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About This Guide

This guide is designed for trained system users of SONAbeam optical communications terminals to help them set up and use the SONAbeam Terminal Controller software to set up and manage their SONAbeam FSO systems.

How this Guide is Organized

This guide is presented in six parts:

About the SONAbeam Terminal Controller Software
This section provides an overview of the SONAbeam Terminal Controller software.

Installing the SONAbeam Terminal Controller Software
This section provides a step-by-step guide through the Setup program that installs the SONAbeam Terminal Controller software onto your computer.

Getting Connected
This section describes how to connect your STC-equipped computer to one or more SONAbeam terminals.

Setting up a New SONAbeam Link
This section describes how to use the SONAbeam Terminal Controller to set up and align the terminals in a SONAbeam link.

Using the SONAbeam Terminal Controller Software
This section provides a detailed description of all of the features provided by the SONAbeam Terminal Controller software.

Technical/ Administrative Information
This section provides technical information to help the system administrator fully utilize the features of their SONAbeam links.

Conventions Used in this Guide

Throughout this guide, certain items of particular importance will be presented in the following formats:

**NOTE...**
This format offers useful or advisory information.

**WARNING!**
This format warns of important issues and actions that need to be avoided or at least given serious consideration.

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..........
Computer Requirements

In order to properly install and run the SONAbeam Terminal Controller software, you will need to provide a computer with the following minimum configuration:

- **CPU:** Pentium II or better
- **Operating System:** Windows NT, 2000 or XP

**NOTE...**

Windows 2000 is the preferred platform...

- **Memory:** 64 MB
- **Free Disk Space:** 20 MB
- **CD ROM Drive:** (for the installation CD)
- **Monitor:** 640 x 480 pixels (minimum); 16 bit color (minimum)
- **Serial port:** Unused COM port *(for initial terminal setup and direct local connection... See Connecting to your SONAbeam Terminals for more information.)*

Or

- **Network port:** Ethernet port – 10BaseT *(for remote terminal configuration and monitoring... See Connecting to your SONAbeam Terminals for more information.)*

SONAbeam Terminal Firmware Compatibility

This guide describes STC software version 3.4.0. In order to properly run this latest version of the SONAbeam Terminal Controller software, your -M and -S series SONAbeam terminals need to be running SONAbeam terminal firmware v3.3.0 or higher and your -E series SONAbeam terminals need to be running firmware v1.0.3 or higher. In order to use all of the features of this STC software, your SONAbeam terminals need to be running firmware v3.4.1 (-M & -S) or v1.0.4 (-E) or higher.

If your terminal is running on earlier firmware, see Appendix A – Updating Legacy -M & -S Series FW Firmware or Appendix B – SONAbeam –E Series FW Recovery for more information on upgrading...

SONAbeam Model Compatibility

The SONAbeam Terminal Controller software described in this guide is generally applicable to all late-model SONAbeam terminals. There are, however, some features that are not supported by certain models. To identify these exceptions, this guide will use the following icons to indicate a product does not support a particular feature:
About the SONAbeam Terminal Controller Software

The **SONAbeam Terminal Controller** (STC) software is a versatile SONAbeam terminal management program designed to be used by qualified installation and/or service personnel during the installation and/or maintenance of SONAbeam FSO terminals to set selected operational options as well as to monitor the operating parameters of one or more running SONAbeam terminals.

The STC program runs on any computer – with Windows NT, 2000 or XP operating systems – and can be connected to a single SONAbeam Terminal through a standard RS232 Null Modem serial interface using the computer’s COM port or to several SONAbeam Terminals (one at a time) over an Ethernet network.

Connected through a suitable interface, STC can completely manage any specified SONAbeam terminal. A suitable interface is either a serial connection to the terminal’s Serial Console Port or an Ethernet connection to the terminal’s Ethernet LAN Port. Connection are terminated either in the terminal’s Customer Interface Compartment (for -S & -E series terminals) or in the Power & Control Assembly (for M-series terminals). **Figure 2** illustrates a system diagram of the STC program used in...
About the SONAbeam Terminal Controller Software

both fashions. Note that in either case, STC communications with the SONAbeam terminal do not consume any of its associated FSO network bandwidth.

