17 (2) PNT 2 | | 2 | MV11+ | FBM17 (1) PNT 1 |
| 3 | +24 | | | 3 | +24 | |
| 4 | MV17+ | FBM17 (2) PNT 3 | | 4 | MV12+ | FBM17 (1) PNT 2 |
| 5 | SC | | | 5 | SC | |
| 6 | SC | | | 6 | SC | |
| 7 | MV18+ | FBM17 (2) PNT 4 | | 7 | MV13+ | FBM17 (1) PNT 3 |
| 8 | +24 | | | 8 | +24 | |
| 9 | MV19+ | FBM01 PNT 1 | | 9 | MV14+ | FBM17 (1) PNT 4 |
| 10 | SC | | | 10 | SC | |
| 11 | SC | | | 11 | SC | |
| 12 | MV20+ | FBM01 PNT 2 | | 12 | MV15+ | FBM17 (2) PNT 1 |
| 13 | +24 | | | 13 | +24 | |
| 14 | DI5+ | FBM17 (1) PNT 7 | | 14 | DO5+ | FBM17 (1) PNT 11 |
| 15 | DI5- | | | 15 | DO5- | |
| 16 | DI6+ | FBM17 (1) PNT 8 | | 16 | DO6+ | FBM17 (1) PNT 12 |
| 17 | DI6- | | | 17 | DO6- | |
| 18 | DI7+ | FBM17 (1) PNT 9 | | 18 | DO7+ | FBM17 (1) PNT 13 |
| 19 | DI7- | | | 19 | DO7- | |
| 20 | DI8+ | FBM17 (1) PNT 10 | | 20 | DO8+ | FBM17 (1) PNT 14 |
| 21 | DI8- | | | 21 | DO8- | |
| 22 | | | | 22 | VO2+ | FBM17 (1) PNT 6 |
| 23 | SC | | | 23 | SC | |
| 24 | CO4+ | FBM17 (2) PNT 5 | | 24 | CO3+ | FBM17 (1) PNT 5 |

**Table B-11. FRMMPU Points for 4-Wide Configuration: Slots 2 and 1**

| FTA | Type | Foxboro Evo Point | | FTA | Type | Foxboro Evo Point |
|---|---|---|---|---|---|---|
| **CL7006 Slot 2: FRMJMP** | | | | **CL7006 Slot 1: FRMMPU** | | |
| 1 | SC | | | 1 | SC | |
| 2 | MV6+ | FBM17 (2) PNT 2 | | 2 | MV1+ | FBM17 (1) PNT 1 |
| 3 | +24 | | | 3 | +24 | |
| 4 | MV7+ | FBM17 (2) PNT 3 | | 4 | MV2+ | FBM17 (1) PNT 2 |
| 5 | SC | | | 5 | SC | |
| 6 | SC | | | 6 | SC | |
| 7 | MV8+ | FBM17 (2) PNT 4 | | 7 | MV3+ | FBM17 (1) PNT 3 |
| 8 | +24 | | | 8 | +24 | |
| 9 | MV9+ | FBM01 PNT 1 | | 9 | MV4+ | FBM17 (1) PNT 4 |
| 10 | SC | | | 10 | SC | |
| 11 | SC | | | 11 | SC | |
| 12 | MV10+ | FBM01 PNT 2 | | 12 | MV5+ | FBM17 (2) PNT 1 |
| 13 | +24 | | | 13 | +24 | |
| 14 | DI1+ | FBM17 (1) PNT 7 | | 14 | DO1+ | FBM17 (1) PNT 11 |
| 15 | DI1- | | | 15 | DO1- | |
| 16 | DI2+ | FBM17 (1) PNT 8 | | 16 | DO2+ | FBM17 (1) PNT 12 |
| 17 | DI2- | | | 17 | DO2- | |
| 18 | DI3+ | FBM17 (1) PNT 9 | | 18 | DO3+ | FBM17 (1) PNT 13 |
| 19 | DI3- | | | 19 | DO3- | |
| 20 | DI4+ | FBM17 (1) PNT 10 | | 20 | DO4+ | FBM17 (1) PNT 14 |
| 21 | DI4- | | | 21 | DO4- | |
| 22 | | | | 22 | VO1+ | FBM17 (1) PNT 6 |
| 23 | SC | | | 23 | SC | |
| 24 | CO2+ | FBM17 (2) PNT 5 | | 24 | CO1+ | FBM17 (1) PNT 5 |

# Appendix C. DCS Fieldbus Module Control Schemes

*This appendix provides examples of upgraded Fisher PROVOX card files and diagrams how Foxboro Evo I/O blocks are configured to connect the I/O to the control compounds.*

There are five examples in this appendix:

- FRM701 replacing a Configurable Controller with Discrete I/O
- FRM711 upgrading a Computing Controller
- FRMMPU with a FRMJMP replacing a 2-wide Interactive Controller
- Two FRMMPUs and an FRMJMP upgrading a 3-wide Interactive Controller with Discrete I/O
- Two FRMMPUs and an FRMJMP upgrading a 3-wide Interactive Controller with Process I/O.

Each example includes two illustrations:

- A hardware diagram showing the location of the DCS Fieldbus Modules and the Fisher PROVOX field termination assemblies used by the controller. The diagrams do not show cables. The field termination assemblies and card file slots are numbered left to right, 1 through 8.

**— NOTE**

Fisher numbers the slots on the CL7006 and CL7016 Interconnect Assemblies from right to left, while card file slots and FTA are numbered from left to right. In this appendix, the slot numbers on the Interconnect Assemblies are noted in the drawings, but the tables and narrative refer to the card file numbering.

- A block chart depicting the ECBs and I/O type blocks used to connect the process signals to the control scheme. As shown in Figure C-1, each block is represented by a box with the compound and block names at the top, input parameters on the left, the block type in the center, output parameters on the right, and other key parameters across the bottom of the box.

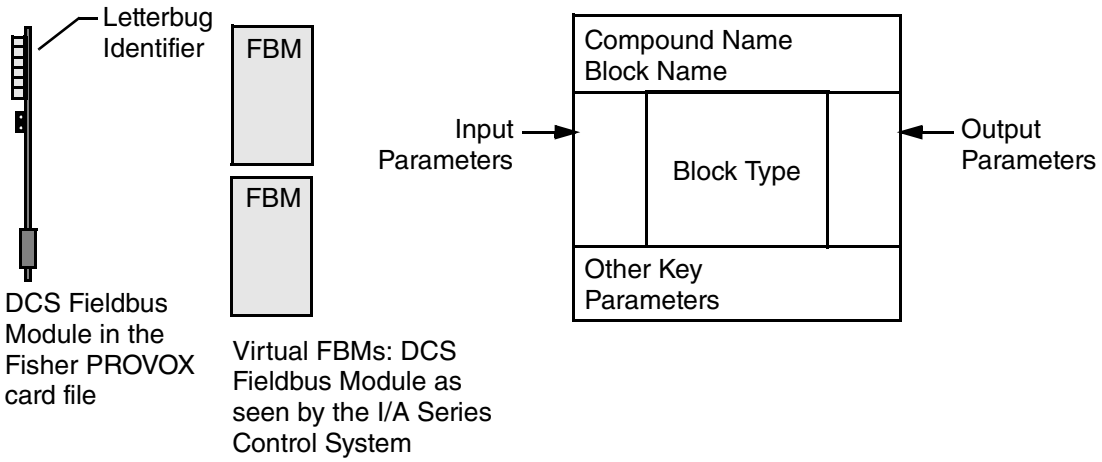



**Figure C-1. Block Diagram Legend**

**NOTE**

The Signal Conditioning Index (SCI) parameter for analog type I/O blocks should be set to 3. For additional ECB and I/O block parameter settings, refer to *Integrated Control Block Descriptions* (B0193AX).

