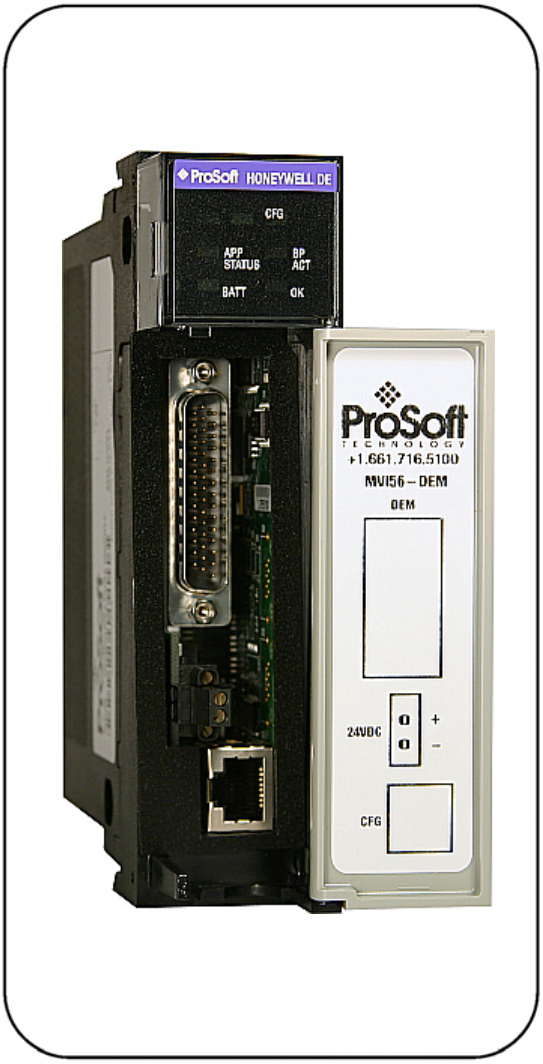
inRAx



MVI56-DEM

ControlLogix Platform

Honeywell DE Communication Module

User Manual

March 06, 2008

ProSoft TECHNOLOGY

Please Read This Notice

Successful application of this module requires a reasonable working knowledge of the Rockwell Automation hardware, the MVI56-DEM Module and the application in which the combination is to be used. For this reason, it is important that those responsible for implementation satisfy themselves that the combination will meet the needs of the application without exposing personnel or equipment to unsafe or inappropriate working conditions.

This manual is provided to assist the user. Every attempt has been made to ensure that the information provided is accurate and a true reflection of the product's installation requirements. In order to ensure a complete understanding of the operation of the product, the user should read all applicable Rockwell Automation documentation on the operation of the Rockwell Automation hardware.

Under no conditions will ProSoft Technology be responsible or liable for indirect or consequential damages resulting from the use or application of the product.

Information in this manual is subject to change without notice and does not represent a commitment on the part of ProSoft Technology Improvements and/or changes in this manual or the product may be made at any time. These changes will be made periodically to correct technical inaccuracies or typographical errors.

Warnings

UL Warnings

A Warning - Explosion Hazard - Substitution of components may impair suitability for Class I, Division 2.
B Warning - Explosion Hazard - When in Hazardous Locations, turn off power before replacing or rewiring modules.
Warning - Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be nonhazardous.
C Suitable for use in Class I, division 2 Groups A, B, C and D Hazardous Locations or Non-Hazardous Locations.

ATEX Warnings and Conditions of Safe Usage:

Power, Input, and Output (I/O) wiring must be in accordance with the authority having jurisdiction

A Warning - Explosion Hazard - When in hazardous locations, turn off power before replacing or wiring modules.
B Warning - Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
C These products are intended to be mounted in an IP54 enclosure. The devices shall provide external means to prevent the rated voltage being exceeded by transient disturbances of more than 40%. This device must be used only with ATEX certified backplanes.
D DO NOT OPEN WHEN ENERGIZED.

Electrical Ratings

- Backplane Current Load: 800 mA @ 5 V DC; 3mA @ 24V DC
- Operating Temperature: 0 to 60°C (32 to 140°F)
- Storage Temperature: -40 to 85°C (-40 to 185°F)
- Shock: 30g Operational; 50g non-operational; Vibration: 5 g from 10 to 150 Hz
- Relative Humidity 5% to 95% (non-condensing)
- All phase conductor sizes must be at least 1.3 mm(squared) and all earth ground conductors must be at least 4mm(squared).

Markings:

 II 3 G 0C <=Ta<= 60C EEx nA IIC T4 DEMKO 07ATEX0710717X

Your Feedback Please

We always want you to feel that you made the right decision to use our products. If you have suggestions, comments, compliments or complaints about the product, documentation or support, please write or call us.

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MVI56-DEM User Manual
March 06, 2008
PSFT.DEM.MVI56.UM.08.03.06

Contents

Guide to the MVI56-DEM User Manual

Function		Section to Read	Details
Introduction (Must Do)	→	Start Here (page 9)	This Section introduces the customer to the module. Included are: package contents, system requirements, hardware installation, and basic configuration.
Verify Communication, Diagnostic and Troubleshooting	→	Verifying Communication (page 35) Diagnostics and Troubleshooting (page 29)	This section describes how to verify communications with the network. Diagnostic and Troubleshooting procedures.
Reference Product Specifications Functional Overview Glossary	→	Reference (page 37) Functional Overview (page 39) Product Specifications (page 37)	These sections contain general references associated with this product, Specifications, and the Functional Overview.
Support, Service, and Warranty Index	→	Support, Service and Warranty (page 69)	This section contains Support, Service and Warranty information. Index of chapters.

1 Start Here

In This Chapter

Installing the MVI56-DEM module requires a reasonable working knowledge of the Rockwell Automation hardware, the MVI56-DEM Module and the application in which they will be used.

Caution: It is important that those responsible for implementation can complete the application without exposing personnel, or equipment, to unsafe or inappropriate working conditions. Safety, quality and experience are key factors in a successful installation.

1.1 System Requirements

The MVI56-DEM module requires the following minimum hardware and software components:

- Rockwell Automation ™ processor, with compatible power supply and one free slot in the rack, for the MVI56-DEM module. The module requires 800mA of available power.
- Rockwell Automation RSLogix 5000 programming software version 2.51 or higher.
- Rockwell Automation RSLinx communication software
- Pentium® II 450 MHz minimum. Pentium III 733 MHz (or better) recommended
- Supported operating systems:
  - Microsoft Windows XP Professional with Service Pack 1 or 2
  - Microsoft Windows 2000 Professional with Service Pack 1, 2, or 3
  - Microsoft Windows Server 2003
- 128 Mbytes of RAM minimum, 256 Mbytes of RAM recommended
- 100 Mbytes of free hard disk space (or more based on application requirements)
- 256-color VGA graphics adapter, 800 x 600 minimum resolution (True Color 1024 × 768 recommended)
- CD-ROM drive
- HyperTerminal or other terminal emulator program.

Note: You can install the module in a local or remote rack. For remote rack installation, the module requires EtherNet/IP or ControlNet communication with the processor.

1.2 Package Contents

The following components are included with your MVI56-DEM module, and are all required for installation and configuration.

Important: Before beginning the installation, please verify that all of the following items are present.

Qty.	Part Name	Part Number	Part Description
1	MVI56-DEM Module	MVI56-DEM	Honeywell DE Communication Module
1	Cable	Cable #15, RS232 Null Modem	For RS232 Connection to the CFG Port
1	Cable	Cable #14, RJ45 to DB9 Male Adapter cable	For DB9 Connection to Module's Port

If any of these components are missing, please contact ProSoft Technology Support for replacement parts.

1.3 Install the Module in the Rack

If you have not already installed and configured your ControlLogix processor and power supply, please do so before installing the MVI56-DEM module. Refer to your Rockwell Automation product documentation for installation instructions.

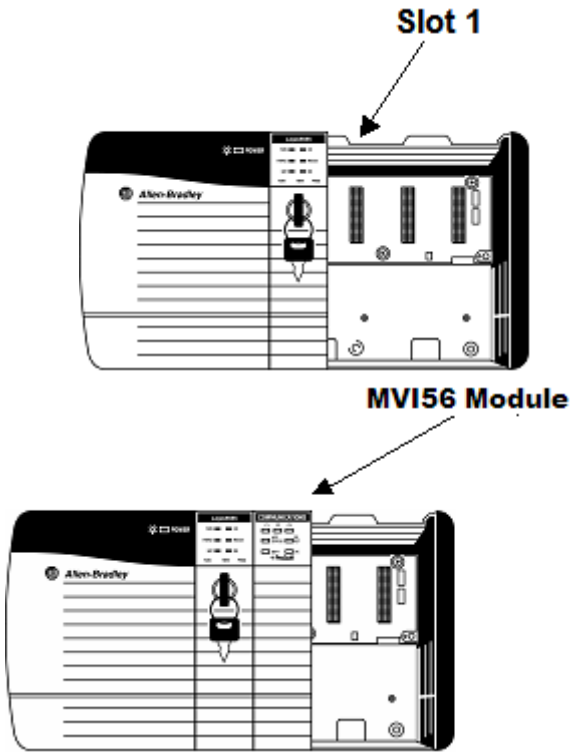
Warning: You must follow all safety instructions when installing this or any other electronic devices. Failure to follow safety procedures could result in damage to hardware or data, or even serious injury or death to personnel. Refer to the documentation for each device you plan to connect to verify that suitable safety procedures are in place before installing or servicing the device.

After you have checked the placement of the jumpers, insert MVI56-DEM into the ControlLogix chassis. Use the same technique recommended by Rockwell Automation to remove and install ControlLogix modules.

Warning: When you insert or remove the module while backplane power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Verify that power is removed or the area is non-hazardous before proceeding. Repeated electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance that can affect module operation.

1 Turn power OFF.

2 Align the module with the top and bottom guides, and slide it into the rack until the module is firmly against the backplane connector.

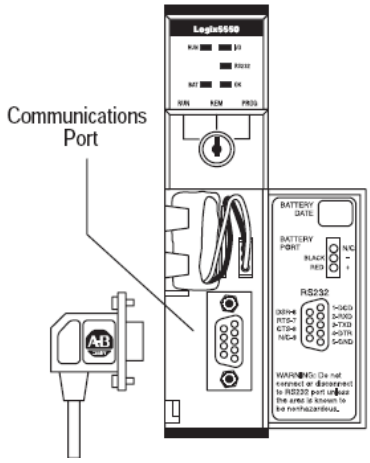


3 With a firm but steady push, snap the module into place.
4 Check that the holding clips on the top and bottom of the module are securely in the locking holes of the rack.
5 Make a note of the slot location. You will need to identify the slot in which the module is installed in order for the sample program to work correctly. Slot numbers are identified on the green circuit board (backplane) of the ControlLogix rack.
6 Turn power ON.

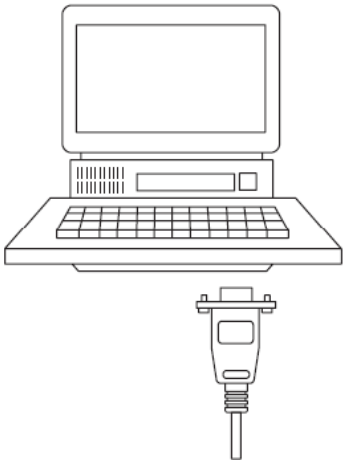
Note: If you insert the module improperly, the system may stop working, or may behave unpredictably.
Note: If you are installing MVI56-DEM with other modules connected to the PCI bus, the peripheral modules will not have holding clips. Make sure all of the modules are aligned with their respective slots before you snap them into place.

1.4 Connect your PC to the Processor

1 Connect the right-angle connector end of the cable to your controller at the communications port.



2 Connect the straight connector end of the cable to the serial port on your computer.

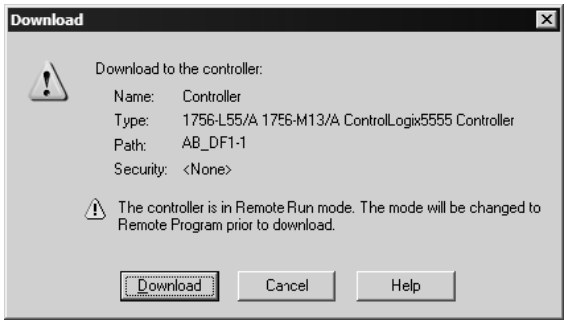


1.5 Download the Sample Program to the Processor

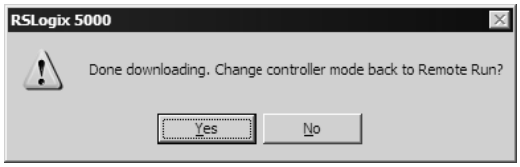
Note: The key switch on the front of the ControlLogix module must be in the REM position.

To download the sample program from RSLogix 5000 to the ControlLogix processor

1. If you are not already online to the processor, open the Communications menu, and then choose Download. RSLogix will establish communication with the processor.
2. When communication is established, RSLogix will open a confirmation dialog box. Click the Download button to transfer the sample program to the processor.



3. RSLogix will compile the program and transfer it to the processor. This process may take a few minutes.
4. When the download is complete, RSLogix will open another confirmation dialog box. Click OK to switch the processor from Program mode to Run mode.

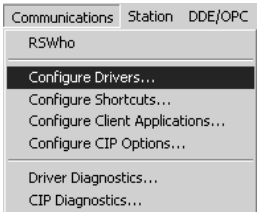


Note: If you receive an error message during these steps, refer to your RSLogix documentation to interpret and correct the error.

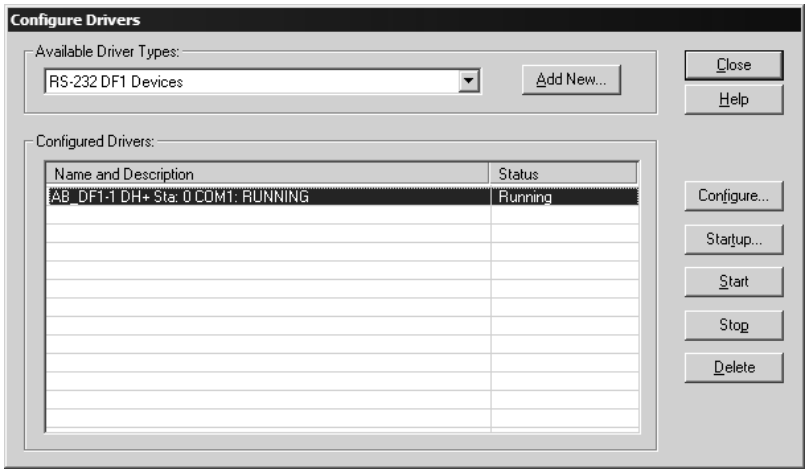
1.5.1 Configuring RSLinx

If RSLogix is unable to establish communication with the processor, follow these steps:

1 Open RSLinx.
2 Open the Communications menu, and choose Configure Drivers.



This action opens the Configure Drivers dialog box.



Note: If the list of configured drivers is blank, you must first choose and configure a driver from the Available Driver Types list. The recommended driver type to choose for serial communication with the processor is "RS-232 DF1 Devices".

3 Click to select the driver, and then click Configure. This action opens the Configure Allen-Bradley DF1 Communications Device dialog box.

4 Click the Auto-Configure button. RSLinx will attempt to configure your serial port to work with the selected driver.
5 When you see the message "Auto Configuration Successful", click the OK button to dismiss the dialog box.

Note: If the auto-configuration procedure fails, verify that the cables are connected correctly between the processor and the serial port on your computer, and then try again. If you are still unable to auto-configure the port, refer to your RSLinx documentation for further troubleshooting steps.

1.6 Connect your PC to the Module

With the module securely mounted, connect your PC to the Configuration/Debug port using the RJ45-DB-9 Serial Adapter Cable and the Null Modem Cable included in the package with the MVI56-DEM module.