While operating, the STC software queries the connected SONAbeam Terminal for specific operational parameters and reports the terminal’s responses in a user-friendly, informative fashion. The STC software can also be used to retrieve and manage terminal operating logs kept by each SONAbeam terminal.

While the STC program is not needed for normal, continuous operation of a SONAbeam link, it can be invaluable during initial installation and alignment of a new terminal, and can also be used to monitor, modify or reconfigure terminal option settings. For routine maintenance or troubleshooting, the software permits users to verify several important operating parameters of a SONAbeam terminal as well it offers detailed log files of terminal performance.

The STC software can be used intermittently, on an as-needed basis such as periodic maintenance, problem troubleshooting or changing terminal or link settings, or it can be used for continuous terminal monitoring.

While providing an easy to use graphical user interface, the STC program also supports the use of the SONAbeam Command Line Interface (CLI) for micromanaging your SONAbeam terminal’s internal operations.

If your network is supervised by an SNMP compliant network management system, the SONAbeam terminal offers optional embedded SNMP functionality for MIB browsing and generation of SNMP V1 traps on prescribed alarm events.

**Figure 2 – Typical SONAbeam Terminal Controller Interfaces**
Integrated Network Management (INM) Features

All late-model SONAbeam terminals come equipped with Integrated Network Management (INM) that provides the following additional terminal features that enhance your network management options.

With the ability to directly apply an IP address to each SONAbeam terminal, the following access protocols are supported: TCP connectivity (Telnet and STC access), FTP (log files and firmware uploads) and SMNP (terminal monitoring and interrogation).

WARNING!

Your SONAbeam terminals support 10BaseT connections only!

TCP Connectivity

With INM equipped SONAbeam terminals supporting TCP connections, the STC program can capitalize on this ability to offer more convenient controlling and monitoring.

The STC program can also be used to configure your terminals to restrict TCP connections to only a prescribed list of specific IP addresses configured for the terminal. Alternatively, the STC program can be used to configure your terminals to allow TCP connections from any IP address. See the section: IP Settings, later in this guide, for more information.

NOTE…

A TCP connection is also be made to your SONAbeam terminals using any 3rd party application program that likewise supports TCP terminal sessions, such as Hyper Access…

FTP Access

The SONAbeam terminal’s support for FTP allows new SONAbeam firmware to be uploaded using FTP with a subsequent (CLI) update command used to copy the uploaded files to the terminal’s working directory. SONAbeam –M and –S terminals also support retrieval of internal event and data logs using any FTP client program.

The STC program employs the SONAbeam terminal’s FTP capabilities when downloading terminal log files and its Update Firmware feature combines the FTP transfer of updated terminal files and the subsequent file copying process into one easy step!

NOTE…

Two levels of FTP access are supported:

Log file account: login as user =fsona password = speedoflight
Firmware upload account: login as user =fsonauupload password = speedoflight

Passive mode is not supported…
The STC program can also be used to restrict FTP connections to your terminals, using the same list of specific IP addresses configured for TCP connections. See the section: IP Settings, later in this guide, for more information.

Embedded SNMP

Embedded support for SNMP V1 is a customer-ordered, optional terminal feature that, when enabled with an fSONA-supplied key code, adds the following SNMP functionality to your terminal:

- Prescribed SNMP (V1) traps sent to user-defined computers on prescribed alarm conditions
- Full support of the System group of MIB-II
- Support of a custom SONAbeam MIB for reporting received power, alarm status and both available and unavailable seconds.

User-defined SNMP related settings are defined in the Settings tab of the STC or via the terminal’s Command Line Interface (CLI).

The SNMP feature can only be enabled when a valid, fSONA-supplied security key code is loaded into the applicable terminal. If not originally purchased with the terminal, an enabling SNMP key code can later be obtained from your local fSONA customer service representative to add this feature to your terminals.

**WARNING!**

The SNMP feature is not be compatible with some older model SONAbeam terminals, i.e. those without an Ethernet LAN port.

When enabled, the SNMP option supports (SNMP V1) GET and GET-NEXT queries for the System group of MIB-II and the SONAbeam enterprise specific MIB. MIB-II traps such as ColdStart, WarmStart and AuthenticationFailure and SONAbeam specific traps are also sent on alarm conditions.

