ABB Multivariable (XMV)
with
Totalflow *X*Series Equipment

User's Setup Manual

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INTRODUCTION

This document describes the setup of an ABB Multivariable Transmitter (XMV) in Section I, the setup of the XSeries XFC or XRC flow computer in Section II, and the interconnection wiring in Section III.

I. XMV Setup

The ABB XMV measures Static Pressure, Differential Pressure and Process Temperature in a gas, vapor or liquid media. The XMV is a 2-wire RS 485 Modbus device with two additional wires required for power. It has a permissible terminal voltage range of 10.5 – 30 VDC. The current draw is 10 mA per XMV. The unit must be setup to operate with the XFC or XRC flow computers.

A. XMV Setup for Part# 1641020-xxx (with Display & Keys)

An optional “Push Button Key Unit” is located at the top of the XMV (see Figure 1–1). It is used to setup the configuration parameters in the XMV. To make the keys accessible, release the screw and flip protective cap aside. Pushing the key down with an instrument screwdriver activates the key. See the menu tree below in Table 1–1.

With the mode key “M”, you can start the menu-controlled programming. To call the next menu item, press the “+” key. To call the previous menu item, press the “-“ key. Submenu items / selection list are activated via the mode “M” key. A numerical value can be changed using the “+” key to increment the value by 1 and the “-“ key to move the curser to the left. The mode “M” key is used to accept the changes. When setup is finished, go to the menu “Exit” screen and press the mode “M” key.

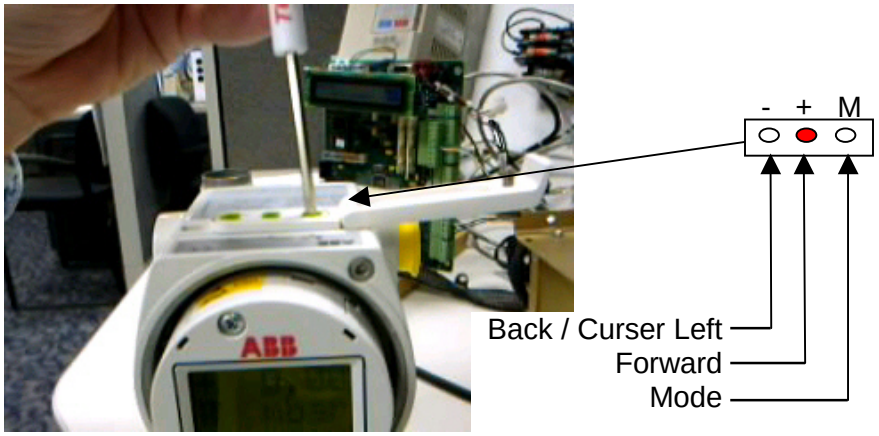


Figure 1–1 Push Button Key Menu

Table 1–1 XMV Menu Tree

Enter program menu With Mode Key "M"		
	Description	***Typical Setting***
	Exit	N/A
	View	Any (Not Used)
	Shift Zero	None (Not Used)
	Damping	0.125 Seconds
	Device Mode	Operate
	Baud Rate	9600
	Bus Address	1 (Set 1–8 as required)
	Resp-Delay	20 Ms
	Display	User Text*
	Exit	N/A

***Note:** Upon exit from the XMV setup mode, the display will show SP, DP, or Temperature from the XSeries if communications are operational OR the message "User-Text" will appear indicating the XMV is waiting on the XSeries to write the display data.

B. XMV Setup for Part# 1641021 (without Display & Keys)

An XMV without a display & keys may be setup using a PC running PCCU software with a RS485 communication link to the XMV. Use a RS-232 to RS-485 converter assembly Totalflow #2100241-002 and adapter cable #2100248-001 to make this connection. On the adapter cable, the "Bus –" (black alligator clip) connects to XMV "Com –" terminal and "Bus +" (red alligator clip) connects to XMV "Com +" terminal. The XMV must be powered up from an external power source during this setup sequence.

1) Open the "TFModbus" utility in PCCU (as shown in Figure 1–2).
2) Open "XmvSetup.ini".

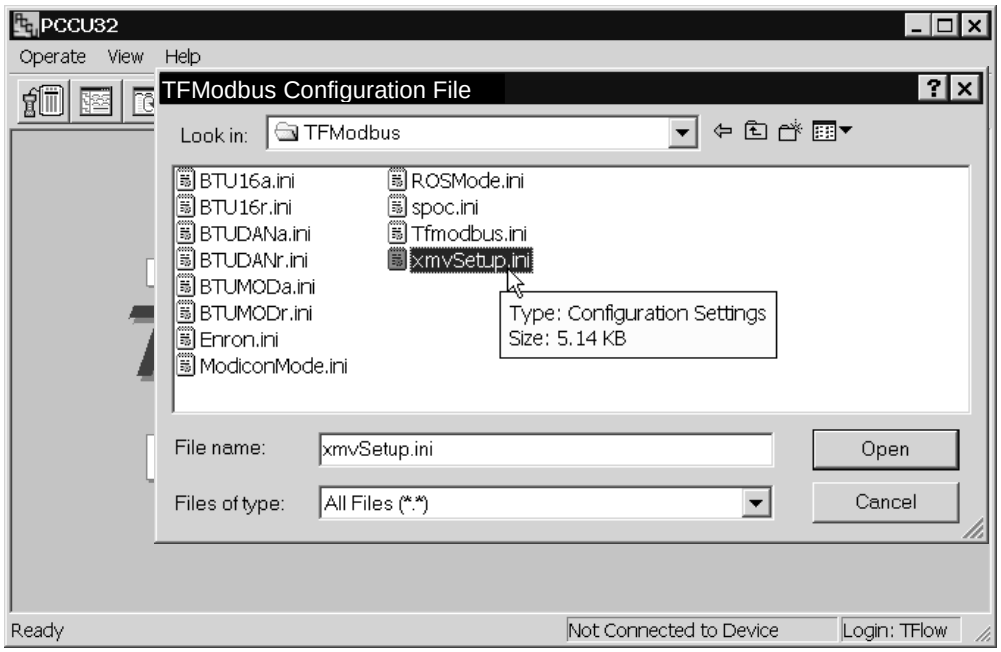


Figure 1–2 TFModbus

3) The INI program will cycle through the Modbus addresses and baud rates until it communicates with the XMV (see Figure 1–3). The address search will stop when the XMV responds. The current Modbus address and baud rate of the XMV are displayed in the address search box.

4) Please note the device address of the XMV, then press ‘OK’.

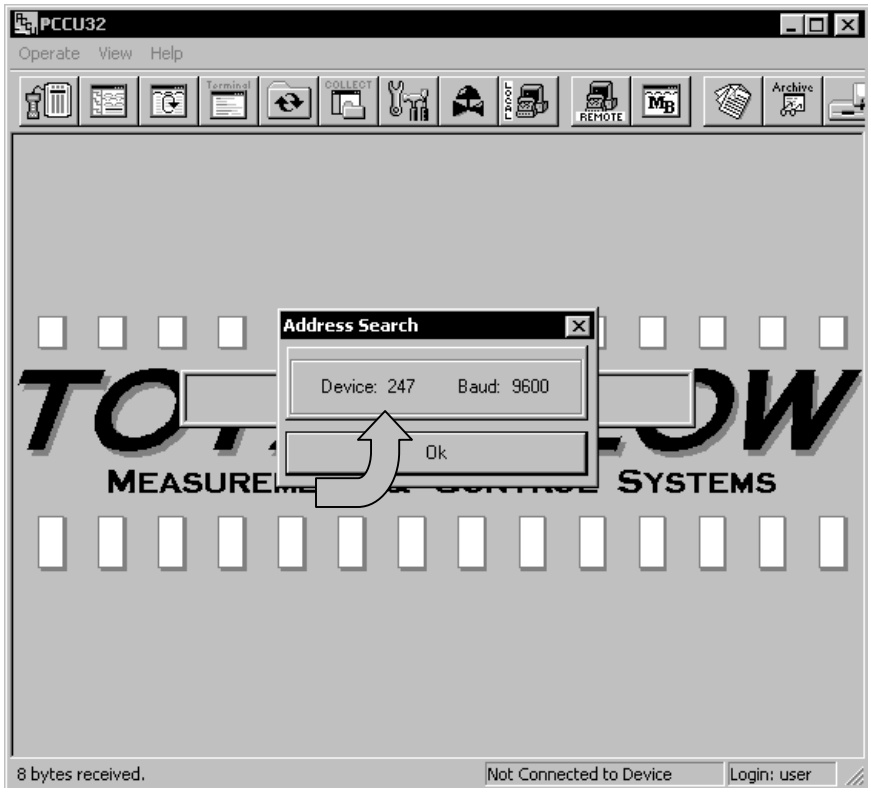


Figure 1–3 Device Address Search Screen

5) When the TFModbus screen appears (see Figure 1–4), select the device address tab with the Modbus address found in the address search. Modbus address 247 is the default and correlates to the “XMV Default” tab.