# Configuring an FRM701

Figure C-2 depicts an upgraded Fisher PROVOX card file in which an FRM701 has been installed in slot 1 to replace a Configurable Controller with Discrete I/O. The original PROVOX module was configured to handle two discrete inputs from the process and three discrete outputs to the process.

The FRM701 reads and writes process values using the same field termination assembly (1) previously used by the Computing Controller. The letterbug installed on the FRM701 in this example is EXMP10.

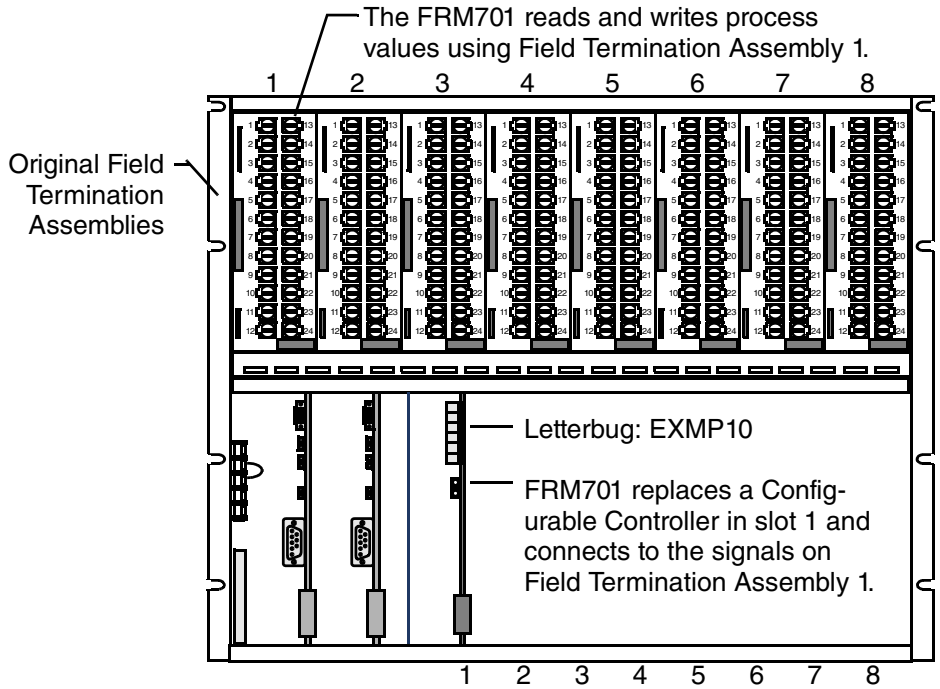



**Figure C-2. Converted Card File with an FRM701 Replacing a Configurable Controller with Discrete I/O**

Figure C-3 shows how four measured variables and two discrete inputs read by the original PROVOX controller are now mapped to a Foxboro Evo control compound. Figure C-4 illustrates how process values determined by the Foxboro Evo control program are directed back to the process employing the one current output and two discrete outputs used by the original controller.

The FRM701 is configured as an FBP10 (EXMP10) and one FBM17 (EXMP11). If the DCS Fieldbus Module had replaced a controller with seven discrete outputs, a second FBM17 (EXMP12) would be required.

The FBM17 serves as the FRM701's data store and provides the measured variable and discrete inputs to individual AIN and CIN blocks respectively, each of which can be connected to one or more control blocks. The control scheme directs output to the process through an AOUT block and two COUT blocks to same FBM17. All of the I/O blocks are configured in the compound FPCVT_1.