See Appendix E for technical reference information on supported SNMP MIBs.
Installing the SONAbeam Terminal Controller Software

WARNING!

If you have an earlier version of STC installed on your computer, you will need to REMOVE it – using the Add/Remove Programs applet from your computer’s Control Panel – before you will be able to install an updated version...

BEFORE YOU UNINSTALL YOUR EXISTING STC: Save your existing sonabeam.ini file, typically located in your Program Files\SONA\STCV3 folder, to another location to preserve your STC’s terminal List. After installing your new STC, return this saved file to your installed folder overwriting what’s there.

You may require administrator privileges to install software on the host computer. Consult your System Administrator for more information...

To install the SONAbeam Terminal Controller software on your computer, insert the SONAbeam Utilities CD into your computer’s CD-ROM drive and launch Windows Explorer.

Locate and open the Setup & Install\Software\Terminal Controller Software folder, and double-click on the Setup.exe file.

Figure 3 – STC Setup Startup Screen

The STC Setup program starts with the Preparing... screen, shown in Figure 3, and then displays the Welcome... screen, shown in Figure 4, when it is ready to commence setting up STC on your computer.

Click the Next button to continue with the setup wizard.

Figure 4 – STC Setup Welcome Screen

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WARNING!

You are advised to close all other Windows programs before running the STC Setup program.

NOTE...

You can end the STC Setup Program at any step that still offers you an Exit Setup or a Cancel button.

Use the Customer Information dialog, shown in Figure 5, and enter the program’s registered user’s name and organization...

Click Next to continue the software installation.

Use the Destination Folder dialogs, shown in Figure 6, to specify where the Setup program will install your STC software. You may accept the default installation path prescribed or click Change to specify a different path using the Change Current Destination Folder dialog.

With a destination folder identified, click Next to continue your software installation.
Installing the SONAbeam Terminal Controller Software

The **Ready to Install the Program** screen, shown in **Figure 7**, allows you to confirm your dialog entries or, by **clicking Back**, allows you to revisit any earlier dialog to correct entered information.

If your setup information is correct, **click Install** to start the setup program.

**Figure 7 – Ready to Install**

As the setup program runs, the **Installing SONAbeam Terminal Controller V3** screen, shown in **Figure 8**, plots its progress.

**Figure 8 – Running the Setup Program**

The **InstallShield Wizard Completed** screen, shown in **Figure 9**, confirms the successful completion of the software installation...

**Figure 9 – Setup Wizard Completed**

Upon successful completion of the setup program, a startup icon for STC v3, like the one illustrated in **Figure 10**, will be added to your desktop for your convenience.

**Figure 10 – STC Startup Icon**

**NOTE...**

Upon completion of the Setup program, remove the SONAbeam Utilities CD from the computer.
Installing the SONAbeam Terminal Controller Software
Connecting to a SONAbeam Terminal

Connection to your SONAbeam terminals can be made using either the terminal’s Serial Management Port or its (10BaseT) Ethernet LAN Port. SONAbeam -M and -S series terminals offer two both RJ45 and DB9 connectivity for their serial ports. SONAbeam -E terminals offer only an RJ45 interface. All SONAbeam terminals provide a standard RJ45 interface for their 10BaseT Ethernet ports.

*Figure 11, Figure 12 and Figure 13 illustrate these STC-to-SONAbeam terminal interface ports.*

*Figure 11 – STC Connections to -M Series SONAbeam Terminal*

Both serial and Ethernet ports can work simultaneously, but you need to use a serial connection to initially set up the terminal’s Ethernet port, i.e. IP Address, Subnet Mask and Gateway.
Connecting to your SONAbeam Terminals

The SONAbeam terminal’s Ethernet LAN Port offers a standard RJ45 jack. Use a cross-over cable if you are connecting directly to a PC or use a straight-through cable if you are connecting to your LAN through a switch or hub.

The SONAbeam terminal’s Serial Console Ports are abbreviated RS232 interfaces configured as Data Terminal Equipment (DTE). As such, use a standard null-modem cable to interface directly to the COM port of a PC.

A DB9-to-RJ45 adapter is included as part of the terminal’s OPTIONAL Basic Alignment Kit to accommodate a variety of cable interfaces.