1 Connect the RJ45-DB-9 Serial Adapter Cable to the Null Modem Cable.
2 Insert the RJ45 cable connector from the RJ45-DB-9 cable into the Configuration/Debug port of the module.
3 Attach the other end to the serial port on your PC or laptop.

2 Installing and Configuring the Module

In This Chapter

This chapter describes how to install and configure the module to work with your application. The configuration process consists of the following steps.

1 Use RSLogix 5000 to identify the module to the processor and add the module to a project.

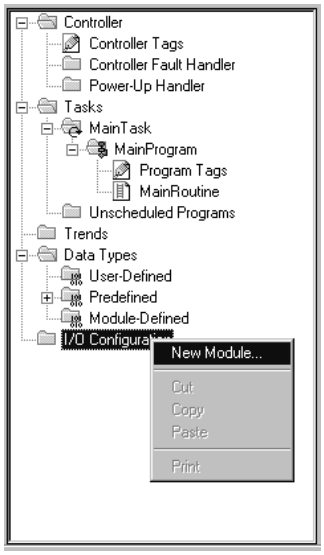
Note: The RSLogix 5000 software must be in "offline" mode to add the module to a project.

2 Modify the example ladder logic to meet the needs of your application, and copy the ladder logic to the processor. Example ladder logic files are provided on the CD-ROM.

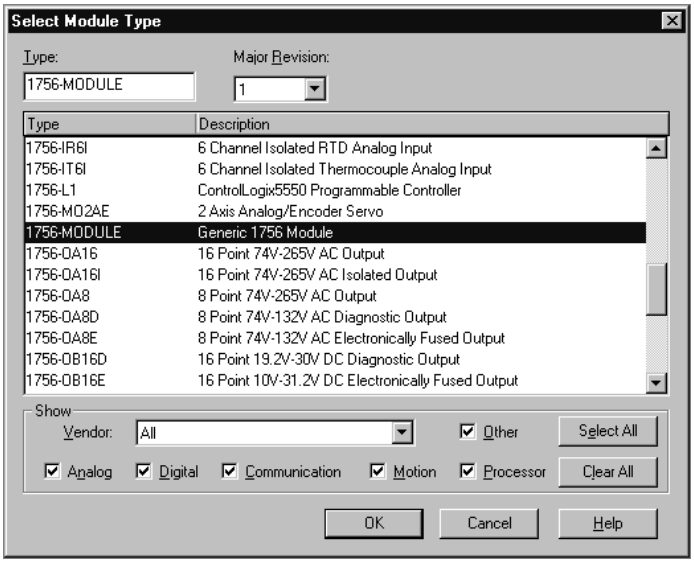
Note: If you are installing this module in an existing application, you can copy the necessary elements from the example ladder logic into your application.

The rest of this chapter describes these steps in more detail.

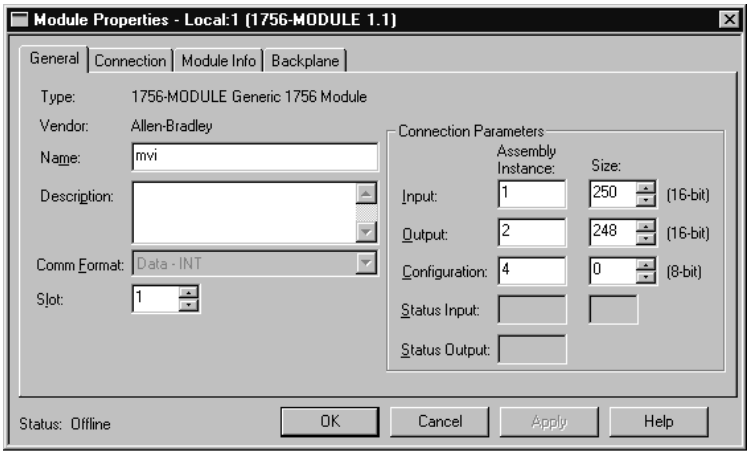
The first step in installing and configuring the module is to define the module to the system. Right-click the mouse button on the I/O Configuration option in the Controller Organization window to display a pop-up menu. Select the New Module option from the I/O Configuration menu.



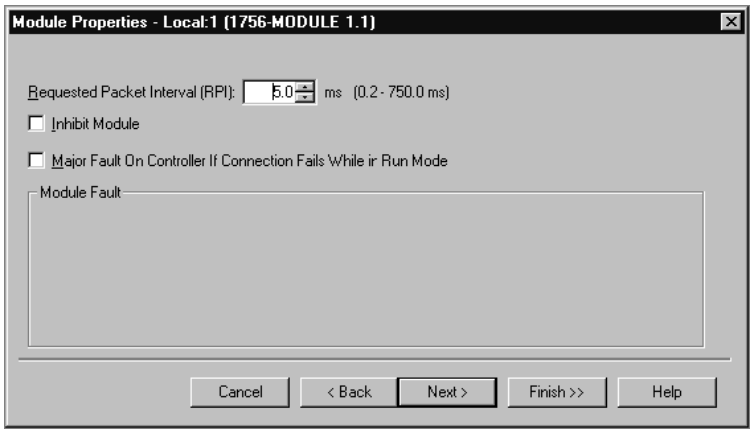
This action opens the following dialog box.



Select the 1756-Module (Generic 1756 Module) from the list and click OK. The following dialog box appears.

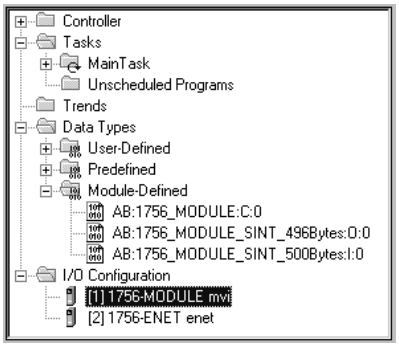


Fill in the dialog box as shown adjusting the Name, Description and Slot options for your application. You must select the **Comm Format** as **Data - INT** in the dialog box. Failure to set the **Assembly Instance** and **Size** values correctly will result in a module that will not communicate over the backplane of the ControlLogix rack. Click Next to display the following dialog box.

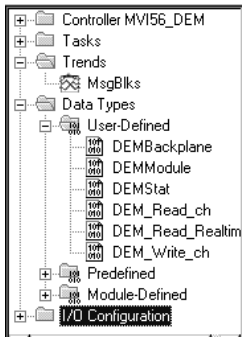


Select the Request Packet Interval value for scanning the I/O on the module. This value represents the minimum frequency that the module will handle scheduled events. This value should not be set to less than 1 millisecond. Values between 1 and 10 milliseconds should work with most applications.

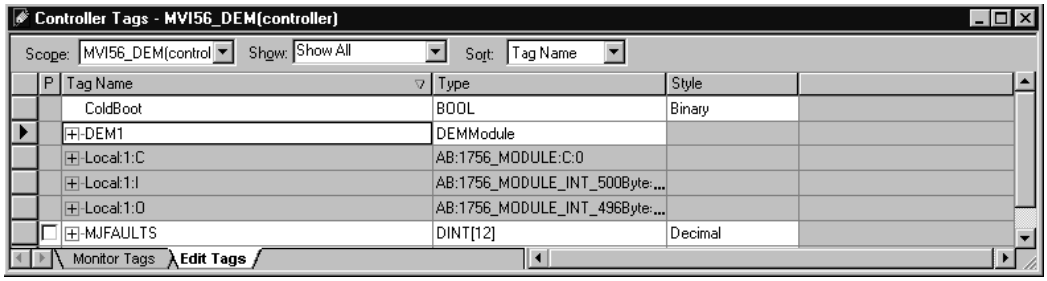
After completing the module setup, the Controller Organization window displays the module's presence. The data required for the module is defined to the application, and objects are allocated in the Controller Tags data area. The Controller Organization window is shown in the following example:



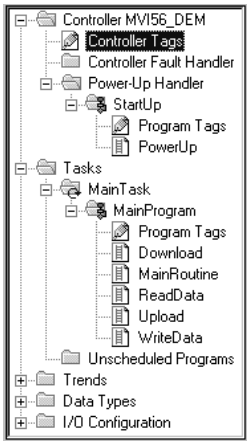
The next step in the module's setup is to define the User Defined Data Types to be used with the module. Copy these data types from the example ladder logic if you are not using the example. They are already defined if you are starting from the example ladder logic. The Controller Organization window should display the User Defined Data Types shown in the following example:



The next step in module setup is to define the data tag to be used to interface with the module and the ladder logic. Open the Controller Tags Edit Tags dialog box and enter the values shown in the following example. The MVI56-DEM module is defined in the example as DEM1 to hold all data related to the module (type DEMModule). The tag name can be set to any valid tag name desired. When using the example ladder logic, this step has already been performed.



The last step in the module setup is to add the ladder logic. If the example ladder logic is used, adjust the ladder to fit the application. When the ladder example is not used, copy the ladder logic shown in the Controller Organization window to the application.



The module is now set up and ready to be used with your application. Insert the module in the rack and attach the serial communication cable to the debug/configuration port and connect the cable from the module to the FTA and 24 VDC power supply.

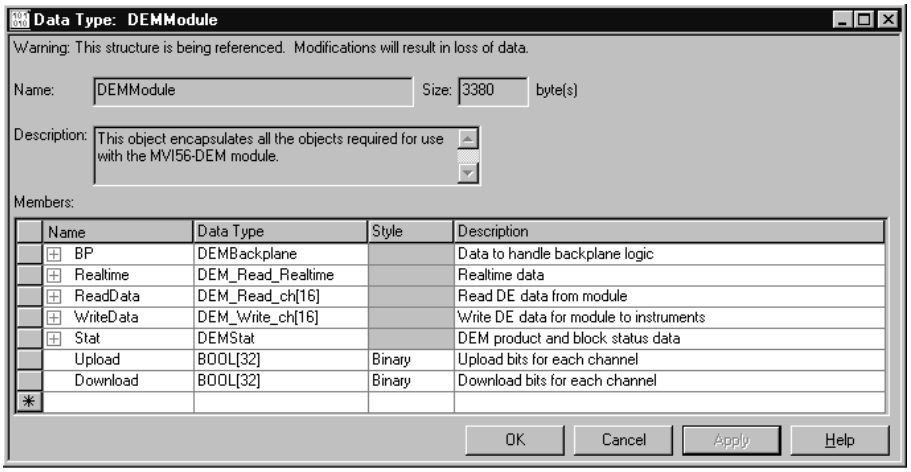
Download the new application to the controller and place the processor in run mode. If the module is attached to the FTA, and DE instruments are present, the module's Application LED (APP LED) should blink or remain on and the backplane activity LED (BP ACT) should blink rapidly. Refer to the **Troubleshooting** section if you encounter errors. Attach a computer or terminal to the debug port on the module and look at the status of the module using the Configuration/Debug Menu in the module.

2.1 Module Configuration

This section contains the setup procedure, data, and ladder logic for successful application of the MVI56-DEM module. Each step in the setup procedure is defined in order to simplify the use of the module.

2.1.1 Module Data (DEMModule)

All data related to the MVI56-DEM is stored in a user-defined data type. An instance of the data type is required before the module can be used. This is accomplished by declaring a variable of the data type in the Controller Tags Edit Tags dialog box. The structure of the object is displayed in the following example:



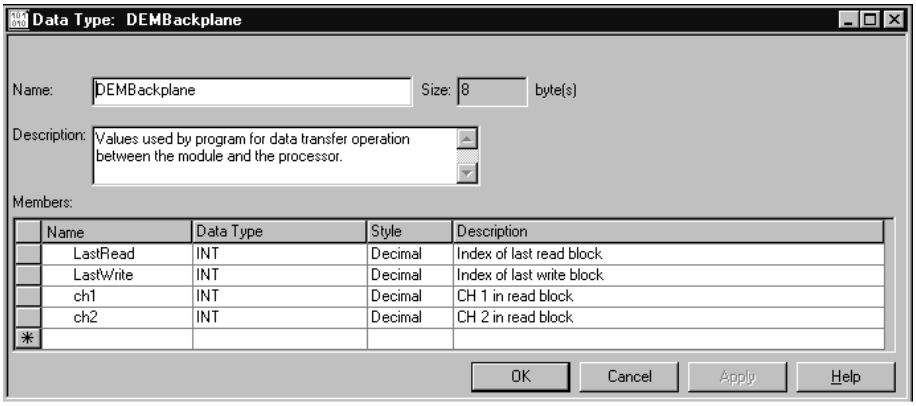
This object contains objects that define variables to be used with the module and status data related to the module. Each of these object types are discussed in the following topics of the document.

The Upload member of this object holds the bits to trigger the upload process. This process copies the data read from the specific channel to the write data area. This process is valuable for removing data mismatch errors and for synchronizing the read and write data. Each bit in the array corresponds to an individual channel with bit 0 corresponding to channel 1 and bit 15 corresponding to channel 16. Review the example ladder logic for the upload function in this manual to see how these bits can be utilized.

The Download member of this object holds the bits to trigger the download process. This process forces a value of one into the function member of the write data for the specific channel. After the function is executed, the function code should be reset to zero to prevent the command from constantly executing. This process is used to alter the configuration data in the specific instrument. Each bit in the array corresponds to an individual channel with bit 0 corresponding to channel 1 and bit 15 corresponding to channel 16. Review the example ladder logic for the download function in this manual to see how these bits can be used.

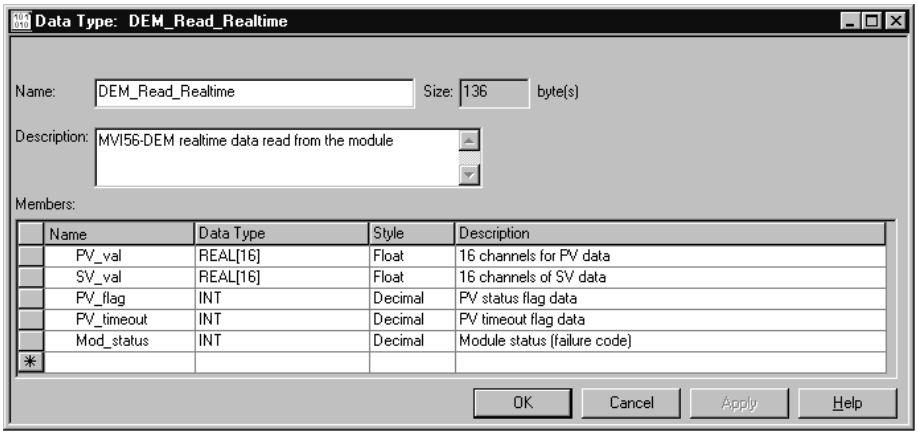
Backplane Object (DEMBackplane)

The DEMBackplane object stores all the variables required for the data transfer operation between the module and the controller. The LastRead data member is used as the handshaking byte to indicate the arrival of new data from the module. The ch1 and ch2 members are use to hold the computed channel numbers received in a read block. These values are used as index values into the read data arrays to determine where the data is stored. The structure of this object is shown in the following illustration:



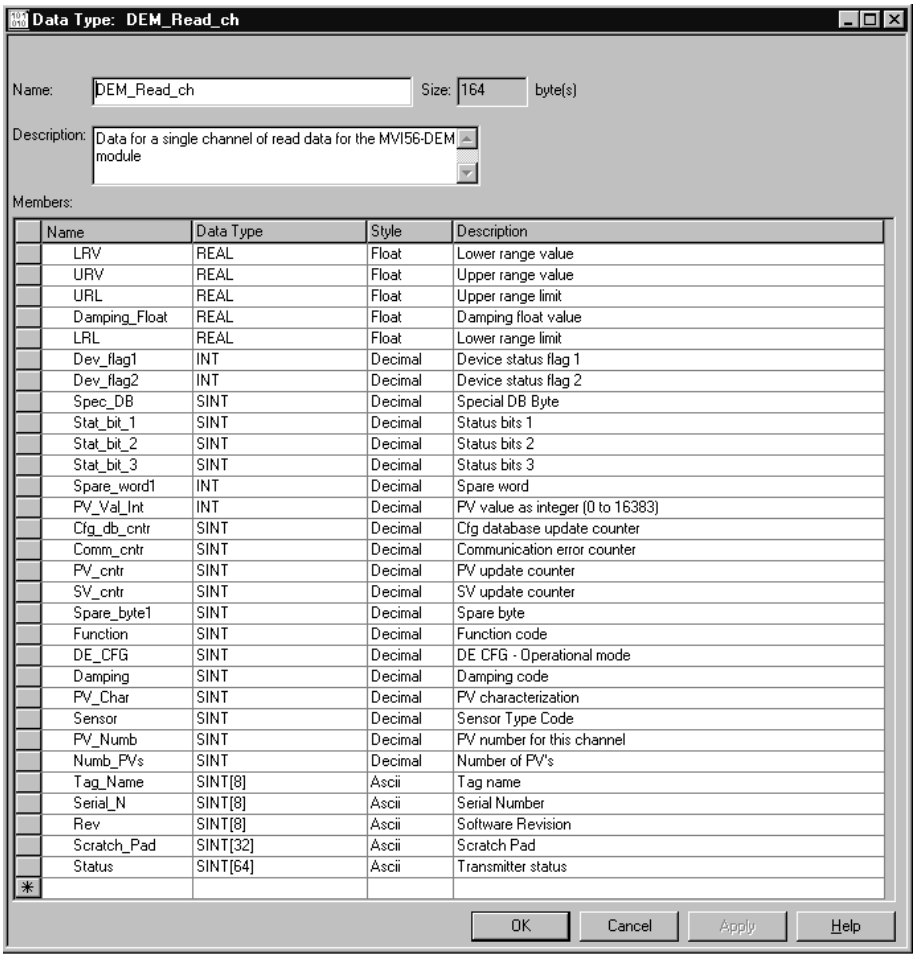
Real-time Object (DEM_Read_Realtime)

The DEM_Read_Realtime object holds the real-time data collected by the module from the DE instruments. The structure of this object is shown in the following example:



Read Object (DEM_Read_ch)

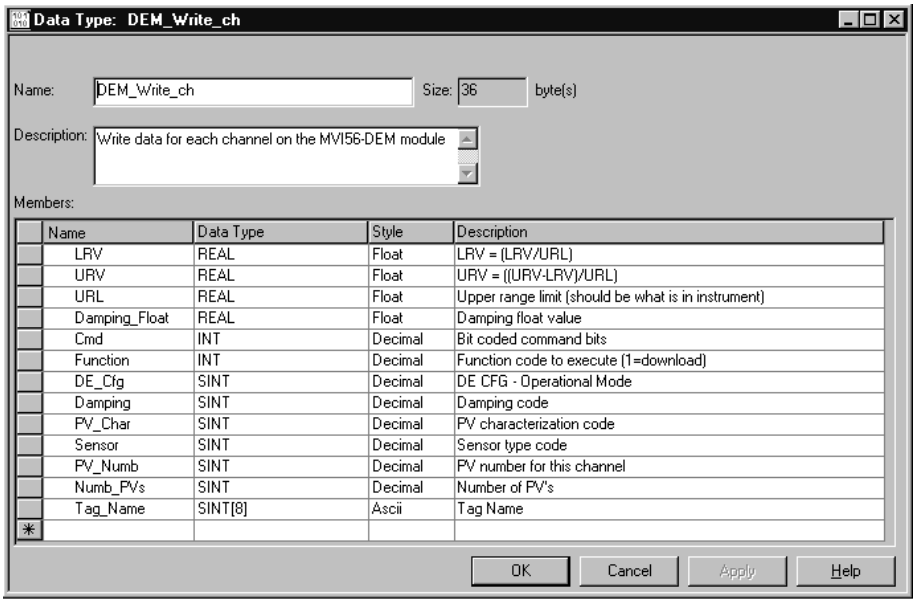
The DEM_Read_ch object is defined to hold the data received from each DE channel and status data computed by the module. The structure of the object used in the example logic is shown in the following example:



Name	Data Type	Style	Description
LRV	REAL	Float	Lower range value
URV	REAL	Float	Upper range value
URL	REAL	Float	Upper range limit
Damping_Float	REAL	Float	Damping float value
LRL	REAL	Float	Lower range limit
Dev_flag1	INT	Decimal	Device status flag 1
Dev_flag2	INT	Decimal	Device status flag 2
Spec_DB	SINT	Decimal	Special DB Byte
Stat_bit_1	SINT	Decimal	Status bits 1
Stat_bit_2	SINT	Decimal	Status bits 2
Stat_bit_3	SINT	Decimal	Status bits 3
Spare_word1	INT	Decimal	Spare word
PV_Val_Int	INT	Decimal	PV value as integer (0 to 16383)
Cfg_db_cntr	SINT	Decimal	Cfg database update counter
Comm_cntr	SINT	Decimal	Communication error counter
PV_cntr	SINT	Decimal	PV update counter
SV_cntr	SINT	Decimal	SV update counter
Spare_byte1	SINT	Decimal	Spare byte
Function	SINT	Decimal	Function code
DE_CFG	SINT	Decimal	DE CFG - Operational mode
Damping	SINT	Decimal	Damping code
PV_Char	SINT	Decimal	PV characterization
Sensor	SINT	Decimal	Sensor Type Code
PV_Numb	SINT	Decimal	PV number for this channel
Numb_PVs	SINT	Decimal	Number of PV's
Tag_Name	SINT[8]	Ascii	Tag name
Serial_N	SINT[8]	Ascii	Serial Number
Rev	SINT[8]	Ascii	Software Revision
Scratch_Pad	SINT[32]	Ascii	Scratch Pad
Status	SINT[64]	Ascii	Transmitter status

Write Object (DEM_Write_ch)

The DEM_Write_ch object is defined to hold the configuration data to be written to each DE channel on the module. The structure of the object used in the example logic is shown in the following example:

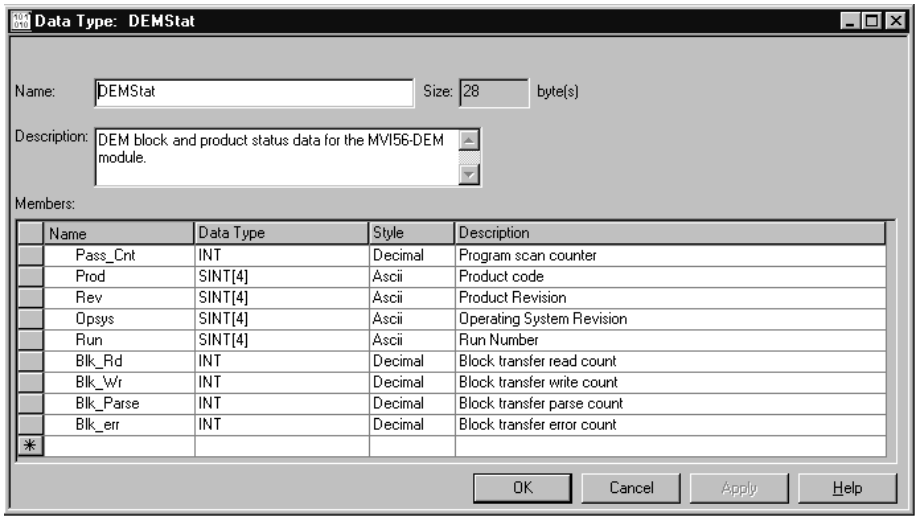


Name	Data Type	Style	Description
LRV	REAL	Float	LRV = (LRV/URL)
URV	REAL	Float	URV = ((URV-LRV)/URL)
URL	REAL	Float	Upper range limit (should be what is in instrument)
Damping_Float	REAL	Float	Damping float value
Cmd	INT	Decimal	Bit coded command bits
Function	INT	Decimal	Function code to execute (1=download)
DE_Cfg	SINT	Decimal	DE CFG - Operational Mode
Damping	SINT	Decimal	Damping code
PV_Char	SINT	Decimal	PV characterization code
Sensor	SINT	Decimal	Sensor type code
PV_Numb	SINT	Decimal	PV number for this channel
Numb_PVs	SINT	Decimal	Number of PV's
Tag_Name	SINT[8]	Ascii	Tag Name

The upload process can be utilized to initialize this data set for each instrument in the module. This is the preferred method of operation as it assures that the data is valid. After the upload process the configuration can be altered to the new desired configuration, and then, the download process can be initiated.

Status Object (DEMStat)

This object stores the product and backplane transfer status data of the module. The DEMStat object shown in the following example is updated each time a read block is received by the processor.



3 Ladder Logic

Ladder logic is required for application of the MVI56-DEM module. Tasks that must be handled by the ladder logic are module data transfer, special block handling and status data receipt. Additionally, a power-up handler may be needed to handle the initialization of the module's data and to clear any processor fault conditions.

The sample ladder logic, on the ProSoft Solutions CD-ROM, is extensively commented, to provide information on the purpose and function of each rung. For most applications, the sample ladder will work without modification.

4 Diagnostics and Troubleshooting

In This Chapter

The module provides information on diagnostics and troubleshooting in the following forms:

- Status data values are transferred from the module to the processor.
- Data contained in the module can be viewed through the Configuration/Debug port attached to a terminal emulator.
- LED status indicators on the front of the module provide information on the module's status.

4.1 Reading Status Data from the Module

The MVI56-DEM module returns a status data set to the ControlLogix processor in read blocks for each channel and for the whole module. This data is transferred to the ControlLogix processor continuously.

The Configuration/Debug port provides the following functionality:

- Full view of the channel read and write data
- View of the module's and channel status data
- View of the real-time PV and SV values
- Version Information
- Control over the module (cold boot)

4.1.1 The Configuration/Debug Menu

The Configuration and Debug menu for this module is arranged as a tree structure, with the Main Menu at the top of the tree, and one or more sub-menus for each menu command. The first menu you see when you connect to the module is the Main menu.

Because this is a text-based menu system, you enter commands by typing the command letter from your computer keyboard in the terminal application (for example, HyperTerminal). The module does not respond to mouse movements or clicks. The command executes as soon as you press the command letter — you do not need to press **[Enter]**. When you type a command letter, a new screen will be displayed in your terminal application.

4.1.2 Required Hardware

You can connect directly from your computer's serial port to the serial port on the module to view configuration information and perform maintenance.

ProSoft Technology recommends the following minimum hardware to connect your computer to the module:

- 80486 based processor (Pentium preferred)
- 1 megabyte of memory
- At least one serial communications port available
- A null modem serial cable.

4.1.3 Required Software

In order to send and receive data over the serial port (COM port) on your computer to the module, you must use a communication program (terminal emulator).

A simple communication program called HyperTerminal is pre-installed with recent versions of Microsoft Windows operating systems. If you are connecting from a machine running DOS, you must obtain and install a compatible communication program. The following table lists communication programs that have been tested by ProSoft Technology.

DOS	ProComm, as well as several other terminal emulation programs
Windows 3.1	Terminal
Windows 95/98	HyperTerminal
Windows NT/2000/XP	HyperTerminal

4.1.4 Using the Configuration/Debug Port

To connect to the module's Configuration/Debug port:

1. Connect your computer to the module's port using a null modem cable.
2. Start the communication program on your computer and configure the communication parameters with the following settings:

Baud Rate	57,600
Parity	None
Data Bits	8
Stop Bits	1
Software Handshaking	None

3. Open the connection. When you are connected, press the **[?]** key on your keyboard. If the system is set up properly, you will see a menu with the module name followed by a list of letters and the commands associated with them.

If there is no response from the module, follow these steps:

1. Verify that the null modem cable is connected properly between your computer's serial port and the module. A regular serial cable will not work.

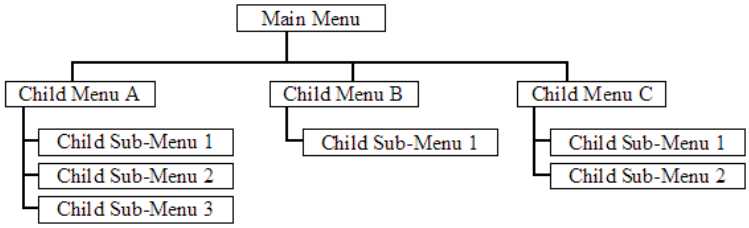
2 Verify that RSLinx is not controlling the COM port. Refer to Disabling the RSLinx Driver for the Com Port on the PC (page 52).
3 Verify that your communication software is using the correct settings for baud rate, parity and handshaking.
4 On computers with more than one serial port, verify that your communication program is connected to the same port that is connected to the module.

If you are still not able to establish a connection, you can contact ProSoft Technology Technical Support for further assistance.

Navigation

All of the sub-menus for this module contain commands to redisplay the menu or return to the previous menu. You can always return from a sub-menu to the next higher menu by pressing **[M]** on your keyboard.

The organization of the menu structure is represented in simplified form in the following illustration:



The remainder of this section shows you the menus available for this module, and briefly discusses the commands available to you.

Keystrokes

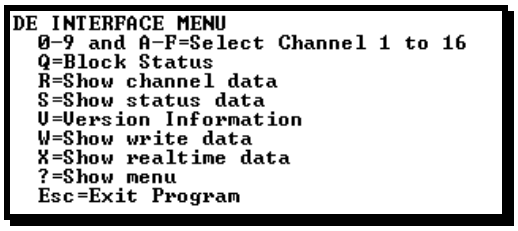
The keyboard commands on these menus are almost always non-case sensitive. You can enter most commands in lower case or capital letters.

The menus use a few special characters (**[?]**, **[-]**, **[+]**, **[@]**) that must be entered exactly as shown. Some of these characters will require you to use the **[Shift]**, **[Ctrl]** or **[Alt]** keys to enter them correctly. For example, on US English keyboards, enter the **[?]** command as **[Shift][/]**.

Also, take care to distinguish capital letter **[I]** from lower case letter **[l]** (L) and number **[1]**; likewise for capital letter **[O]** and number **[0]**. Although these characters look nearly the same on the screen, they perform different actions on the module.

4.1.5 Main Menu

When you first connect to the module from your computer, your terminal screen will be blank. To activate the main menu, press the **[?]** key on your computer's keyboard. If the module is connected properly, the following menu will appear on your terminal screen:



Caution: Some of the commands available to you from this menu are designed for advanced debugging and system testing only, and can cause the module to stop communicating with the processor or with other devices, resulting in potential data loss or other failures. Only use these commands if you are specifically directed to do so by ProSoft Technology Technical Support staff. Some of these command keys are not listed on the menu, but are active nevertheless. Please be careful when pressing keys so that you do not accidentally execute an unwanted command.