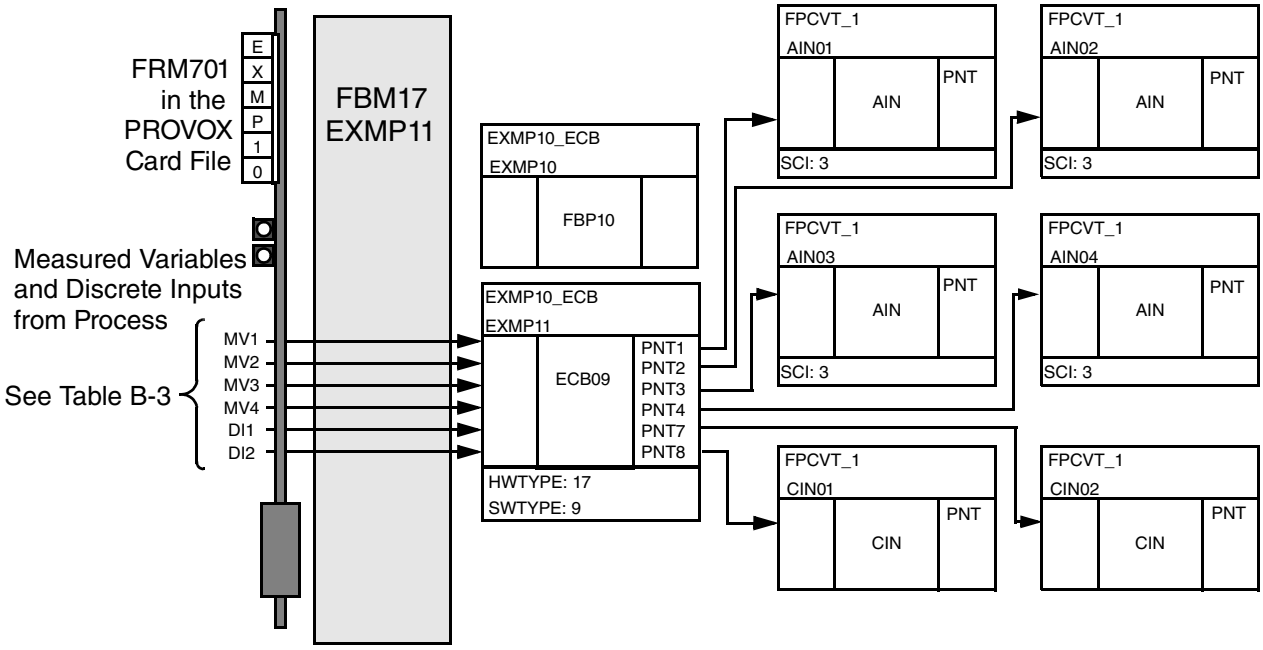



**Figure C-3. Blocks Required to Map Inputs from Process Using an FRM701**

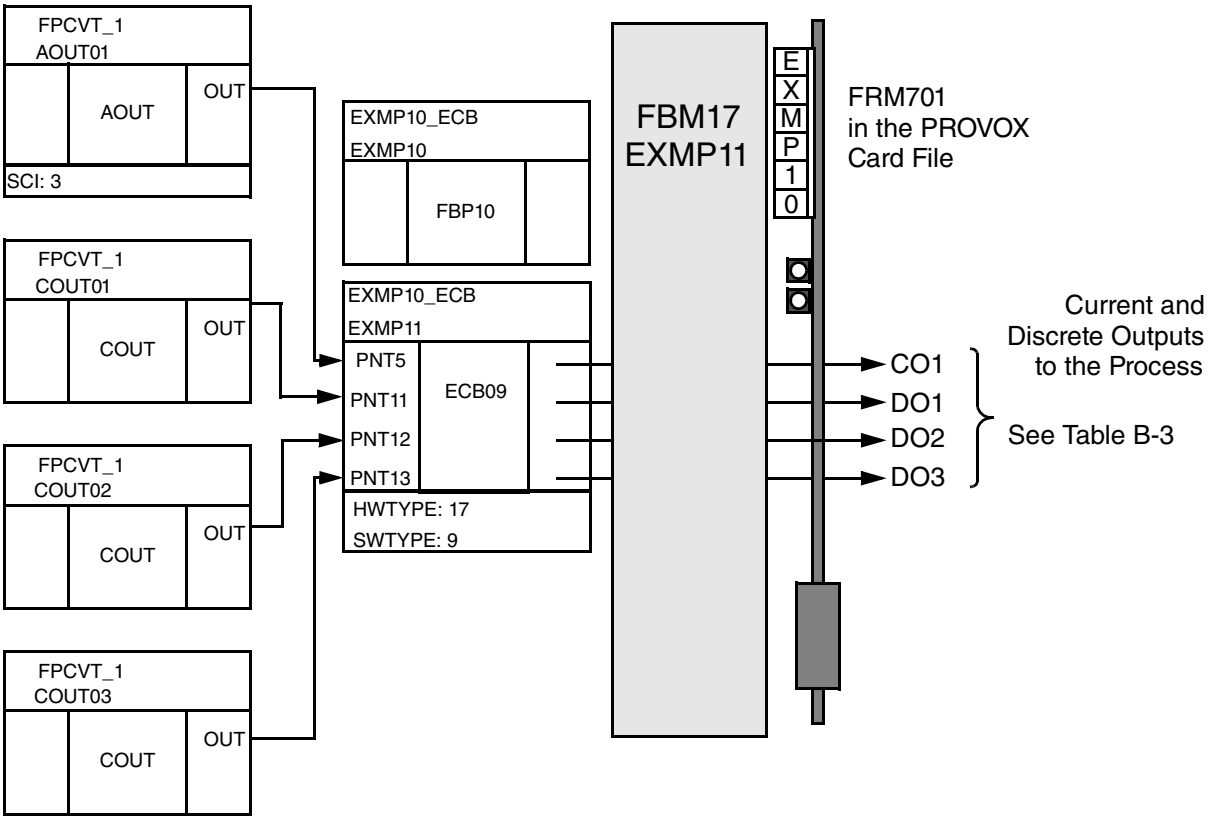



**Figure C-4. Blocks Required to Map Outputs to Process Using an FRM701**

# Configuring an FRM711

Figure C-5 depicts an upgraded Fisher PROVOX card file in which an FRM711 has been installed in slot 2 to replace a Computing Controller.

The FRM711 reads and writes process values using the same field termination assembly (2) previously used by the Computing Controller. The letterbug installed on the FRM711 in this example is EXMP20.

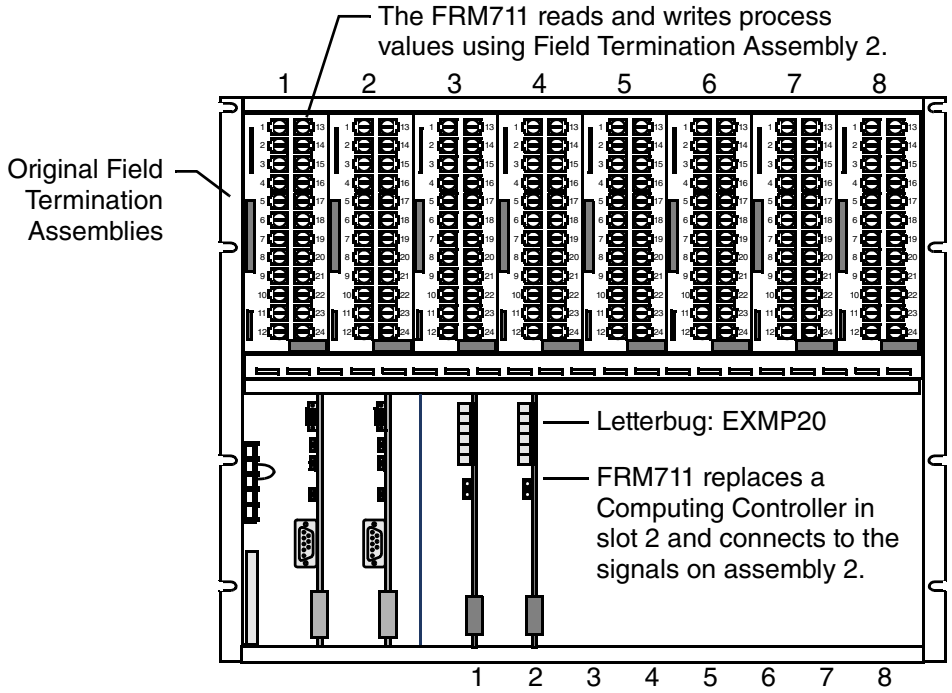



**Figure C-5. Converted Card File with an FRM711 Replacing a Computing Controller**

Figure C-6 shows how five measured variables and four discrete inputs read by the original PROVOX controller are now mapped to a Foxboro Evo control compound. Figure C-7 illustrates how process values determined by the Foxboro Evo control program are directed back to the process employing the two analog outputs (one voltage and one current output) and two discrete outputs used by the original controller.

The FRM701 is configured as an FBP10 (EXMP20) and two FBM17s (EXMP21 and EXMP22). The second FBM17 only handles one point, MV5. Do not configure the second FBM17 if MV5 was not used in the original PROVOX controller configuration.

The FBM17s serve as the FRM711's data store and provide the measured variable and discrete inputs to individual AIN and CIN blocks respectively, each of which can be connected to one or more control blocks. The control scheme directs output to the process through two AOUT blocks and two COUT blocks to first FBM17. All of the I/O blocks are configured in the compound FPCVT_2.

