

# Installation and Operating Instructions

For

# Synergy488

with

**Environmental Chamber Control Firmware  
TE1579**

**Tidal Engineering Corporation (c) 2004  
Doc. No. TE1579 Revision E**



**Revisions**

<b>Rev</b>	<b>Date</b>	<b>Revision</b>
Prelimin.	2 April 2004	Preliminary
B	7 June 2004	Added Modbus capability and enhanced setup instructions. Firmware TE1579_2_0.
C	10 June 2004	Added Detailed instructions for client connections including GPIB addressing and TCPIP setup. Also added Yokogawa wiring. Renamed document: Synergy488_Application_Manual_for_Environmental_Chamber_Control_Rev_C.doc
D	25 June 2004	Added Yokogawa and BlueM Pro PC Link Communication setup instructions for 550 and 750
E	20 Sept. 2004	New release for Firmware TE1579_4_1. Added Partlow MIC 1460 and MIC 1462 Communication setup. Corrected typographical errors and other errors.

## **Synergy488 Manual for Environmental Chamber Control**

**For**

### **TE1579 Environmental Chamber Control Firmware with GPIB, Serial and Ethernet Communications**

Document Number TT1579

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## 1. Introduction

This manual covers the Synergy488, Tidal Engineering Corporation's SBC488E with Application specific firmware TE1579-4

This firmware is designed to provide GPIB, RS-232 and Ethernet communications capabilities to the following Controllers:

- Tenney VersaTenn II and VersaTenn III

- Watlow 942 and F4 controllers

- Yokogawa UP750 and UP550

- BlueM Pro750 and Pro550

- Partlow MIC14 60 and MIC 1462

Other ASCII and ModbusRTU controllers can also be supported. Consult factory for specifics.

Contact the factory for the availability of other firmware to support different controllers

The SBC488E monitors and receives commands from client computers on all three input ports simultaneously. The commands are sent to the chamber controller on a first come-first serve basis.

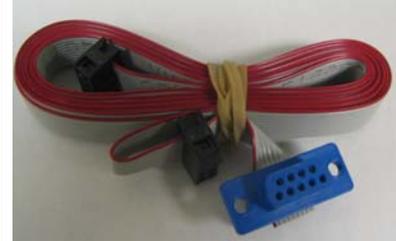
The determination of ASCII or Modbus RTU controller type is made using the Mode jumpers at P13.

### 1.1 Synergy488 Configurations

The Synergy488 Environmental Test Chamber control firmware is P/N TE1579. There are two hardware configurations, SBC488E P/N TE1267-1 and TE1267-3. The following list .

Firmware Revision	Description
TE1579_2_0	1. Added Modbus-RTU Master for F4 over GPIB and Telnet TCPIP to port 5000. Install Jumper on Mode 0 (First jumper).
TE1579_3_3	1. Added support for PCLink for Pro550 and Pro750, Yokogawa 550 and 750 controllers. Install Jumper on Mode 1 (Second jumper).
TE1579_4_1	1. Added support for Partlow 1462 (Modbus) over GPIB, RS-232 and Telnet (TCPIP to port 5000). Jumper on Mode 2 (Third jumper).  2. Checks GPIB address dipswitch all the time, not just at power up.

**1.2 Synergy488 Accessories**

P/N	Description	
TE1435-1	<p>Wall Transformer:                      Input: 115 VAC, 60 Hz                      Output: 9 Volts DC, 500 mA                      Connector: Molex 10-11-2023</p>	
TE1640-1	<p>Wall Transformer:                      Input: 90-285 VAC, 47 to 63Hz                      Output: 9 Volts DC, 500 mA                      Connector: Molex 10-11-2023                      Note: This part includes a set of mains adapters for most US and International applications (see photo)</p>	
TE1602	<p>Connector Assembly:                      P1: 10-Position Header                      P2: 10-Position Terminal Block                      P3: 15-position Male (VTIII)                      Connect to any controller</p>	
TE1595	<p>Serial Ribbon Cable:                      Length: 6 ft.                      P1: 10 Position IDC Connector                      P2: 10 Position IDC Connector                      P3: 9 Position Female DSUB                      Note: DSUB is wired to connect direct to PC serial port.</p>	
TE1596	<p>GPIB Ribbon Cable:                      Length: 6 ft.                      P2: 26 Position IDC Connector                      PX: GPIB Connector</p>	

## 2. Controller Setup

This section describes the configuration of the Chamber Controller and the setup of the Synergy488 for communications. SBC488E with TE1579 firmware accepts client commands over three ports, RS-232 (P6), GPIB (P2/P8) and Ethernet (J4) and passes the commands to a controller or processes SBC488E configuration commands itself. Controller Communications parameters are listed in the table below:

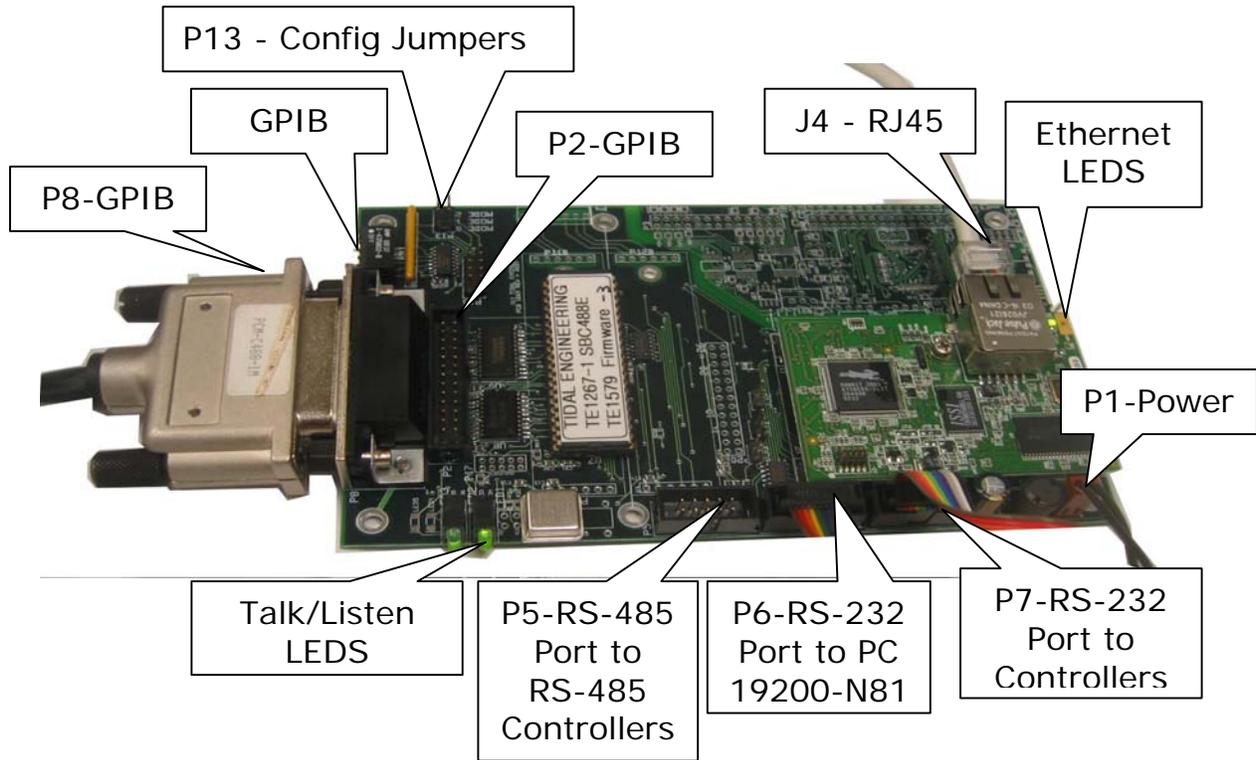
Chamber Controller Setup

Controller	Wiring	Controller Comm. Settings	SBC488E Jumpers
	<b>VersaTenn III</b>		
	Use TE1602 adapter. Adapter P3 connects directly to VTIII A01. 9600 Baud	7 Data bits Odd Parity (1 Stop Bit)	Mode 0-No Mode 1-No Mode 2-No
	<b>Watlow 942</b>		
	Use TE1602 adapter. See wiring in next section. 9600 Baud	7 Data bits Odd Parity 1 Stop Bit	Mode 0-No Mode 1-No Mode 2-No
	<b>Watlow F4</b>		
	Use TE1602 adapter. See wiring in next section. 19200 Baud	8 Data Bits No parity 1 Stop Bit	<b>Mode 0-YES</b> Mode 1-No Mode 2-No
	<b>Yokogawa/BlueM 750 and 550</b>		
	Use TE1602 adapter. See wiring in next section. 9600 Baud	8 Data Bits No parity 1 Stop Bit	Mode 0-No <b>Mode 1-YES</b> Mode 2-No

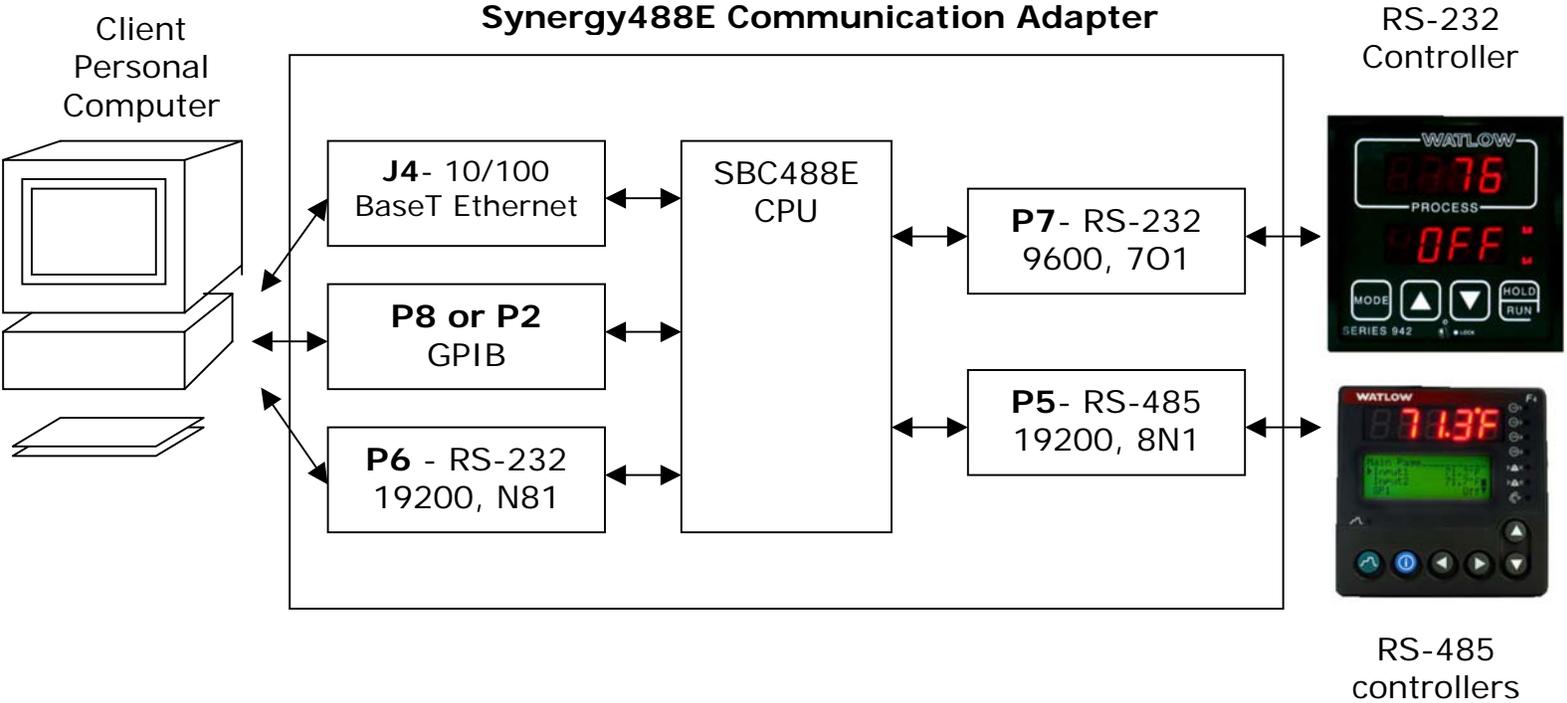
Chamber Controller Setup (Continued)