Selecting a Channel

These commands select the current channel for use with the commands. After you select a channel, press **[R]** (show channel data), **[S]** (show status data) or **[W]** (show write data) o view information for the selected channel. The following table shows the relationship between the commands and the channel numbers:

Press This Key	To Select This Channel
0	Channel 1
1	Channel 2
2	Channel 3
3	Channel 4
4	Channel 5
5	Channel 6
6	Channel 7
7	Channel 8
8	Channel 9
9	Channel 10
A	Channel 11
B	Channel 12
C	Channel 13
D	Channel 14
E	Channel 15
F	Channel 16

Viewing Block Transfer Status

Press **[Q]** to view block transfer status for the module. After selecting this option, the following is displayed. Selecting this option at one-second intervals can be used to determine the number of blocks transferred each second.

```
BACKPLANE STATISTICS:
  Read: 32926   Write: 32926   Parsing: 32926   Error: 0
```

Viewing Channel Data

Press **[R]** to view the floating-point, integer and ASCII data for the currently selected channel.

```
DE CHANNEL 1 DATA

  TAG : Test 001     SERIAL#: 19372420     REV: A.1
  SCRATCH PAD: XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
  REALTIME PV : 35.796448        SV : 23.960938
          NAN: 35.796448         NAN: 23.960938

  INTEGER VALUES:
    CFG CNTR: 166       COM ERR: 0         PV CNTR: 127       SV CNTR: 254
    FUNCTION: 0         DE OP  : 4         DAMPING: 0         PV CHAR: 12
    SENSOR T: 9         PV NUMB: 1         # OF PV: 1         PV<INT>: 2932

  FLOATING POINT VALUES:
    LRV     :     0.000000   URV:    200.000519   URL : 13840.339844
    DAMPING :     0.000000   LRL:      0.000000   SPAN:     0.014451
```

Viewing Status Data

Press **[S]** to view status data for the currently selected channel.

```
DE CHANNEL 1 STATUS
  TAG       : Test 001     SCRATCH PAD: XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
  TRANS STAT: STATUS OKAY
  REALTIME PV: 35.710236        SV: 23.963379
  STATUS FLAGS (#1)
    FUNC DONE: 0   FUNC PASSED: 0   PV UPDATE : 0   PV OUTPUT: 0
    SFC DET  : 0   SV UPDATE  : 0   CFG UPDATE: 0   REAL CFG : 1
    COLD JNC : 0   OPN THERM  : 0   FREQ 50    : 0   DATA MISM: 0
    SPARE    : 0   PV BAD     : 0   PV URNG    : 0   PV ORNG  : 0
  MISMATCH FLAGS (#2)
    LRV      : 0   URV        : 0   URL       : 0   DAMPING  : 0
    DE CONF  : 0   PV CHAR    : 0   SENSOR TYP: 0   TAG ID   : 0
    PV NUMBER: 0   # OF PV'S  : 0   COLD JUNC : 0   OPN THERM: 0
    FREQ 50  : 0   SPARE      : 0   SPARE     : 0   SPARE    : 0
  STATUS BITS:
    SPECIAL DB    : 0 0 0 0 0 0 0 0
    STATUS BITS 1 : 0 0 0 0 0 0 0 0
    STATUS BITS 2 : 0 0 0 0 0 0 0 0
    STATUS BITS 3 : 0 0 0 0 0 0 0 0
```

This screen displays errors in interfacing with the DE instrument. It also displays mismatch errors.

Viewing Version Information

Press **[V]** to view Version information for the module.

Use this command to view the current version of the software for the module, as well as other important values. You may be asked to provide this information when calling for technical support on the product.

Values at the bottom of the display are important in determining module operation. The Program Scan Counter value is incremented each time a module's program cycle is complete.

Tip: Repeat this command at one-second intervals to determine the frequency of program execution.

Viewing Write Data

Press **[W]** to view write data for the currently selected channel. You can use this information to configure an instrument.

```
DE CHANNEL 1 WRITE DATA

  TAG : Test 001

  INTEGER VALUES:
    CMD BITS: 0000      FUNCTION: 0        DE OP  : 4        DAMPING: 0
    PV CHAR : 12        SENSOR T: 9        PV NUMB: 1        # OF PV: 1

  FLOATING POINT VALUES:
    LRV     :     0.000000   URV:   200.000519   URL: 13840.339844
    DAMPING :     0.000000
```

Viewing Realtime Data

Press **[X]** to view real-time data for all 16 channels on the module.

```
DE REALTIME DATA
  Module Status = 0
  CH      PV Value      SV Value  PV_Bad  PV_Tout  MisM
   1       35.8392       23.9702    0        0       0
   2        0.0000        0.0000    1        1       0
   3        0.0000        0.0000    1        1       0
   4        0.0000        0.0000    1        1       0
   5        0.0000        0.0000    1        1       0
   6        0.0000        0.0000    1        1       0
   7        0.0000        0.0000    1        1       0
   8        0.0000        0.0000    1        1       0
   9       -1.1426       23.8496    0        0       0
  10        0.0000        0.0000    1        1       0
  11        0.0000        0.0000    1        1       0
  12        0.0000        0.0000    1        1       0
  13        0.0000        0.0000    1        1       0
  14        0.0000        0.0000    1        1       0
  15        0.0000        0.0000    1        1       0
  16        0.0000        0.0000    1        1       0
```

Exiting the Program

Caution: Some of the commands available to you from this menu are designed for advanced debugging and system testing only, and can cause the module to stop communicating with the processor or with other devices, resulting in potential data loss or other failures. Only use these commands if you are specifically directed to do so by ProSoft Technology Technical Support staff. Some of these command keys are not listed on the menu, but are active nevertheless. Please be careful when pressing keys so that you do not accidentally execute an unwanted command.

Press **[Esc]** to restart the module and force all drivers to be loaded. The module will use the configuration stored in the module's Flash ROM to configure the module.

4.2 LED Status Indicators

The LEDs indicate the module's operating status as follows:

ProSoft Module	Color	Status	Indication
CFG	Green	On	NA
		Off	NA
P1	Green	On	NA
		Off	NA
P2	Green	On	Data is being transferred between the module and a remote terminal using the Configuration/Debug port.
		Off	No data is being transferred on the Configuration/Debug port.
APP Status	Amber	Off	The module is not communicating with any instruments.
		On	The module is communicating with all channels.
		Blinking	The module is communicating with some of the channels.
BP ACT	Amber	On	The module is performing a write operation on the backplane.
		Off	The module is performing a read operation on the backplane. Under normal operation, the LED should blink rapidly On and Off.
OK	Red/Green	Off	The card is not receiving any power or is not securely plugged into the rack.
		Green	The module is operating normally.
		Blinking Green/Red	Database mismatch, failed command, error, or bad function.
		Red	Hardware failure or bad data returned.

During normal startup LEDs on the module will flash in different (mainly toggle back and forth). When the module is initializing the OK LED is red followed by a green LED upon initialization completion.

4.2.1 Troubleshooting

Use the following troubleshooting steps if you encounter problems when the module is powered up. If these steps do not resolve your problem, please contact ProSoft Technology Technical Support.

Processor Errors

Problem Description	Steps to take
Processor Fault	Verify that the module is plugged into the slot that has been configured for the module. Verify that the slot in the rack configuration has been set up correctly in the ladder logic.
Processor I/O LED flashes	This indicates a problem with backplane communications. Verify that all modules in the rack are configured in the ladder logic.

Module Errors

Problem Description	Steps to take
BP ACT LED remains off or blinks slowly	This indicates that backplane transfer operations are failing. Connect to the module's Configuration/Debug port to check this. To establish backplane communications, verify the following items: ▪ The processor is in Run mode. ▪ The backplane driver is loaded in the module. ▪ The module is configured for read and write block data transfer. ▪ The ladder logic handles all read and write block situations. ▪ The module is configured in the processor.
OK LED remains red	The program has halted or a critical error has occurred. Connect to the Configuration/Debug port to see if the module is running. If the program has halted, turn off power to the rack, remove the card from the rack and re-insert the card in the rack, and then restore power to the rack.

5 Reference

In This Chapter

5.1 Product Specifications

The MVI56 DE Master Communication Module allows ControlLogix I/O compatible processors to interface easily with Honeywell DE instruments. Compatible devices include a large array of field devices including pressure, temperature, metering and many other instruments.

5.1.1 Features and Benefits

The module supports 16 DE channels, allowing both single and/or multivariable Honeywell transmitters operating in the DE mode to be directly integrated in the ControlLogix platform.

Data exchange between the DEM module and the processor data table is performed using standard ladder logic. Included in the system is the pre-programmed ControlLogix, the DEM module and the Honeywell field terminal assembly and cable.

5.1.2 General Specifications

- Single Slot - 1756 backplane compatible
- Local or remote rack
- The module is recognized as an Input/Output module and has access to processor memory for data transfer between processor and module
- Ladder Logic is used for data transfer between module and processor.
- Configuration data obtained through user-defined ladder. Sample ladder file included

5.1.3 Hardware Specifications

Specification	Description
Backplane Current Load	800 mA @ 5 V DC 3mA @ 24V DC
Operating Temperature	0 to 60°C (32 to 140°F)
Storage Temperature	-40 to 85°C (-40 to 185°F)
Shock	30g Operational
	50g non-operational
	Vibration: 5 g from 10 to 150 Hz
Relative Humidity	5% to 95% (non-condensing)
LED Indicators	Module Status
	Backplane Transfer Status
	Application Status
	Serial Activity
Debug/Configuration port (CFG)	
CFG Port (CFG)	RJ45 (DB-9M with supplied cable)
	RS-232 only
Application ports (PRT1 & PRT2)	
Full hardware handshaking control, providing radio, modem and multi-drop support	
Software configurable communication parameters	Baud rate: 110 to 115,200 baud, depending on protocol
	RS-232 and 422
	Parity: none, odd or even
	Data bits: 5, 6, 7, or 8
	Stop bits: 1 or 2
	RTS on/off delay: 0 to 65535 milliseconds
App Ports (P1,P2) (Serial modules)	RJ45 (DB-9M with supplied cable)
	RS-232 handshaking configurable
	500V Optical isolation from backplane
Shipped with Unit	RJ45 to DB-9M cables for each port
	6-foot RS-232 configuration cable
	FTA cable
	Non-redundant Field Termination Assembly

5.1.4 Functional Specifications

- Backplane data transfer via input/output files
- Interfaces with Honeywell smart transmitters operating in the DE mode
- Support multiple DE channels CLX - up to 16 Channels with single PV transmitter, multivariable transmitters
- Instrument database mismatch verification
- Interfaces directly to Honeywell Field Terminal Assembly (FTA)
- Single cable connection from DEM module to FTA
- External 24 VDC source connection on front of DEM module for instrument loop power
- LEDs for visual module status
  - Module active
  - Module fault
- Operation via simple ladder logic

5.2 Functional Overview

This section provides an overview of how the MVI56-DEM module transfers data using the DEM protocol. You should understand the important concepts in this chapter before you begin installing and configuring the module.

5.2.1 General Concepts

The following discussion explains several concepts that are important for understanding the operation of the MVI56-DEM module.

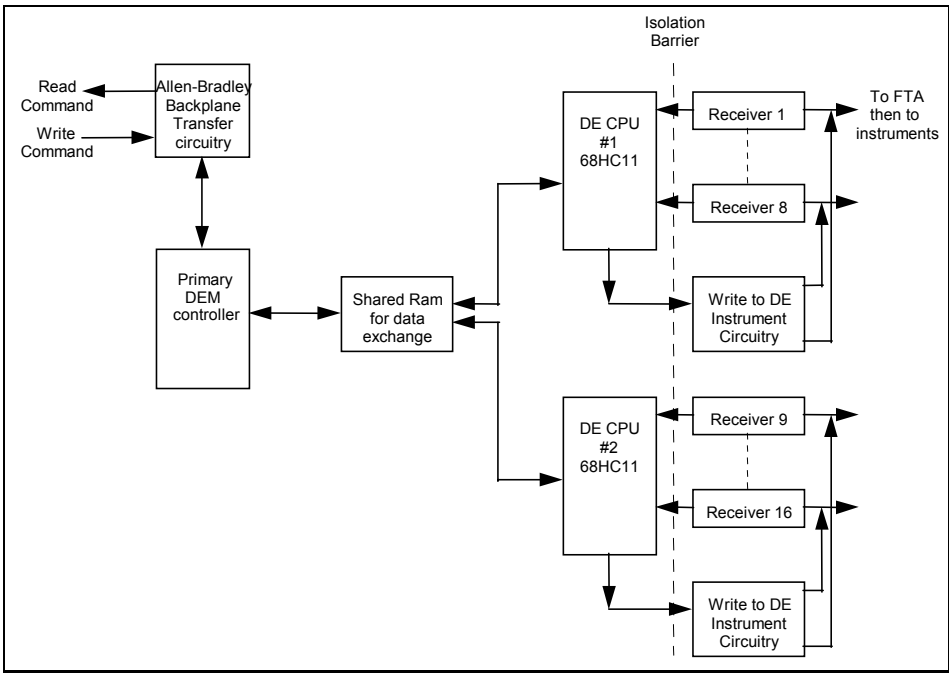
DE Channels

The MVI56-DEM module has been designed to provide a tightly integrated Communication Interface between the Rockwell Automation ControlLogix platform and the family of Honeywell Smart Transmitters.

The module consists of two DE CPU micro-controllers, each of which provide communications with 8 DE Smart Transmitters. The subsequent figure shows the following functional components on the module:

- A Primary DEM controller responsible for the overall operation of the board, including:
  - Access to Shared Ram between DE CPU #1, #2
  - Backplane communications with Rockwell Automation processor
  - Transferring data from DE processors to processor
  - Transferring write commands from the processor to DE processors
  - Data Base Mismatch comparisons
  - LED Status indicators
- Two DE CPU 68HC11 micro-controllers, each with the following:
  - Eight data receivers which provide input signal conditioning (noise filtering, surge limiting, etc.) for the serial data inputs
  - An output channel selector and driver circuitry allowing the DE processor to output data base write commands to any channel

- The Shared RAM provides a mailbox through which the MVI processor and the two DE processors can communicate. Access to this Shared RAM is strictly controlled by the MVI56-DEM processor
- The DEM module is connected to a Field Terminal Assembly (FTA), not shown in diagram, which includes 250 ohm range resistors to convert the 4 to 20 ma current signals from the Smart Transmitters in the DE mode into 1 to 5 Volt signals



The module supports both Single and/or Multi-variable Honeywell Transmitters operating in DE. Supported Honeywell instruments include:

- ST 3000 Smart Pressure Transmitter
- STT 3000 Smart Temperature Transmitter
- SMV 3000 Smart Multivariable Transmitter
- MagneW 300 Smart Magnetic Flow meter
- SCM 3000 Smart Coriolis Mass Flow meter
- SGC 3000 Smart Gas Chromatograph

There can be Single and Multi-Variable instruments connected to the DEM module, in any mix, totaling 16 logical DE Channels. An example configuration could be as follows:

DE Channel	Physical Type	Instrument
1	SV	ST 3000 Pressure
2	SV	STT 3000 Temperature
3	MV	PV 1 - SMV 3000
4		PV 2
5		PV 3
6		PV 4

DE Channel	Physical Type	Instrument
7	MV	PV 1 - SMV 3000
8		PV 2
Boundary		Cannot cross boundary with an MV Transmitter
9	SV	ST 3000 Pressure
10	SV	ST 3000 Pressure
11	SV	STT 3000 Temperature
12	SV	STT 3000 Temperature
13	MV	PV 1 - SMV 3000
14	MV	PV 2
15	MV	PV 3
16	MV	PV 4

Multivariable Considerations: The following 'rules' must be followed when integrating multivariable devices:

1. No instrument can be physically wired to the FTA terminals within the logical limits of another instrument
2. Cannot cross from Channel 8 to 9 with an MV transmitter, or rollover from Channel 16 to 1
3. The Tag ID must be identical and non-blank across all logical channels configured for use by a multivariable device
4. You must perform a Download Command on the physical channel in order to change the number of PV's being transmitted (DECONFIG can only be written to the first slot of a multivariable transmitters

Module Power Up

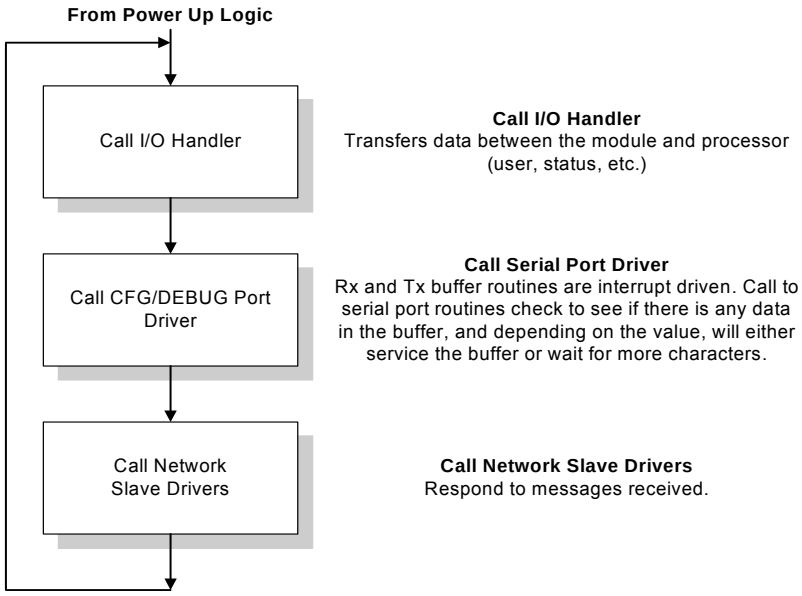
On power up, the module begins performing the following logical functions:

1. Initialize hardware components
   - Initialize backplane driver
   - Test and clear all RAM and shared RAM
   - Test and initialize both DE processors
   - Initialize the serial communication ports
2. Initialize the databases and ports
3. Set up the communication interface for the debug/configuration port

After the module receives the configuration, the module begins receiving and transmitting messages with devices on the serial networks.