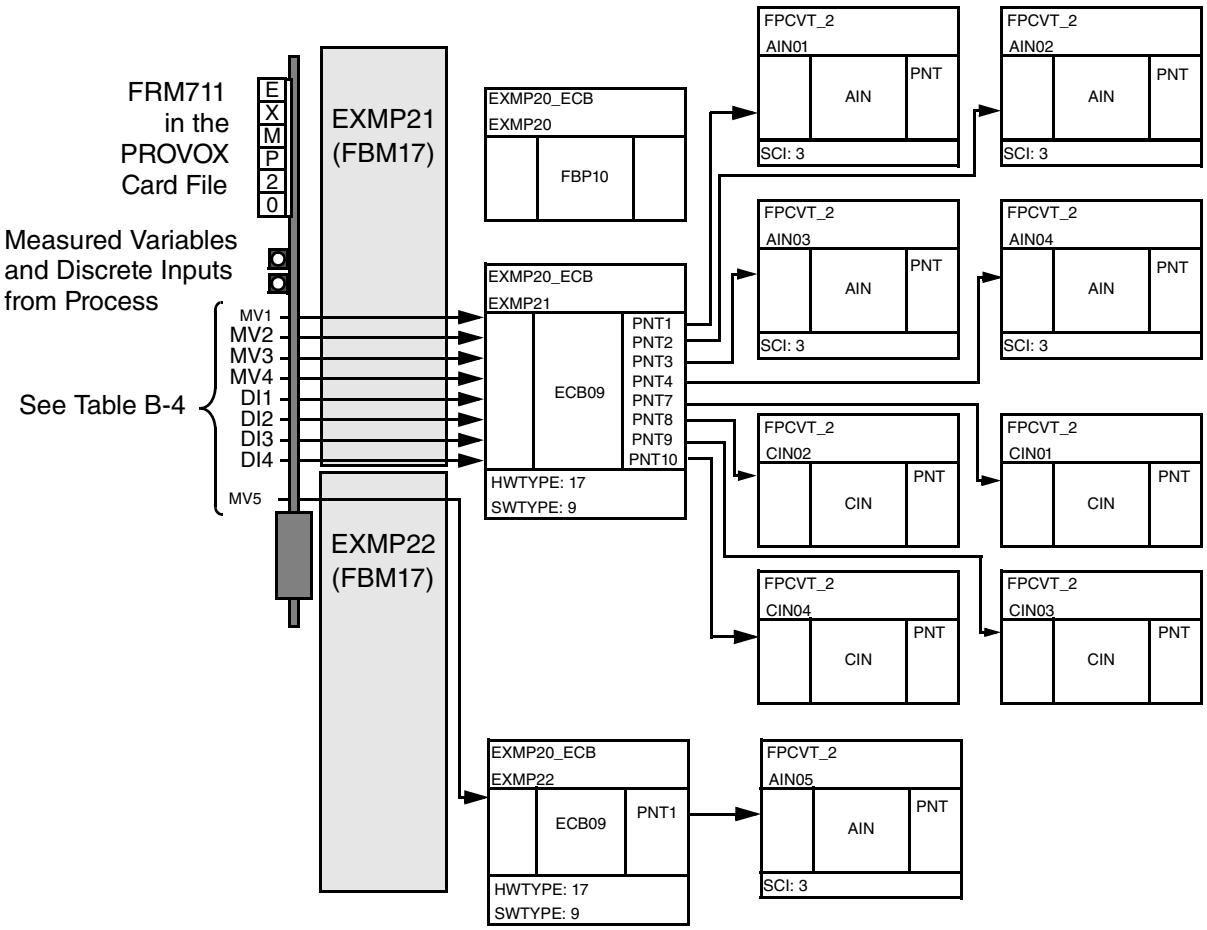



**Figure C-6. Blocks Required to Map Inputs from the Process Using an FRM711**

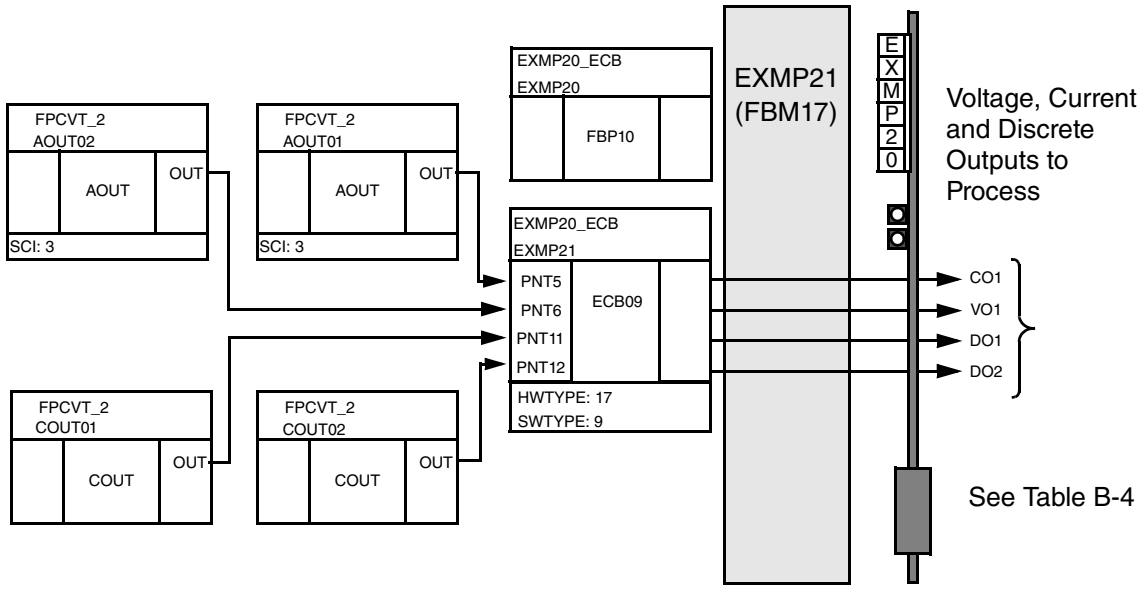



**Figure C-7. Blocks Required to Map Outputs to the Process Using an FRM711**

# Mapping I/O from a 2-Wide Controller

Figure C-8 depicts an upgraded Fisher PROVOX card file in which a 2-wide Interactive Controller occupying slots 3 and 4 has been replaced with an FRMMPU in slot 4 and an FRMJMP in slot 3. The DCS Fieldbus Module and the jumper card plug directly into the CL7016 Interconnect Assembly used by the 2-wide Controller. The letterbug identifier installed on the FRMMPU is EXMP30.

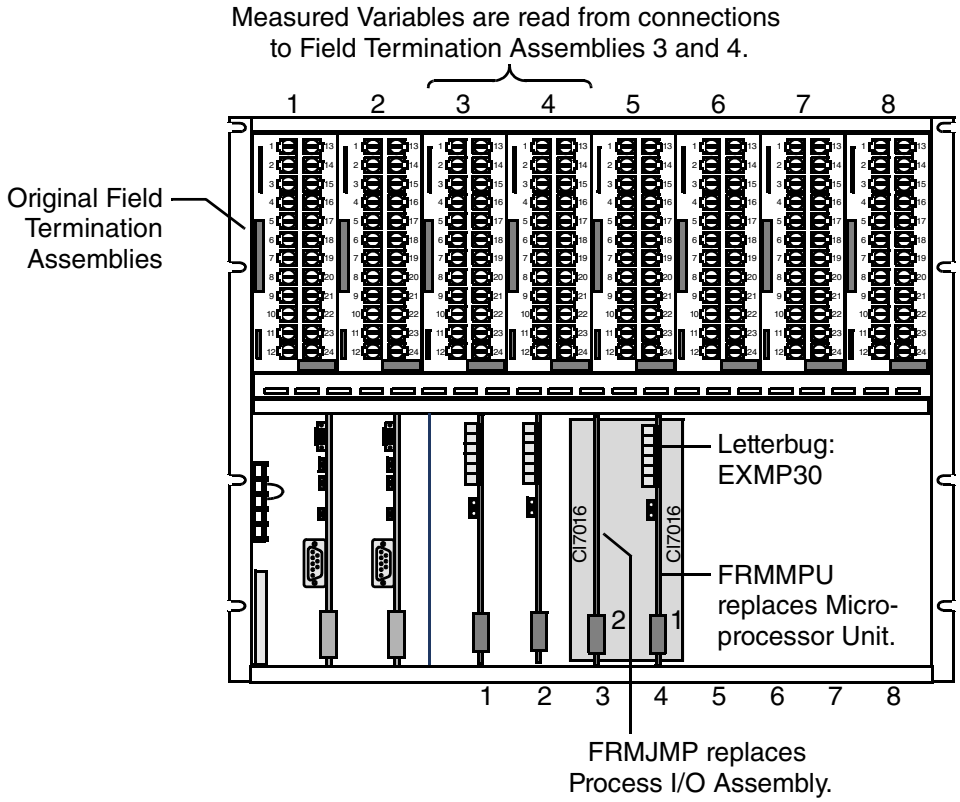



**Figure C-8. Converted Card File with an FRMMPU Replacing a 2-Wide Interactive Controller**

Figure C-9 shows how the ten measured variables and four discrete inputs read by the original PROVOX controller are now mapped to a Foxboro Evo control compound. Figure C-10 illustrates how process values determined by the Foxboro Evo control program are directed back to the process employing the three analog outputs (one voltage and two current outputs) and four discrete outputs used by the original controller.

The FRMMPU is configured as an FBP10 (EXMP30), two FBM17s (EXMP31 and EXMP32), and one FBM01 (EXMP33). The FBM01 handles two points, MV9 and MV10. Do not configure an FBM01 if these two measured variables were not used in the original PROVOX controller configuration.

The FBM17s and FBM01 serve as the FRMMPU's data store and provide the measured variable and discrete inputs to individual AIN and CIN blocks respectively, each of which can be connected to one or more control blocks. The two points held by the FBM01 can be connected by a single Multiple Analog Input (MAIN) block instead of two AINs, as illustrated in Figure C-9.

The control scheme directs output to the process through four AOUT blocks and four COUT blocks to the two FBM17s. All of the I/O blocks are configured in the compound FPCVT_3.

