



Troubleshooting the GPIB interface for model F4 and 96 controllers

General Description

The ESS, Inc. GPIB communications interface for the model F4 and 96 temperature controllers consists of three major components:

1. The temperature controller with serial communications interface using Modbus RTU protocol
2. The GPIB interface
3. The power supply for the GPIB interface

The model F4 and 96 controllers utilize a serial EIA 232 communications interface. The interface uses the Modbus RTU communication protocol. Modbus RTU protocol is fast and extremely reliable.

Note: ESS, Inc. offers several technical documents and software programs at no charge to assist in using the Modbus RTU protocol. See the Downloads page of our web site for more information.

The GPIB interface allows the model F4 and 96 temperature controllers to be used as GPIB instruments conforming to IEEE-488.2 standards. When a model F4 or 96 controller is fitted with the GPIB interface, simple ASCII commands are all that are needed to communicate with them.

The power supply provides precise 5 VDC to the GPIB interface.

Default Communication Parameters for model F4 and 96 Controllers

For the GPIB interface to function properly, several parameters must be properly set. These parameters are properly set and tested at the factory. However, if you are having problems you should check to be sure that they are still set correctly.

The model F4 and 96 controller have two critical parameters that must be correctly set:

| Parameter | Description | Default Value |
|-----------|--------------|---------------|
| 1 | Baud Rate | 9600 |
| 2 | Unit Address | 1 |

The communication parameters for the F4 and 96 are found in the Setup menu. For the F4 you will find them under the Communications section of the Setup menu and for the 96 in the Out 4 section of the Setup menu.

Note: Operation manuals for the F4 and 96 are available at no charge from the Downloads page of the ESS, Inc. web site.

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Default Communication Parameters for the GPIB Interface

The GPIB interface has several critical parameters that must be correctly set.

The following setup parameters are set using SCPI commands.

Note: For complete information on the SCPI command set, download a copy of the technical manual 4899/4809 from the Downloads page of the ESS, Inc. web site.

| Parameter | Keyword | Description | Default Value |
|-----------|---------|----------------------|---------------|
| 1 | ADDR | GPIB Primary Address | 04 |
| 2 | BAUD | Baud Rate | 9600 |
| 3 | PAR | Parity | None |
| 4 | BITS | Data Bits | 8 |
| 5 | SBIT | Stop Bits | 1 |

Sample SCPI command to set the GPIB primary address:

SYST:COMM:GPIB:ADDR 04

Sample SCPI command to set the Baud rate:

SYST:COMM:SER:BAUD 9600

The following Modbus setup parameters are set using GPIB commands.

Note: For complete information on the Modbus command set, download a copy of the technical manual 4899/4809 from the Downloads page of the ESS, Inc. web site.

| Parameter | Command | Description | Default Value |
|-----------|---------|----------------|---------------|
| 1 | C | Unit Address | 1 |
| 2 | D | Timeout Period | 300 |

Sample Modbus GPIB command to set the Unit Address:

C 1

Sample Modbus GPIB command to set Timeout Period:

D300



To save both SCPI and Modbus GPIB setup parameters to non-volatile memory use the ***SAV 0** command.

Hardware Tests

If you are sure that all of the default setup parameters are correct and are still having problems then proceed to the following hardware tests:

*Note: Some early F4 systems use a communications selector slide switch near the GPIB and serial interface connectors. If your system has an external GPIB address hardware switch to set the primary GPIB address then it will also have the communications selector slide switch. The slide switch has two positions. Make sure that it is in the **232** position for serial communications and the **GPIB** position for GPIB communications.*

GPIB Interface Hardware Test

The simplest way to test that the GPIB interface, GPIB cable and host computer are functioning properly and that the GPIB primary address is set correctly is to use the ***IDN?** command. If everything is working properly then the GPIB interface should return an identification string.

Model F4 and 96 Serial Hardware Test

The serial interface on the model F4 and 96 temperature controller is easily tested using the COMM6.exe utility program. COMM6.exe is a self-installing executable program that will allow you to test the serial interface and will handle the Modbus RTU protocol for you automatically. This program is offered at no charge from the Download page of the ESS, Inc. web site. You will need a straight through serial cable to connect your computer's serial communications port to the model F4 or model 96 temperature controller. To use COMM6.exe, follow the instructions in the COMM6.exe Help menu.

Serial Cable Pin Assignments

| Computer 232 serial 9 pin port | F4 or 96 serial 9 pin port |
|--------------------------------|----------------------------|
| 2 | 2 |
| 3 | 3 |
| 5 | 5 |

| Computer 232 serial 25 pin port | F4 or 96 serial 9 pin port |
|---------------------------------|----------------------------|
| 3 | 2 |
| 2 | 3 |
| 7 | 5 |



GPIB Software and Interface Cabling Check

If the Hardware tests for the GPIB interface and the model F4 and 96 serial interface are successful then the GPIB interface should work. If it doesn't there are two likely problems.

GPIB Software

The first problem may be that the program used to communicate with the GPIB interface has errors in the commands or syntax. An easy way to determine if the program is at fault is to use a known good program. A GPIB test program can be downloaded at no charge from the Download page of the ESS, Inc. web site. The program was created with HP VEE. If you don't already have development or run time versions of HP VEE you can obtain a run time version of HP VEE at no charge from ESS, Inc. on CDROM (Tioga 1.0). The CDROM includes all of the files you will need to install the run time version of HP VEE and the I/O libraries. The I/O libraries will allow you to configure the run time version to work with the GPIB interface installed in your PC. Tioga 1.0 also includes uninstall utilities if you would like to remove the HP VEE run time version and I/O libraries after you are finished.