Main Logic Loop

Upon completing the power up configuration process, the module enters an infinite loop that performs the functions shown in the following diagram.



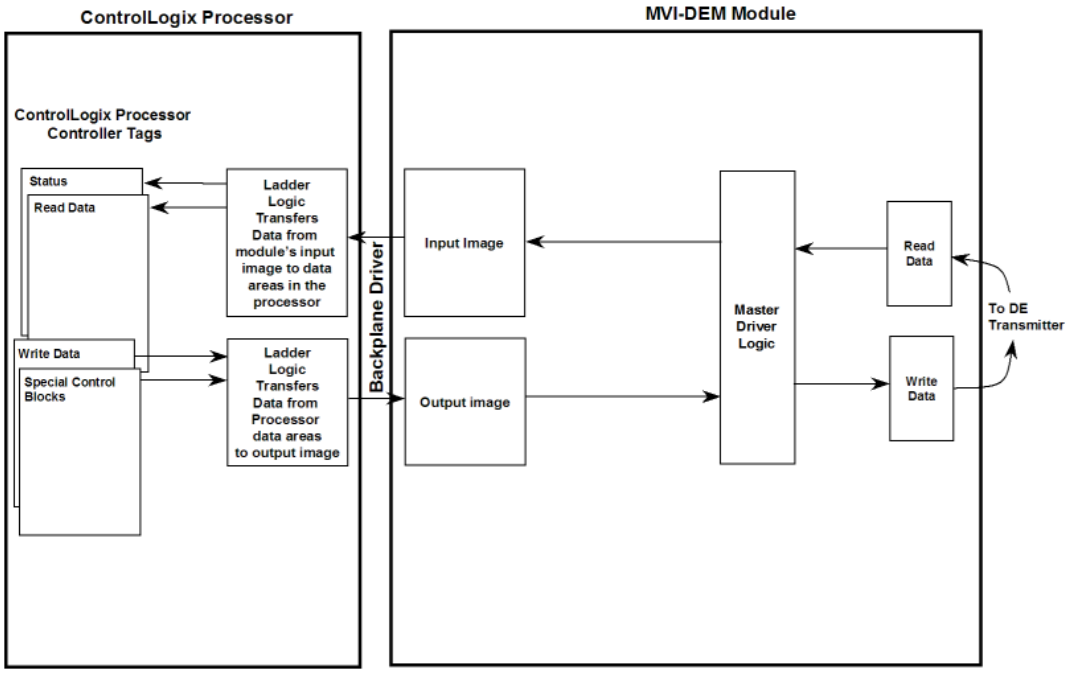
Backplane Data Transfer

The MVI56-DEM module communicates directly over the backplane. Data travels between the module and the ControlLogix processor across the backplane using the module's input and output images. The update frequency of the data is determined by the scan rate defined by the user for the module and the communication load on the module. Typical updates are in the range of 1 to 10 milliseconds.

Data received by the DE driver is placed in the module's input image. This data is processed by the ladder logic in the ControlLogix processor. The input image for the module is set to 500 bytes. This large data area permits fast throughput of data between the module and the processor.

The processor inserts data in the module's output image to transfer to the module. The module's program extracts the data and transmits the data out to the DE driver to the DE instruments. Additionally, the ControlLogix processor can send special control blocks to the module to instruct it to perform a special task. The output image for the module is set to 496 bytes. This large data area permits fast throughput of data from the processor to the module.

The following illustration shows the data transfer method used to move data between the ControlLogix processor, the MVI56-DEM module, and the DE instruments.



As shown in the previous diagram, all data transferred between the module and the processor over the backplane is through the input and output images. Ladder logic must be written in the ControlLogix processor to interface the input and output image data defined in the controller tags. The user is responsible for handling and interpreting all data received on the application ports and transferred to the input image.

As blocks are transferred between the module and the processor, each block contains a block identification code that defines the content or function of the block of data transferred. The block identification codes used by the module are displayed in the following table:

Block ID	Type	Description
0 to 1	Write Block	Data transferred from the processor to the module containing configuration data to pass to the instruments. Each block contains data for 8 channels. Block 0 contains the data for channels 1 to 8. Block 1 contains the data for channels 9 to 16.
0 to 7	Read Block	Data transferred from the module to the processor. Each block contains status data, real-time data and data for 2 channels. Block 0 contains the data for channels 1 and 2. Block 1 contains the data for channels 3 and 4. Block 7 contains the data for channels 15 and 16.
9999	Write Block	Forces the module to perform a cold-boot operation.

Block identification codes 0 to 1 for write and 0 to 7 for read move the channel data between the module and the processor. Block identification code 9999 is used as a special control block to control the module. Each of these blocks are discussed in the following topics:

Normal Data Transfer

Normal data transfer includes the transferring of data received by or to be transmitted to the DE driver. This data is transferred through read (input image) and write (output image) blocks. Refer to Module Configuration for a description of the data objects used with the blocks and the ladder logic required. The following topics discuss the structure and function of each block.

Read Block

These blocks of data transfer information from the module to the ControlLogix processor. The general structure of the input image used to transfer data received from the DE devices is shown in the following table:

Reserved
Write Block ID
Real Time PV (32 words)
Real Time SV (32 words)
Status Data (3 Words)
Channel x Data (82 Words)
Channel x+1 Data (82 Words)
Product and Block Status Data (13 Words)
Spare (3 Words)
Read Block ID

The first part of the block contains the real-time PV and SV values and the status data for the module and channels. The next two portions of the block contain the data for two channels of the module. The next segment of the block contains the product and block transfer status data. All this information should be stored in the processor when received by the user's ladder logic. The Block Identification Code (word 249) is used to signal the ControlLogix processor that a new block is ready for processing and informs the processor of the contents of the block. If the value of the code is set to 0, the block contains the channel read data for channels 1 and 2. If the value is set to 7, the block contains the channel read data for channels 15 and 16.

Refer to the Reference chapter for a detailed listing of the read block structure. Controller tags should be defined in the processor to receive this data.

The read data block also contains the block identification code the module expects to receive from the processor (word 1 in the block). Under normal data transfer conditions, the ladder logic should use the code to build the appropriate block for the module in the output image.

Write Block

These blocks of data transfer information from the processor to the module. The general structure of the output image used to transfer this data is shown in the following table.

Write Block ID
Channel x Data (17 Words)
Channel x+1 Data (17 Words)
Channel x+2 Data (17 Words)
Channel x+3 Data (17 Words)
Channel x+4 Data (17 Words)
Channel x+5 Data (17 Words)
Channel x+6 Data (17 Words)
Channel x+7 Data (17 Words)
Spare Data (111 Words)

The Block Identification code defines the content of the data contained in the block. If the block code is set to 0, data for channels 1 to 8 are contained in the block. If the block code is set to 1, data for channels 9 to 16 are contained in the block. Under normal conditions, the value used for the write block identification code should be that received in the read block from the module.

The Reference chapter of this document contains a detailed description of the write block structure. Ladder logic should be written to transfer the correct write data for each channel into these blocks.

Command Control Blocks

Block identification codes greater than 9900 are utilized to perform special functions in the module. Each control block recognized and used by the module is defined in the following topics.

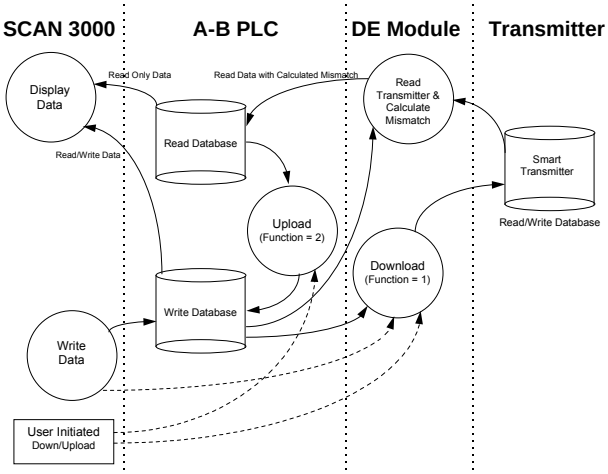
Cold Boot Block (9999)

Block 9999 performs a cold-boot operation on the module. The format of the block constructed by the processor is as follows:

Offset	Description	Length
0	9999	1
1 to 247	Spare	247

5.2.2 Data Flow

The movement of data between the transmitter and the processor is important to understand. The following illustration shows the data movement paths that are supported in this application. The diagram shows SCAN 3000 implementation, but functionality will be similar for other interfaces. The SCAN 3000 software will be supported after the interface to the ControlLogix processor has been defined.



Important: One of the underlying concepts that must be understood is that the processor is considered the 'owner' of the data. Therefore the contents of the processor data space, in particular the Write Data space, are the data to which all other data is compared.

Step	Description
Power Up	The read database will be populated by the DEM from the Smart Transmitter, and the write database will remain unchanged from its initial value in the processor. The user can then choose to upload or download
Read DE Transmitter & Calculate Mismatch	The module continuously transfers from the Smart Transmitter database to the read database, comparing the Write and Read files in the processor for mismatch. The module performs a mismatch comparison between the two and sets the status in the read database accordingly

Step	Description
Upload	Populates write database with that of the Smart Transmitter (via the read database in the processor). Upload may be a continuous loop if the module is to be configured in an un-secure mode. Otherwise, the Upload should only be initiated by a user. Ladder logic must support this feature. The operation only interacts with the processor and does not affect the operation of the MVI module.
Download	Download populates the Smart Transmitter with the values in the write database from the processor. First download will put the Smart Transmitter in the DE mode (future) (if it is not already)

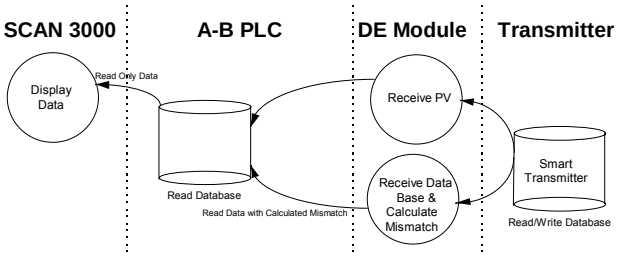
5.2.3 Reading from Honeywell Smart Transmitters

The ProSoft MVI56-DEM module allows the processor to read the real time data, the status data, and the configuration parameters in the Smart Transmitter's database. An overview of the data that is available from a transmitter follows (A detailed listing and description of the data is in the Reference chapter of this manual):

Type	Description
Real Time	PV Value (Last Good Value and NaN value)
	SV Value (Last God Value and NaN value)
Status	Module Status: Health indication
	Data Base Mismatch Status flags
	PV Update Counter
	SV Update Counter
	Communication Error Counter
	Status Messages: ASCII
Configuration	Function: Download/Upload
	Tag Name: ASCII
	Serial Number: ASCII
	DE Configuration: Data base mode
	Damping Value
	PV Characterization
	Sensor Type
	PV Number (channel # on MV transmitter)
	Number of PVs: (# of channels on MV Transmitter)
	Upper Range Value: URV
	Lower Range Value: LRV
	Upper Range Limit: URL
	Lower Range Limit: LRL

The Status and Configuration values are being received from the Smart Transmitter on a continuous basis to the DEM. The DEM will not actually receive these values until a complete database has been acquired from the instrument. This cycle can take anywhere from 15 to 90 seconds, depending on the instrument type. After the database is read into the DEM module, the cycle automatically starts over again. In this fashion the DEM module, and therefore the PLC Read Database, are being completely updated on a regular basis.

The flow of data from the instrument all of the way to the Operator display is shown in the following diagram:



5.2.4 Writing to Honeywell Smart Transmitters

In addition to the read functionality described previously, the ProSoft MVI56-DEM module allows the PLC application to change some of the configuration values in the Honeywell Smart Transmitter. These values are written to the instrument by pre-loading the appropriate register locations in the PLC and initiating a Download (Function = 1) cycle.

The module executes the Download Command and returns the completion status in the Device Status word. Upon receipt of the completion bit, the Download write register should be cleared to prevent continuous execution of the operation.

Note: The example ladder provided with the module and listed in this document performs the logic necessary to implement the Download functionality. We recommend the use of this logic, at least as a starting point, with simple modifications to the addressing.

The configuration parameters that can be written to the instrument are as follows:

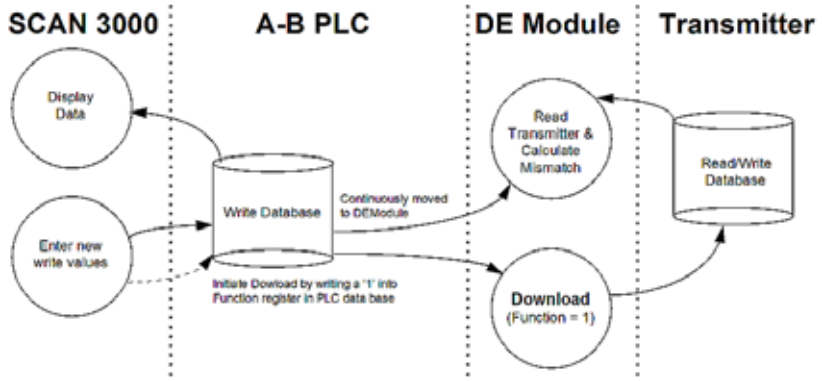
Type	Description	Write to Transmitter	Mismatch Tested
Configuration	Function: Download/Upload	N	N
	Tag Name: ASCII	Y	Y
	DE Configuration	Y	Y(1)
	Damping Value	Y	Y
	PV Characterization	Y	Y
	Sensor Type	Y	Y
	Upper Range Value: URV	Y	Y
	Lower Range Value: LRV	Y	Y
	Upper Range Limit: URL	N	Y(2)
	PV Num -	N	Y(2)
	Number of PV	N	Y(2)

(1) DE Configuration modes which disable the database read also disable Mismatch testing

(2) These values are written to the module for Mismatch testing purposes

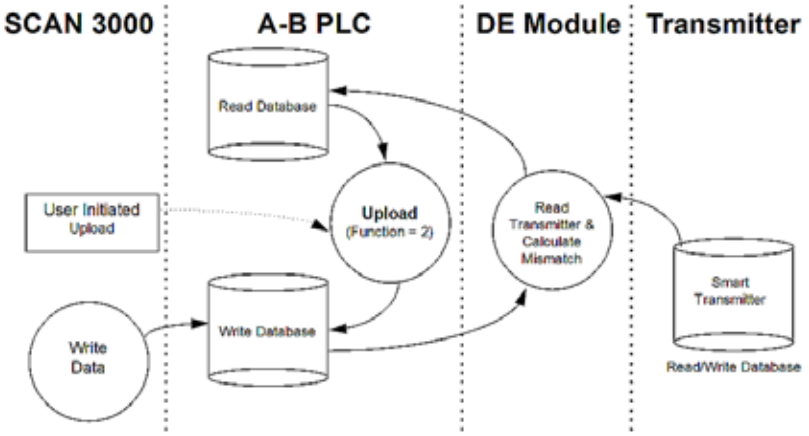
Performing a Download: Function 1

The Download Function performs the step of writing the new data to the instrument. Until the Function is set to 1, the Write Database is not moved to the instrument. The flow of write data from the operator interface station to the instrument is shown in the following diagram. The Write Database image in the PLC is being moved to the DEM module for Mismatch comparison purposes.