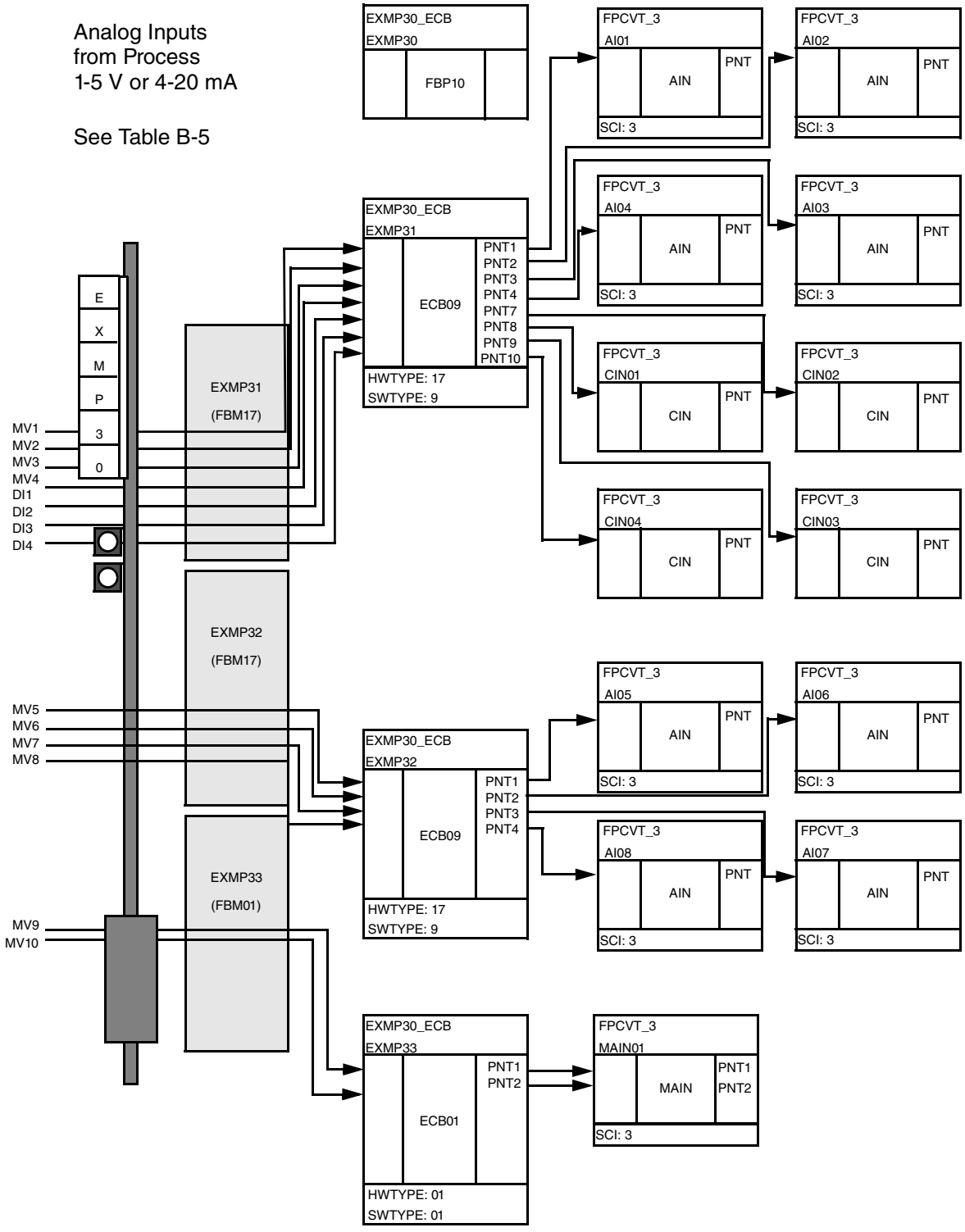



**Figure C-9. Connecting Inputs from the Process via an FRMMPU in a 2-Wide Interactive Controller**

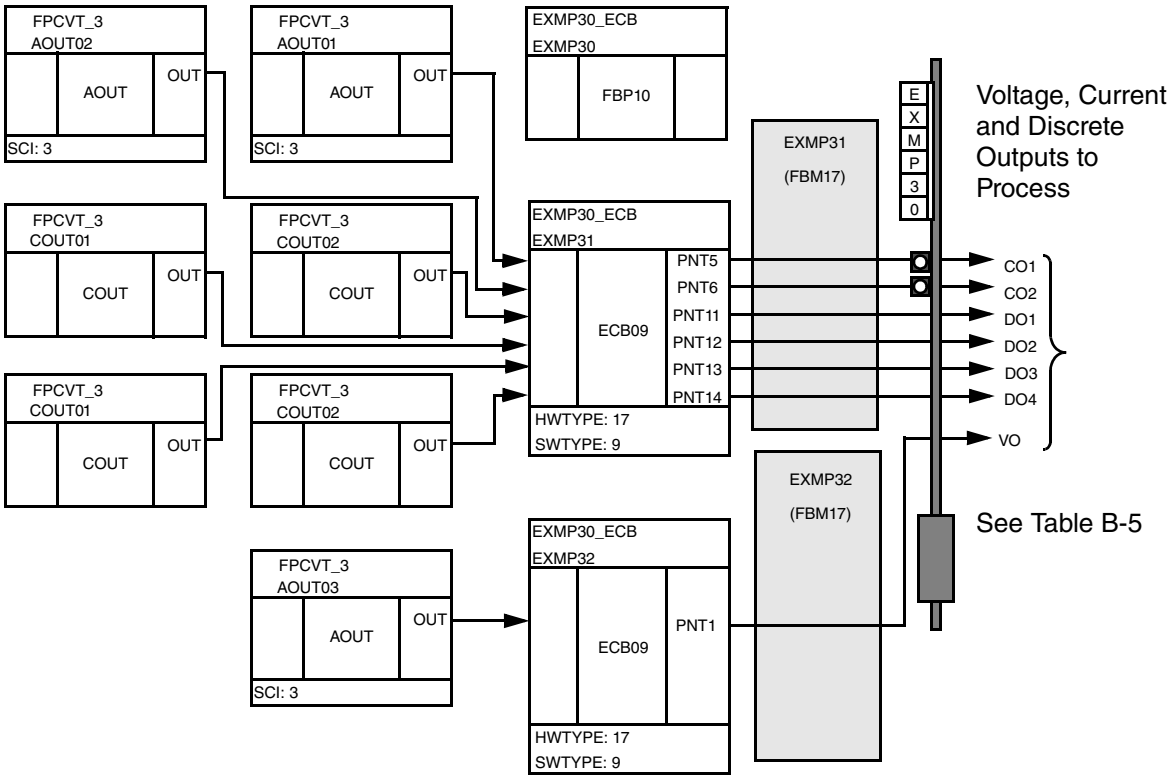



**Figure C-10. Connecting Outputs to the Process via an FRMMPU in a 2-Wide Interactive Controller**

## Mapping I/O for a 4-Wide Controller

The FBMs and I/O block structure configured for the two FRMMPUs in a 4-wide Interactive Controller upgrade is essentially two copies of the 2-wide structures shown in Figure C-9 and Figure C-10. The first of these maps I/O from the two wiring assemblies on the right, while the second handles I/O from the two wiring assemblies on the left. The only differences between the two structures are the naming of the FBMs, which is derived from two different letterbug identifiers installed on the FRMMPUs, and the names of the compounds that hold the I/O blocks.

# Mapping I/O from a 3-Wide Controller

## With Process I/O

Figure C-11 depicts an upgraded Fisher PROVOX card file in which two FRMMPUs and an FRMJMP have been installed to replace a 3-wide Interactive Controller with Process I/O. The upgrade equipment plugs directly into the CL7006 Interconnect Assembly used by the 3-wide Controller. The DCS Fieldbus Modules are configured as follows:

- An FRMMPU is plugged in the right slot (slot 1 on the CL7006, slot 8 in Figure C-11) to replace the Microprocessor. The letterbug installed on this module is EXAMP40.
- An FRMJMP replaces the Process I/O Assembly in the slot (slot 2 on the CL7006, slot 7 in Figure C-11).
- The next slot to the left (slot 3 on the CL7006, slot 6 in Figure C-11) is left blank as it was in the original controller.
- A second FRMMPU is installed in the left slot in the Interconnect Assembly (slot 4 on the CL7006, slot 5 in Figure C-11) in place of the other Process I/O Assembly. This FRMMPU has been assigned the letterbug EXMP50.