Controller	Wiring	Controller Comm. Settings	SBC488E Jumpers
	<b>Partlow MIC 1460 and MIC 1462</b>		
	<p>Use TE1602 adapter. See wiring in next section. 9600 Baud</p>	<p>8 Data Bits Even parity 1 Stop Bits</p>	<p>Mode 0-No Mode 1-No <b>Mode 2-YES</b></p>

### SBC488E Diagram

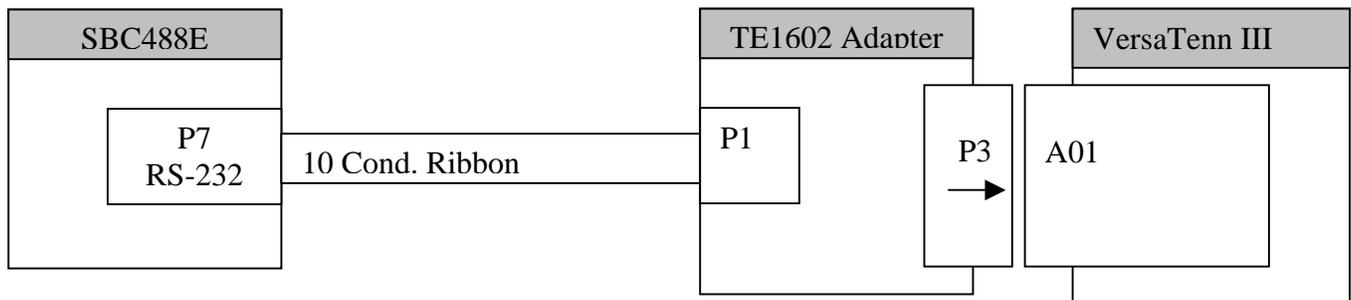
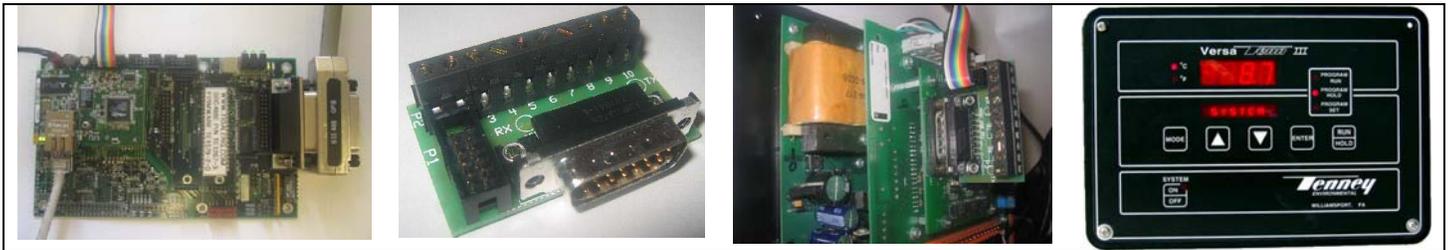


### Synergy488E Communication Adapter



## 2.1 VersaTenn III Setup

### Wiring to SBC488E/Wiring adapter



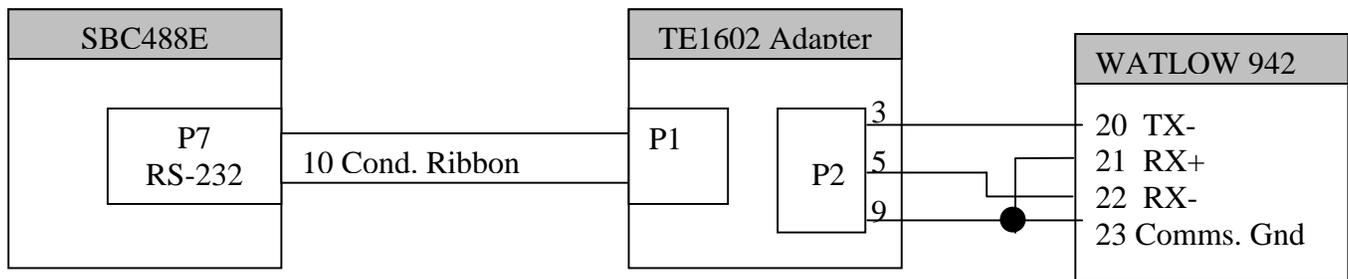
Watlow 942 Wiring to TE1602 Wiring adapter (Note that TE1602 adapter is designed to plug directly onto the VTIII communications connector A01)

SBC488E-P7 to Adapter-P2	SBC488E-P7 to Adapter-P2		VersaTenn III Function	VersaTenn III Connector No.
TX	3		TX-	20
Comms Gnd	9		RX+	21
RX	5		RX-	22
Comms Gnd	9		Comms Gnd	23

Controller	Wiring	Controller Comm. Settings	SBC488E Jumpers
<p><b>VersaTenn III</b></p>	<p>Use TE1602 adapter. Adapter P3 connects directly to VTIII A01.</p>	<p>9600 Baud 7 Data bits Odd Parity</p>	<p>Mode 0-No Mode 1-No Mode 2-No</p>

## 2.2 Watlow 942 Setup

### Wiring to SBC488E/Wiring adapter



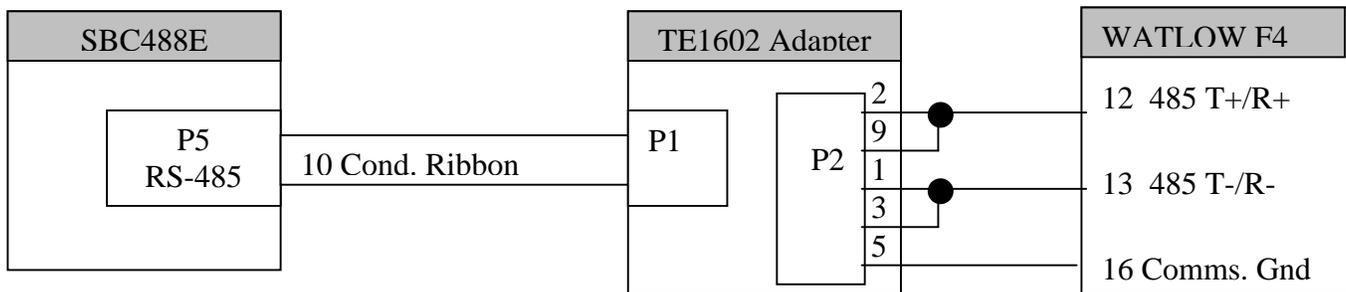
### Watlow 942 Wiring to TE1602 Wiring adapter

SBC488E-P7 to Adapter-P2	SBC488E-P7 to Adapter-P2		Watlow 942 Function	Watlow 942 Connector No.
TX	3		TX-	20
Comms Gnd	9		RX+	21
RX	5		RX-	22
Comms Gnd	9		Comms Gnd	23

Controller	Wiring	Controller Comm. Settings	SBC488E Jumpers
<p><b>Watlow 942</b></p>	<p>Use TE1602 adapter. See wiring in next section.</p>	<p>9600 Baud 7 Data bits Odd Parity</p>	<p>Mode 0-No Mode 1-No Mode 2-No</p>

### 2.3 Watlow F4

#### Wiring to SBC488E/Wiring adapter



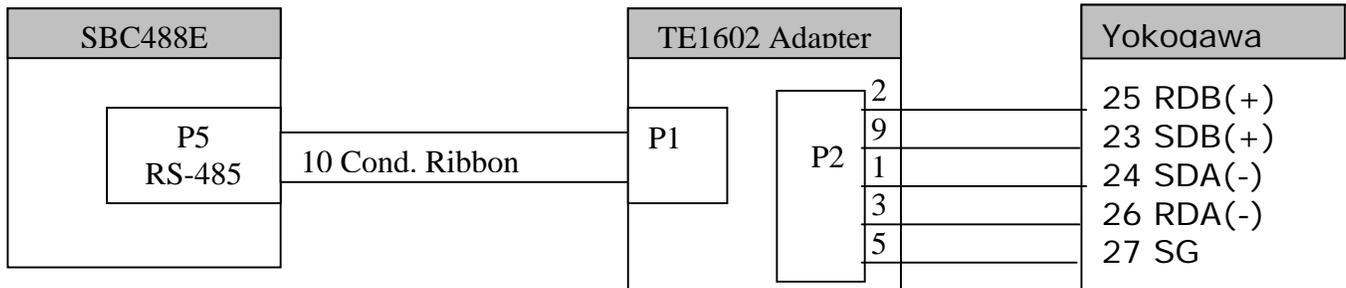
#### Watlow F4 Wiring to TE1602 Wiring adapter

SBC488E-P5 Adapter-P2	SBC488E-P5 Function		Watlow F4 Function	Watlow F4 Connector No.
2	TX+		485 T+/R+	12
9	RX+		485 T+/R+	12
1	RX-		485 T-/R-	13
3	TX-		485 T-/R-	13
5	Comms. Gnd		Comms. Gnd	16

Controller	Wiring	Controller Comm. Settings	SBC488E Jumpers
<p><b>Watlow F4</b></p> 	<p>Use TE1602 adapter. See wiring in next section.</p>	<p>19200 Baud 8 Data Bits No parity</p>	<p><b>Mode 0-YES</b> Mode 1-No Mode 2-No</p>

**2.4 Yokogawa/BlueM**

**Wiring to SBC488E/Wiring adapter**



**Yokogawa Wiring to TE1602 Wiring adapter**

SBC488E-P5 Adapter-P2	SBC488E-P5 Function	Yokogawa Function	Yokogawa Connector No.
2	TX+	RDB(+)	25
9	RX+	SDB(+)	23
1	RX-	SDA(-)	24
3	TX-	RDA(-)	26
5	Comms. Gnd	SG	27

Controller	Wiring	Controller Comm. Settings	SBC488E Jumpers
<p><b>Yokogawa</b></p>	<p>Use TE1602 adapter. See wiring in next section.</p>	<p>9600 Baud 8 Data Bits No parity</p>	<p>Mode 0-No <b>Mode 1-YES</b> Mode 2-No</p>

**Controller Setup for Yokogawa PCLink Communications:  
Applies to Yokogawa 550 and 750 and BlueM Pro550 and Pro750.**

Get to the R485 sub-menu on the controller as follows:

1. From Operating Display,  
Press and hold SET/EN  
T Key for 3 Seconds.  
PROG should appear.
2. Press [^] until STUP visible.
3. STUP Press set.
4. Enter password if required.
5. UPMD Press Set.  
Press [^] until R485 visible.
6. R485 Press Set

Setup the controller as follows

PSL1 = 0 PC link Communication  
BPS1 = 9600 Baud  
PRI1 = Parity None  
STP1 = 1 Stop bit  
DLN1 = 8 Data length  
ADR1 = 1 (1 to 99)  
RP.T1 = 8 Minimum Response time 1

DISP button (Display) will take you back.

Skip the PSL2 settings, they don't mater for this application note.

Read the Yokogawa and BlueM documentation for a complete description of the register set for the 550 and 750.

There are two command formats supported by the Synergy488E.

1. Modbus Command format.
2. The Y command format (Y is for Yokogawa)

Since both Modbus controllers like the F4 and the Yokogawa support register based configuration, we can support them both with the Modbus Command set described in Section 4.

