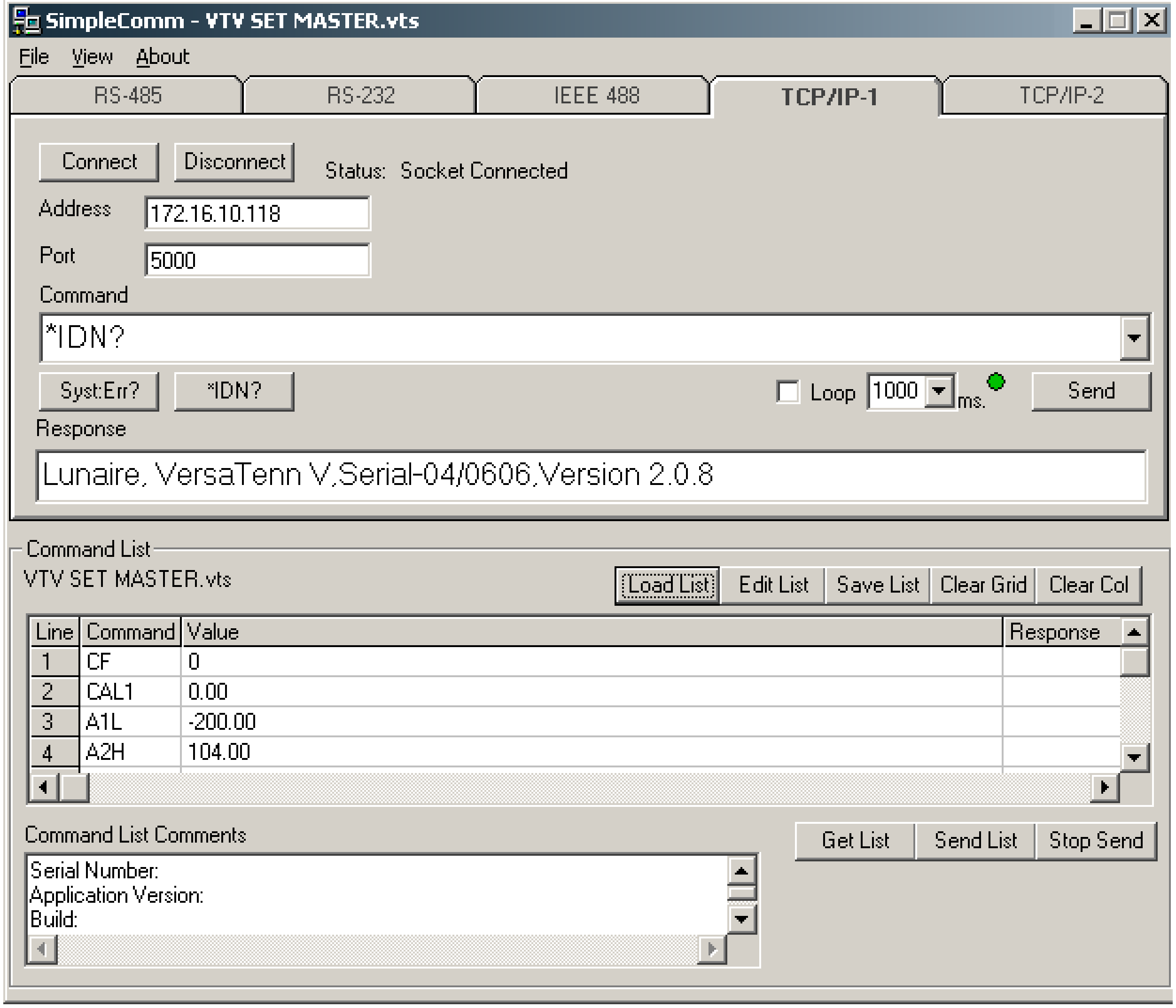
VersaTenn V Simple Communications

The VTV SimpleComm application is an all in one communications package designed to be used with VersaTenn V environmental chambers. It provides a simple interface for sending and receiving commands over: RS-485, RS-232, IEEE 488 and TCP/IP.

The VersaTenn V supports over 130 unique commands, allowing for complete control and monitoring of your chamber from remote locations. You can find the VersaTenn V command set at Tidal Engineering's website www.tidalengineering.com. Navigate to the VersaTenn V page and look under the general information section for the VTV Communications Commands Acrobat Reader file. This file contains a spreadsheet of all the available communication commands. The source code is also available on the web site for users who would like to develop their own communications programs. The source files are located on the VersaTenn V page and are linked to under the Downloads section.



Status: Socket Connected

Address 172.16.10.118

Port 5000

Command
*IDN?

□ Loop 1000 ms. ●

Response
Lunaire, VersaTenn V,Serial-04/0606,Version 2.0.8

Command List
VTV SET MASTER.vts

Line	Command	Value	Response
1	CF	0	
2	CAL1	0.00	
3	A1L	-200.00	
4	A2H	104.00	

Command List Comments
Serial Number:
Application Version:
Build:

Figure 1 – VTV SimpleComm

Installing SimpleComm

Insert the setup disk in the floppy drive of your PC. Through your windows explorer, find the "A" drive and double click on the setup.exe file. Alternatively, you may press Start / Run from your desktop. Type "A:\setup" and hit enter. Follow the directions on the screen. You may be prompted to insert a second or third installation disk.