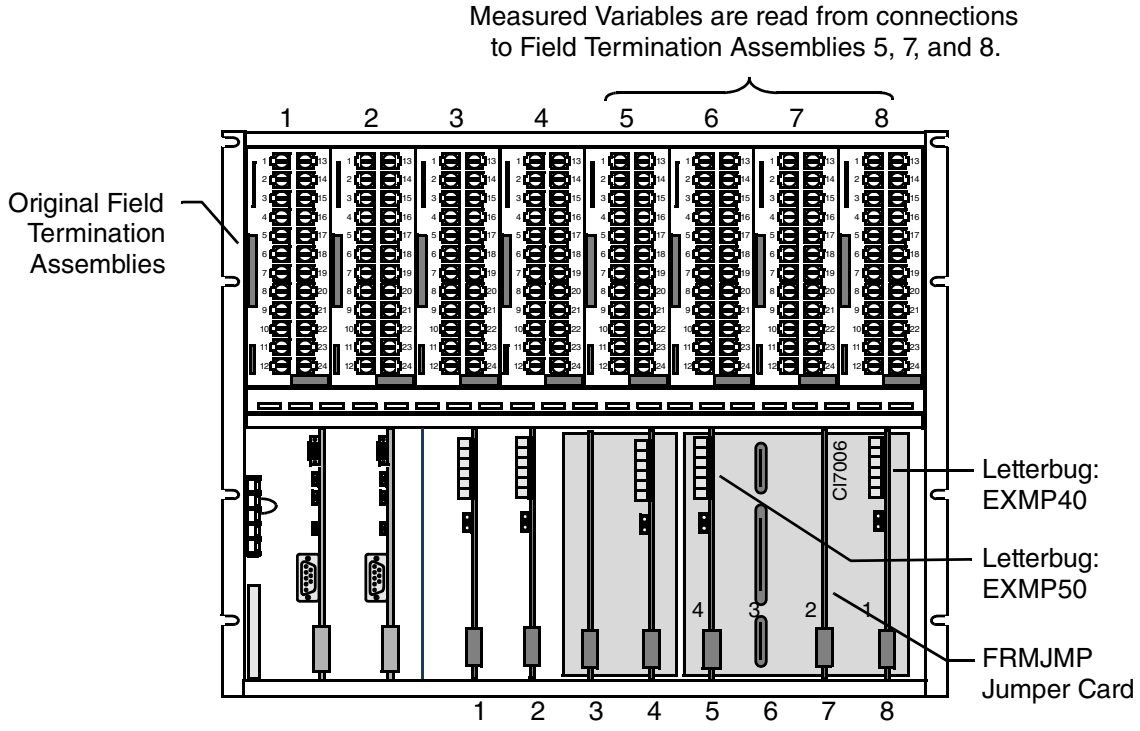



**Figure C-11. Converted Card File with Two FRMMPUs and a FRMJMP Replacing a 3-Wide Interactive Controller with Process I/O**

EXMP40 is configured as an FBP10 (EXMP40), two FBM17s (EXMP41 and EXMP42), and one FBM01 (EXMP43). These FBMs are responsible for the process signals on wiring assemblies 7 and 8. These points include ten measured variables, four discrete inputs, three process outputs (two current outputs and one voltage output).

The FBM17s and FBM01 serve as the FRMMPU's data store and provide the measured variable and discrete inputs to individual AIN and CIN blocks respectively, each of which can be connected to one or more control blocks. The two points managed by the FBM01 can be connected to the control blocks by a single Multiple Analog Input (MAIN) block instead of two AINs.

The I/O handled by the FRMMPU is identified in the Fisher PROVOX controller with the same designations as a 2-wide controller, and the points from this first FRMMPU are connected to the control database the same way you configure an FRMMPU in a 2-wide controller upgrade. See Figure C-9 for mapping of inputs from the process and Figure C-10 for blocks connections for outputs to the process. Change the ECB compound and block names from EXMP3*x* to EXMP4*x*, and the control compound name from FPCVT_3 to FPCVT_4.

The second FRMMPU (EXMP50) is configured as an FBP10 (EXMP50) and two FBM17s (EXMP51 and EXMP52). These FBMs are responsible for five measured variables (MV16 to MV20) and two process outputs (VO2 and CO4). Figure C-12 and Figure C-13 illustrate the additional blocks required to connect the I/O handled by the second FRMMPU.

Note that all of the I/O blocks for both FRMMPUs are configured in the same compound, FPCVT_4.