Performing an Upload

The Upload Function performs the step of moving the data that has been read from the instrument database from the PLC Read database into the PLC Write database. This function is useful for initializing the Write database when the Read database is known to contain good data. Performing this step clears any Mismatch conditions that exist. The flow of write data from the read database during the Upload function is shown in the following diagram:



The operation is completely contained in the PLC processor and does not require any action by the MVI processor. Ladder logic must copy the read data to the write data area. This can occur on a continuous basis or triggered by an event.

5.2.5 PV Value Integrity

A great deal of effort is put into the task of assuring the integrity of the PV value presented to the PLC. Two forms of the PV and SV variables are made available to the PLC:

PV: Last Good Value

This value is the PV value unconditioned by the Data Base Mismatch. Care should be exercised when using this PV value as the scaling, which is based on the URV/URL/LRV parameters, may not be accurate.

During the normal operation, the DEM module performs integrity checks of the health of the PV value. Should a condition be detected which could affect the integrity, the Bad PV Flag is set (Device Status Word 1/13). The four conditions which will cause the Bad PV Flag to be set are:

PV Update Timeout

If the PV value has not been updated within 6 seconds (24 PV update cycles), the flag will be set

Data Base Mismatch

If any data base mismatch condition is detected, the flag will be set

SFC Write Detected

If an SFC write to the instrument data base is detected, the flag will be set. Note that in a redundant application, the SFC Write Detected condition will be detected when a Download command is executed from the other module or from the SFC unit.

FTA Not Present

If the FTA connector or the 24 VDC power supply is disconnected, the flag will be set.

In order to clear the Bad PV Flag, the offending condition must be cleared, and under most circumstances will have to wait until a new data base has been received from the instrument.

5.2.6 Data Base Mismatch

Data base mismatch testing is performed by the DEM module on the write parameters received from the PLC. The mismatch status is returned to the PLC for use by the ladder logic or for status available to the PLC in via the Data Mismatch Active Flag in Device Status Word #1.

Bit	Description
0	Mismatch - LRV
1	Mismatch - URV
2	Mismatch - URL
3	Mismatch - Damping

Bit	Description
4	Mismatch - DE Configuration
5	Mismatch - PV Characterization
6	Mismatch - Sensor Type
7	Mismatch - Tag ID
8	Mismatch - PV Number
9	Mismatch - Number of PV Values
10	Mismatch - Cold Junction Reference
11	Mismatch - Open Thermo Couple Detection
12	Mismatch - Freq 50

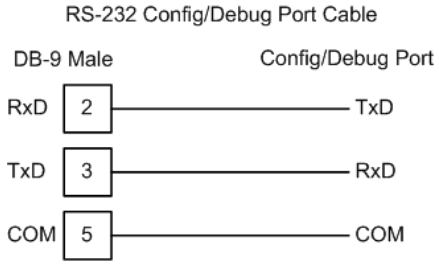
Important: The mismatch condition is performed in the DEM module on the write parameters every time the module receives a new copy of the parameters from the PLC.

Clearing the database mismatch condition is executed in one of several ways:

1. Wait for the mismatch condition to clear. If the mismatch was generated as the result of a Download Command, the mismatch will be cleared when the next data base is fully read from the instrument
2. Perform a Download Command to the instrument. If the write data is known to be correct executing a Download will move the new values to the instrument. If the Download is successful, the mismatch condition will clear when the next data base is fully read from the instrument
3. Perform an Upload Command.

5.3 RS-232 Configuration/Debug Port

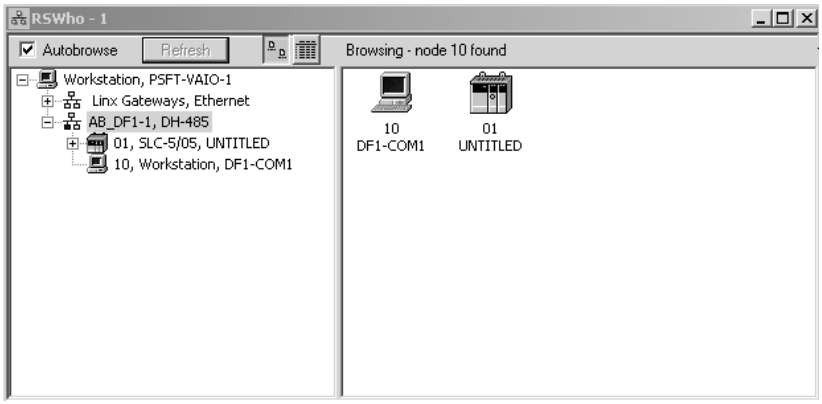
This port is physically an RJ45 connection. An RJ45 to DB-9 adapter cable is included with the module. This port permits a PC based terminal emulation program to view configuration and status data in the module and to control the module. The cable for communications on this port is shown in the following diagram:



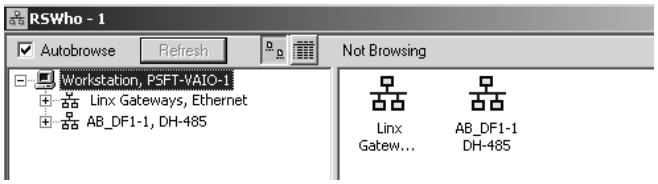
5.3.1 Disabling the RSLinx Driver for the Com Port on the PC

The communication port driver in RSLinx can occasionally prevent other applications from using the PC's COM port. If you are not able to connect to the module's configuration/debug port using ProSoft Configuration Builder (PCB), HyperTerminal or another terminal emulator, follow these steps to disable the RSLinx Driver.

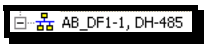
1 Open RSLinx and go to Communications>RSWho
2 Make sure that you are not actively browsing using the driver that you wish to stop. The following shows an actively browsed network:



3 Notice how the DF1 driver is opened, and the driver is looking for a processor on node 1. If the network is being browsed, then you will not be able to stop this driver. To stop the driver your RSWho screen should look like this:



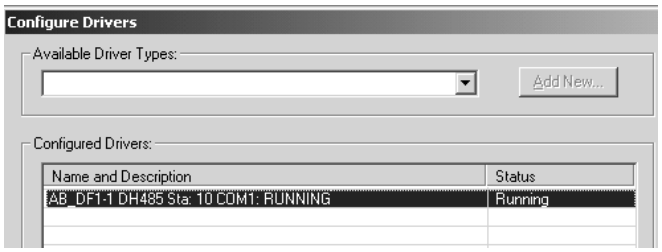
Branches are displayed or hidden by clicking on the ⊞ or the ⊟ icons.



4 When you have verified that the driver is not being browsed, go to

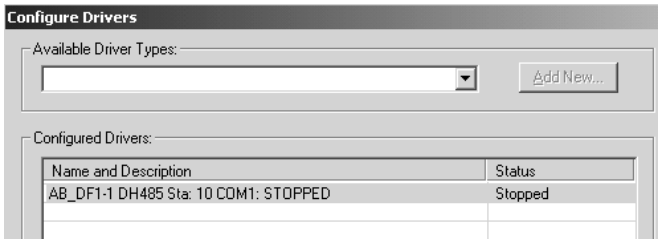
Communications>Configure Drivers

You may see something like this:



If you see the status as running, you will not be able to use this com port for anything other than communication to the processor. To stop the driver press the "Stop" on the side of the window:

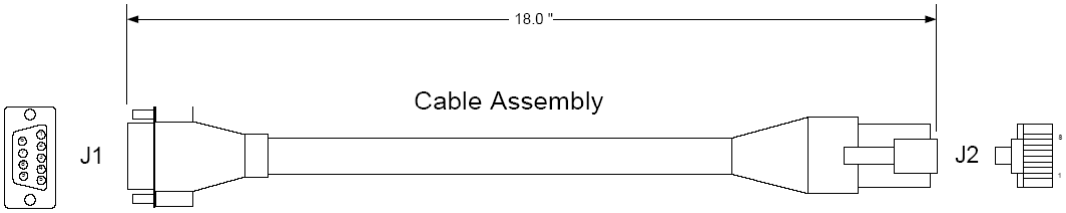
5 After you have stopped the driver you will see the following:

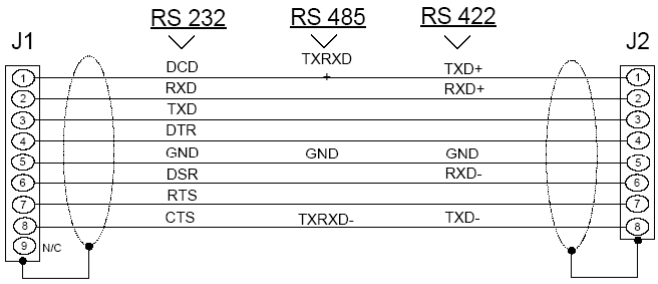


6 Upon seeing this, you may now use that com port to connect to the debug port of the module.

Note: You may need to shut down and restart your PC before it will allow you to stop the driver (usually only on Windows NT machines). If you have followed all of the above steps, and it will not stop the driver, then make sure you do not have RSLogix open. If RSLogix is not open, and you still cannot stop the driver, then reboot your PC.

5.4 DB9 to RJ45 Adaptor (Cable 14)

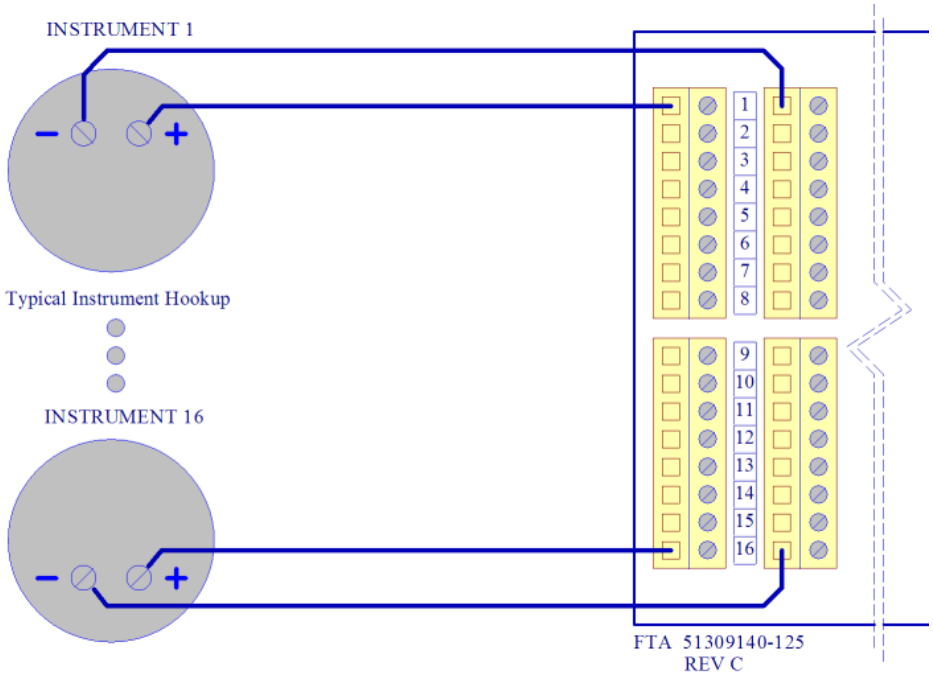




Wiring Diagram

5.5 Application Port Connection

The MVI56-DEM module has a single, high-density DB connector to attach the module to a FTA. The FTA and connection cable are supplied with the module. The following illustration shows the termination of instruments to the FTA:

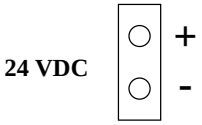


5.5.1 Installation Instructions

1. Power, input and output wiring must be in accordance with Class I, Division 2 wiring methods [Article 501-4(b) of the National Electrical Code, NFPA 70] and in accordance with the authority having jurisdiction. The following warnings must also be heeded:
2. Warning - Explosion Hazard - Substitution of components may impair suitability for Class I, Division 2
3. Warning - Explosion Hazard - When in hazardous locations, turn off power before replacing or wiring modules
4. Warning - Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

5.5.2 DEM Board Power Cabling

The DEM module is receives its power from the backplane. However, the DEM board receives its power externally. The power cabling setup is as follows:



5.5.3 Non-Redundant Configurations

In a typical Non-Redundant configuration, a single FTA is connected to a single module. The FTA available in this configurations is:

Honeywell FTA Model	Description	Size
MU-TSTX03	Compression Terminals	15.24 x 12.065 cm

Note: This unit is provided by ProSoft Technology

This unit is shipped standard with each MVI56-DEM unit, along with a 3-meter cable. If other configurations are required, please contact ProSoft Technology.

5.5.4 Redundant Configurations

The DE I/O system supports the implementation of redundancy at the I/O level quite easily. Using a standard Redundant FTA, a set of instruments can be connected to two MVI56-DEM modules. These two modules can be in separate racks or in the same racks, with either one or two PLC processors themselves in a redundant configuration.

Honeywell FTA Model	Description	Size
MU-TSTX13	Compression Terminals	30.73 x 12.065 cm
MU-TSTX53	Screw Terminals	30.73 x 12.065 cm

Note: These units are available from ProSoft Technology upon request

5.6 MVI56-DEM Read Block

This section contains the format of the read blocks passed from the module to the processor. Refer to the Reference chapter for a detailed definition of each parameter. These blocks have block identification codes that determine which channel data is contained in the block. The following table lists the relationship between the block identification codes and the channel data:

Block ID	Channel Data
0	1 and 2
1	3 and 4
2	5 and 6
3	7 and 8
4	9 and 10
5	11 and 12
6	13 and 14
7	15 and 16

The following table contains a detailed listing of the read block structure:

Words	Bytes		Channel	Description
	Start	Stop		
0	0	1		Reserved
1	2	3	Write Block ID	Block identification code for write block to receive
2	4	7	Channel 1	PV Value (Floating-point format)
4	8	11	Channel 2	PV Value (Floating-point format)
6	12	15	Channel 3	PV Value (Floating-point format)
8	16	19	Channel 4	PV Value (Floating-point format)
10	20	23	Channel 5	PV Value (Floating-point format)
12	24	27	Channel 6	PV Value (Floating-point format)
14	28	31	Channel 7	PV Value (Floating-point format)
16	32	35	Channel 8	PV Value (Floating-point format)
18	36	39	Channel 9	PV Value (Floating-point format)
20	40	43	Channel 10	PV Value (Floating-point format)
22	44	47	Channel 11	PV Value (Floating-point format)
24	48	51	Channel 12	PV Value (Floating-point format)
26	52	55	Channel 13	PV Value (Floating-point format)
28	56	59	Channel 14	PV Value (Floating-point format)
30	60	63	Channel 15	PV Value (Floating-point format)
32	64	67	Channel 16	PV Value (Floating-point format)
34	68	71	Channel 1	SV Value (Floating-point format)
36	72	75	Channel 2	SV Value (Floating-point format)
38	76	79	Channel 3	SV Value (Floating-point format)
40	80	83	Channel 4	SV Value (Floating-point format)
42	84	87	Channel 5	SV Value (Floating-point format)
44	88	91	Channel 6	SV Value (Floating-point format)