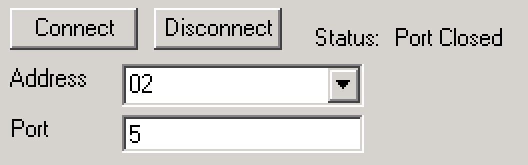
Connecting SimpleComm

The PC on which SimpleComm is running must be connected to the chamber. The method of connection depends on the desired mode of communications. RS-485 and 232 use serial cables, IEEE 488 uses a 488 cable and TCP/IP used network cables such as CAT5.

RS-485

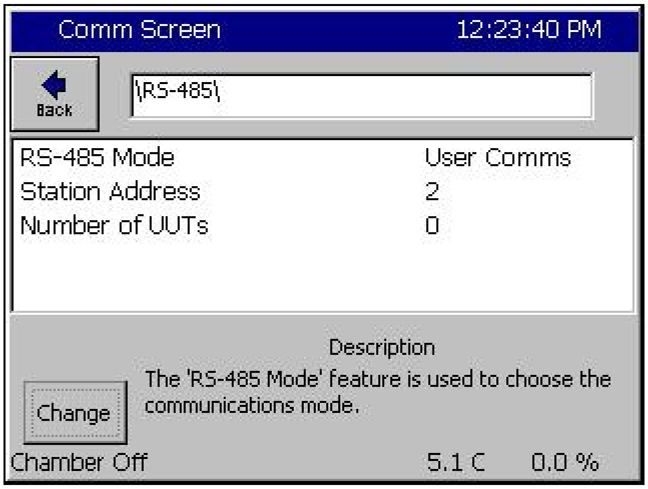
To communicate over RS-485, plug a serial cable into the back of your PC and connect the other end to the serial port on the chamber. On the SimpleComm, press the RS-485 tab and set the port number to the same port number specified on your PC (Figure 2). To determine the port settings on the PC, go to Start/Settings/System, select the hardware tab, select Device Manager and expand the Ports icon. The VersaTenn's RS-485 port settings are hard-coded to: 9600 baud rate, no parity, 8 data bits and 1 stop bit. Next, set SimpleComm's RS-485 address to the same address as the VersaTenn V (Figure 3). The RS-485 Mode must be set to User Comms, if it reads UUT Sensors, change the setting.

Once the settings are complete, press the connect button. The status label will read: port open.



Status: Port Closed
Address 02
Port 5

Figure 2 – SimpleComm



Comm Screen 12:23:40 PM

\RS-485\

RS-485 Mode	User Comms
Station Address	2
Number of UUTs	0

Description
The 'RS-485 Mode' feature is used to choose the communications mode.

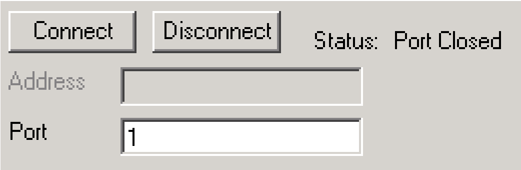
Chamber Off 5.1 C 0.0 %

Figure 3 – VersaTenn V

RS-232

To communicate over RS-232, plug a serial cable into the back of your PC and connect the other end to the serial port on the chamber. On the SimpleComm, press the RS-232 tab and set the port number to the same port number specified on your PC (Figure 4). To determine the port settings on the PC, go to Start/Settings/System, select the hardware tab, select Device Manager and expand the Ports icon. The VersaTenn's RS-232 port settings are hard-coded to: 19200 baud rate, no parity, 8 data bits and 1 stop bit (Figure 5). RS-232 does not need address settings.

Once the settings are complete, press the connect button. The status label will read: port open.

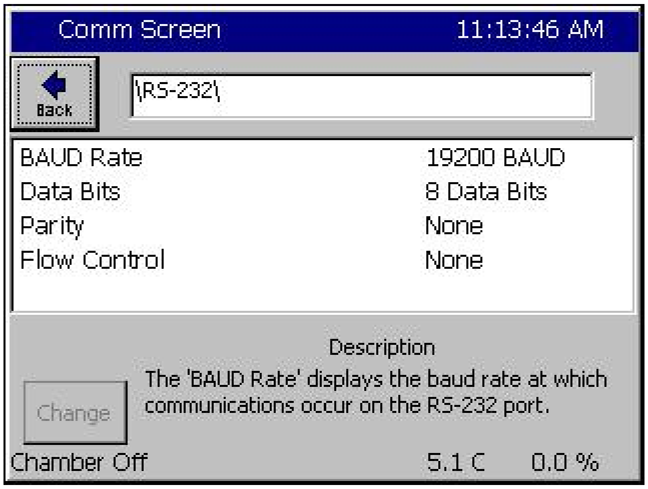


Status: Port Closed

Address

Port 1

Figure 4 – SimpleComm



Comm Screen 11:13:46 AM

\RS-232\

BAUD Rate	19200 BAUD
Data Bits	8 Data Bits
Parity	None
Flow Control	None

Description
The 'BAUD Rate' displays the baud rate at which communications occur on the RS-232 port.