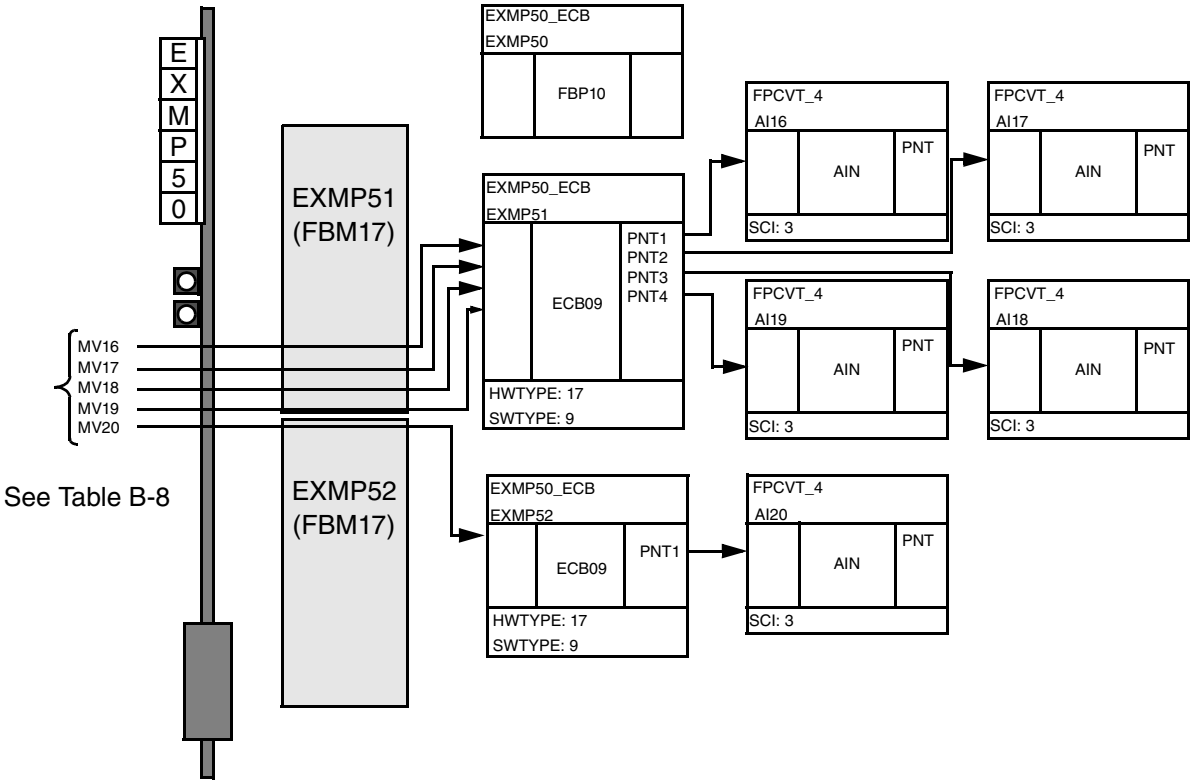



**Figure C-12. Connecting Inputs from the Process via the Second FRMMPU in a 3-Wide Interactive Controller Upgrade**

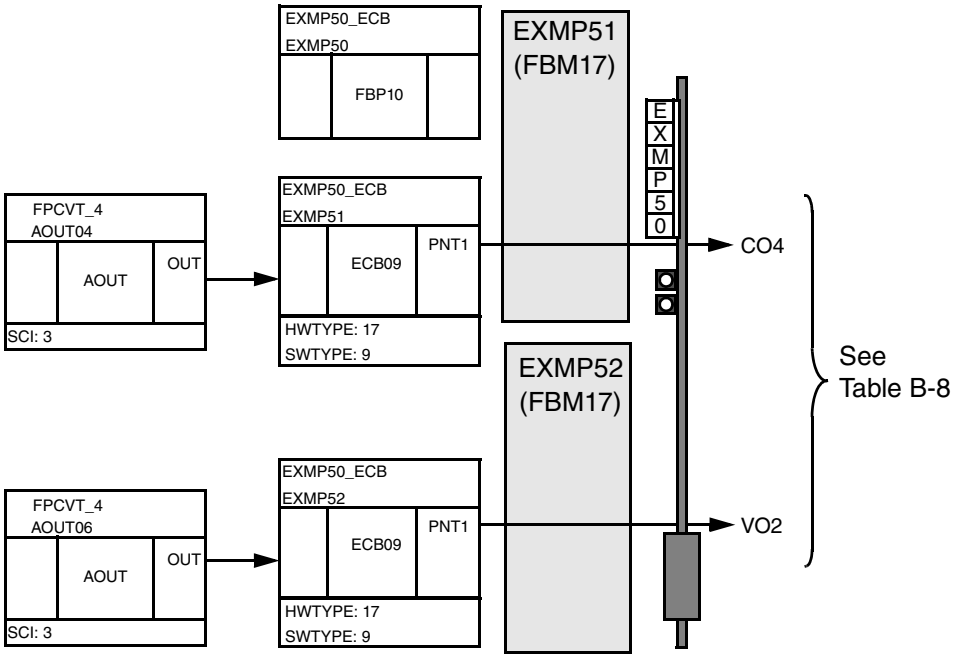



**Figure C-13. Connecting Outputs to the Process via the Second FRMMPU in a 2-Wide Interactive Controller Upgrade**

## With Discrete I/O

Figure C-14 depicts an upgraded Fisher PROVOX card file in which two FRMMPUs and an FRMJMP have been installed to replace a 3-wide Interactive Controller with Discrete I/O. The upgrade equipment plugs directly into the CL7006 Interconnect Assembly used by the 3-wide Controller. The DCS Fieldbus Modules are configured as follows:

- An FRMMPU is plugged in the right slot (slot 1 on the CL7006, slot 8 in Figure C-14) to replace the Microprocessor. The letterbug installed on this module is EXAMP60.
- An FRMJMP replaces the Discrete I/O Assembly in the slot (slot 2 on the CL7006, slot 7 in Figure C-14).
- A second FRMMPU is installed in the next slot to the left in the Interconnect Assembly (slot 3 on the CL7006, slot 6 in Figure C-14) in place of the other Discrete I/O Assembly. This FRMMPU has been assigned the letterbug EXMP70.
- The left slot (slot 4 on the CL7006, slot 5 in Figure C-14) is left blank as it was in the original controller.

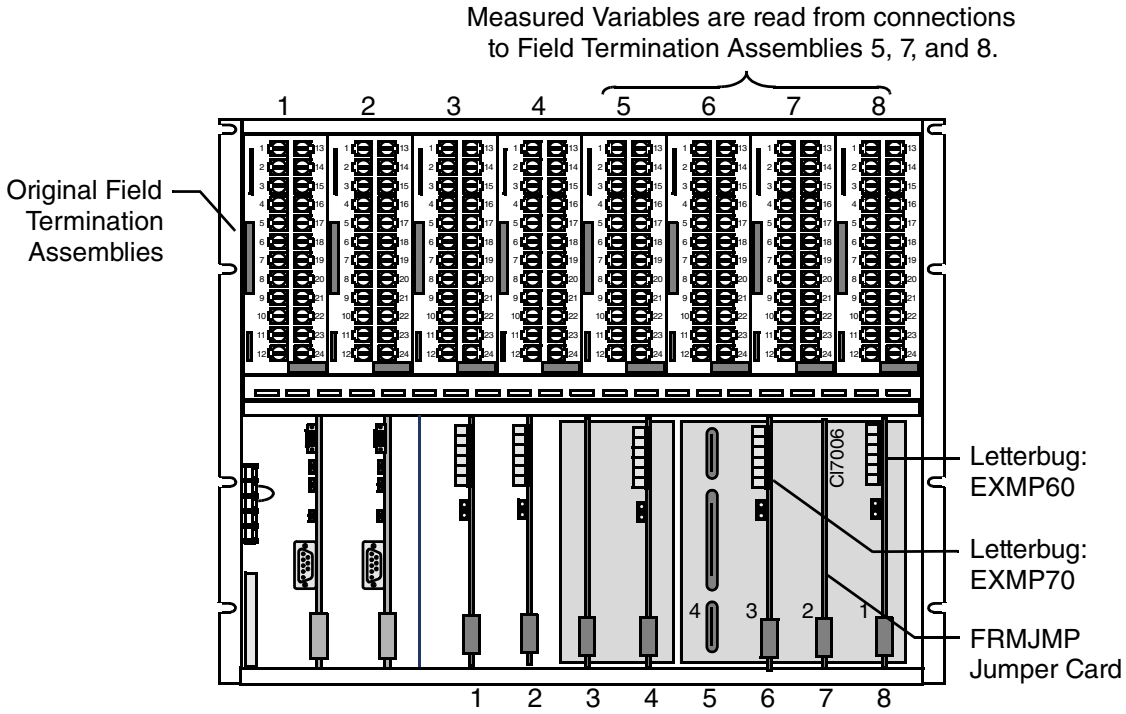



**Figure C-14. Converted Card File with Two FRMMPUs and a FRMJMP Replacing a 3-Wide Interactive Controller with Discrete I/O**

EXMP60 is configured as an FBP10 (EXMP60), two FBM17s (EXMP61 and EXMP62), and one FBM01 (EXMP63). These FBMs are responsible for the process signals on wiring assemblies 7 and 8. These points include ten measured variables, four discrete inputs, three process outputs (two current outputs and one voltage output).

The FBM17s and FBM01 serve as the FRMMPU's data store and provide the measured variable and discrete inputs to individual AIN and CIN blocks respectively, each of which can be connected to one or more control blocks. The two points managed by the FBM01 can be connected to the control blocks by a single Multiple Analog Input (MAIN) block instead of two AINs.

The I/O handled by the FRMMPU is identified in the Fisher PROVOX controller with the same designations as a 2-wide controller, and the points from this first FRMMPU are connected to the control database the same way you configure an FRMMPU in a 2-wide controller upgrade. See Figure C-9 for mapping of inputs from the process and Figure C-10 for blocks connections for outputs to the process. Change the ECB compound and block names from EXMP3*x* to EXMP6*x*, and the control compound name from FPCVT_3 to FPCVT_6.

The second FRMMPU (EXMP70) is configured as an FBP10 (EXMP70) and an FBM17 (EXMP71). The FBM17 is responsible for four discrete outputs on wiring assembly 6 (DO5 to DO8). Figure C-15 illustrates the additional blocks required to connect the I/O handled by the second FRMMPU.

Note that all of the I/O blocks for both FRMMPUs are configured in the same compound, FPCVT_6.