To read register D0215

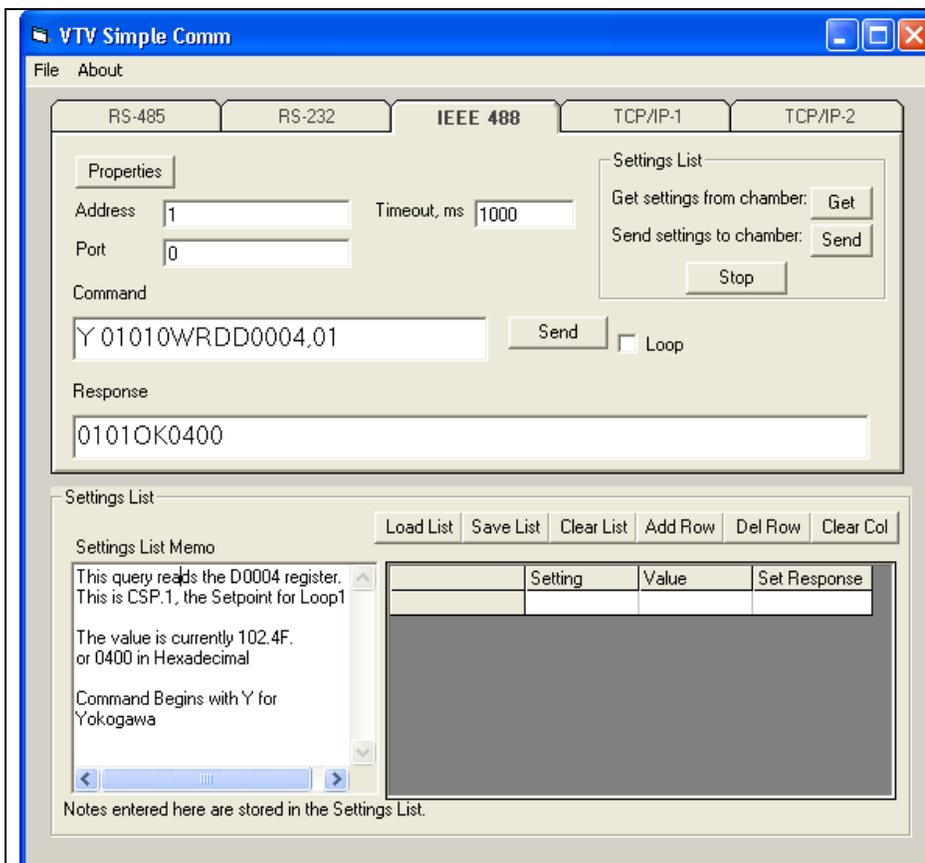
Command: r? 215,1  
Response: 0194

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 In addition the Synergy488E supports the Y command set. The Y command set is the same as the Yokogawa PC Link command set except the Synergy488E takes care of the leading STX and trailing ETX characters in the message.

For example: to RD register D0215, send this:

Command = Y 01010WRDD0215,01  
 Response = 0101OK0194

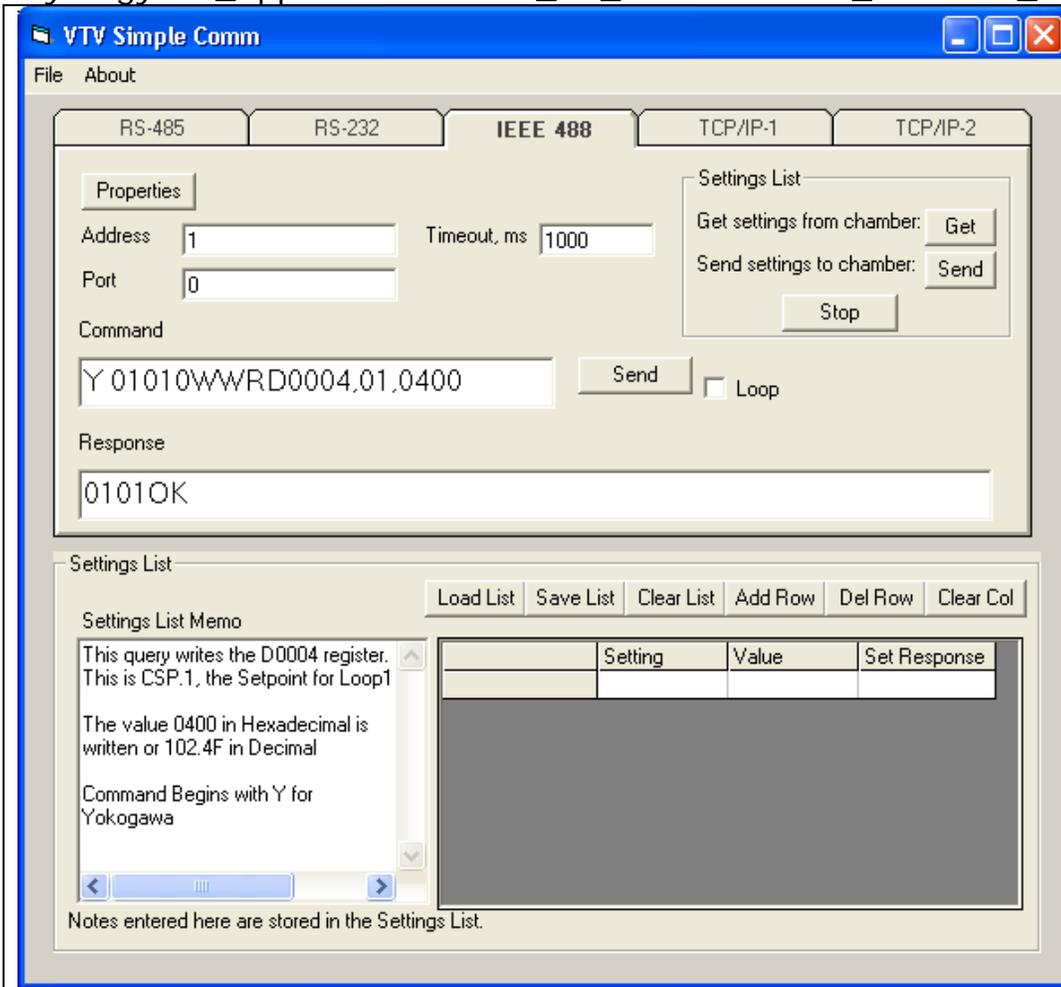
The following screen shots show examples of the SimpleComm Program reading and writing to the PRO550 controller. Read the Yokogawa and BlueM documentation for a complete description of the register set for the 550 and 750.



This query reads the D0004 register. Which is the Setpoint for Loop1. AKA CSP.1,

The value is currently 102.4F or 0400 in Hexadecimal

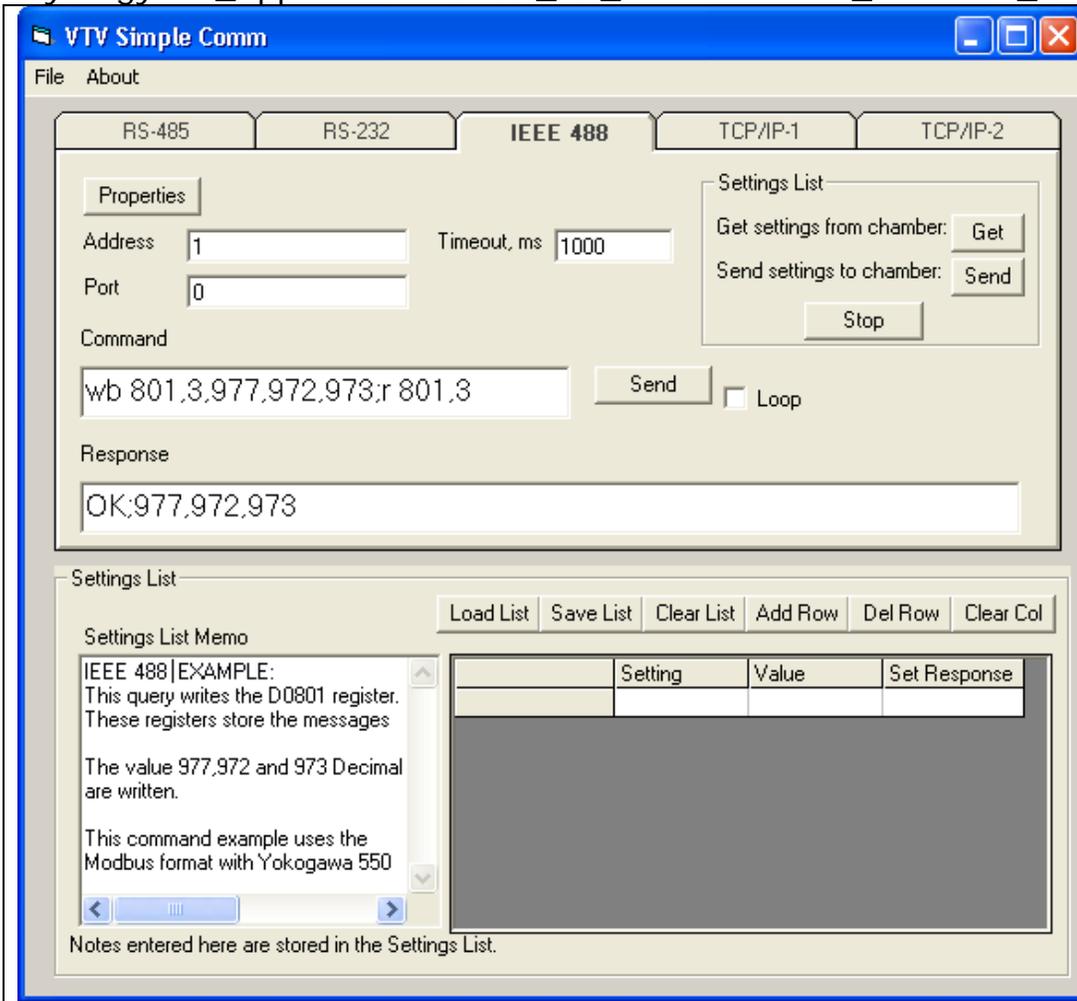
Command Begins with Y and a space before the Yokogawa command WRD to read the register



This query writes the D0004 register. This is CSP.1, the Setpoint for Loop1.

The value 0400 in Hexadecimal is written or 102.4F in Decimal

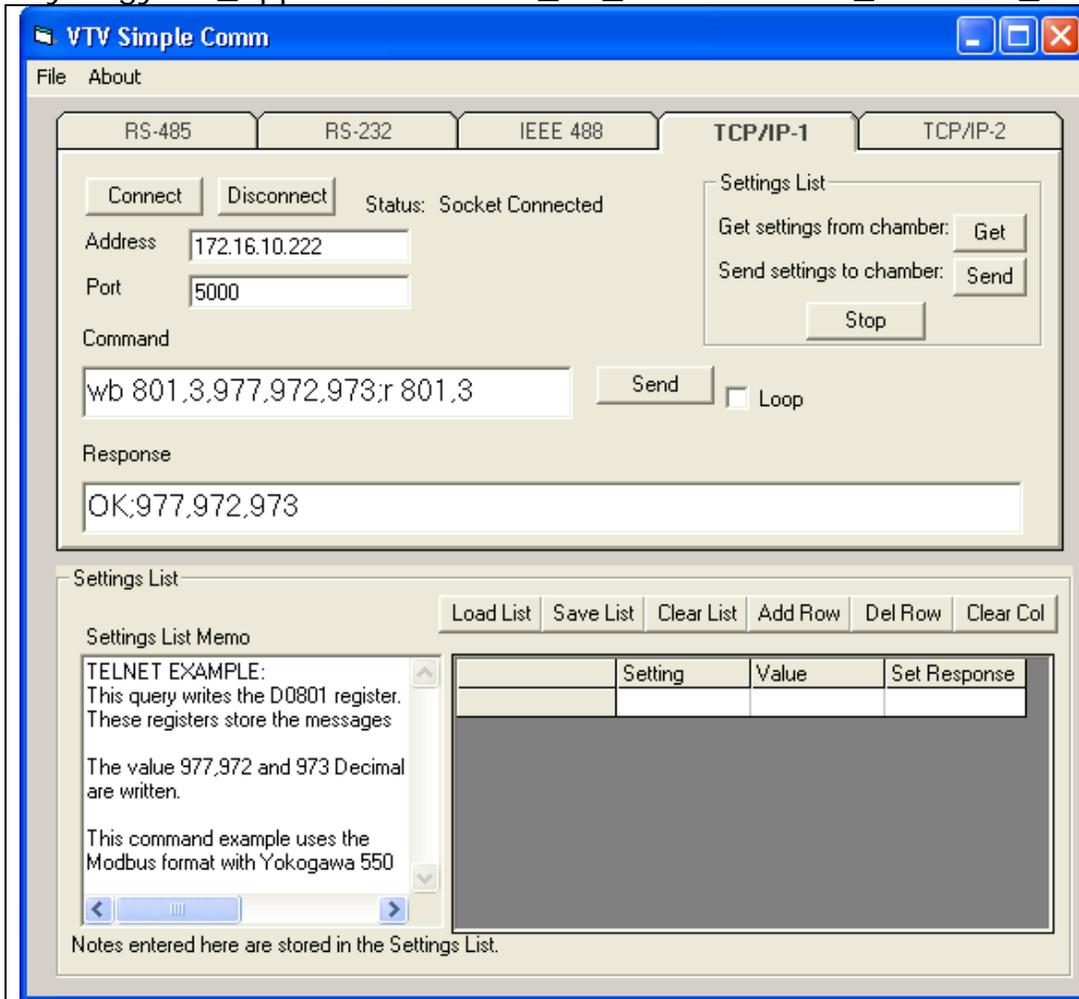
Command Begins with Y for Yokogawa



IEEE 488  
 EXAMPLE:  
 This query writes three registers starting at the D0801 register. These registers store messages.