6) The process data from the XMV should now be displayed.

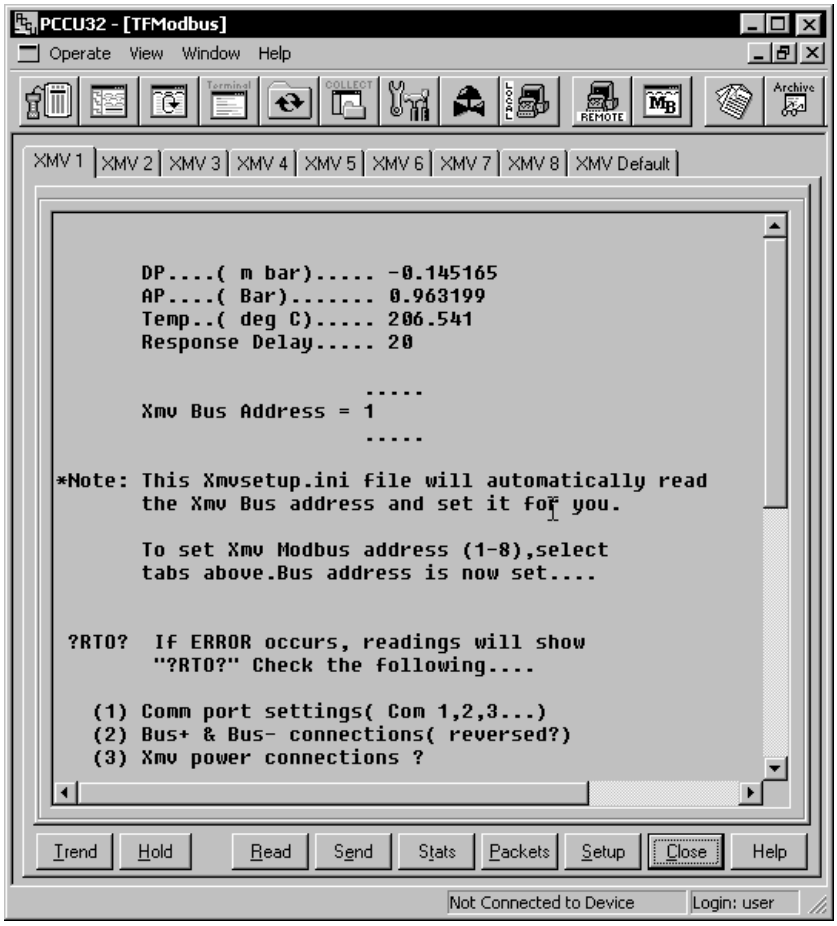


Figure 1–4 TFModbus Device Communication

7) If the address is correct and the response delay is 20 ms, no further action is needed for setup on this device.
8) If the address is correct, but the response delay is not 20 ms, select a different address tab, then reselect the original address tab so the response delay parameter will be updated to 20 ms in the XMVsetup.ini. Skip to step 10, otherwise continue to step 9.
9) If a different address is required, select the Tab with the required address. The Xmvsetup.ini will re-address the XMV to the address specified and set the response delay to 20 ms. The process data will be read and displayed from the XMV using the new address and setup parameters.
10) Power must be maintained for 60 seconds after selecting the new address tab for data to be saved in the XMV.
11) For setting up multiple XMVs, you will need to connect directly with each device and follow steps 1 through 10.

C. Adding a Display and Keys to an XMV

A display and keys may be added permanently to an XMV. They can also be added temporarily under power for XMV setup. The required parts are listed in Table 1–2.

Table 1–2 XMV Display & Keys Parts List

Item	Part Number	Description
1	1801000-001	LCD Display
2	1801001-001	Mounting Screws for Display (2) required
3	1801002-001	LCD Glass Cover
4	1801003-001	Keys for programming

If adding “keys” to an XMV that was shipped WITHOUT keys, a 3/32 inch hex wrench (not shipped with transmitter) is needed to remove the blank cover. Additionally, a #10 torque driver is needed to secure the keys properly to the transmitter base.

The 2.5 mm and 3 mm hex wrenches shipped with the XMV are used for the “Head Lock” and “Cover Lock”.

D. Adjusting the XMV Static Pressure Response Time.

The standard response time for the XMV to fully reach the applied Static Pressure is 4 seconds. Refer to Totalflow Technical Bulletin #113 if the XMV Static Pressure response time needs to be adjusted.

II. XSeries Setup to support the ABB XMV

A. XSeries Configuration Files

Totalflow has standard configuration files (see Table 2–1) that have all the setup parameters and support files for use with the ABB XMV. Totalflow recommends using these released files when possible. If XMV support needs to be added to existing configuration files, reference Section 2B-2F below.

A few of the standard configuration files for use with the XSeries and ABB XMVs are shown below. Contact Totalflow for other available configurations.

Table 2–1 Standard Configuration Files

Part Number	Description
2100961-xxx	XFC with AGA3 support for 1-3 ABB XMVs
2100922-xxx	XRC with AGA3 support for 1 ABB XMV
2100962-xxx	XRC with AGA3 support for 1-4 ABB XMVs
2101469-xxx	XRC with AGA3 support for 1-6 ABB XMVs with Station totals for pod applications

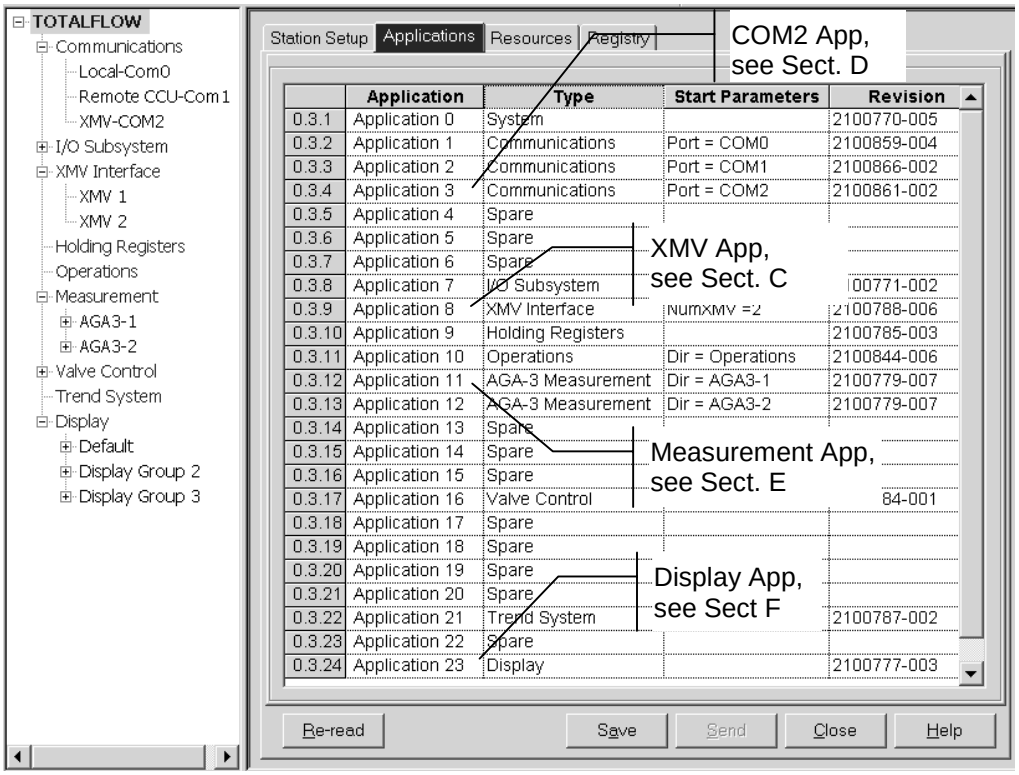
1) All standard XMV configuration files are built to support the XMV with display. If the display is not used, the user should delete the “MVxxTXT.mrb” files in the Modbus folder under the XMV communications port.