![Figure 12 – STC Connections to -S Series SONAbeam Terminal](image)

Connection to a SONAbeam -E terminal can be made using either the SONAbeam’s TERMINAL MGMTNTE RS232 serial port or TERMINAL MGMTNTE ETHERNET LAN port. These terminal management ports are accessible in Customer Interface Area, behind the back panel of the SONAbeam –E terminal. Both ports use standard RJ45 connectors. Figure 14 illustrates the locations of these STC-to-SONAbeam interface connectors.

![Figure 13 – STC Connections to -E Series SONAbeam Terminals](image)
Connecting to your SONAbeam Terminals

If you have a serial port on your computer, it will be easiest to use that for your initial connection to set up the terminal’s Ethernet properties (IP Address, Subnet Mask and Gateway) before you can successfully make a TCP connection to your SONAbeam terminal.

If you do not have a serial port on your computer, you can use an Ethernet port and a crossover cable to make your initial connection to the terminal, knowing that the –E terminal defaults to the following factory-set IP settings:

- IP Address: 192.168.55.161
- Subnet Mask: 255.255.255.0
- Gateway: 192.168.55.254

**NOTE…**

You may have to change the IP settings of your computer to be able to talk to the SONAbeam at this address.

When using the SONAbeam terminal’s Ethernet LAN port, use a crossover cable if you are connecting directly to a PC or use a straight-through cable if you are connecting your terminal to your LAN through a switch or hub.

The SONAbeam terminal’s serial port is configured as Data Terminal Equipment (DTE) without hardware handshaking. Use a standard null-modem cable to interface directly to a COM port on your PC.

**NOTE…**

A DB9-to-RJ45 adapter is included as part of the OPTIONAL Basic Alignment Kit to better accommodate a serial connection to your terminal.

SONAbeam Terminal Serial Interface

When connecting your STC host computer to a local SONAbeam terminal via the serial port, connect one of the computer’s COM ports to one of the serial ports on your terminal (S-Series) or PCA (M-Series). The connection between a SONAbeam terminal and STC is a standard, 3-wire serial interface running at 19,200 bits per second, formatted: 8 bits, 1 stop bit, no parity.

**Standard 9-Pin D-Sub Connector**

A standard 9-pin D-Sub male connector, identical to what you might find on your PC, is available at connector P2:

<table>
<thead>
<tr>
<th>Position</th>
<th>Signal Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NC</td>
</tr>
<tr>
<td>2</td>
<td>RD</td>
</tr>
<tr>
<td>3</td>
<td>TD</td>
</tr>
<tr>
<td>4</td>
<td>NC</td>
</tr>
<tr>
<td>5</td>
<td>SG</td>
</tr>
<tr>
<td>6</td>
<td>NC</td>
</tr>
<tr>
<td>7</td>
<td>NC</td>
</tr>
<tr>
<td>8</td>
<td>CTS</td>
</tr>
<tr>
<td>9</td>
<td>NC</td>
</tr>
</tbody>
</table>
Connecting to your SONAbeam Terminals

RJ45 Modular Connector

A standard 8 pin RJ45 modular connector is available at connector P3:

<table>
<thead>
<tr>
<th>Position</th>
<th>Signal Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NC</td>
</tr>
<tr>
<td>2</td>
<td>NC</td>
</tr>
<tr>
<td>3</td>
<td>NC</td>
</tr>
<tr>
<td>4</td>
<td>SG</td>
</tr>
<tr>
<td>5</td>
<td>RD</td>
</tr>
<tr>
<td>6</td>
<td>TD</td>
</tr>
<tr>
<td>7</td>
<td>CTS</td>
</tr>
<tr>
<td>8</td>
<td>NC</td>
</tr>
</tbody>
</table>

PC to PCA Interface

The wired interface between your PC and the SONAbeam terminal’s Monitor & Control Port is a simple 3-wire interface with TD crossed to RD, and RD crossed to TD, as shown in Figure 14.

![Figure 14 – Typical SONAbeam Terminal – PC Interface](image)

NOTE...

Both RJ45 and DB9 connect to the same serial port and only one should be used at one time.

The computer’s COM port and the terminal’s serial console ports are both configured as Data Terminal Equipment (DTE). A crossed (Null Modem) cable connection is therefore required to successfully interface the two...