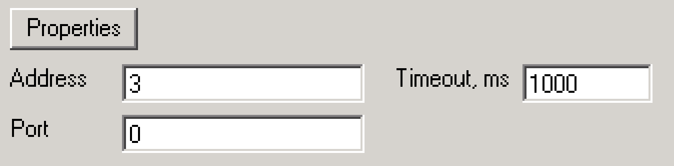
Chamber Off 5.1 C 0.0 %

Figure 5 – VersaTenn V

IEEE 488

To communicate over IEEE 488, you will need an IEEE 488 communications card installed in your PC. Plug a 488 cable into the back of your PC and connect the other end to the 488 port on the chamber. On the SimpleComm, press the IEEE 488 tab and set the port number to the same port number specified on your GPIB controller (Figure 6). Next, set SimpleComm’s 488 address to the same address as the VersaTenn V (Figure 7). The default Timeout is set to 1 second (1000 ms). The default sample rate for the IEEE 488 is 4 times per second. SimpleComm will query the chamber 4 times per second until the timeout period is reached.

IEEE 488 has no connect buttons; connections are made on an as needed basis. If a communication attempt fails, a popup window will notify the user of the error.

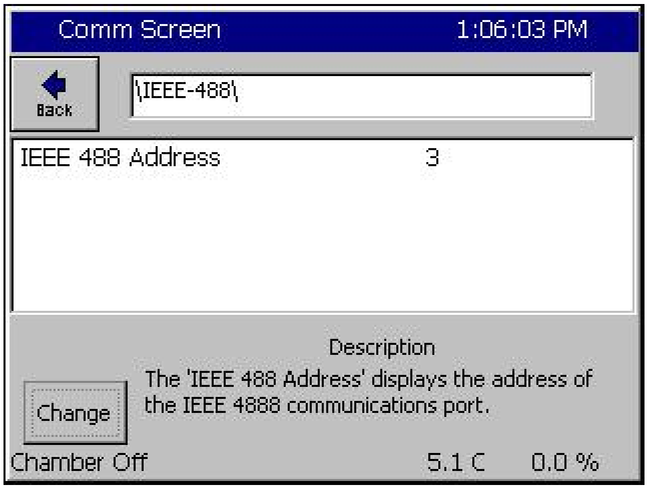


Address 3

Timeout, ms 1000

Port 0

Figure 6 – SimpleComm



\IEEE-488\

IEEE 488 Address 3

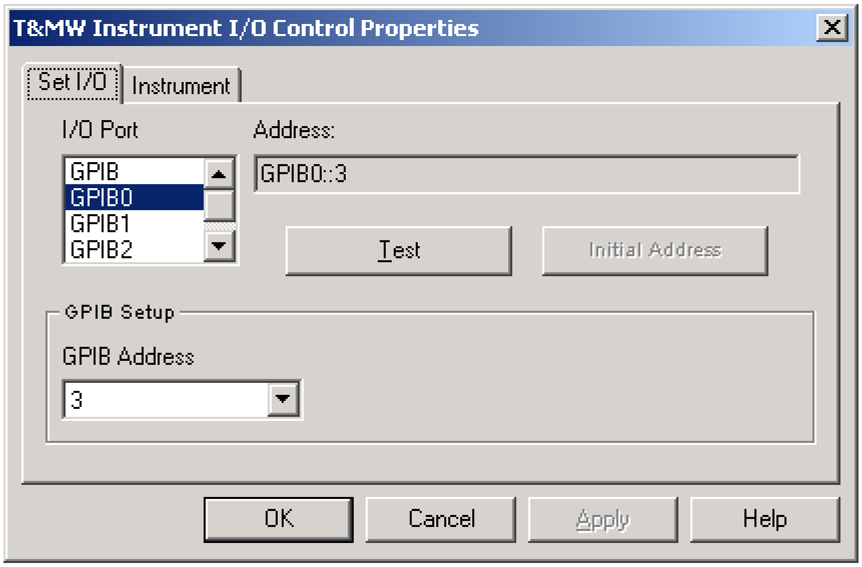
Description

The 'IEEE 488 Address' displays the address of the IEEE 4888 communications port.

Chamber Off 5.1 C 0.0 %

Figure 7 – VersaTenn V

To view IEEE specific controls, press the properties button (Figure 6). From this window you may view and set the GPIB port and address (Figure 8). You can test the IEEE connection by pressing the test button. This test sends the *IDN? Command to the VersaTenn V. The response will be displayed in the response test box (Figure 9). If there is no response it will display an error message.