2) If one of the multi-tube XMV configurations are used, the actual number of XMVs must be entered in the *Entry Mode/XMV Interface/Setup Tab*. The user should un-instantiate any unused measurement tubes by setting the application to “Spare” in *Entry Mode/Station ID/Application Tab*. The user should also delete the associated display group in “Save and Restore *R:Drive/Display Folder* to customize the configuration files for a specific configuration.

B. XMV Support Applications

To support an ABB XMV with an XSeries flow computer, the following applications are required (see Figure 2–1):

1) XMV Interface Application—typically instantiated at app# 8. See Section C.
2) Communications Application—typically COM 2 instantiated at app# 3. See Section D.
3) Measurement Tube Application—typically instantiated at app# 11-18 as required. See Section E.
4) Display Application—typically instantiated at app# 23 with a display group for each measurement tube. See Section F.



	Application	Type	Start Parameters	Revision
0.3.1	Application 0	System		2100770-005
0.3.2	Application 1	Communications	Port = COM0	2100859-004
0.3.3	Application 2	Communications	Port = COM1	2100866-002
0.3.4	Application 3	Communications	Port = COM2	2100861-002
0.3.5	Application 4	Spare		
0.3.6	Application 5	Spare		
0.3.7	Application 6	Spare		
0.3.8	Application 7	I/O Subsystem		00771-002
0.3.9	Application 8	XMV Interface	NumXMV =2	2100788-006
0.3.10	Application 9	Holding Registers		2100785-003
0.3.11	Application 10	Operations	Dir = Operations	2100844-006
0.3.12	Application 11	AGA-3 Measurement	Dir = AGA3-1	2100779-007
0.3.13	Application 12	AGA-3 Measurement	Dir = AGA3-2	2100779-007
0.3.14	Application 13	Spare		
0.3.15	Application 14	Spare		
0.3.16	Application 15	Spare		
0.3.17	Application 16	Valve Control		84-001
0.3.18	Application 17	Spare		
0.3.19	Application 18	Spare		
0.3.20	Application 19	Spare		
0.3.21	Application 20	Spare		
0.3.22	Application 21	Trend System		2100787-002
0.3.23	Application 22	Spare		
0.3.24	Application 23	Display		2100777-003

Figure 2–1 PCCU Applications Setup

C. XMV Interface

1) Enter the number of XMVs in the system under the *XMV Interface/Setup tab* as shown in Figure 2–2.
2) Enter the XMV setup parameters in *Entry mode/XMV Interface/XMV #/Setup Tab* as shown in Figure 2–3.

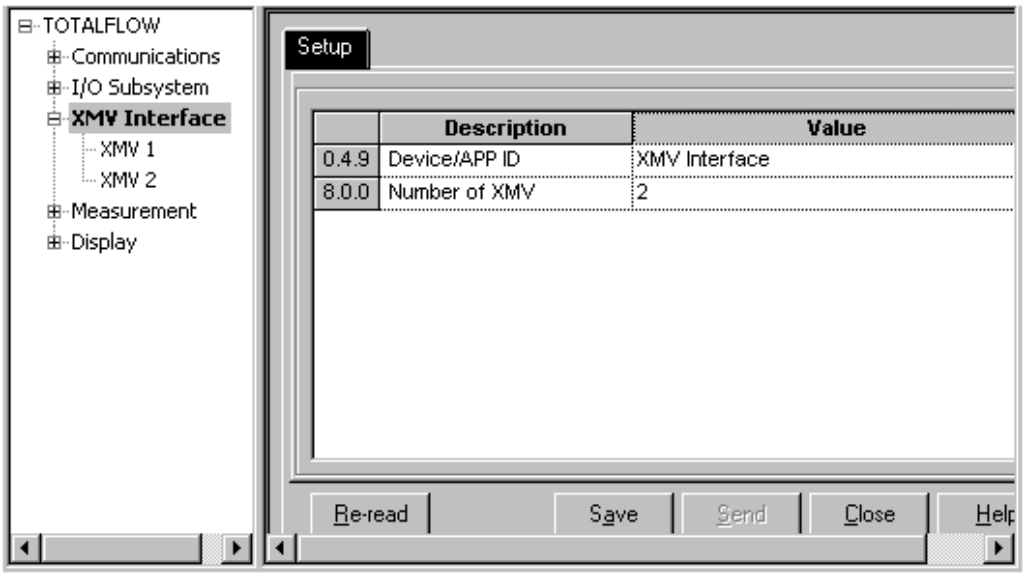


Figure 2–2 PCCU XMV Setup

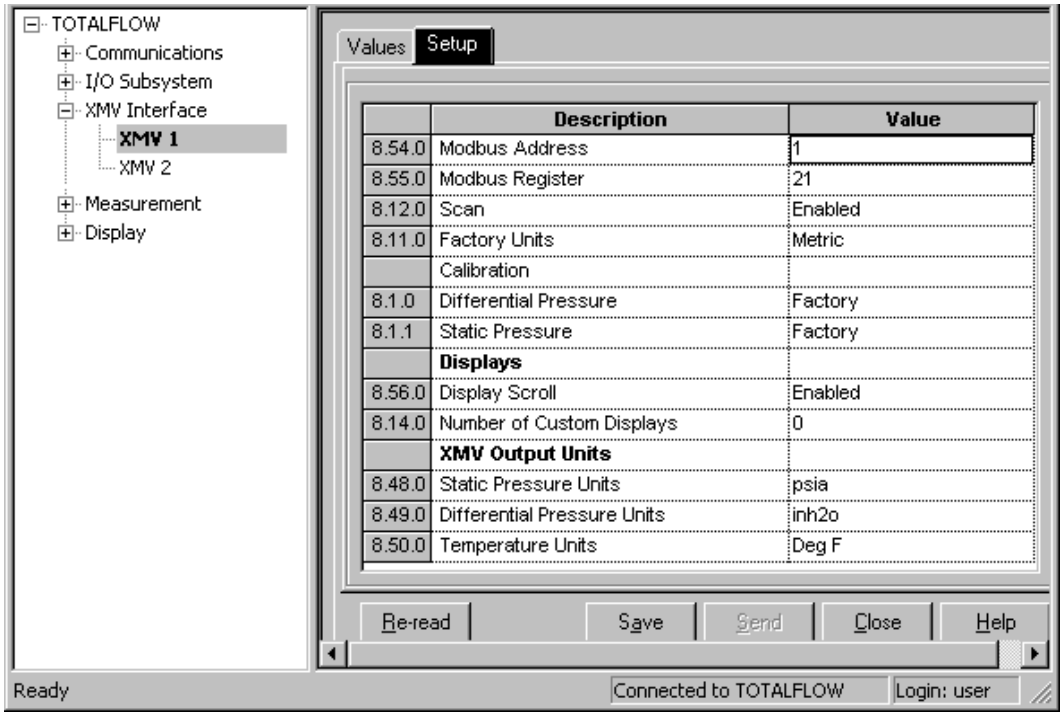


Figure 2–3 PCCU XMV1 Setup

D. XMV Communications Port Setup

1) Setup the Communication Port parameters (see Figures 2–4 and 2–5) in *Entry Mode/Communications/XMV-COM#*.