The values 977,972 and 973 Decimal are written.

This command example uses the Synergy488E Modbus format with Yokogawa 550

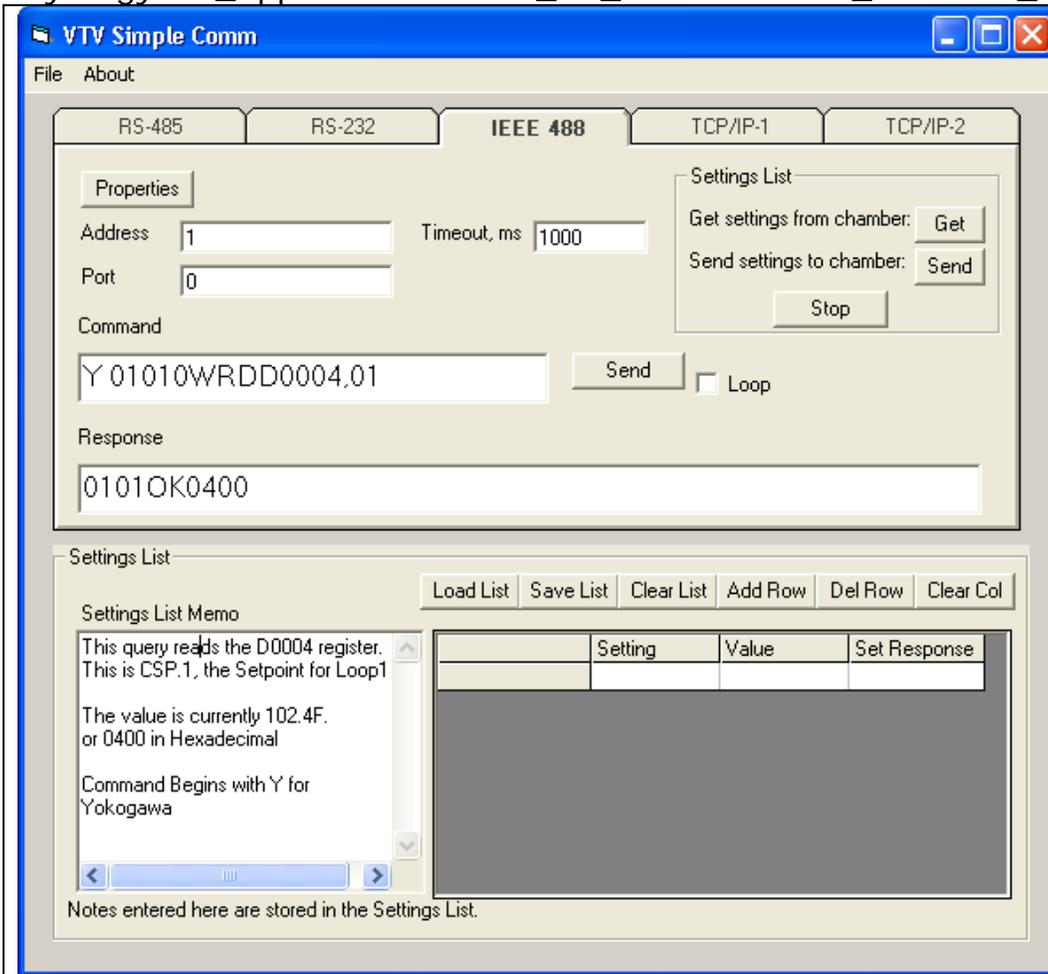


TELNET EXAMPLE:

This query writes three registers starting at the D0801 register. These registers store messages.

The values 977,972 and 973 Decimal are written.

This command example uses the Synergy488E Modbus format with Yokogawa 550



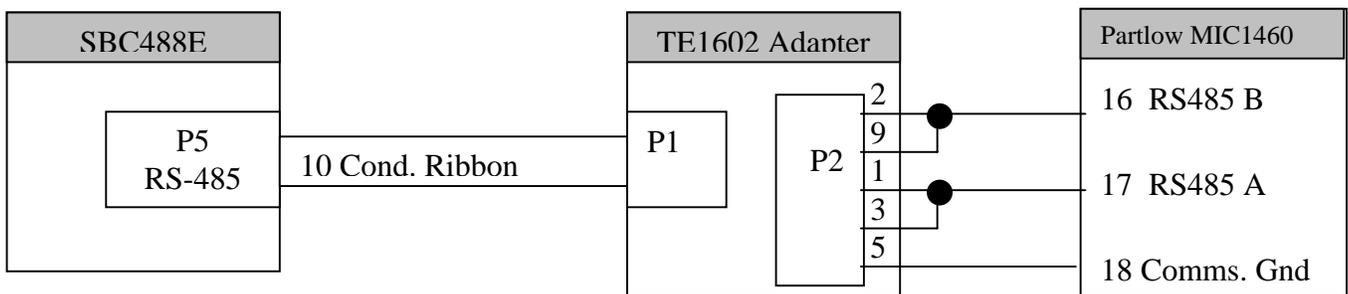
This query reads the D0004 register. Which is the Setpoint for Loop1. AKA CSP.1,

The value is currently 102.4F. or 0400 in Hexadecimal

Command Begins with Y and a space before the Yokogawa command WRD to read the register

**2.5 Partlow MIC 1460 and MIC 1462**

**Wiring to SBC488E/Wiring adapter**



**Partlow Wiring to TE1602 Wiring adapter**

SBC488E-P5 Adapter-P2	SBC488E-P5 Function	Partlow Function	Partlow Connector No.
2	TX+	RS485 B	16
9	RX+	RS485 B	16
1	RX-	RS485 A	17
3	TX-	RS485 A	17
5	Comms. Gnd	SG	18

Controller	Wiring	Controller Comm. Settings	SBC488E Jumpers
<p><b>Partlow MIC 1460 and MIC 1462</b></p> 	<p>Use TE1602 adapter. See wiring in next section.</p>	<p>9600 Baud 8 Data Bits Even parity 1 Stop Bits</p>	<p>Mode 0-No Mode 1-No <b>Mode 2- YES</b></p>

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 The steps below describe the Partlow controller communications setup and are provided for your convenience. if you have difficulty please refer to the Partlow manual for the latest information.

1. Hold the mode key until **Conf Par** appears on the Partlow LED readout.
2. Press the scroll key until **Baud Rate** appears on the Partlow LED readout.
3. Use the Up and Down arrows to select **9600 baud**.
4. Press scroll once. **Protocol** should appear on the Partlow LED readout.
5. Use the Up and Down arrows to select **MbE**. (for Modbus Even parity)
6. Press scroll once. **Address** appears on the Partlow LED readout.
7. Use the Up and Down arrows to set the Address.  
 (Typically set to 1, the Synergy488 Default Modbus address).
8. Press and hold mode until the screen goes blank and then does the lamp test.

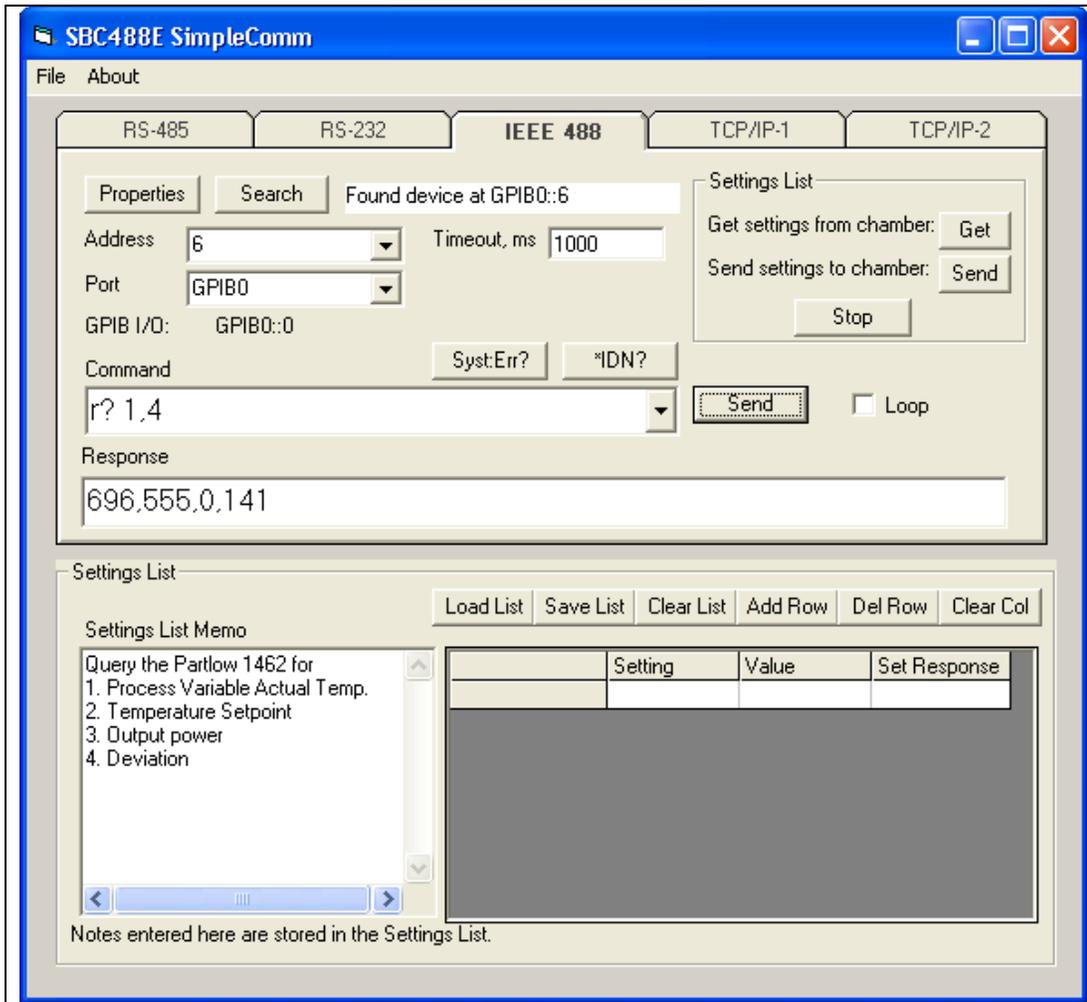
Example Partlow 1462 Communications screenshot in Simple Com

The screenshot shows the 'SBC488E SimpleComm' application window. The 'IEEE 488' tab is selected. The 'Found device at GPIB0::6' is displayed. The 'Address' is set to 6, 'Port' to GPIB0, and 'Timeout, ms' to 1000. The 'Command' field contains 'W 2,1100'. The 'Settings List' section includes a memo: 'Set the Partlow 1462 for Temperature Setpoint to 110.0 Deg.' and an empty table with columns 'Setting', 'Value', and 'Set Response'.

**GPIB Example**

Set the Partlow 1462 Temperature Setpoint to 110.0 Deg.