Your computer’s COM may also require looping RTS→CTS and/or DTR→DCD in order to enable communications, depending on the configuration of the COM port used.
SONAbeam Terminal Ethernet LAN Interface

The SONAbeam terminal’s Ethernet LAN Port, available only in late model SONAbeam terminals equipped with Integrated Network Management (INM), can be used for remote (networked) management of the SONAbeam terminal via a standard Ethernet LAN. Use a straight through Ethernet cable for connectivity to a switch or hub, or a crossover cable when connected directly to the Ethernet port of a PC workstation.

Before you can properly deploy your terminal’s Ethernet LAN Port, the terminal’s IP settings will need to be configured using a serial connection to the terminal and then using the STC’s Initial Configuration Wizard or its Settings controls to configure the terminal’s IP settings.

WARNING!

Your SONAbeam terminals support 10BaseT connections only!

When shipped from the factory, your SONAbeam terminal is configured with the following parameters:

- **IP address:** 192.168.55.161
- **Subnet mask:** 255.255.255.0
- **Gateway:** 192.168.55.254.

This setting may conflict with another device on your network, so you are advised to set your SONAbeam terminal’s IP setting, using the terminal’s serial port or a direct connection to the terminal’s Ethernet port and your computer using a crossover cable, to set appropriate network settings before connecting the SONAbeam terminal to your network.
Setting Up a New SONAbeam Terminal/Link

The SONAbeam Terminal Controller program is an indispensable tool in the installer’s toolbox. When setting up a newly installed terminal, STC will readily verify operation, help align the link and help you configure the terminal to the user’s requirements.

This section, while it assumes that you have reviewed the more detailed subsequent section entitled “Using the SONAbeam Terminal Controller”, is intended to provide you with sufficient instructions to perform the necessary adjustment and configuration tasks associated with setting up a new SONAbeam terminal or link, without having to refer to the later section(s) of this guide.

The basic procedures for installing and aligning a pair of SONAbeam terminals as a new link are detailed in the SONAbeam Installation Manual. The following procedure assumes that you have the requisite equipment and personnel at both ends of the link, as well as a ready ability to communicate between both teams (e.g. cell phones or walkie-talkies) during the alignment procedure.

In this section you will find information on the following:
- Connecting and starting the STC program…
- Use STC to verify terminal power up operation…
- Use STC to setup your terminal for alignment…
- Use STC to align your new terminal…
- Use STC to setup post alignment terminal configuration and verify deployment…

Connecting STC to your SONAbeam Terminal

When installing a new SONAbeam terminal, a direct RS232 connection (using a standard Null Modem interface cable) must be established between the SONAbeam terminal’s serial port and an unused COM port on your STC hosting computer as described earlier in this guide.

Starting the STC Program

With STC installed on your computer, as described in a preceding section, you can start the program from either the startup icon created on your Desktop when you installed the software or from the Start>Programs>… menu, as illustrated in Figure 15, as you would any other Windows program.

Figure 15 – Starting the SONAbeam Terminal Controller Program
Setting Up a New SONAbeam Terminal/Link

STC opens with its main window, as shown in Figure 16. To complete the connection between the STC and the SONAbeam terminal, simply select Comm 1 (or other applicable computer communications port used) from the Select Terminal drop-down list.

STC will attempt to connect to the selected terminal and, unless an error is otherwise reported, display the Password dialog, as shown to the right. The Password dialog is used to restrict terminal configuration changes to qualified operators.

Simply enter the STC administrative password ("speedoflight") and click OK.

STC is now ready for a number of operations during the installation and deployment of a new SONAbeam terminal. These are described in this section:

1 – Select an STC – SONAbeam terminal connection…
2 – Verify basic terminal operation & access terminal logs…
3 – Setup terminal operating parameters…
4 – Monitor optical Rx Pwr (to help align the terminal)…
5 – Monitor terminal operating parameters…
6 – Configure communications and network parameters…

Figure 16 – Using the SONAbeam Terminal Controller Main Window
Initial Terminal Configuration

Before a terminal from the factory can be successfully aligned and deployed, there are a number of
terminal configuration parameters that need to be set. Conveniently, STC includes an *Initial
Configuration Wizard* that will automatically start whenever you connect it to a new, out-of-the-box
SONAbeam terminal.