T&MW Instrument I/O Control Properties

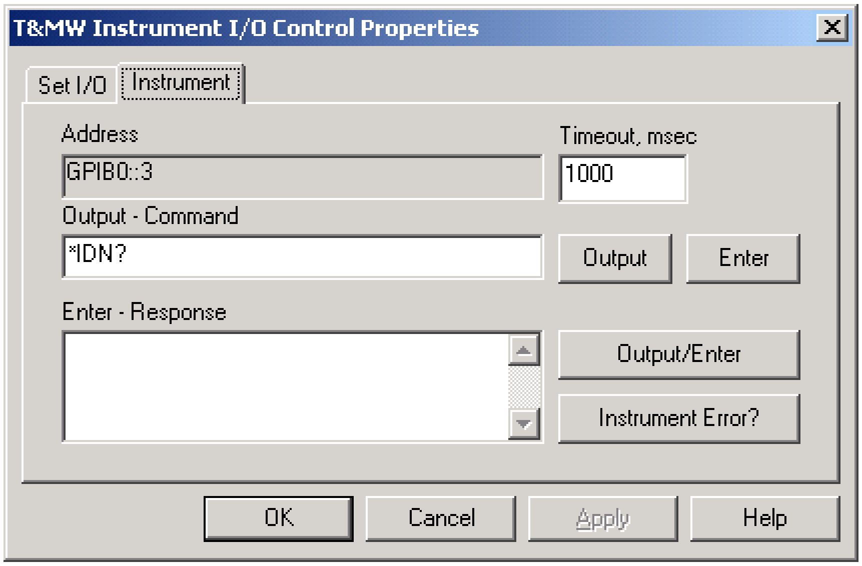
I/O Port: GPIB0

Address: GPIB0::3

GPIB Setup

GPIB Address: 3

Figure 8 – TMW GPIB Control


T&MW Instrument I/O Control Properties

Address: GPIB0::3

Timeout, msec: 1000

Output - Command: *IDN?

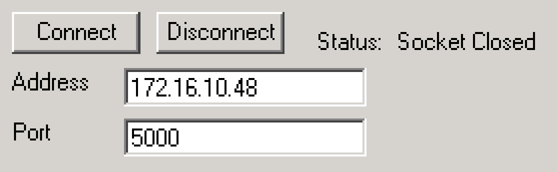
Enter - Response

Figure 9 – TMW GPIB Control

TCP / IP

To communicate over TCP/IP, plug a network cable into the back of your PC and connect the other end to your LAN. You must also connect your chamber to a LAN. The VersaTenn V requires a DHCP router to dynamically assign it an IP address. Once assigned the IP Address will appear in the Ethernet folder of the VersaTenn V (Figure 11). Set the SimpleComm to the same address (Figure 10). The default port for the chamber is 5000; always set SimpleComm's port to 5000. To enable the TCP/IP communications on the chamber, go to the TCP/IP Server folder and set it to enabled (Figure 12).

Once the settings are complete, press the connect button. The status label will read: socket connected.

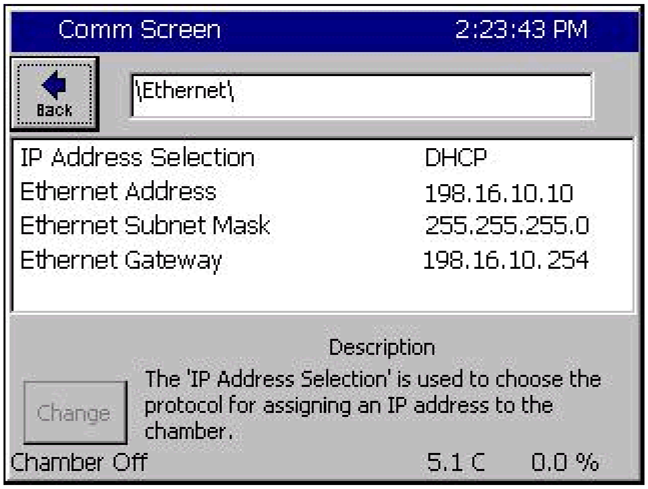


Status: Socket Closed

Address 172.16.10.48

Port 5000

Figure 10 – SimpleComm



Comm Screen 2:23:43 PM

\Ethernet\

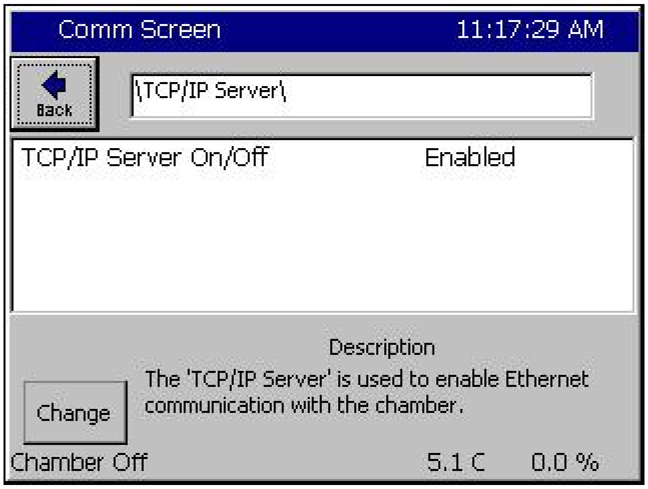
IP Address Selection	DHCP
Ethernet Address	198.16.10.10
Ethernet Subnet Mask	255.255.255.0
Ethernet Gateway	198.16.10. 254

Description

The 'IP Address Selection' is used to choose the protocol for assigning an IP address to the chamber.