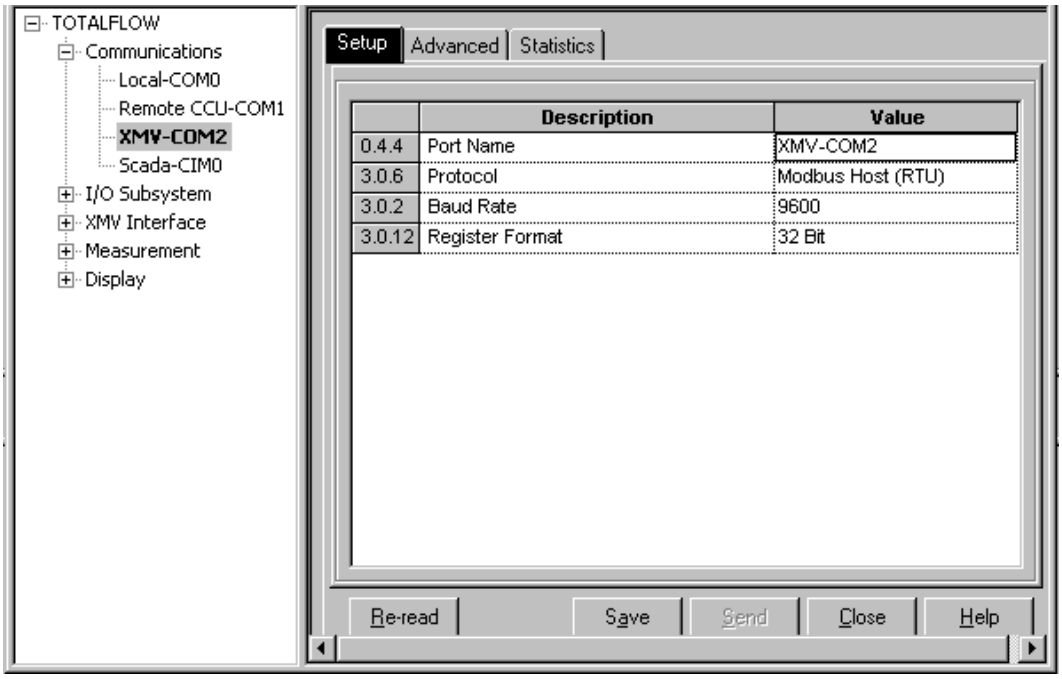


Figure 2–4 Setup Parameters

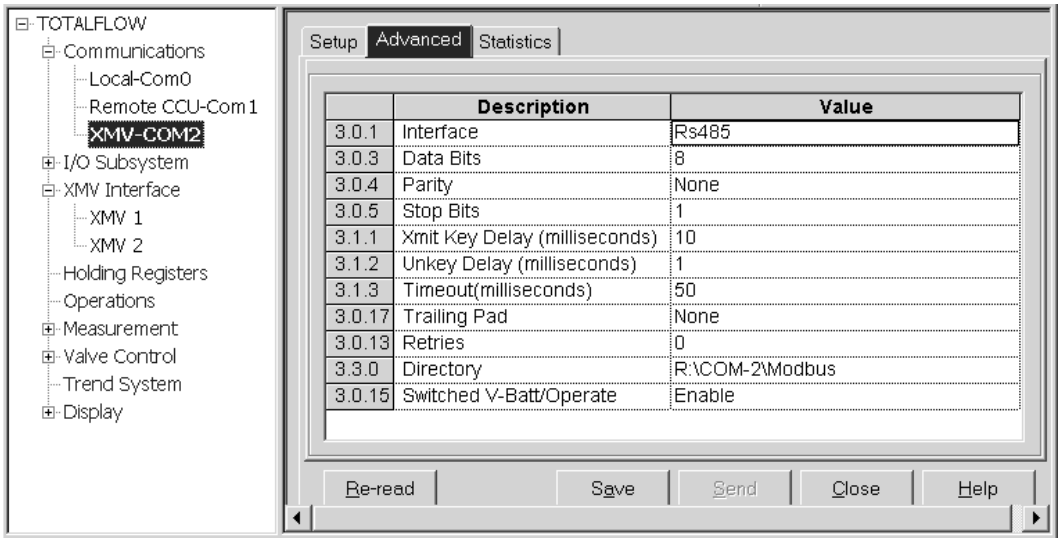


Figure 2–5 Setup Advanced Parameters

2) Setup the Communication Port MRB(s) (Modbus Request Block).

   In step 1, a “Modbus” folder was created for the communications port. There are 2 supported types of MRBs. The user needs to determine which method is desired and create the required Modbus Request Block(s).

- Legacy Method

  The Legacy method uses 2 modbus blocks per XMV and is supported by all versions of the XSeries Flash software. There are two Modbus Request Blocks (MRB) that need to be created and stored in the Modbus folder for each XMV installed (See figures 2–6 through 2–11 as needed).

  - ✓ Mv1.MRB (block one) is required for reading registers from the XMV and storing the raw values into the XMV application.
  - ✓ Mv1Txt.MRB (block two) writes the SP, DP & Temperature data to the XMV display.