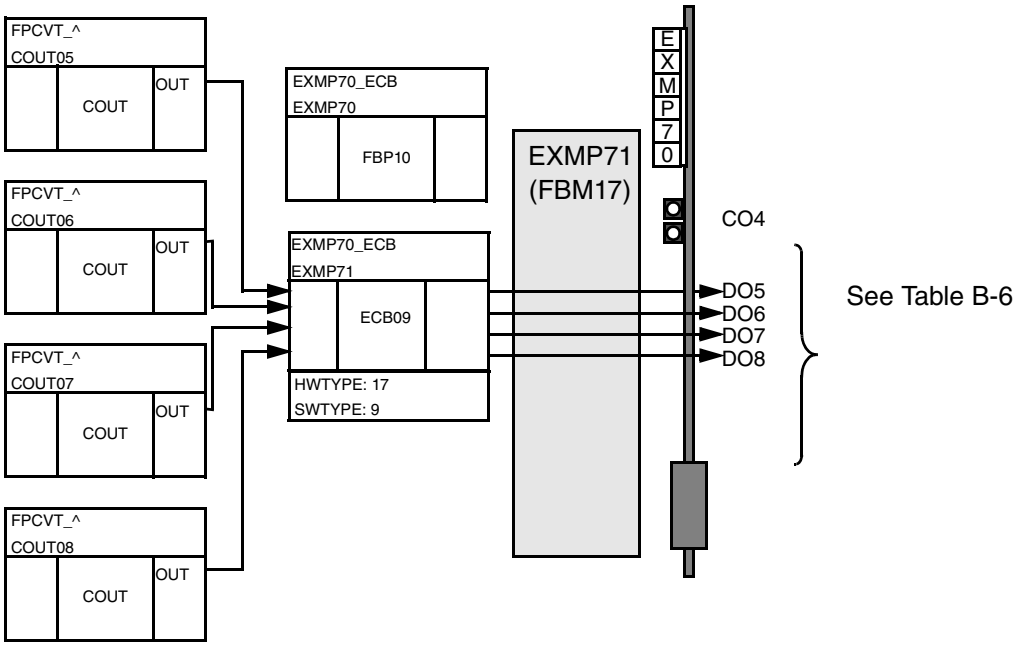



**Figure C-15. Connecting Outputs to the Process via the second FRMMPU in an Upgrade of a 3-Wide Interactive Controller with Discrete I/O**

# Appendix D. CP60 Upgrade

*This appendix provides the procedure to upgrade CP30 or CP40 Control Processors to CP60 Control Processors on existing Foxboro Evo systems.*

1. Prior to replacing CP30 or CP40 control processors with a CP60, the following step must be followed:
   a. Install V6.3.1 or later System Software on the existing system and EEPROM all the Fisher PROVOX Integrators using the existing CP30 or CP40 based system.

**NOTE**

Be sure to EEPROM all the Fisher PROVOX Integrators as well as other FBMs using the existing CP30 or CP40 based system. If this step is not followed, the CP60 replacement is not able to communicate with the older version Fisher PROVOX Integrator software.
The following table list the FBP EEPROM REV levels for the old Fisher PROVOX Integrators (pre-V6.3.1 systems) and the new ones (V6.3.1 or later system).

| DCS Fieldbus Module | FBP EEPROM REV | |
|---|---|---|
| | Pre-V6.3.1 Systems | New FBP |
| FRM701 | 40.2 | 4.21.07.03 |
| FRM711 | 40.2 | 4.21.07.03 |
| FRMMPU | 40.2 | 4.21.07.03 |

2. After the system has been upgraded to V6.3.1 or later and all the Integrators have been upgraded with new IOM software, the CP30s and CP40s can be replaced with CP60 control processors. Follow the instructions in *Control Processor 60 and Control Processor 60S Installation and Maintenance* (B0400FB) for CP60 and DCM10E, DCM10Ef installation.

# Appendix E. FCP280 or FCP270 Upgrade

*This appendix provides the procedure to upgrade CP30, CP40, or CP60 Control Processors to FCP280 or FCP270 Field Control Processors on existing Foxboro Evo systems.*

If upgrading from the CP60 to the FCP280 or FCP270, there is no need to EEPROM update the Fisher PROVOX Integrators or other FBMs. No special procedure is required.

To replace CP30, CP40, or CP60 control processors with the FCP280 or FCP270, perform the following:

**NOTE**

The FCP280 is supported by I/A Series software v8.8 or Control Core Services software v9.0 or later.
The FCP270 is supported by I/A Series software v8.1.1 to v8.8 or Control Core Services software v9.0 or later.

1. Install the appropriate version of the Control Core Services software on the Foxboro Evo system which contains your control processors - see the note above. Refer to the Global Client Support website (*https://support.ips.invensys.com*) for the latest version of Control Core Services software and its documentation.
   Also, install the latest EEPROM on all the Fisher PROVOX Integrators using the existing CP30 or CP40 based system.

**NOTE**

Be sure to EEPROM update all the Fisher PROVOX Integrators as well as other FBMs using the existing CP30 or CP40 based system. If this step is not followed, the FCP270 replacement is not able to communicate with the older version Fisher PROVOX Integrator software.
The following table list the FBP EEPROM REV levels for the old Fisher PROVOX Integrators (pre-I/A Series software v6.3.1) and the new ones (I/A Series software v8.1.1-v8.8 or Control Core Services software v9.0 or later).

| DCS Fieldbus Module | FBP EEPROM REV | |
|---|---|---|
| | Pre-I/A Series v6.3.1 | New FBP |
| FRM701 | 40.2 | 4.21.07.03 |
| FRM711 | 40.2 | 4.21.07.03 |
| FRMMPU | 40.2 | 4.21.07.03 |

2. After the system has been upgraded to the appropriate version of I/A Series software or Control Core Services software and all the Integrators have been upgraded with new IOM software, the CP30s, CP40s, or CP60s can be replaced with FCP280 or FCP270 control processors.
   - To install the FCP280, refer to *Field Control Processor 280 (FCP280) Upgrade Guide* (B0700GC) for instructions on replacing the CP30s, CP40s, or CP60s, and refer to the chapter "Installing the Field Control Processor 280" in *Field Control Processor 280 (FCP280) User's Guide* (B0700FW) for instructions on installing the FCP280.
   - To install the FCP270, follow the instructions in *Field Control Processor 270 (FCP270) User's Guide* (B0700AR).
   - To cable the Fieldbus to the FCP280, follow the instructions in "Fieldbus Cabling at the FCP280" on page 38.
   - To cable the Fieldbus to the FCP270, follow the instructions in "Fieldbus Cabling at the FCP270" on page 43.

# Appendix F. ZCP270 Upgrade

*This appendix provides the procedure to upgrade CP30, CP40, or CP60 Control Processors to ZCP270 Z-Module Control Processors on existing Foxboro Evo systems.*

If upgrading from the CP60 to the ZCP270, there is no need to EEPROM update the Fisher PROVOX Integrators or other FBMs. No special procedure is required.

To replace CP30, CP40, or CP60 control processors with the ZCP270, perform the following:

1. Install V8.3 or later System Software on the existing system and EEPROM all the Fisher PROVOX Integrators using the existing CP30 or CP40 based system.

**NOTE**

Be sure to EEPROM update all the Fisher PROVOX Integrators as well as other FBMs using the existing CP30 or CP40 based system. If this step is not followed, the ZCP270 replacement is not able to communicate with the older version Fisher PROVOX Integrator software.
The following table list the FBP EEPROM REV levels for the old Fisher PROVOX Integrators (pre-V6.3.1 systems) and the new ones (V8.3 or later system).

| DCS Fieldbus Module | FBP EEPROM REV | |
|---|---|---|
| | Pre-V6.3.1 Systems | New FBP |
| FRM701 | 40.2 | 4.21.07.03 |
| FRM711 | 40.2 | 4.21.07.03 |
| FRMMPU | 40.2 | 4.21.07.03 |

2. After the system has been upgraded to V8.3-V8.8 or V9.0 or later and all the Integrators have been upgraded with new IOM software, the CP30s, CP40s, or CP60s can be replaced with ZCP270 control processors. To install the ZCP270, follow the instructions in *Z-Module Control Processor 270 (ZCP270) User's Guide* (B0700AN). To cable the Fieldbus to the ZCP270, follow the instructions in "Fieldbus Cabling at the ZCP270" on page 49.

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