Chamber Off 5.1 C 0.0 %

Figure 11 – VersaTenn V



\TCP/IP Server\

TCP/IP Server On/Off Enabled

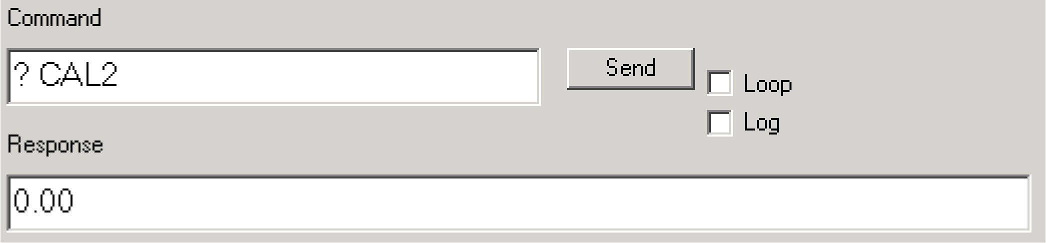
Description
The 'TCP/IP Server' is used to enable Ethernet communication with the chamber.

Chamber Off 5.1 C 0.0 %

Figure 12 – VersaTenn V

Sending and Receiving Commands

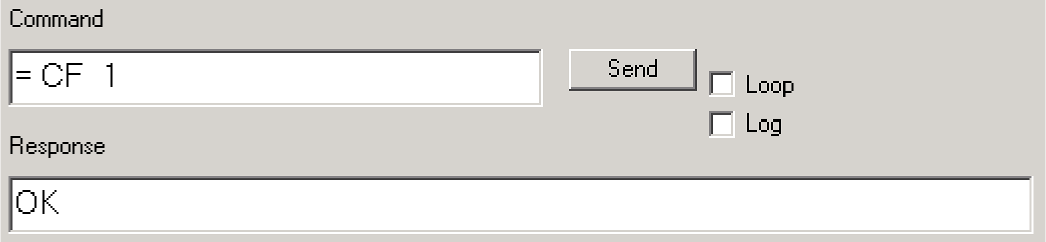
To send individual commands, first connect to the chamber, then type the command into the command text box, then either hit enter or press the send button. The reply from the chamber will be displayed in the response text box. All query commands are preceded with a "?" and all set commands are preceded with an "=" (Figures 13 & 14).



Command: ? CAL2

Response: 0.00

Figure 13 – Sending Query Commands



Command: = CF 1

Response: OK

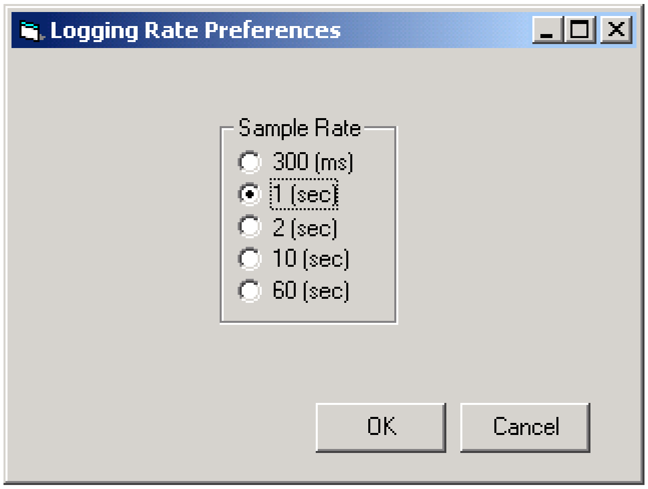
Figure 14 – Sending Set Commands

The RS-485 commands are a special case. Normally commands over RS-485 are preceded by a greater than symbol and the address, ">02 ? CAL2" and all responses are similarly preceded, "<02 0.00". SimpleComm automatically prefixes the commands so it is not necessary for you to.

Sending and Receiving Command Loops

To send an individual command multiple times, such as monitoring the temperature "? C1", select the loop check box (Figure 13). The command string will be sent once a second as long as the loop box remains checked. The response box will display each reply as it is received.

To change the sample rate, select the File menu and Preferences. Select the sample rate you desire and press OK (Figure 15). The default sample rate is 1 second.