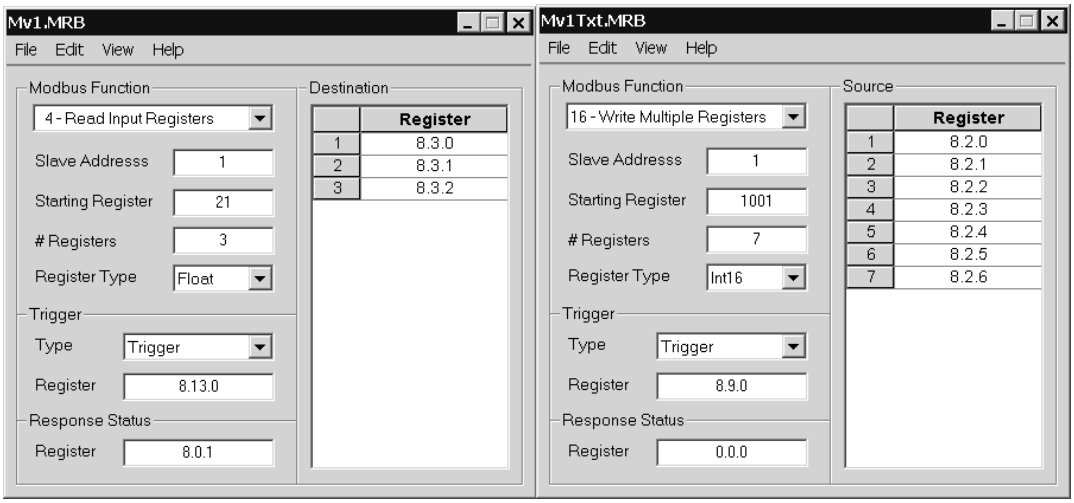


Figure 2–6 XMV MRB Registers, Address 1

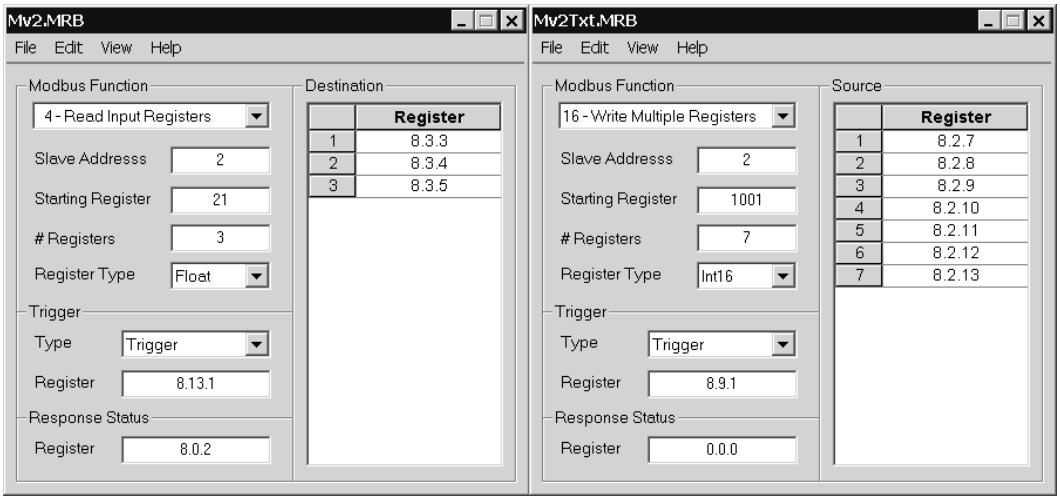


Figure 2–7 XMV MRB Registers, Address 2

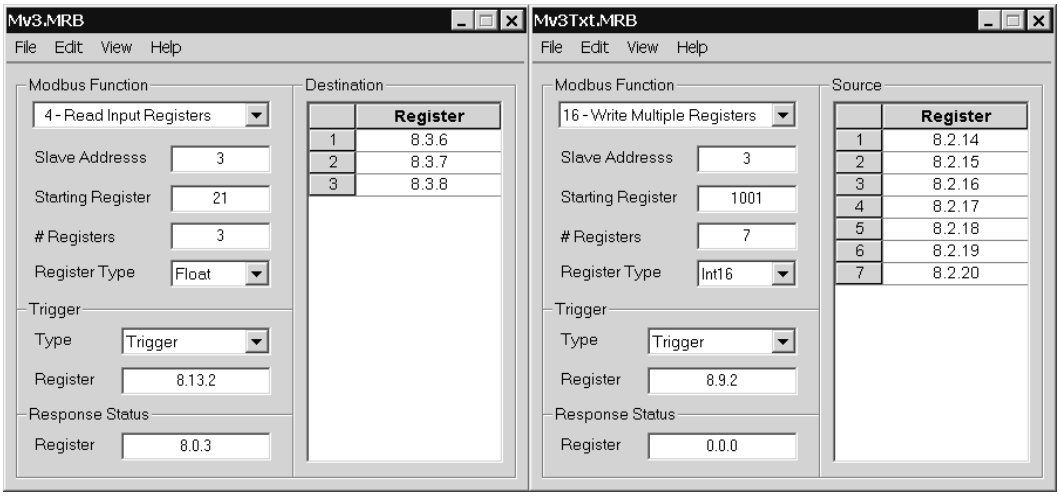


Figure 2–8 XMV MRB Registers, Address 3

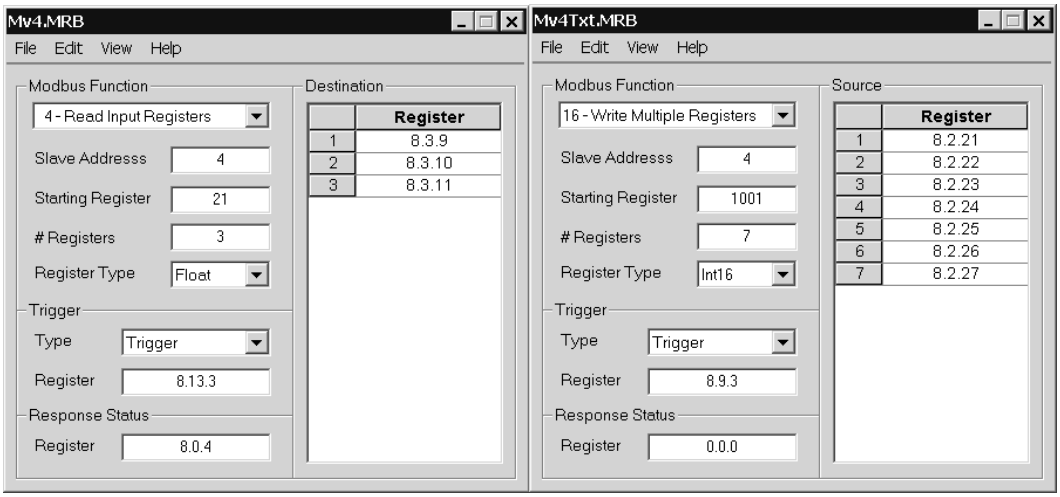


Figure 2–9 XMV MRB Registers, Address 4

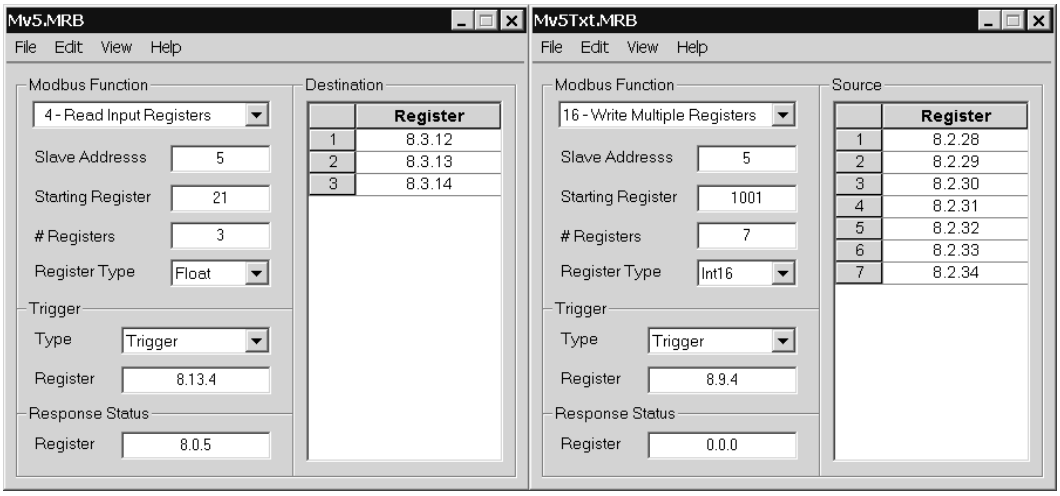


Figure 2–10 XMV MRB Registers, Address 5

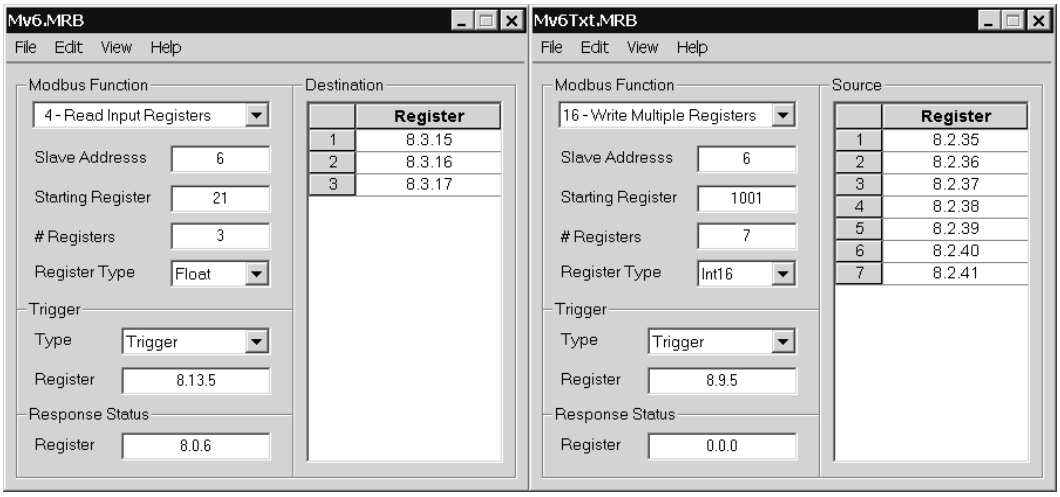


Figure 2–11 XMV MRB Registers, Address 6

- Interface Controlled Method

  The Interface Controlled Method uses one Modbus block and is supported by all XSeries Flash software released after 4/21/2004 (XFC flash 2101050-011 and XRC flash 2101052-009 and later). Regardless of the number of XMVs used, this method requires one Modbus block (see Figure 2-12).

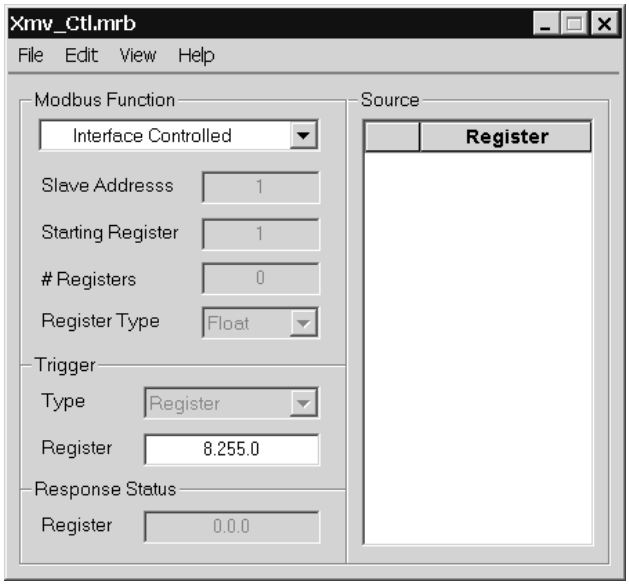


Figure 2–12 XMV Interface Control Block

3) Once the method is determined, the required block(s) must be created.