Words	Bytes		Channel	Description
	Start	Stop		
46	92	95	Channel 7	SV Value (Floating-point format)
48	96	99	Channel 8	SV Value (Floating-point format)
50	100	103	Channel 9	SV Value (Floating-point format)
52	104	107	Channel 10	SV Value (Floating-point format)
54	108	111	Channel 11	SV Value (Floating-point format)
56	112	115	Channel 12	SV Value (Floating-point format)
58	116	119	Channel 13	SV Value (Floating-point format)
60	120	123	Channel 14	SV Value (Floating-point format)
62	124	127	Channel 15	SV Value (Floating-point format)
64	128	131	Channel 16	SV Value (Floating-point format)
66	132	133	All Channels	PV Update Flag (1 bit for each channel with 1=updated)
67	134	135	All Channels	PV Timeout Flag (1 bit for each channel with 1=timeout, 0=normal)
68	136	137	N/A	Module Status 0: All OK 1: DE CPU Init Error 2: DE CPU Reset Error 3: DE Timeout Error 5: FTA Not Connected If Status Codes 1 to 3 are received, the module has detected a failure condition in at least one of the DE processors. If Status Code 5 is received, the module has determined that the FTA is not connected. Verify the connection and plug back in. The module will clear the error condition itself and continue operation once the FTA is reconnected.
69	138	141	First Channel	LRV: lower range value (Float format)
71	142	145	in Block	URV: upper range value (Float format)
73	146	149		URL: upper range limit (Float format)
75	150	153		Damping (Float format)
77	154	157		LRL: lower range limit (Float format)
79	158	159		Device Status Flags 1
80	160	161		Device Status Flags 2
81	162			Special DB Byte
	163			Status Bits 1
82	164			Status Bits 2
	165			Status Bits 3
83	166	167		Spare
84	168	169		PV Value 0 to 16383
85	170			Cfg Database update counter
	171			Communication error counter

Words	Bytes		Channel	Description
	Start	Stop		
86	172			PV update counter
	173			SV update counter
87	174			Spare
	175			Function
88	176			DE CFG: Operational Mode
	177			Damping
89	178			PV Characterization
	179			Sensor Type
90	180			PV Number
	181			Number of PV's
91	182	189		Tag Name
95	190	197		Serial Number
99	198	205		Software Revision
103	206	237		Scratch Pad
119	238	301		Transmitter Status
151	302	305	Second Channel	LRV: lower range value (Float format)
153	306	309	in Block	URV: upper range value (Float format)
155	310	313		URL: upper range limit (Float format)
157	314	317		Damping (Float format)
159	318	321		LRL: lower range limit (Float format)
161	322	323		Device Status Flags 1
162	324	325		Device Status Flags 2
163	326			Special DB Byte
	327			Status Bits 1
164	328			Status Bits 2
	329			Status Bits 3
165	330	331		Spare
166	332	333		PV Value 0 to 16383
167	334			Cfg Database update counter
	335			Communication error counter
168	336			PV update counter
	337			SV update counter
169	338			Spare
	339			Function
170	340			DE CFG: Operational Mode
	341			Damping
171	342			PV Characterization
	343			Sensor Type
172	344			PV Number
	345			Number of PV's

Words	Bytes		Channel	Description
	Start	Stop		
173	346	353		Tag Name
177	354	361		Serial Number
181	362	369		Software Revision
185	370	401		Scratch Pad
201	402	465		Transmitter Status
233	466	467	Product Status	Program Scan Counter
234	468	471		Product Code Name
236	472	475		Software Revision
238	476	479		Operating System Revision
240	480	484		Run Number
242	484	485	Block Transfer Status	Block transfer read count
243	486	487		Block transfer write count
244	488	489		Block transfer parse count
245	490	491		Block transfer error count
246	492	497	N/A	Spare
249	498	499	Read Block ID	Read block identification code (0 to 7)

5.7 MVI56-DEM Write Block

This section contains the format of the write blocks passed from the processor to the module. These blocks have block identification codes that determine which channel data is contained in the block. The following table lists the relationship between the block identification codes and the channel data contained:

Block ID	Channel Data
0	1 to 8
1	9 to 16

The following table contains a detailed listing of the write block structure:

Words	Bytes		Channel	Description
	Start	Stop		
0	0	1	Write Block ID	Block identification code for this block (0 to 1)
1	2	5	First Channel	LRV=(LRV/URL) (Float format)
3	6	9		URV=((URV-LRV)/URL) (Float format)
5	10	13		URL (Float format)
7	14	17		Damping (Float format)
9	18	19		Command Bits
10	20	21		Function
11	22			DE Configuration
	23			Damping
12	24			PV Characterization
	25			Sensor Type
13	26			PV Number

Words	Bytes		Channel	Description
	Start	Stop		
	27			Number of PV's
14	28	35		Tag Name
18	36	39	Second Channel	LRV=(LRV/URL) (Float format))
20	40	43		URV=((URV-LRV)/URL) (Float format)
22	44	47		URL (Float format)
24	48	51		Damping (Float format)
26	52	53		Command Bits
27	54	55		Function
28	56			DE Configuration
	57			Damping
29	58			PV Characterization
	59			Sensor Type
30	60			PV Number
	61			Number of PV's
31	62	69		Tag Name
35	70	73	Third Channel	LRV=(LRV/URL) (Float format)
37	74	77		URV=((URV-LRV)/URL) (Float format)
39	78	81		URL (Float format)
41	82	85		Damping (Float format)
43	86	87		Command Bits
44	88	89		Function
45	90			DE Configuration
	91			Damping
46	92			PV Characterization
	93			Sensor Type
47	94			PV Number
	95			Number of PV's
48	96	103		Tag Name
52	104	107	Fourth Channel	LRV=(LRV/URL) (Float format))
54	108	111		URV=((URV-LRV)/URL) (Float format)
56	112	115		URL (Float format)
58	116	119		Damping (Float format)
60	120	121		Command Bits
61	122	123		Function
62	124			DE Configuration
	125			Damping
63	126			PV Characterization
	127			Sensor Type
64	128			PV Number
	129			Number of PV's

Words	Bytes		Channel	Description
	Start	Stop		
65	130	137		Tag Name
69	138	141	Fifth Channel	LRV=(LRV/URL) (Float format)
71	142	145		URV=((URV-LRV)/URL) (Float format)
73	146	149		URL (Float format)
75	150	153		Damping (Float format)
77	154	155		Command Bits
78	156	157		Function
79	158			DE Configuration
	159			Damping
80	160			PV Characterization
	161			Sensor Type
81	162			PV Number
	163			Number of PV's
82	164	171		Tag Name
86	172	175	Sixth Channel	LRV=(LRV/URL) (Float format)
88	176	179		URV=((URV-LRV)/URL) (Float format)
90	180	183		URL (Float format)
92	184	187		Damping (Float format)
94	188	189		Command Bits
95	190	191		Function
96	192			DE Configuration
	193			Damping
97	194			PV Characterization
	195			Sensor Type
98	196			PV Number
	197			Number of PV's
99	198	217		Tag Name
103	206	209	Seventh Channel	LRV=(LRV/URL) (Float format)
105	210	213		URV=((URV-LRV)/URL) (Float format)
107	214	217		URL (Float format)
109	218	221		Damping (Float format)
111	222	223		Command Bits
112	224	225		Function
113	226			DE Configuration
	227			Damping
114	228			PV Characterization
	229			Sensor Type
115	230			PV Number
	231			Number of PV's
116	232	239		Tag Name

Words	Bytes		Channel	Description
	Start	Stop		
120	240	243	Eighth Channel	LRV=(LRV/URL) (Float format)
122	244	247		URV=((URV-LRV)/URL) (Float format)
124	248	251		URL (Float format)
126	252	255		Damping (Float format)
128	256	257		Command Bits
129	258	259		Function
130	260			DE Configuration
	261			Damping
131	262			PV Characterization
	263			Sensor Type
132	264			PV Number
	265			Number of PV's
133	266	273		Tag Name
137	274	495	N/A	Spare

5.8 DE Parameter Descriptions

This section contains a detailed listing of the Honeywell DE parameters.

5.8.1 Device Status Flags #1

Bit	Name	Description
0	Function Done	0 = Not complete, 1 = Complete Status Flag associated with the function parameter. When the Function parameter is set to one(1) to initiate a database write to the instrument, this bit may be monitored to determine completion
1	Function Passed	0 = Function Failed, 1 = Function Passed Flag to be used in conjunction with Function Done Flag. When the Function Command is set to anything besides Imaging PV, the Function Done Flag is set False, When the requested Function Command is completed, the MVI will return to the Imaging PV mode, set the Function Done Flag to 1 and set the Function Passed depending on the outcome of the command. Note that if a Download to an Instrument is initiated and no parameters have been changed in the database, the Function Passed Flag will **not** be set.
2	PV Update Flag (Toggles)	This flag indicates that the DEM has received a new PV value from the instrument in this DE Channel. This flag will be toggled during the next Block Transfer with the current block read number, unless a new PV value is received again.
3	PV Output	This flag indicates that the PV is in Output Mode. In this implementation the instrument can only be placed in Output Mode by the SFC (hand held) In this mode, the PV is forced to a value which overrides the transmitter PV. This is a read only value

Bit	Name	Description
4	SFC Detected	This flag indicates that the DE CPU has detected that the SFC has changed transmitter parameters. This bit is for status indication only in the PLC but is used by the DEM as part of the parameter mismatch logic.
5	SV Updated Flag (Toggles)	This flag indicates that the DEM has received a new SV value from the instrument in this DE Channel. This flag will be toggled during the next Block Transfer with the current BTR Block ID number, unless a new SV value is received again.
6	Config Data Base Update (Toggles)	This flag indicates that the DEM has received a new Configuration Data Base from the DE CPU. This flag will only be updated by the DE CPU when the complete data base has been received from the instrument. be toggled during the next Block Transfer with the current BTR Block ID number.
7	Spare	
8	Cold Junction Ref	A flag indicating if cold junction reference is being used by the transmitter. This value may be changed in the instrument by the PLC via the Download Function. 0 External reference used 1 Internal (to transmitter) reference is used
9	Open Thermocouple Detect	A flag indicating if Open Thermocouple Detection is enabled in the transmitter. This value may be changed in the instrument by the PLC via the Download Function. 0 Detection Not Enabled 1 Detection Enabled
10	Freq 50	A flag indicating if 50 or 60 Hertz filtering is being used in the transmitter. This value may be changed in the instrument by the PLC via the Download Function. 0 60 Hz 1 50 Hz
11	Data Mismatch Active Flag	A flag set by the DEM whenever an active data base mismatch condition exists. The exact mismatched parameters can be determined by checking Device Status Flags #2. The Data Mismatch flag will be cleared by the DEM whenever the condition causing the mismatch is cleared. 0 No mismatch condition 1 Mismatch condition
12	Spare	
13	Bad PV Flag	A flag set by the DEM whenever the PV value is suspected or known to be bad. After the PV value is good again, this flag will be cleared by the DEM. Conditions causing this flag to be set include: **PV Update Timeout**: If the PV value has not been updated within the timeout period, the flag is set **FTA Not Present:** If the FTA connector or the 24 VDC power supply is disconnected, the flag will be set **SFC Write Detected:** If an SFC write to the instrument data base is detected, the flag will be set. Note that in a redundant application, the SFC Write Detected condition will be detected when a Download command is executed from the other module or from the SFC unit. **Database Mismatch**: If the data base mismatch condition is detected, the flag will be set

Bit	Name	Description
14	PV Under Range Flag	This flag is set whenever the PV value is under 0%.
15	PV Over Range Flag	This flag is set whenever the PV value is over 100%.

5.8.2 Device Status Flags #2

The bits in this word indicate the current mismatch status for each data variable which is verified. When the bit is set (1) the variable is in a mismatched condition. The mismatch may be cleared by performing a download to the instrument or by performing an upload (copying the read data base to the write data base). If the PLC database is downloaded to the instrument, the mismatch condition will not clear until the complete database has been read back from the instrument.

Bit	Description
0	LRV - Mismatch
1	URV - Mismatch
2	URL - Mismatch
3	Damping - Mismatch
4	DE Config - Mismatch
5	PV Char - Mismatch
6	Sensor Type - Mismatch
7	Tag ID - Mismatch
8	PV Number - Mismatch
9	Number of PV Values - Mismatch
10	Cold Junction Ref - Mismatch
11	Open Thermocouple Detect - Mismatch
12	Freq 50 - Mismatch
13	Spare
14	Spare
15	Spare

Special DB byte

Bit	Description
0	Initial Power-up Data base
1	1st DB Capture in progress
2	4 Byte Data Base
3	No DE Data Available
4	SFC Write Detected
5	Output Mode
6	Not Used
7	Not Used

Status Bits 1 to 3

Bit	Description
0	Defined by Honeywell
1	Defined by Honeywell
2	Defined by Honeywell
3	Defined by Honeywell
4	Defined by Honeywell
5	Defined by Honeywell
6	Defined by Honeywell
7	Defined by Honeywell

Command Bits

Bit	Name	Description
0	Cold Junction Ref	A flag indicating if cold junction reference is being used by the transmitter. This value may be changed in the instrument by the PLC via the Download Function. 0 External reference used 1 Internal (to transmitter) reference is used
1	Open Thermocouple Detect	A flag indicating if Open Thermocouple Detection is enabled in the transmitter. This value may be changed in the instrument by the PLC via the Download Function. 0 Detection Not Enabled 1 Detection Enabled
2	Freq 50	A flag indicating if 50 or 60 Hertz filtering is being used in the transmitter. This value may be changed in the instrument by the PLC via the Download Function. 0 60 Hz 1 50 Hz

PV Number

In a multi-variable transmitter, this value indicates the relative number of the PV value coming from the instrument. Used in combination with Number of PV value in low byte. In a single variable instrument, this will have a value of 1.

5.8.3 Number of PVs

Indicates the total number of PV values being returned from the instrument. This value will be 1 in a single variable instrument

PV Value: 0 to 4095

A 12-bit representation of the value being returned in the PV: Last Good Value field. This value is intended to be used for PID logic and other applications that would require that the Floating Point value be de-scaled. This value is initialized to 0 during power up.

Config database update counter

Updated by the DE CPU, for debug purposes, every time the instrument data base has been completely received. The counter increments from 0 to 0ffh and then wraps around to 0.

Communication error counter

Updated by the DE CPU, for debug purposes, to indicate the number of DE communication errors which have occurred since reset. The counter increments from 0 to 0ffh and then wraps around to 0.

PV updated counter

Updated by the DE CPU every time the PV value is received from an instrument. Note also that the COMM LED on the module will also toggle on when a PV is received.

5.8.4 SV updated counter

Updated by the DE CPU every time the SV variable is received from an instrument.

Function

This value describes the operating mode of the DEM for the DE Channel and the corresponding transmitter. The following modes are defined and/or supported:

Fctn	Description
0	Imaging PV (Default)
1	Download Transmitter Parameters to Instrument
2	Upload Transmitter Parameters
	Performed in ladder logic. Copies data base read
	back from instrument into write registers
3	Set LRL (Not supported, use mode #1)
4	Set URL (Not supported, use mode #1)
5	Correct LRL (Not supported, use mode #1)
6	Correct URL (Not supported, use mode #1)
7	Correct Zero Point (Not supported, use mode #1)
8	Restore Calib (Not supported)

DE CFG - Operational Mode

Indicates the DE operational mode for the transmitter configuration and the data which will be returned from the instrument. The available values are as follows:

Value	Description
0	Analog Mode
1	PV value only
2	PV and SV only

Value	Description
3	PV and Configuration Data Base (6 Byte mode)
4	PV, SV and Configuration Data Base (6 Byte Mode)

Note that the DE CFG value must be at least a 3 (instrument must be in 6 byte mode) in order for the database to be read from the instrument

Damping

This is the damping value correspond to the particular damping value in the transmitter. These values are based on a lookup table, which is a function of the type of transmitter.

Damping	SPT	STT	SFM
0	0.0	0.0	0.0
1	0.16	0.30	0.5
2	0.32	0.70	1.0
3	0.48	1.5	2.0
4	1.0	3.1	3.0
5	2.0	6.3	4.0
6	4.0	12.7	5.0
7	8.0	25.5	10.0
8	16.0	51.1	50.0
9	32.0	102.3	100.0

PV Characterization

This parameter defines the algorithm used in the transmitter for process variable characterization. The correct PV Characterization parameter chosen when downloading the database must be in the set that is supported by the transmitter installed in the DE Channel.