Sample Rate
- ○ 300 (ms)
- ● 1 (sec)
- ○ 2 (sec)
- ○ 10 (sec)
- ○ 60 (sec)

Figure 15 – Sample Rate

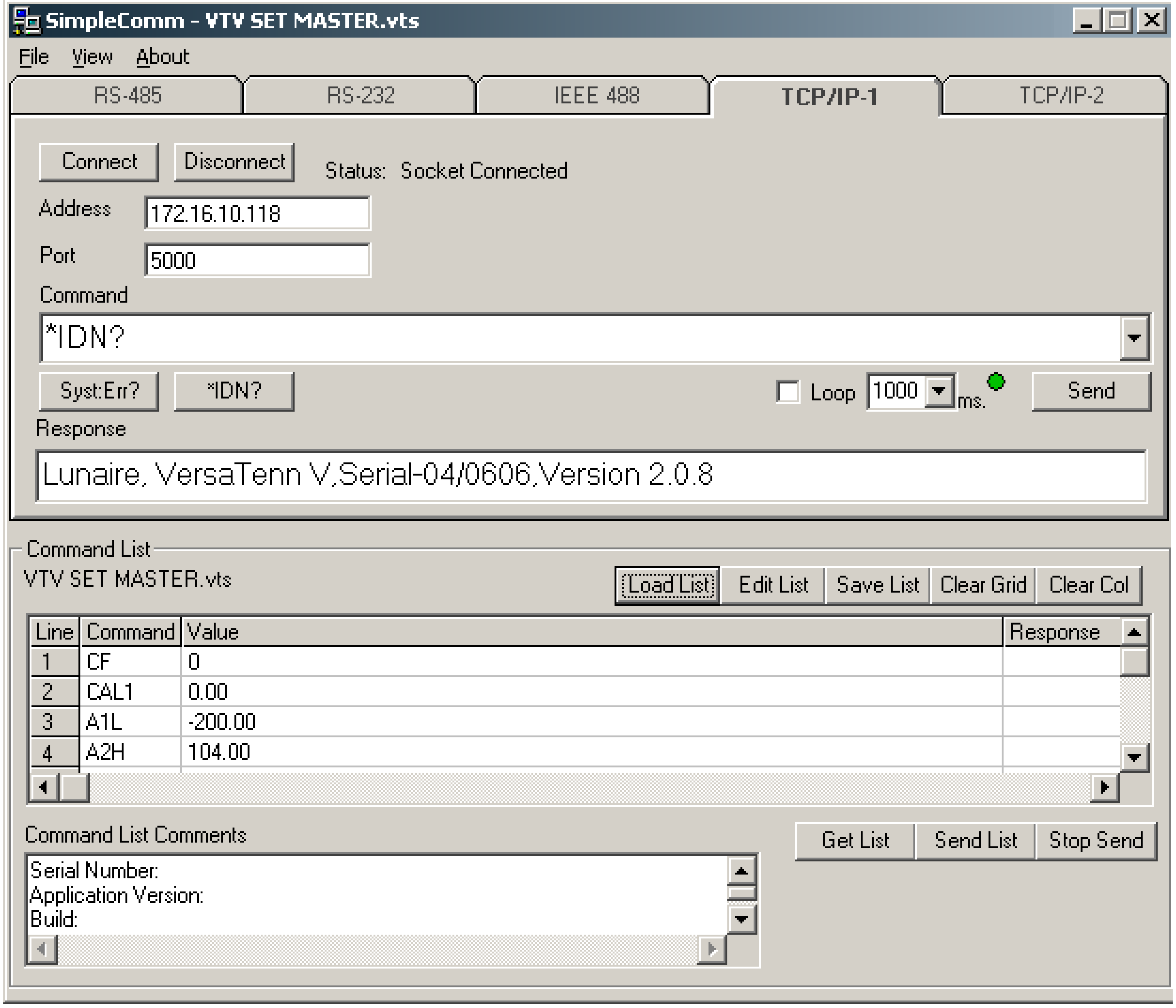
TCP/IP has an additional logging feature that logs all responses to the looped queries to a file called log.txt. It is located in the SimpleComm's root directory.

Neither looping nor logging will function while you are sending or getting settings lists.

Settings Lists

Settings Lists are lists of commands that get a snapshot chamber's current configuration or set a chamber to a preconfigured state. If you have multiple chambers and would like them all set to the same state, you can configure one chamber and get all its parameter values and save them to a Settings List. You can then use this list to send these values up to the other chambers, quickly putting them all in the same configuration.

Settings Lists are simple text files and can be edited in notepad if desired. Commented lines must be preceded by a double slash. When loaded the comments will be displayed in the Memo field (Figure 16).



Status: Socket Connected

Address 172.16.10.118

Port 5000

Command

*IDN?

□ Loop 1000 ms.

Response

Lunaire, VersaTenn V,Serial-04/0606,Version 2.0.8

Command List

VTV SET MASTER.vts

Line	Command	Value	Response
1	CF	0	
2	CAL1	0.00	
3	A1L	-200.00	
4	A2H	104.00	

Command List Comments

Serial Number:
Application Version:
Build:

Figure 16 – Settings Lists

Downloading, Editing and Uploading Chamber Settings

When upgrading a chamber to a new application version you will lose all your chambers configuration settings and PID tunings. It is a good idea to save all the configuration settings in a separate text file *before* upgrading. After you upgrade you can then reconfigure your chamber to all the previous settings and PID tunings. You may use a simple checklist, such as the one available in the User Manual, and record all the items manually. Alternatively, you may use SimpleComm. SimpleComm has simplified the task of downloading and uploading chamber settings by assembling a precompiled list of commands to automatically query your chambers settings, saving them and uploading them to your new chamber.