Example Partlow 1462 Communications screenshots in Simple Com



- GPIB Example  
Query the Partlow 1462 for
1. Process variable
  2. Temperature set point
  3. Output power
  4. Deviation

### **3. Synergy488 Commands**

The SBC488E - TE1579 accepts client commands over three ports, RS-232 (P6), GPIB (P2/P8) and Ethernet (J4) passes the commands onto a controller or processes SBC488E configuration commands itself.

Commands meant for the Chamber Controller through to the serial port on P5 (RS-485 Modbus) or P7 (RS-232 ASCII) and sends controller replies back to the client connection. The Synergy488 also support several configuration commands.

The ModbusRTU commands are sent to the Synergy488 using an ASCII format and translated to the binary ModbusRTU protocol for transmission on P5. The syntax of ASCII format is defined below in section

The ASCII commands are sent to the ASCII controller over RS-232 from SBC488E connector P7.

Configuration commands are used to configure and identify the board.

#### **3.1 Synergy488 Configuration Commands**

Synergy488 Configuration commands are:

##### **3.2 Identify Command**

The identify command returns information about the Synergy488 firmware.

Query syntax: `"*IDN?"`

Response: `"TidalEngineeringCorp,TE1267-3,firmware_1579-3,Rev-";`

##### **3.3 Save Command**

The Save command saves the current TCPIP properties into nonvolatile memory bank x. There are ten memory banks, numbered 0 thru 9. Bank 0 is unique in that it is restored when the Synergy488 is powered up.

Command syntax: `"*SAV x`

Where x is bank 0 through 9.

### **3.4 Recall Command**

The Recall command recalls the stored TCPIP properties from nonvolatile memory bank x. There are ten memory banks, numbered 0 thru 9.

Command syntax: "\*RCL x"

Where x is bank 0 through 9.

This command recalls the saved TCPIP properties from bank x.

Examples:

Command

```
*RCL 0
```

### **3.5 TCPIP Properties Command**

The TCPIP Properties command sets the current network parameters for the Ethernet connection including, IP Address, Subnet mask and Gateway. The TCPIP Properties query returns the current network parameters for the Ethernet connection.

Command syntax: "TCPIP iii.iii.iii.iii,nnn.nnn.nnn.nnn,ggg.ggg.ggg.ggg";

Where iii.. is the IP address

Where nnn.. is the netmask

Where ggg.. is the gateway

Examples:

Command

```
TCPIP 172.16.10.118,255.255.255.0,172.16.10.254
```

```
*SAV 0
```

Query

```
TCPIP?
```

Response 172.16.10.118,255.255.255.0,172.16.10.254.

**IMPORTANT: Execute the "\*SAV 0" command if you want to save this setting and have it restored whenever the board is powered up.**

## 4. Synergy488 Modbus Command Set

The ModbusRTU commands are sent to the SBC488E using an ASCII format and translated to the binary ModbusRTU protocol for transmission on P5. The syntax of ASCII format is defined here

### 4.1 Channel Command

Command Syntax: C addr

Modbus Address Command. Sets Modbus slave device address for subsequent commands. Value for addr is 1 to 255.

Query Syntax: C?

Example 1: C 1 'sets SBC488E to address Modbus device #1

### 4.2 Read Register Command

Query Syntax: R[?] reg, num

Reads one or multiple Modbus device registers. User specifies starting register reg and number of registers to be read num. The [?] is an optional symbol. Values for reg are 0 to 32767.

Values for num are 1 to 64. Responses are returned as 16-bit decimal or HEX values separated by commas. Output format selected with the Format command. i.e.

For Example 1:

Command: R? 0,1 reads Watlow Model Number.

Response: 5270 for Watlow Model F4

For Example 2:

Command: R? 0,3 reads three successive registers.

Response: 5270,0,123 for the Watlow F4 Controller.

#### **4.3 Write Register Command**

Command Syntax: W reg,w

Write Register Command. Writes a 16-bit value, w to a single Modbus device register, reg. Values for reg are 0 to 32767. Values for w are 0 to 65535. An example is: W 100, 55 writes the decimal value 55 to register 100.

Example 1: W 300,110 sets setpoint number 1 to 110 Degrees C

#### **4.4 Write Register Block Command**

Command Syntax: WB reg,num,v0,v1,v2....vn

Write Block Command. Writes multiple 16-bit words, v0 to multiple registers. Starting register, reg. Number, num specifies how many words are to be written. Values for reg are 0 to 32767. Values for num are 1 to 64. Values for w are 0 to 65535.

#### **4.5 Write Modbus Timeout Command**

Command Syntax: D time

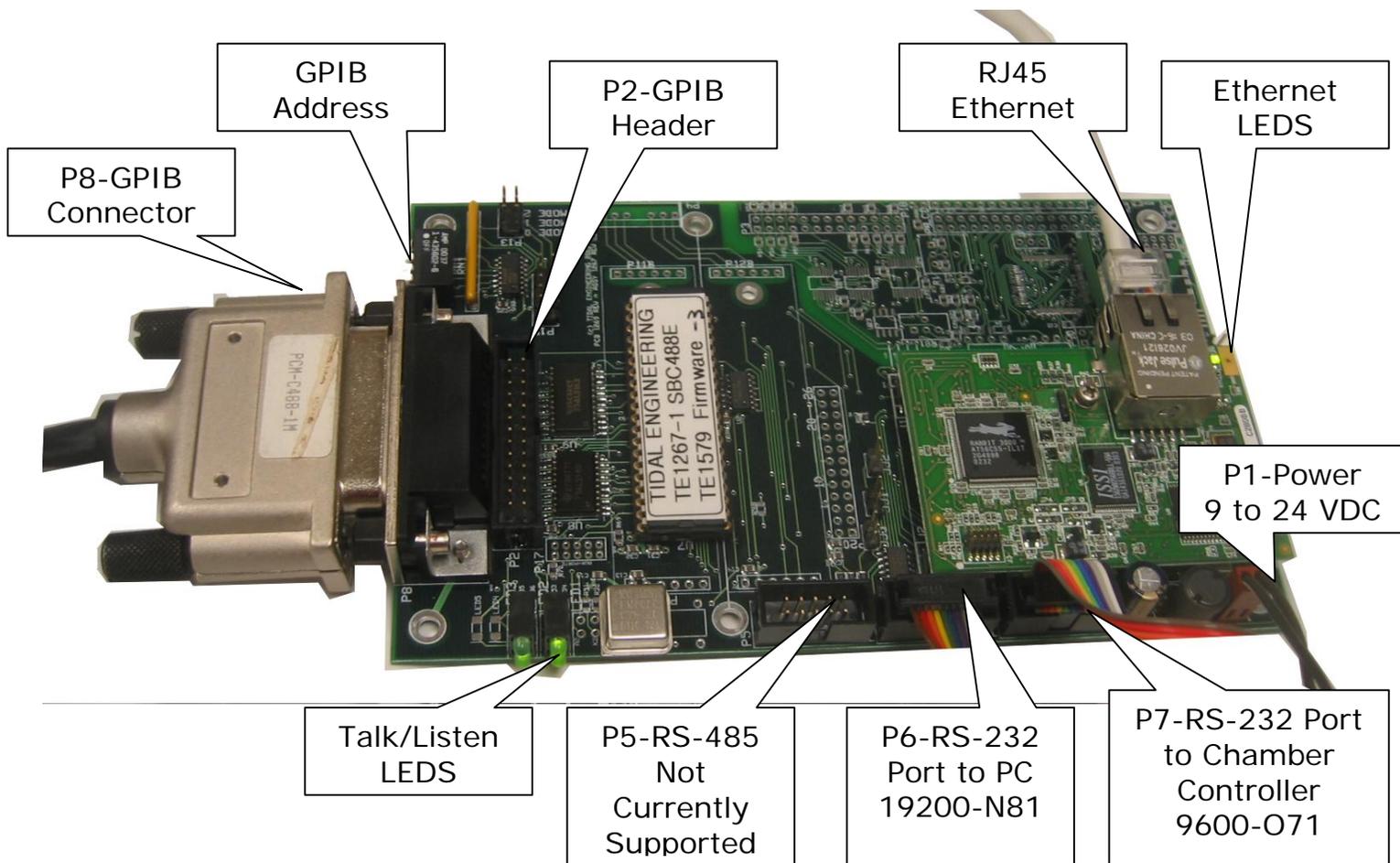
Timeout Command. Sets timeout value of Modbus response message in milliseconds. Timeout is the total time for the message to be received by the SBC488E. Value for time is 1 to 65,535 milliseconds. Default is 100.

Query Syntax: D?

Queries the current timeout setting.

## 5. Synergy488 Connection Summary:

- Client: P6 RS-232 -Serial port to PC, 19200, N81  
Client: P8 GPIB connector  
(GPIB extension cable is available and can be connected to P2 header)  
Client: J4 Ethernet RJ45 connector (TE1579-3 Only)
- Controller: P7 RS-232 - Chamber Controller port  
Controller: P5 RS-485 - Chamber Controller port  
Power: P1 9 to 24 VDC, 300 mA.



**5.1 RS-232 Client Connection Setup**

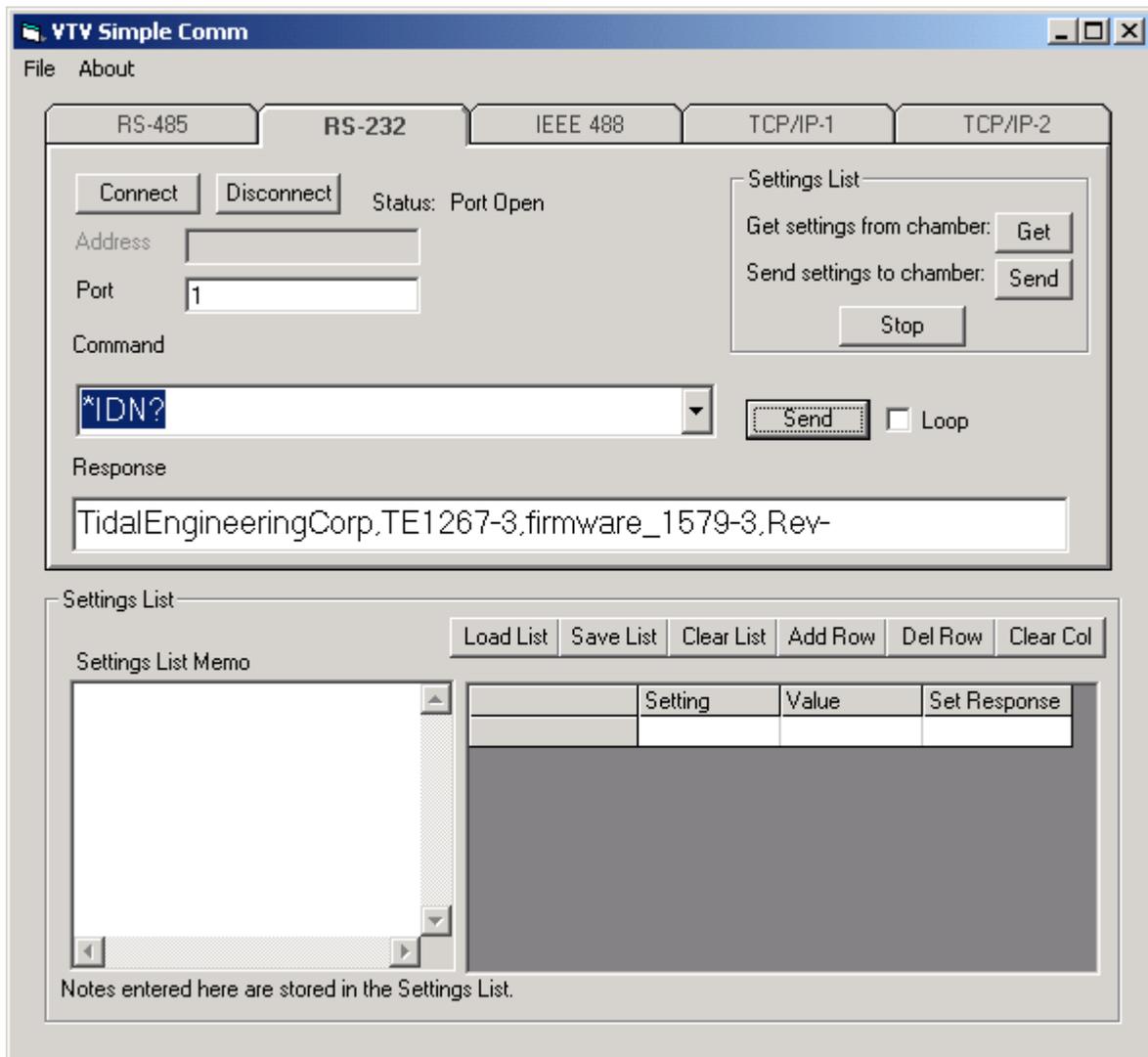
1. Setup the Serial port on your PC, 19200, N81.  
 Connect the RS-232 cable to P6 on the SBC488E.