Important: The PV Characterization value is not checked by the DEM module against the transmitter type. You must be cautious when writing the value to be sure that the correct value is selected

Sensor Type

Value indicates the type of instrument that is connected to the DE Channel. Possible values are:

Value	Hex	Description
8	8	SPT DP
9	9	SPT GP
10	A	SPT AP
11	B	STT
12	C	SFM
13	D	SCM
14	E	SGC

Value	Hex	Description
15	F	SVP
16	10	MTT
17	11	STP
18	12	SLV
19	13	SDU
20	14	Generic

6 Support, Service & Warranty

In This Chapter

Be sure and read the full Warranty that can be found on our web site at www.prosoft-technology.com for details and other terms and conditions. The content in this summary is subject to change without notice. The content is current at date of publication.

ProSoft Technology, Inc. strives to provide meaningful support to its customers. Should any questions or problems arise, please feel free to contact us at:

Internet	Web Site: http://www.prosoft-technology.com/support
	E-mail address: support@prosoft-technology.com

Those of us at ProSoft Technology, Inc. want to provide the best and quickest support possible, so before calling please have the following information available. You may wish to fax this information to us prior to calling.

1. Product Version Number
2. System architecture
3. Network details

In the case of hardware, we will also need the following information:

1. Module configuration and contents of file
2. Module Operation
3. Configuration/Debug status information
4. LED patterns
5. Information about the processor and user data files as viewed through the development software and LED patterns on the processor
6. Details about the networked devices interfaced, if any

For technical support calls within the United States, an after-hours answering system allows pager access to one of our qualified technical and/or application support engineers at any time to answer your questions.

6.1 How to Contact Us: Sales and Support

All ProSoft Technology Products are backed with full technical support. Contact our worldwide Technical Support team and Customer Service representatives directly by phone or email:

USA / Latin America (excluding Brasil) (Office in California)

+1(661) 716-5100
+1(661) 716-5101 (Fax)
1675 Chester Avenue, 4th Floor
Bakersfield, California 93301
U.S.A.
+1.661.716.5100, support@prosoft-technology.com
Languages spoken include: English, Spanish

Asia Pacific Sales (office in Malaysia)

+603.7724.2080
+603.7724.2090 (Fax)
C210, Damansara Intan,
1 Jalan SS20/27, 47400 Petaling Jaya
Selangor, Malaysia
+603.7724.2080, asiapc@prosoft-technology.com
Languages spoken include: Chinese, Japanese, English

Asia Pacific Support (office in China)

+86.21.64518356 x 8011
+86.21.64756957 (Fax)
4/F, No. 16 Hongcao Road
Shanghai, China 200233
China
+86.21.64518356 x 8011, zhang@prosoft-technology.com
Languages spoken include: Chinese, English

Europe / Middle East / Africa (office in Toulouse, France)

+33 (0) 5.34.36.87.20
+33 (0) 5.61.78.40.52 (Fax)
Zone d'activité de Font Grasse
17, rue des Briquetiers
F-31700 Blagnac
France
+33 (0) 5.34.36.87.20. support. EMEA@prosoft-technology.com
Languages spoken include: French, English

Brasil (office in Sao Paulo)

+55-11-5084-5178
+55-11-5083-3776 (Fax)
Rua Vergueiro, 2949 - sala 182 - Edifício Vergueiro Work Center
Vila Mariana - São Paulo
Cep: 04101-300 - Brasil
+55-11-5084-5178, eduardo@prosoft-technology.com
Languages spoken include: Portuguese, English

6.2 Return Material Authorization (RMA) Policies and Conditions

The following RMA Policies and Conditions apply to any returned product. These RMA Policies are subject to change by ProSoft without notice. For warranty information, see Section C below entitled "Limited Warranty". In the event of any inconsistency between the RMA Policies and the Warranty, the Warranty shall govern.

6.2.1 All Product Returns

1 In order to return a Product for repair, exchange or otherwise, the Customer must obtain a Returned Material Authorization (RMA) number from ProSoft and comply with ProSoft shipping instructions.
2 In the event that the Customer experiences a problem with the Product for any reason, Customer should contact ProSoft Technical Support at one of the telephone numbers listed above in Section A. A Technical Support Engineer will request several tests in an attempt to isolate the problem. If after these tests are completed, the Product is found to be the source of the problem, ProSoft will issue an RMA.
3 All returned Products must be shipped freight prepaid, in the original shipping container or equivalent, to the location specified by ProSoft, and be accompanied by proof of purchase. The RMA number is to be prominently marked on the outside of the shipping box. Customer agrees to insure the Product or assume the risk of loss or damage in transit. Products shipped to ProSoft without an RMA number will be returned to the Customer, freight collect. Contact ProSoft Technical Support for further information.
4 Out of warranty returns are not allowed on RadioLinx accessories such as antennas, cables, and brackets.

The following policy applies for Non-Warranty Credit Returns:

A 10% Restocking Fee if Factory Seal is *not* broken
B 20% Restocking Fee if Factory Seal is broken

ProSoft retains the right, in its absolute and sole discretion, to reject any non-warranty returns for credit if the return is not requested within three (3) months after shipment of the Product to Customer, if the Customer fails to comply with ProSoft's shipping instructions, or if the Customer fails to return the Product to ProSoft within six (6) months after Product was originally shipped.

6.3 Procedures for Return of Units Under Warranty

1 A Technical Support Engineer must pre-approve all product returns.
2 Module is repaired or replaced after a Return Material Authorization Number is entered and a replacement order is generated.
3 Credit for the warranted item is issued within 10 business days after receipt of product and evaluation of the defect has been performed by ProSoft. The credit will only be issued provided the product is returned with a valid Return Material Authorization Number and in accordance with ProSoft's shipping instructions.

a) If no defect is found, a credit is issued.

b) If a defect is found and is determined to be customer generated or if the defect is otherwise not covered by ProSoft's Warranty, or if the module is not repairable, a credit is not issued and payment of the replacement module is due.

6.4 Procedures for Return of Units Out of Warranty

1 Customer sends unit in for evaluation.

2 If no defect is found, Customer will be charged the equivalent of US $100 plus shipping, duties and taxes that may apply. A new Purchase Order will be required for this evaluation fee.

If the unit is repaired the charge to the Customer will be 30%* of the list price plus any shipping, duties and taxes that may apply. A new Purchase Order will be required for a product repair.

3 For an immediate exchange, a new module may be purchased and sent to Customer while repair work is being performed. Credit for purchase of the new module will be issued when the new module is returned in accordance with ProSoft's shipping instructions and subject to ProSoft's policy on non-warranty returns. This is in addition to charges for repair of the old module and any associated charges to Customer.

4 If, upon contacting ProSoft Customer Service, the Customer is informed that unit is believed to be unrepairable, the Customer may choose to send unit in for evaluation to determine if the repair can be made. Customer will pay shipping, duties and taxes that may apply. If unit cannot be repaired, the Customer may purchase a new unit.

6.4.1 Un-repairable Units

- 3150-All
- 3750
- 3600-All
- 3700
- 3170-All
- 3250
- 1560 can be repaired, if defect is the power supply
- 1550 can be repaired, if defect is the power supply
- 3350
- 3300
- 1500-All

*** 30% of list price is an estimated repair cost only. The actual cost of repairs will be determined when the module is received by ProSoft and evaluated for needed repairs.**

6.4.2 Purchasing Warranty Extension

As detailed below in ProSoft's Warranty, the standard Warranty Period is one year (or in the case of RadioLinx modules, three years) from the date of delivery. The Warranty Period may be extended for an additional charge, as follows:

- Additional 1 year = 10% of list price
- Additional 2 years = 20% of list price
- Additional 3 years = 30% of list price

6.5 LIMITED WARRANTY

This Limited Warranty ("Warranty") governs all sales of hardware, software and other products (collectively, "Product") manufactured and/or offered for sale by ProSoft, and all related services provided by ProSoft, including maintenance, repair, warranty exchange, and service programs (collectively, "Services"). By purchasing or using the Product or Services, the individual or entity purchasing or using the Product or Services ("Customer") agrees to all of the terms and provisions (collectively, the "Terms") of this Limited Warranty. All sales of software or other intellectual property are, in addition, subject to any license agreement accompanying such software or other intellectual property.

6.5.1 What Is Covered By This Warranty

A *Warranty On New Products*: ProSoft warrants, to the original purchaser only, that the Product that is the subject of the sale will (1) conform to and perform in accordance with published specifications prepared, approved, and issued by ProSoft, and (2) will be free from defects in material or workmanship; provided these warranties only cover Product that is sold as new. This Warranty expires one year (or in the case of RadioLinx modules, three years) from the date of shipment (the "Warranty Period"). If the Customer discovers within the Warranty Period a failure of the Product to conform to specifications, or a defect in material or workmanship of the Product, the Customer must promptly notify ProSoft by fax, email or telephone. In no event may that notification be received by ProSoft later than 15 months (or in the case of RadioLinx modules, 39 months) from the date of delivery. Within a reasonable time after notification, ProSoft will correct any failure of the Product to conform to specifications or any defect in material or workmanship of the Product, with either new or used replacement parts. Such repair, including both parts and labor, will be performed at ProSoft's expense. All warranty service will be performed at service centers designated by ProSoft. If ProSoft is unable to repair the Product to conform to this Warranty after a reasonable number of attempts, ProSoft will provide, at its option, one of the following: a replacement product, a full refund of the purchase price or a credit in the amount of the purchase price. All replaced product and parts become the property of ProSoft. These remedies are the Customer's only remedies for breach of warranty.

B *Warranty On Services*: Material and labor used by ProSoft to repair a verified malfunction or defect are warranted on the terms specified above for new Product, provided said warranty will be for the period remaining on the original new equipment warranty or, if the original warranty is no longer in effect, for a period of 90 days from the date of repair.

C The Warranty Period for RadioLinx accessories (such as antennas, cables, brackets, etc.) are the same as for RadioLinx modules, that is, three years from the date of shipment.

6.5.2 What Is Not Covered By This Warranty

A ProSoft makes no representation or warranty, expressed or implied, that the operation of software purchased from ProSoft will be uninterrupted or error free or that the functions contained in the software will meet or satisfy the purchaser's intended use or requirements; the Customer assumes complete responsibility for decisions made or actions taken based on information obtained using ProSoft software.

B With the exception of RadioLinx accessories referenced in paragraph 1(c) this Warranty does not cover any product, components, or parts not manufactured by ProSoft.

C This Warranty also does not cover the failure of the Product to perform specified functions, or any other non-conformance, defects, losses or damages caused by or attributable to any of the following: (i) shipping; (ii) improper installation or other failure of Customer to adhere to ProSoft's specifications or instructions; (iii) unauthorized repair or maintenance; (iv) attachments, equipment, options, parts, software, or user-created programming (including, but not limited to, programs developed with any IEC 61131-3 programming languages, or "C") not furnished by ProSoft; (v) use of the Product for purposes other than those for which it was designed; (vi) any other abuse, misapplication, neglect or misuse by the Customer; (vii) accident, improper testing or causes external to the Product such as, but not limited to, exposure to extremes of temperature or humidity, power failure or power surges outside of the limits indicated on the product specifications; or (viii) disasters such as fire, flood, earthquake, wind or lightning.

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6.5.3 DISCLAIMER REGARDING HIGH RISK ACTIVITIES

PRODUCT MANUFACTURED OR SUPPLIED BY PROSOFT IS NOT FAULT TOLERANT AND IS NOT DESIGNED, MANUFACTURED OR INTENDED FOR USE IN HAZARDOUS ENVIRONMENTS REQUIRING FAIL-SAFE PERFORMANCE (INCLUDING, WITHOUT LIMITATION, THE OPERATION OF NUCLEAR FACILITIES, AIRCRAFT NAVIGATION OF COMMUNICATION SYSTEMS, AIR TRAFFIC CONTROL, DIRECT LIFE SUPPORT MACHINES OR WEAPONS SYSTEMS), IN WHICH THE FAILURE OF THE PRODUCT COULD LEAD DIRECTLY OR INDIRECTLY TO DEATH, PERSONAL INJURY, OR SEVERE PHYSICAL OR ENVIRONMENTAL DAMAGE (COLLECTIVELY, "HIGH RISK ACTIVITIES"). PROSOFT SPECIFICALLY DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR HIGH RISK ACTIVITIES.

6.5.4 DISCLAIMER OF ALL OTHER WARRANTIES

THE WARRANTIES SET FORTH IN PARAGRAPH 1 ABOVE ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

6.5.5 LIMITATION OF REMEDIES**

IN NO EVENT WILL PROSOFT (OR ITS DEALER) BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES BASED ON BREACH OF WARRANTY, BREACH OF CONTRACT, NEGLIGENCE, STRICT TORT, OR ANY OTHER LEGAL THEORY. DAMAGES THAT PROSOFT AND ITS DEALER WILL NOT BE RESPONSIBLE FOR INCLUDE, BUT ARE NOT LIMITED TO: LOSS OF PROFITS; LOSS OF SAVINGS OR REVENUE; LOSS OF USE OF THE PRODUCT OR ANY ASSOCIATED EQUIPMENT; LOSS OF DATA; COST OF CAPITAL; COST OF ANY SUBSTITUTE EQUIPMENT, FACILITIES, OR SERVICES; DOWNTIME; THE CLAIMS OF THIRD PARTIES, INCLUDING CUSTOMERS OF THE PURCHASER; AND INJURY TO PROPERTY.

** Some areas do not allow time limitations on an implied warranty, or allow the exclusion or limitation of incidental or consequential damages. In such areas the above limitations may not apply. This Warranty gives you specific legal rights, and you may also have other rights which vary from place to place.

6.5.6 Time Limit for Bringing Suit

Any action for breach of warranty must be commenced within 15 months (or in the case of RadioLinx modules, 39 months) following shipment of the Product.

6.5.7 No Other Warranties

Unless modified in writing and signed by both parties, this Warranty is understood to be the complete and exclusive agreement between the parties, suspending all oral or written prior agreements and all other communications between the parties relating to the subject matter of this Warranty, including statements made by salesperson. No employee of ProSoft or any other party is authorized to make any warranty in addition to those made in this Warranty. The Customer is warned, therefore, to check this Warranty carefully to see that it correctly reflects those terms that are important to the Customer.

6.5.8 Intellectual Property

A Any documentation included with Product purchased from ProSoft is protected by copyright and may not be photocopied or reproduced in any form without prior written consent from ProSoft.

B ProSoft's technical specifications and documentation that are included with the Product are subject to editing and modification without notice.

C Transfer of title shall not operate to convey to Customer any right to make, or have made, any Product supplied by ProSoft.

D Customer is granted no right or license to use any software or other intellectual property in any manner or for any purpose not expressly permitted by any license agreement accompanying such software or other intellectual property.

E Customer agrees that it shall not, and shall not authorize others to, copy software provided by ProSoft (except as expressly permitted in any license agreement accompanying such software); transfer software to a third party separately from the Product; modify, alter, translate, decode, decompile, disassemble, reverse-engineer or otherwise attempt to derive the source code of the software or create derivative works based on the software; export the software or underlying technology in contravention of applicable US and international export laws and regulations; or use the software other than as authorized in connection with use of Product.

6.5.9 Additional Restrictions Relating To Software And Other Intellectual Property

In addition to complying with the Terms of this Warranty, Customers purchasing software or other intellectual property shall comply with any license agreement accompanying such software or other intellectual property. Failure to do so may void this Warranty with respect to such software and/or other intellectual property.

6.5.10 Allocation of risks

This Warranty allocates the risk of product failure between ProSoft and the Customer. This allocation is recognized by both parties and is reflected in the price of the goods. The Customer acknowledges that it has read this Warranty, understands it, and is bound by its Terms.

6.5.11 Controlling Law and Severability

This Warranty shall be governed by and construed in accordance with the laws of the United States and the domestic laws of the State of California, without reference to its conflicts of law provisions. If for any reason a court of competent jurisdiction finds any provisions of this Warranty, or a portion thereof, to be unenforceable, that provision shall be enforced to the maximum extent permissible and the remainder of this Warranty shall remain in full force and effect. Any cause of action with respect to the Product or Services must be instituted in a court of competent jurisdiction in the State of California.

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