To open a Settings List press the Load List button. Select a file and press OK. The name of the loaded file is displayed on the title bar. The content of the list appears in the Settings List data grid. The Settings column holds the commands. The Value column holds the values for the commands. The Set Response column holds the chamber's responses from set commands.

To edit an item in the list, press the Edit List button. Enter your changes and press Save As or Cancel. Clicking in the Comments box and typing additional lines will add text to the Comments field. You can clear the entire list, including commands, by pressing the Clear List button. Alternatively you can clear selected columns by highlighting the column and pressing the Clear Col button.

Getting Data

To get the current configuration of a chamber, load a Settings List that is a list of commands. SimpleComm automatically installs a master list of the most important commands. The list is named "VTV GET MASTER.VTS" and it is stored in the root installation directory of the SimpleComm program. Once loaded, make sure you are connected and press the Get List button. SimpleComm will query the chamber one command at a time until it has gone through the entire list. After each query is sent to the chamber, SimpleComm will wait until it receives a response before trying to get the next value. As each response arrives it is placed in the corresponding cell in the Value column. When the entire list has been transferred a popup window will state that the transfer is complete.

After you have gathered your chambers settings, press the Save List button to save the list. SimpleComm automatically installs a master list of the most important commands and their respective settings for a new chamber. The list is named "VTV SET MASTER.VTS" and it is stored in the root installation directory of the SimpleComm program. We suggest saving your new chamber settings either over this file or in a new file with an appropriate descriptive name identifying the chamber.

Sending Data

To send your upgraded chamber the original configuration settings, load the Settings List you created in the previous step. Once loaded, make sure you are connected and press the Send button. SimpleComm will set the chamber one command at a time until it has gone through the entire list. After each set command is sent to the chamber, SimpleComm will wait until it receives an "OK" response before trying to get the next value. As each "OK" response arrives it is placed in the corresponding cell in the Set Response column. When the entire list has been transferred and popup window will state that the transfer is complete.

Get Settings List Example:

```
\\Serial Number: 06/0201
\\Version: 1.4.10
CF
CAL1
A1L
```

Set Settings List Example:

```
\\Serial Number: 06/0201
\\Version: 1.4.10
CF 0
CAL1 0.00
A1L -200
```

Important Note:

Make sure that you always have the chamber set to the same temperature scale for downloading and uploading operations. If you download from a chamber in Centigrade mode, then upload to a chamber that is in Fahrenheit, you will have numerous incorrect settings.

Additionally, all Communication settings, cascade registration keys and web server registration keys will need to be recorded and reentered manually. The table below is a list of these settings. These settings are not part of the sensitive tunings of you chamber and are not absolutely necessary to save.

Registration Keys

Web Server Registration Key _____________

Cascade Registration Key _____________

Communications

RS-485

RS-485 Mode _____________

Station Address _____________

Number of UUTs _____________

IEEE-488

IEEE 488 Address _____________

Ethernet

IP Address Selection _____________

Ethernet Address _____________

Ethernet Subnet Mask _____________

Ethernet Gateway _____________

Web Server

Web Server On/Off _____________

Web Server Login Name _____________

Web Server Password _____________

Web Server Address _____________

TCP/IP Server

TCP/IP Server On/Off _____________

Visual Basic Source Code

Tidal Engineering provides the source code for the VT V SimpleComm as a reference guide for developers. We recommend that you use Visual Basic 6.0 or higher and Windows 2000 or higher. If you are using Windows 95, 98, ME or NT we recommend you do not overwrite any system files if asked during installation.

Before you install the source code, you must install the VTV SimpleComm application, which contains a TMW GPIB component that is needed to run the program in Visual Studio. To install the source code, download the files from the Tidal Engineering web site. Double click on the Setup.exe file and follow the installation directions. Start Visual Studio and open the Visual Basic Project file, SimpleComm.vbp. The source code and forms are fully editable.

Communications Source Code

There are several key selections of code that form the backbone of communication over serial ports, TCP/IP and GPIB. The selections are discussed below and are broken into three areas: settings & connecting, sending data and receiving data. These sections of code can be cut and pasted into your own programs, thus adding quick and simple communication routines to your applications.

Setting & Connecting

Setting & Connecting with RS 232 & RS 485

```
        ‘ If your not connected, then connect
        If (Not MSComm1(Index).PortOpen) Then
                ' Set the Comm Port number to the value in the Comm Port text box
                MSComm1(Index).CommPort = Val(txtPort(Index).Text)
                ‘ Set Baud Rate and Parity
                MSComm1.Settings = "9600,N,8,1" ‘RS 485
                MSComm1.Settings = "19200,N,8,1" ‘RS 232
                ‘ Open the port
                MSComm1(Index).PortOpen = True
                MSComm1(Index).InputLen = 0
                MSComm1(Index).RThreshold = 1
        End If
```