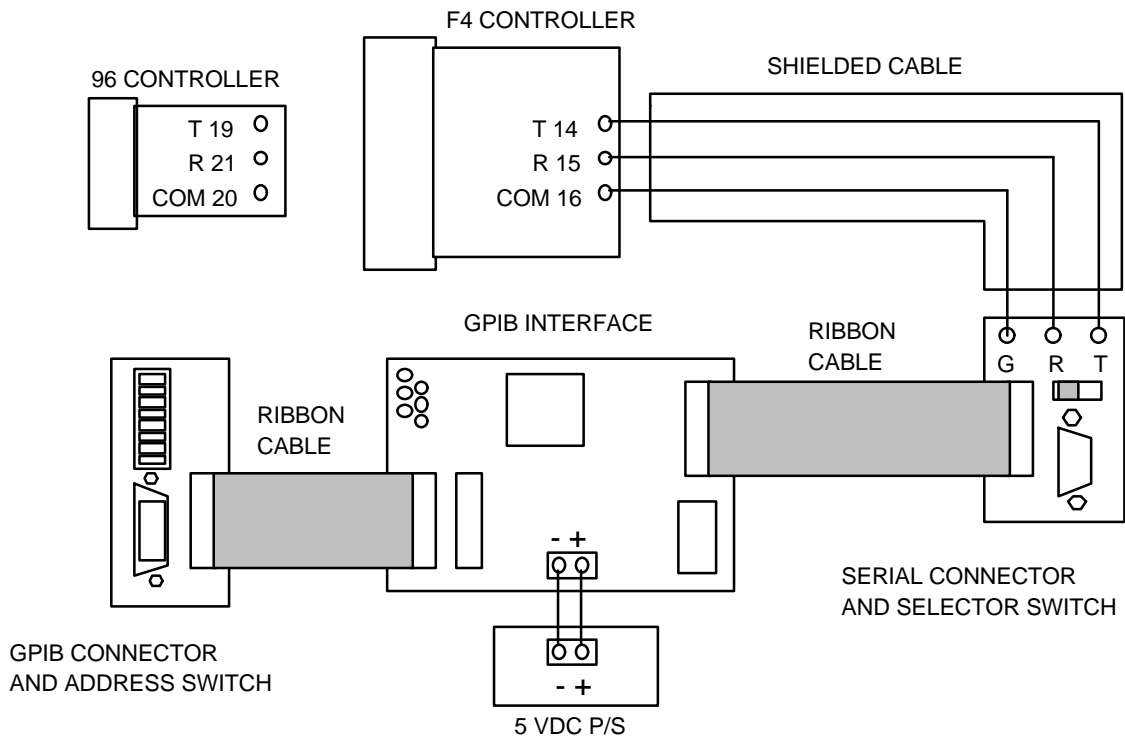


Figure 1



GPIB Interface Cabling

The second problem may be that the cables that connect between the model F4 and 96 temperature controllers and the GPIB interface are loose, connected improperly, disconnected or broken. There are a few systems with the early style GPIB interface. If you have an external GPIB address switch and 232/GPIB interface selector slide switch located near the serial and GPIB connectors on your system then you have the early style GPIB interface. Most systems will have the later style. See early system layout in Figure 1 and later system layout in Figure 2 to help you identify and check the cabling on your interface.

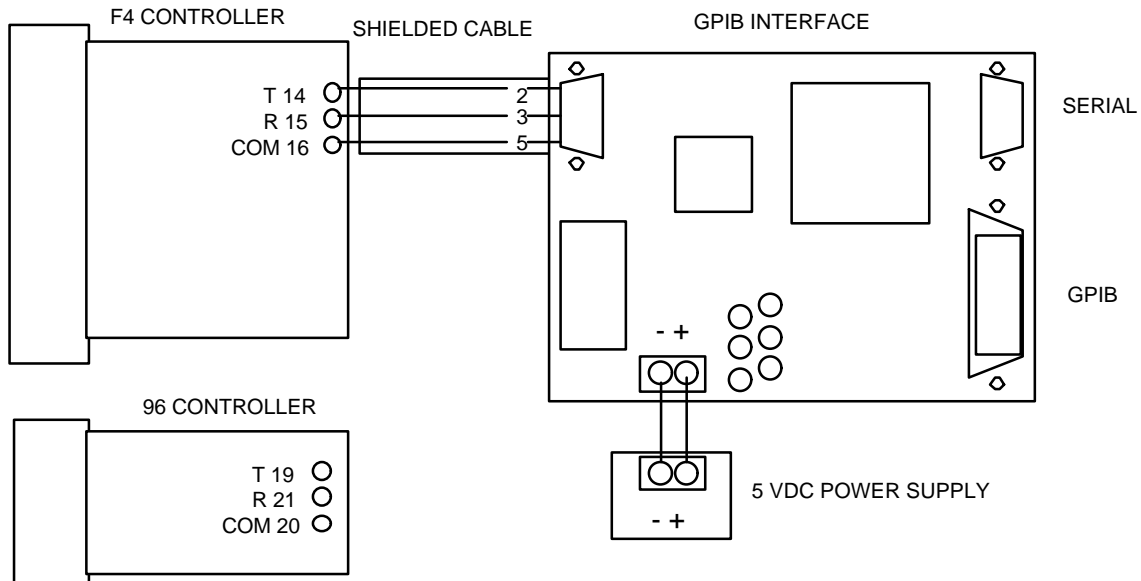


Figure 2

If you have followed all of the instructions in this guide and you are still experiencing problems you will need to contact the factory for further assistance.