Baud	Parity	Data Bits	Stop Bits
19200	None	8	1

2. Set the Port box on the SimpleComm screen to the Comm port that you have connected too.

3. Press Connect.

4. Enter a command, such as “\*IDN?” in the command window and press **Send**.



### 5.2 GPIB Client Connection Setup

The GPIB address is setup on five-position dipswitch S1.

The each dipswitch position has a binary weighted value and the GPIB address of the SBC488E is the sum of the values of all 5 positions. When the lever is up, the value is added to the sum. When the lever is down, the value is 0.

Dipswitch Marking	1	2	3	4	5
Value	16	8	4	2	1

The following two pictures provide examples of the dipswitch settings.



GPIB address setup Example 1: Address 3

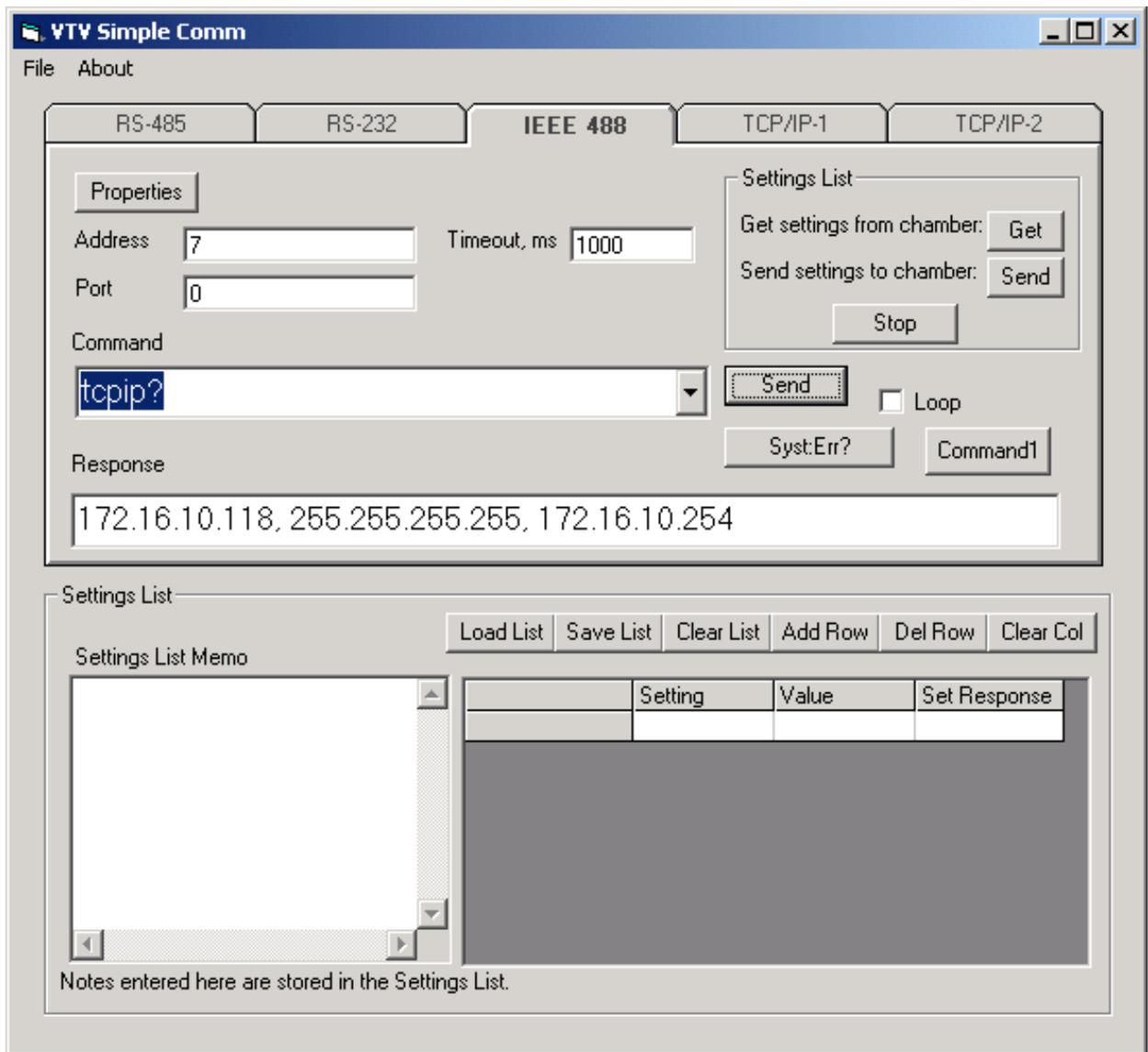


GPIB address setup Example 2: Address 16

Connect the GPIB cable from your PC to the P8 GPIB connector. Alternatively, use the accessory GPIB Ribbon Cable P/N TE1596 to connect the SBC488E to your PC's GPIB controller.

To set up the SimpleComm program for GPIB (IEEE 488):

1. Enter the Synergy488's GPIB Address in the Address window (See the figure below). Press Properties and click Apply. Note that the Port will be normally set to "0" unless you have multiple GPIB cards in your PC.
2. Enter a command, such as "TCPIP?" in the command window and press **Send**.



### 5.3 Ethernet Client Connection Setup

The Synergy488 supports communications over its Ethernet port. You can communicate to your chamber controller through a network or directly from a PC. The TCPIP Properties command is used to setup the IP Address on the Synergy488.

When putting the Synergy488 on a network obtain a compatible address from your Network administrator and enter it into the Synergy488 using the serial port or the GPIB port..

You can also connect the Synergy488 directly to your PC using a "crossover" Ethernet cable or a small Ethernet hub. When using a direct connection you can set the IP address of the PC and the Synergy488 to 172.16.10.222 and 172.16.10.223 respectively and set the Subnet mask and Gateway on both boards to 255.255.255.0,172.16.10.254. Other addresses can be used as well.

The TCPIP Properties command sets the network parameters for the Ethernet connection including, IP Address, Subnet mask and Gateway. The TCPIP Properties query returns the current network parameters for the Ethernet connection.

Command syntax: "TCPIP iii.iii.iii.iii,nnn.nnn.nnn.nnn,ggg.ggg.ggg.ggg";

Where iii.. is the IP address

Where nnn.. is the netmask

Where ggg.. is the gateway

Examples:

Command

```
TCPIP 172.16.10.118,255.255.255.0,172.16.10.254
*sav 0
```

Query

```
TCPIP?
```

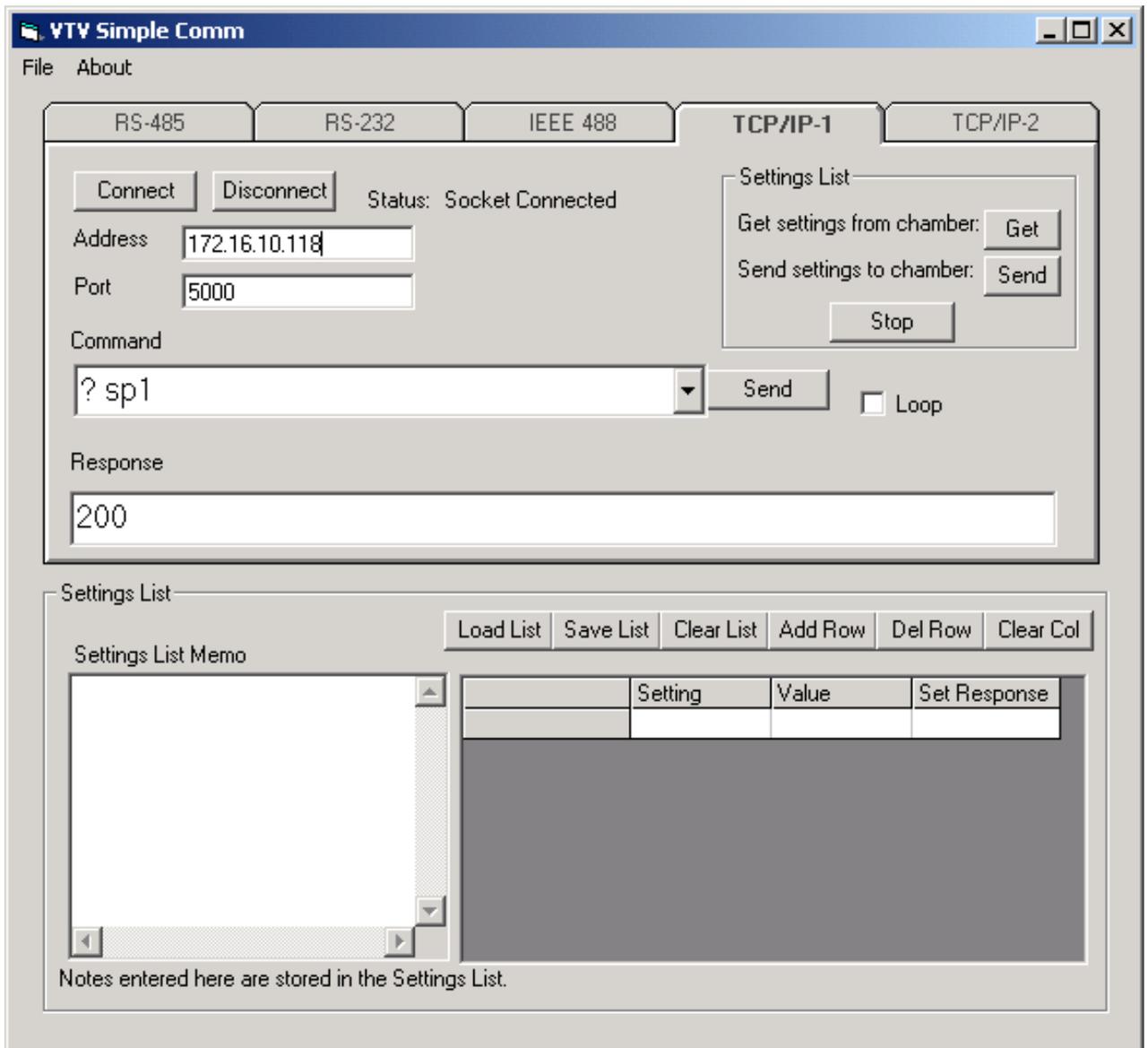
Response 172.16.10.118,255.255.255.0,172.16.10.254.