Note: Instructions shown are for using PCCU 4.53 or later. If using PCCU4.52 or earlier, the blocks must be created and saved to the users PC hard drive and then downloaded using the “Save and Restore” utility to the Modbus folder under the XMV Com Port.

A) Go to “File Utilities”, then “Save and Restore” in the Operate Menu (see Figure 2–13).

B) Under “R: Drive” in the tree view, select the XMV Com Port (see Figure 2–14).

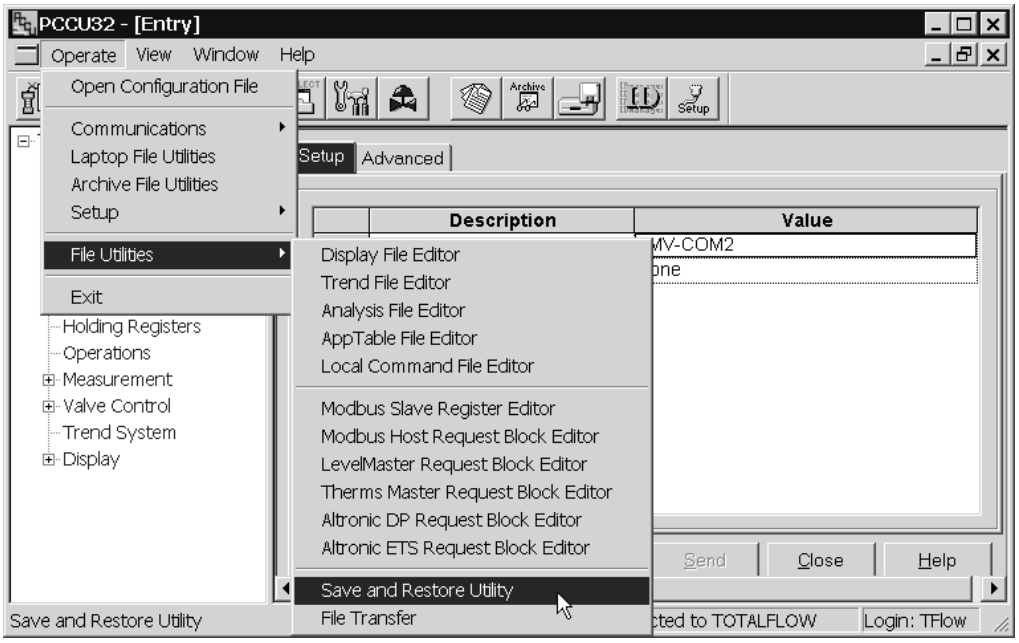


Figure 2–13 Save and Restore File Utility

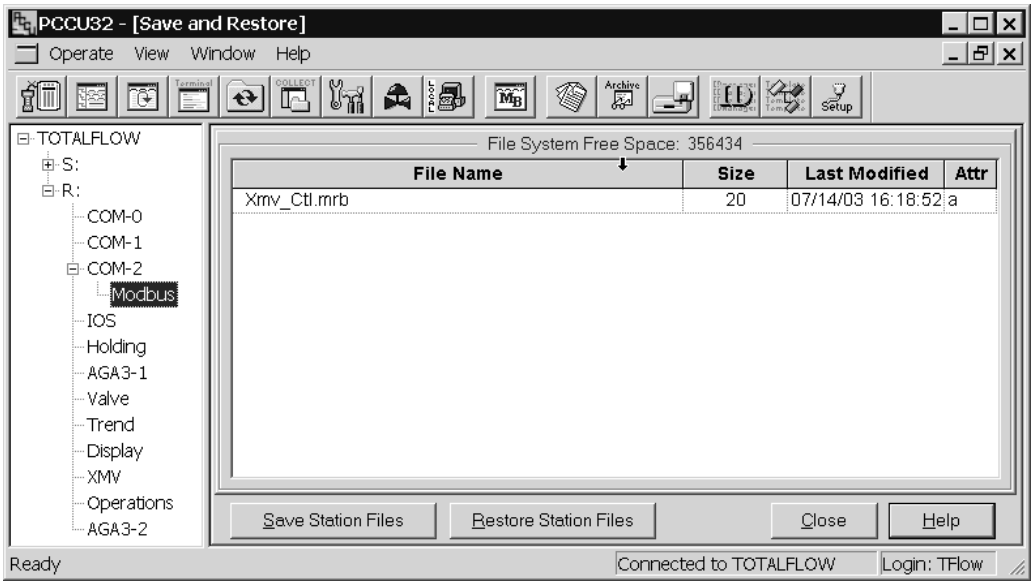


Figure 2–14 Save and Restore Tree View

C) Return to “File Utilities” in the Operate Menu and select “Modbus Host Request Block Editor” (see Figure 2–15).

D) Create the required MRBs using figures 2–6 through 2–12.

E) When finished with each MRB, press the “Send” button (see Figure 2–16) to load the MRB into the “R: Drive”

Note: If modifying an existing block, to create a new block, you will need to use the “File/Send As” feature to rename and save the block to the Modbus folder.

Note: Refer to Totalflow Technical Bulletin No. 118 or the PCCU Help files for more details on creating and using Modbus Blocks.

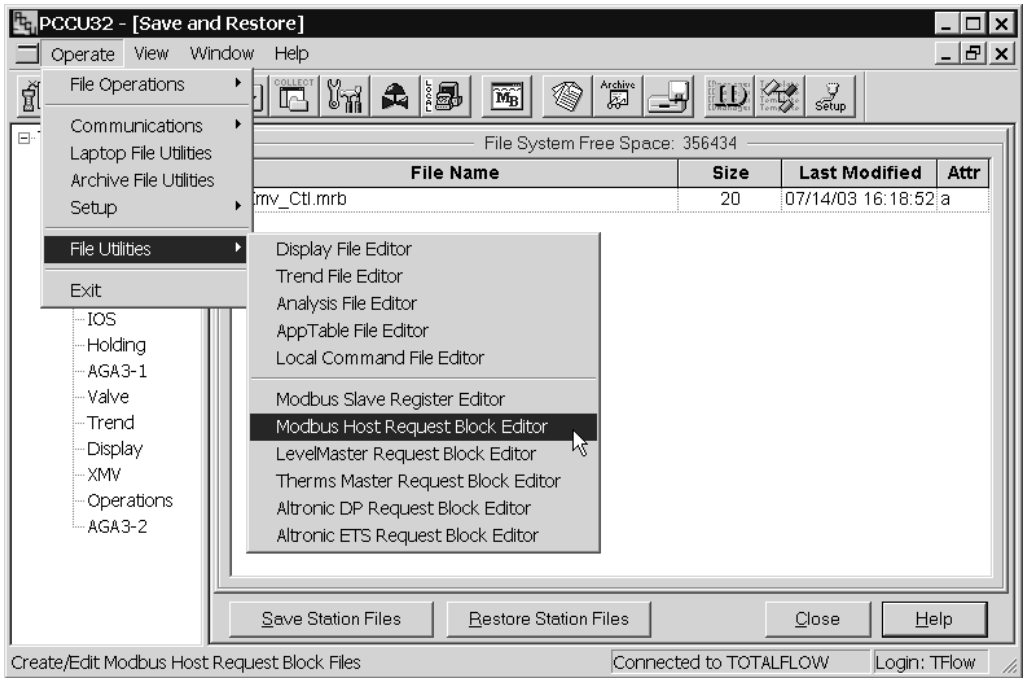


Figure 2–15 Modbus Host Request Block Editor

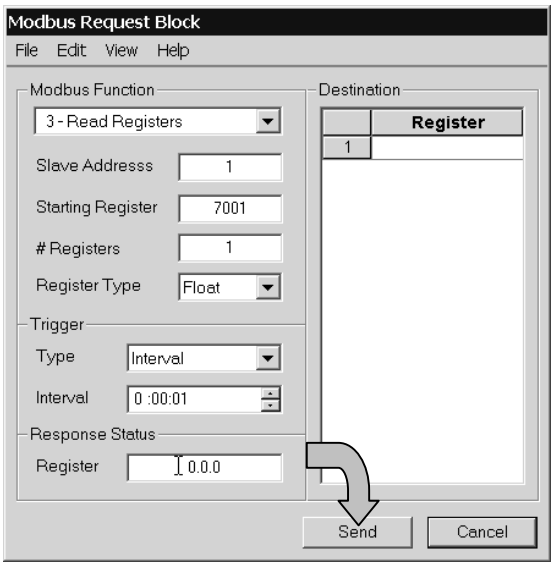


Figure 2–16 MRB Entry Screen

E. Assigning XMVs to Measurement Tubes

The data inputs from the XMVs can be assigned to any measurement tube.