Setting & Connecting with GPIB

```
        ‘ Set the timeout to the value in the timeout box (milliseconds)
        TMWControl1.TimeOut = Trim(Str(Val(txtTimeout488.Text)))
        ‘ Set the address to the value in the address box
        ’ final address will appear as: GPIB0::1::INSTR
        TMWControl1.address = "GPIB" & Trim(Str(Val(txtPort(Index).Text))) & "::" &
        Trim(Str(Val(txtAddress(Index).Text))) '& "::INSTR"
```

Setting & Connecting with TCP/IP

```
        ‘ If your not connected, then connect
        If tcpClient1.State <> sckConnected Then
                '`IP address "###.###.###.###"
                ‘ Set the address to the value in the address box
                tcpClient1.RemoteHost = txtAddress(Index).Text
                ‘ Set the port to the value in the port box
                tcpClient1.RemotePort = txtPort(Index).Text
                ‘ Close it first – just in case
                While tcpClient1.State <> sckClosed
                        tcpClient1.Close
                Wend
                ‘ Connect
                tcpClient1.Connect
       End If
```

Sending

Sending with Serial Ports

```
‘ If your not connected, tell the user
If (Not MSComm1(Index).PortOpen) Then
        MsgBox ("The RS 485 port is not connected.  Please connect and try again.")
End If
' Clear buffer
a$ = MSComm1(Index).Input
txtIn(Index).Text = ""
‘ Send the command in the command text box
MSComm1(Index).Output = txtOut(Index).Text & vbCr
' The 485 send requires a ">" and the address such as "02" in the string.  Use:
‘ MSComm1(Index).Output = ">" & cboAddress485.Text & " " & txtOut.Text & vbCr
```

Sending with GBIB

```
‘ Create a global variable to hold a timer counter
Global GPIBResult as Integer
‘ Send the command in the command text box
TMWControl1.Output (txtOut(Index).Text & vbCr)
```

Sending with TCP/IP

```
' If tcp/ip1 is not connected, close it and tell the user
If tcpClient1.State <> sckConnected Then
        'IP address "###.###.###.###"
        ‘ Set the address to the value in the address box
        tcpClient1.RemoteHost = txtAddress(Index).Text
        ‘ Set the port to 5000
        tcpClient1.RemotePort = 5000
        While tcpClient1.State <> sckClosed
                tcpClient1.Close
        Wend
        MsgBox ("TCP/IP1 is not connected.  Please connect and try again.")
End If
' If tcp/ip1 is connected,
‘ Send the command in the command text box
If tcpClient1.State = sckConnected Then
         tcpClient1.SendData txtOut(Index).Text & vbCr
End If
```

Receiving

Receiving with Serial Ports

```
‘ MSComm1 is the name of the Microsoft Comm component
Private Sub MSComm1_OnComm(Index As Integer)
        Select Case MSComm1(Index).CommEvent
        ' Events
        Case comEvSend              ' SThreshold # of characters in transmit buffer.
        Case comEvEOF               ' An EOF charater was found in the input stream
        Case comEvReceive           ' Received RThreshold # of chars
                ‘ Receive the data and write the result in the response text box
                txtIn(Index).Text = txtIn(Index) & MSComm1(Index).Input
        End Select
End Sub
```

Receiving with GPBIB

```
        ' The GPIB contro has no receive event, it must be queried for a response.
        ’ timerGPIB counts down from 2 to 0, decrementing in the Timer1 function.
        ‘ Timer1 fires every 250 milliseconds
        ‘ This allows us to check for a response 4 times a second.
        timerGPIB = 2
        GPIBResult = "" 'tracks GPIB reply - see Timer1 function
        ' While loop will exit after receives a reply or times out - see Timer1 function
        While timerGPIB > 0
                DoEvents
        Wend
        ‘ If we don’t receive a reply in 1 second, time out
        If GPIBResult = "" Then 'no reply
                txtIn(Index).Text = "Timeout: " & TMWControl1.TimeOut/1000 & "seconds."
        Else
                ‘ Write the reply to the response text box
                txtIn(Index).Text = GPIBResult 'GPIB value
        End If

        ‘--- Timer1 function: fires every 250 ms ---
        ‘ Timer1 queries 4 times per second and jumps out of while loop once every 1 second
        If timerGPIB > 0 Then
                ' Check for a response to the previous Send query
                TMWControl1.Enter result$
                ' If we receive a result we break the previous Do Events loop
                If result$ <> "" Then
                        ‘Set global variable to response value
                        GPIBResult = result$
                        timerGPIB = 0
                        ‘ Breaks out of previous While loop and records response
                Else
                        ' Increment timerGPIB
                        timerGPIB = timerGPIB – 1
                End If
        End If
```

Receiving with TCP / IP

```
‘ tcpClient1 is the name of the Microsoft TCP Client component
Private Sub tcpClient1_DataArrival(ByVal bytesTotal As Long)
        Dim strData As String
        ' Get data
        tcpClient1.GetData strData
        ‘ Write the response in the response test box
        txtIn(3).Text = Replace(strData, vbCrLf, "", 1, -1, vbBinaryCompare)
End Sub
```