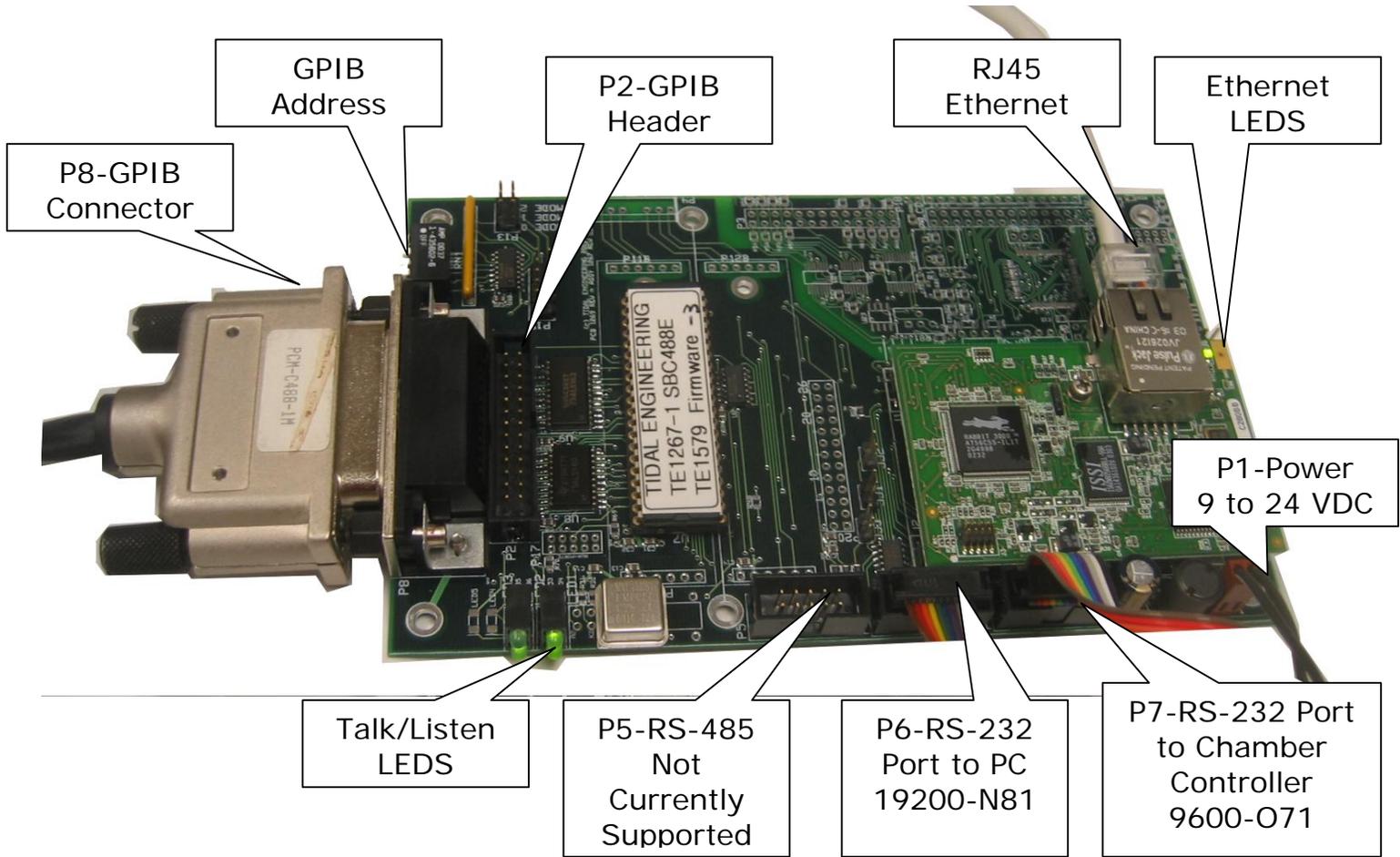
Once the Synergy488's IP address has been loaded, use the command \*SAV 0 to store it in nonvolatile memory.

To set up the SimpleComm program for TCP/IP:

1. Enter the Synergy488's IP Address in the **Address** window.
2. Set the **Port** to 5000 (the default) and press Connect (See the figure below).  
Note: In other telnet programs you may need to set the protocol to telnet and the emulation to VT100.
3. Press **Connect**.
4. Enter a **Command**, such as "TCPIP?" in the command window and press **Send**.

The screen shot below demonstrates the use of the Free SimpleComm program to query the chamber controllers setpoint 1 (temperature) via Telnet (TCP/IP).





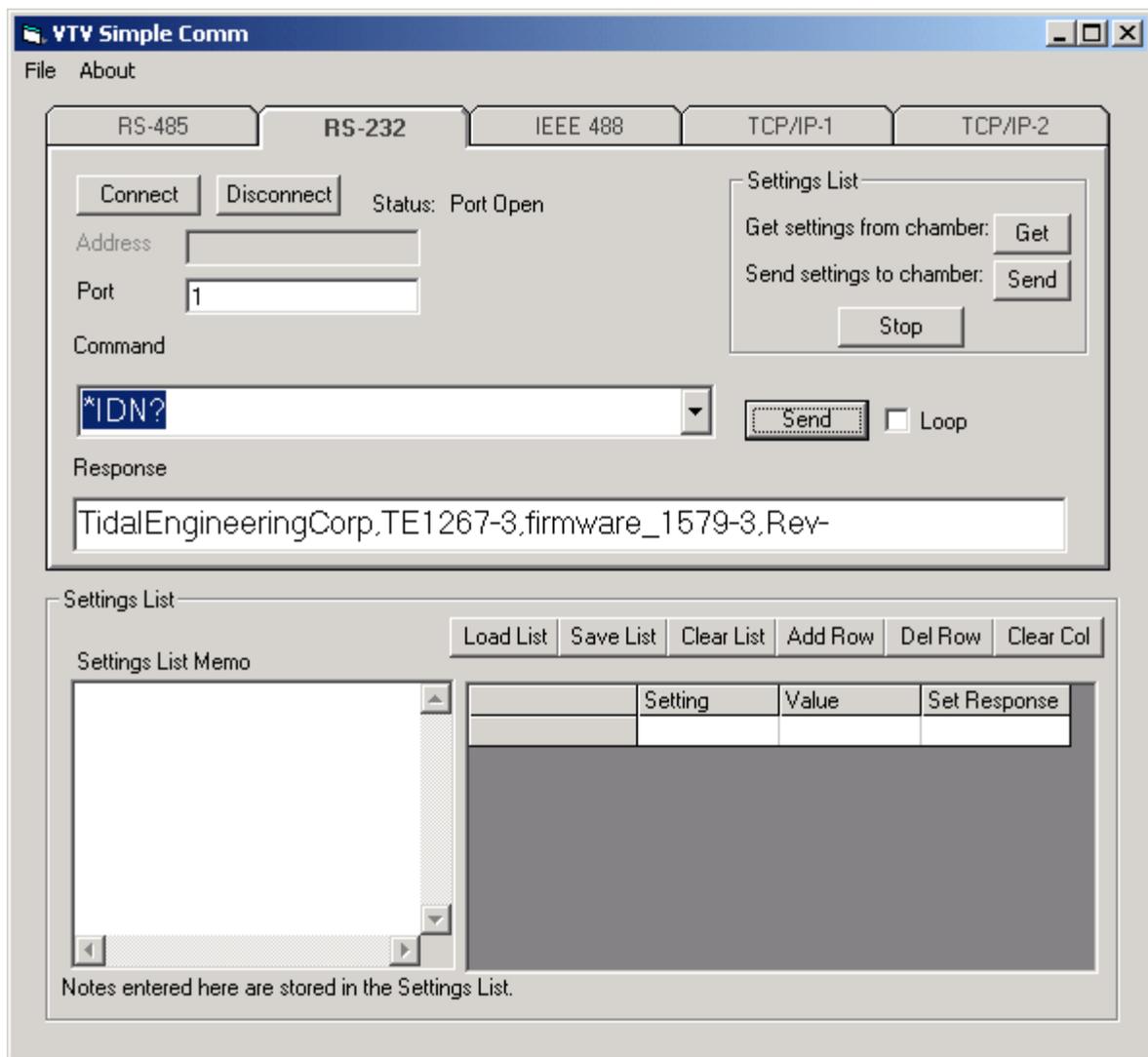
## 6. SimpleComm

Tidal Engineering Corporation provides a Free Client software package that can be download from our website at

[http://www.tidaleng.com/downloads/VTVSimpleComm\\_3\\_1\\_8.zip](http://www.tidaleng.com/downloads/VTVSimpleComm_3_1_8.zip)

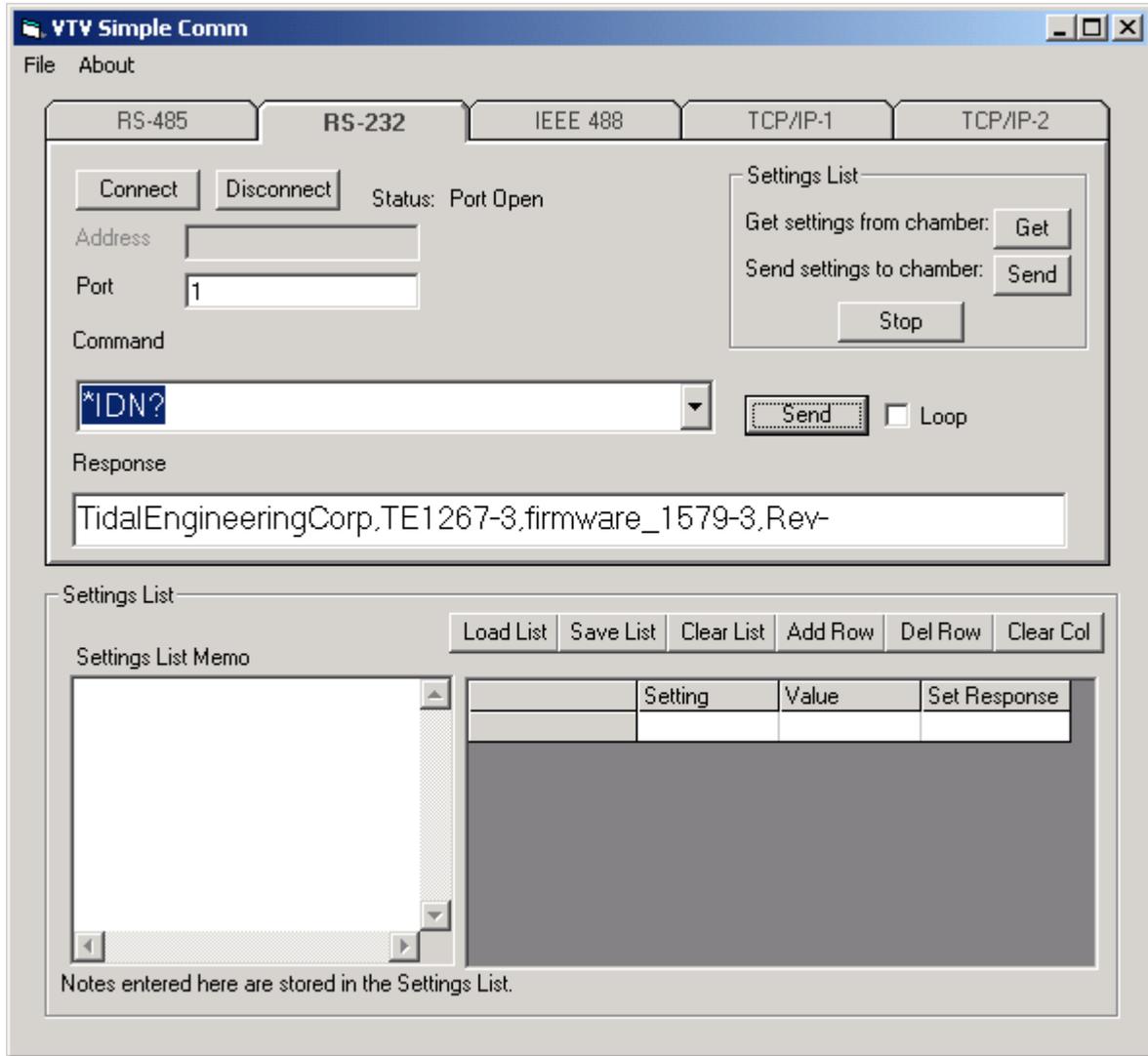
and installed on your PC to control the Synergy488 and the connected controller via:

1. RS-232
2. Ethernet (TCP/IP)
3. And IEEE 488 (GPIB)



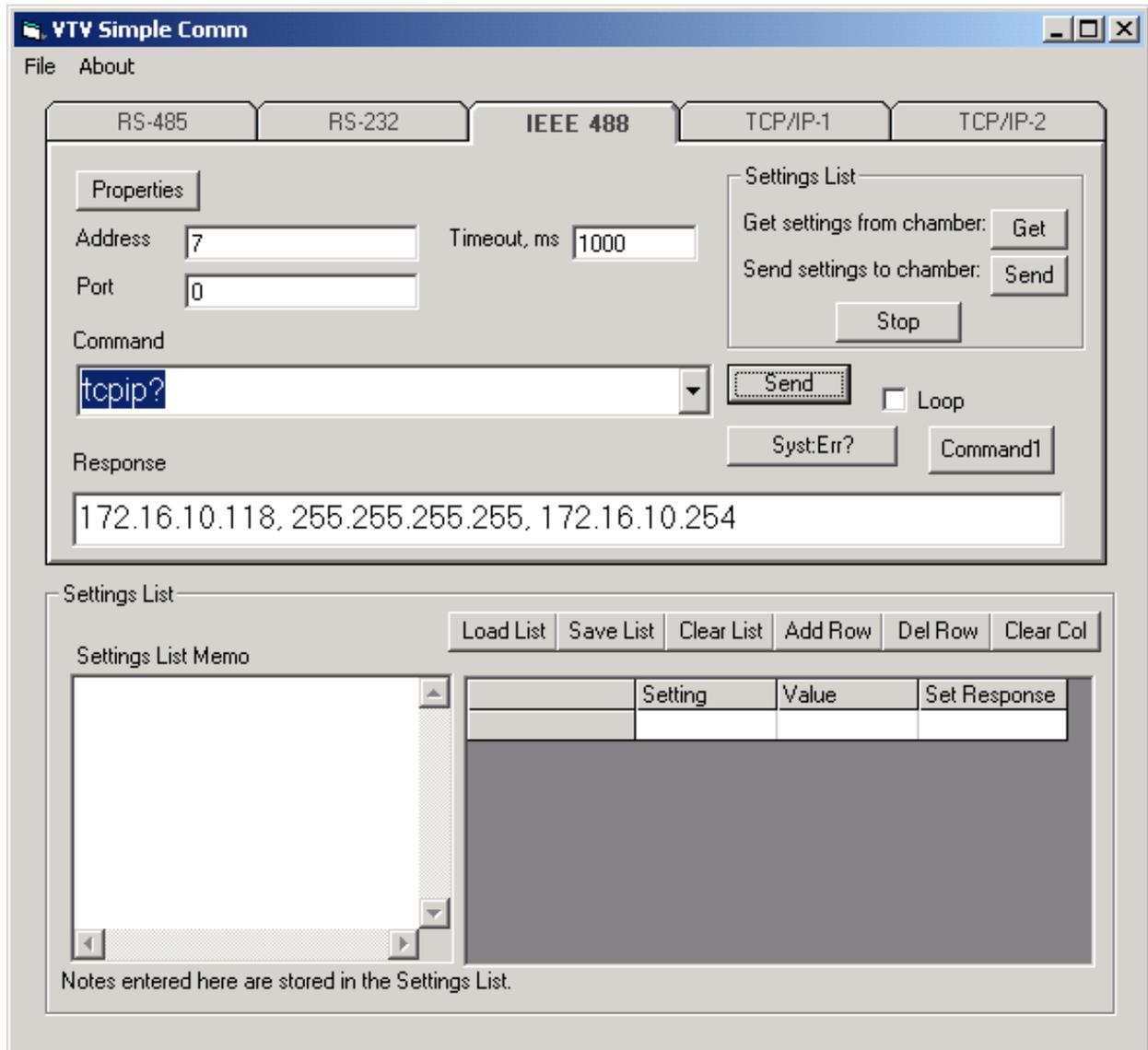
**6.1 RS-232**

The screen shot below demonstrates the use of the Free SimpleComm program to query the board identification via RS-232.



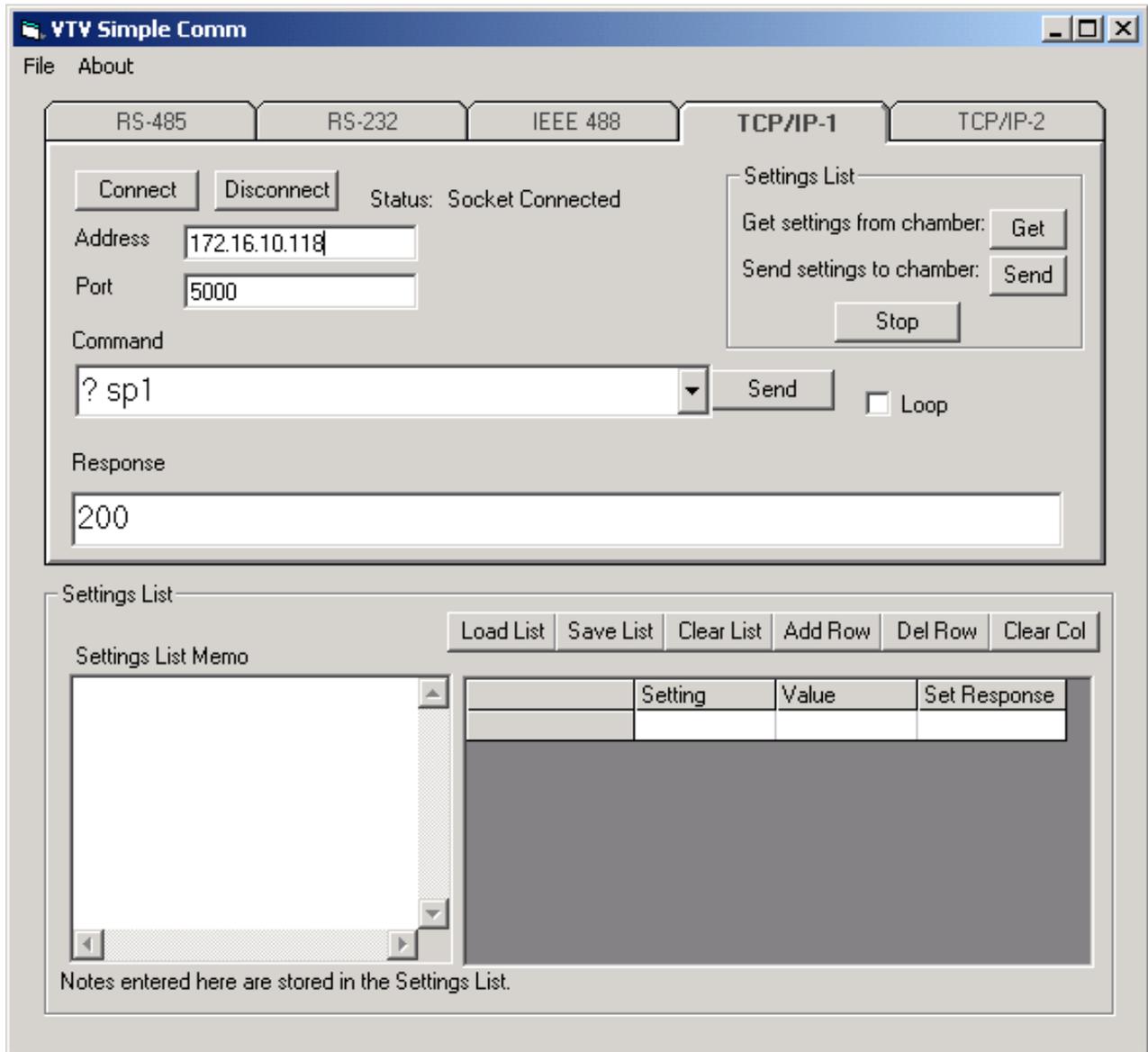
## 6.2 GPIB

The screen shot below demonstrates the use of the Free SimpleComm program querying the boards IP address IEEE 488 (GPIB).

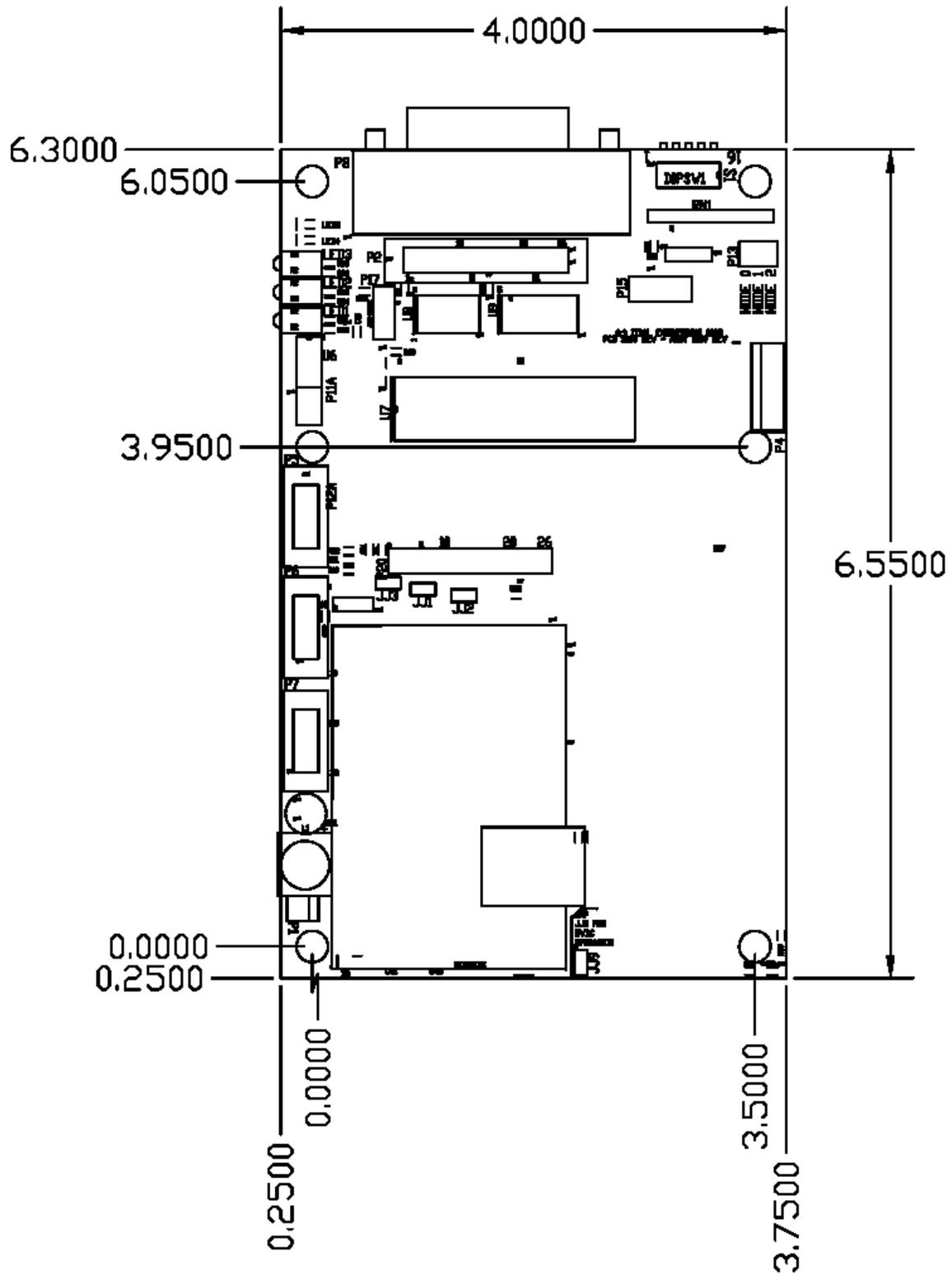


### 6.3 Ethernet (TCPIP) Telnet

The screen shot below demonstrates the use of the free SimpleComm program to query the chamber setpoint 1 (temperature) via Telnet (TCPIP).



## 7. SBC488E Outline Drawing



## 8. About Tidal Engineering

Headquartered in Randolph, NJ, Tidal Engineering Corporation has been designing and building award winning embedded hardware and software for test and measurement and data acquisition applications since 1992. The company further provides product development services together with engineering support, and is recognized for technical expertise in such areas as Embedded IEEE 488, and turnkey SCADA (Supervisory Control and Data Acquisition) systems. Tidal's products are available exclusively through ADI American Distributors Inc., an ISO-9002 certified distributor of electronic and electromechanical components and assemblies.

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Visit [www.TidalEng.com](http://www.TidalEng.com) for Information on our other products including the new Touch Screen-based, Internet Enabled Synergy Controller and TCweb, The Multi Channel Thermocouple monitor with Web, E-Mail and Industrial and Process Control communications.



Synergy Controller



TCweb