1) To assign the input, the user must note the App/Array/Register for the “Scaled Values” for each XMV (see Figure 2–17).
2) Next go to Calibration (see Figure 2–18):
3) Select the measurement tube to be configured from the tree view (see Figure 2–19).
4) Select the Setup Tab.
5) Enter the appropriate App/Array/Register for Static Pressure, Differential Pressure & Temperature from the XMV Scaled Values on the XMV/Values tab.

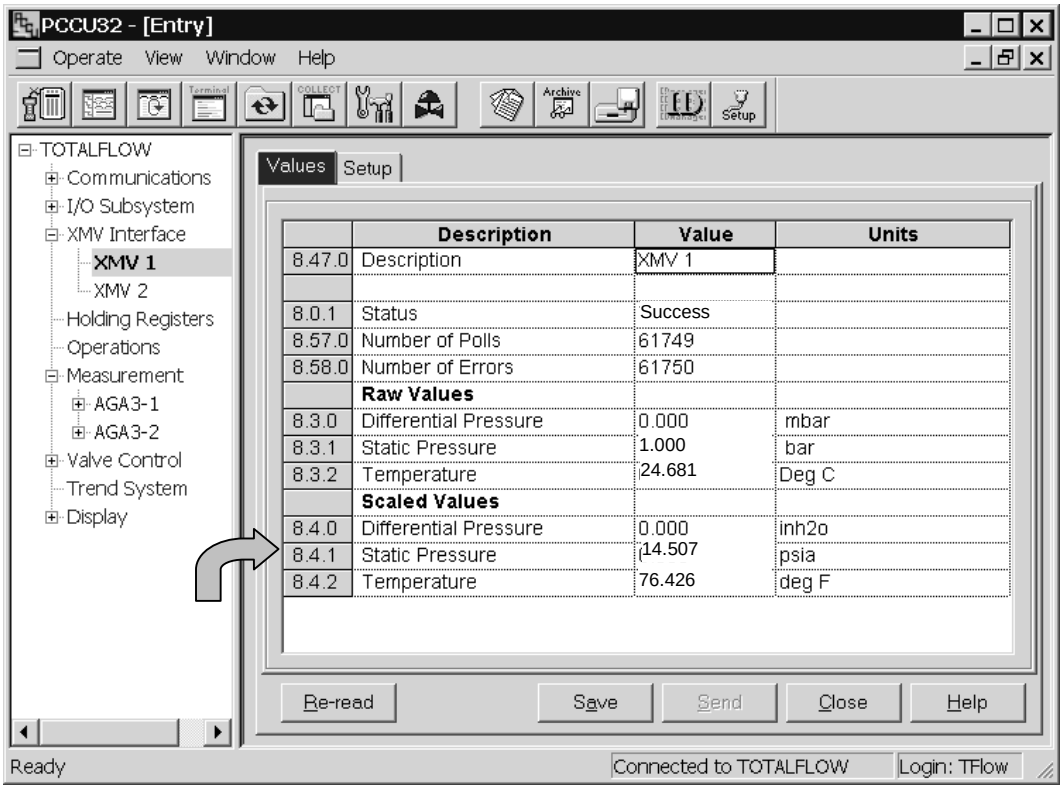


Figure 2–17 XMV Values Screen (APP/ARAY/REG)

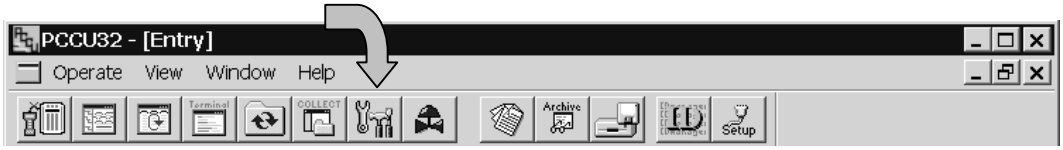


Figure 2–18 PCCU Menu Bar (Calibrate)

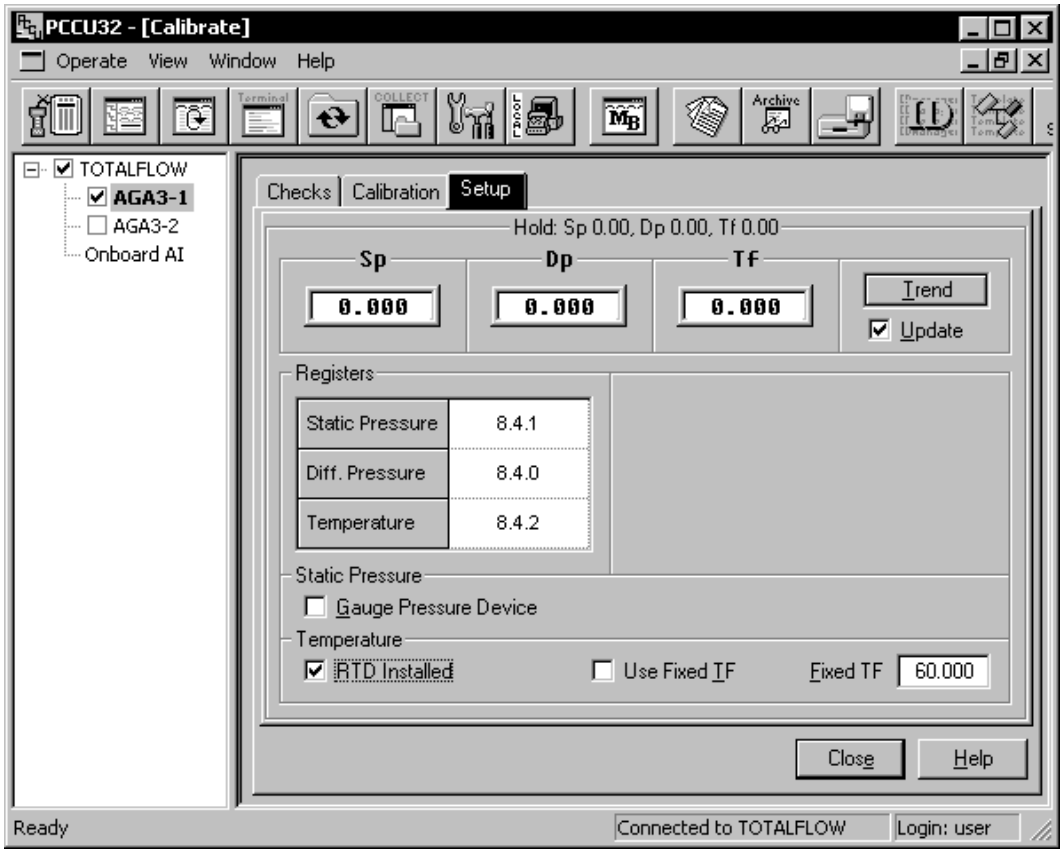


Figure 2–19 PCCU32 Calibrate Measurement Tubes

F. Displays for XMV

There are no actual displays in the XSeries for the XMV, rather the XMV is typically assigned to a measurement tube and the measurement tube has an associated display group. If a measurement tube has been added, then a display group for that tube needs to be added with the following procedure:

Enter the “Save and Restore” utility. Go to the Display folder on R: and double click on an existing display group for a measurement tube. Modify the group name, display names and display registers for the new measurement tube. Use the “File / Send As…” option to download the modified file with a new file name to the Display folder. Go to “Entry “ mode and check displays.

III. XSeries to ABB XMV Wiring & Interconnect

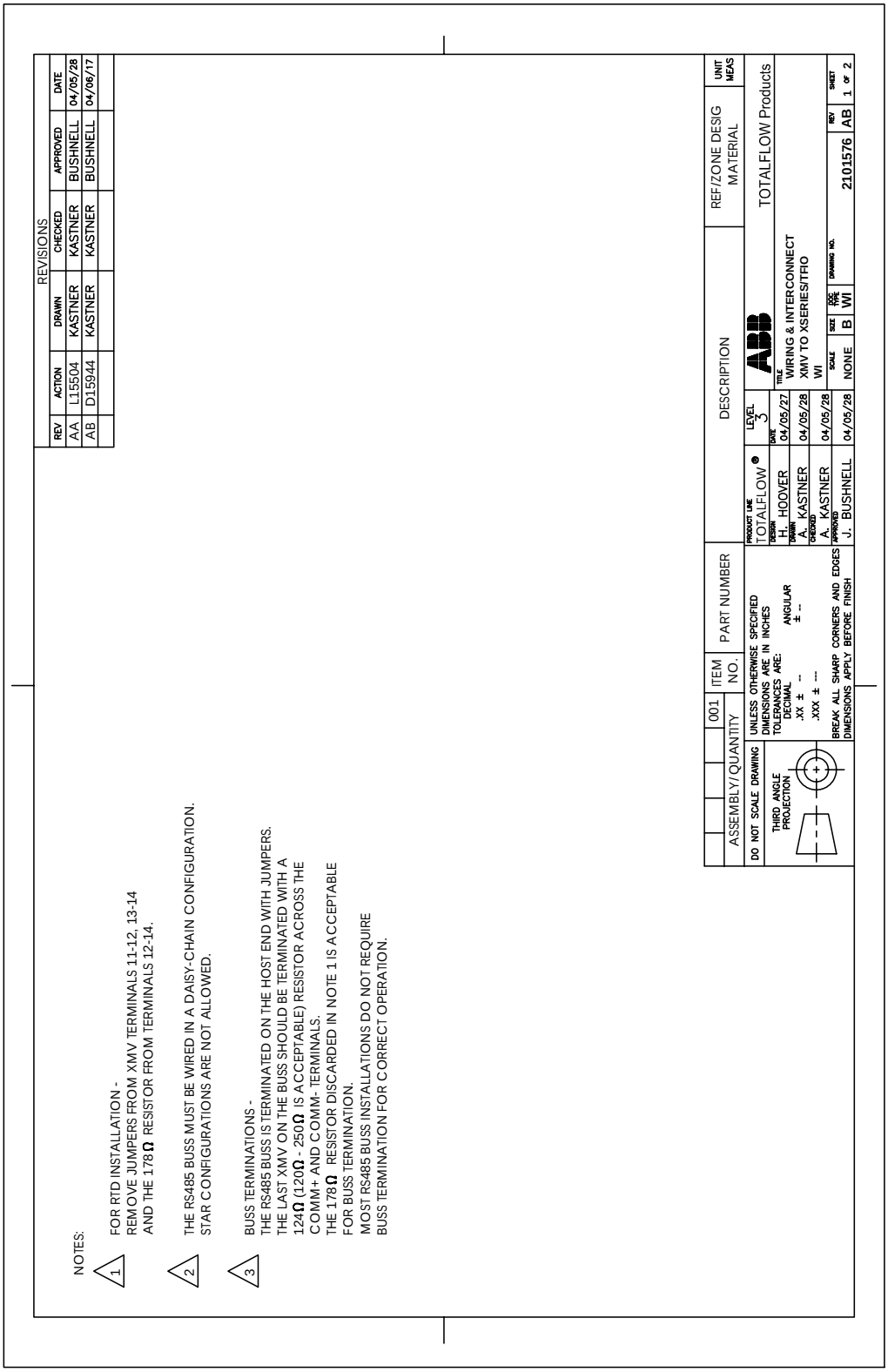


Figure 3–1 Wiring & Interconnect XMV to XSeries, Pg. 1

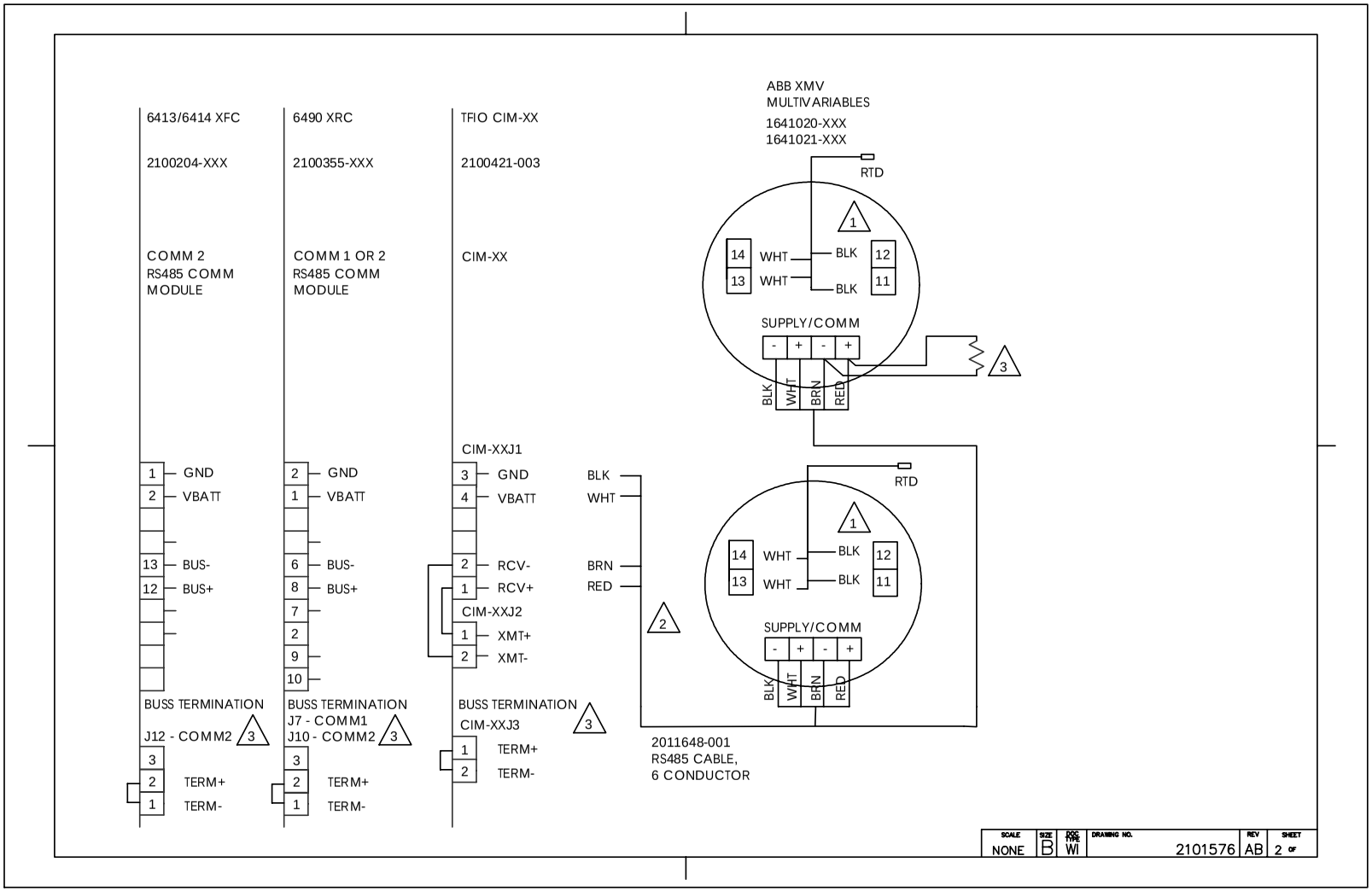


Figure 3–2 Wiring & Interconnect XMV to XSeries, Pg. 2

Figure 3–3 Back view of the XMV

SUMMARY

At this point the XFC or XRC should be receiving data from the XMV. Data updates can be verified by viewing the data in “Entry / XMV Interface / XMV xx / Values Tab”. The data should be reflecting process conditions and be updating every second.

Communications success can be monitored in “Entry / Communications / COMxx / Host Status”. The “Number of Polls” should be incrementing without any change in the “Number of Errors”. For easier viewing, all data fields on the “Host Status Tab” can be reset to “0” by writing a “0” in the fields and using the “Send” button.

The Measurement Tube using the XMV inputs should be now be calibrated.

Note: Be sure and save the system configuration to the S: drive using the “Save and Restore” utility.