This section is designed to guide you through the use of this wizard applet.

*NOTE…*

The *Initial Configuration Wizard* will automatically start whenever STC is
connected to a terminal that is configured with a link distance of ZERO
metres…

Terminal Identification

The wizard starts with a terminal identification dialog, as
shown to the right. Terminal identification helps with
managing the SONAbeam terminal in your network.

The **Name** assigned to the terminal can subsequently be
picked from a list in your STC of terminals that you can
manage.

The terminal’s **Location** can later be used to identify where
the terminal is while the **Contact** information identifies who
to contact for maintenance or access to the terminal site.

To configure your terminal’s identification information
simply enter a suitable **Name**, **Location** and **Contact** for
the terminal…

*NOTE…*

*STC will allow you revisit your terminal identification information and edit it
after the terminal is deployed…*

The terminal identification dialog also offers to set the terminal’s Deployment Date to the current date
and time reported by your computer’s clock. The terminal’s Deployment Date helps you track when
you terminals were deployed to help you manage any scheduled maintenance.

To have the wizard set the terminal’s Deployment Date, simply check the **Set deployment date to
today** checkbox…

*Click Next* to continue the wizard…
Terminal Clock

The SONAbeam terminal’s internal clock is used for time stamping regular terminal performance and event logs so it is important that it be accurate. The wizard will set the terminal’s clock to the same date and time currently reported by your STC host computer.

To have the wizard set the terminal’s clock, confirm your PC’s time and date are correctly set and then click **Sync Clock to PC** to set the terminal’s internal clock to that of the host PC…

*Click Next* to continue…

**WARNING!**

*Be sure your computer’s date and time are correctly set BEFORE using it to set the date and time for the SONAbeam terminal.*

Terminal Data Rate

Most SONAbeam terminals can be setup to operate within a range of data rates. It is important for the terminal to be configured to operate at the correct data speed to be deployed in your network. The wizard offers to set the terminal’s data rate to the option selected from a list of data rates supported by the connected terminal.

To set the terminal’s data rate, select the appropriate link data rate at which the terminal will operate. See **SONAbeam Data Rate**, located later in this guide, for more information on SONAbeam terminal data rate options

*Click Next* to continue…

Ready for Alignment

To prepare the terminal for the alignment process, the wizard automatically disables the terminal’s APC (Adaptive Power Control) option to prevent it from interfering with the alignment process. The wizard also offers to disable the terminal’s (low power) Rx Pwr Alarms so that the terminal does not log dozens of (false) alarms during the alignment process.

*Click Next* to continue…
Finish

The final step in the configuration wizard sets up the IP parameters of the terminal’s Ethernet LAN port.

Select the IP addressing assignment applicable to your application.

If Static IP addressing is selected, use the Edit buttons to prescribe the applicable IP Address, Subnet Mask & Gateway assignments for the terminal that you are setting up.

Click Finish to complete the Initial Configuration Wizard…

**NOTE...**

After alignment, STC will let you revisit these terminal options to enable or disable them...

**WARNING!**

If you are installing a new link, you must complete the initial terminal configuration on BOTH terminals BEFORE you may commence aligning the two terminals!

Verifying Basic Operation

Basic operation of the SONAbeam terminal can now be verified through the Terminal Status pane:

You can also use the Diagnostics tab to further verify the SONAbeam terminal is powered and ready to for alignment.
Aligning Your SONAbeam Link

With the initial configuration completed on BOTH terminals, they are now ready for alignment. Using the STC’s **Rx Power** tab, shown in *Figure 17*, follow the procedure detailed in the SONAbeam Installation Manual in the section: *Aligning Your SONAbeam Terminals*.

![Figure 17 – Received Signal Strength Display](image)

**NOTE…**

Because the alignment process generally involves tuning for a maximum received power, use the **Rx Peak** feature in conjunction with the **Rx Power** display to help identify your peak signal strength…Keep this **Peak** value for future reference.

For very large link distances, you may find that a DVM measurement provides better ‘is-this-better’ resolution. See your Installation manual for more information.

**WARNING!**

In order to stabilize the **Rx Power** readings reported by a terminal, its fiber optic ports must be connected to a live network!

Alternatively, you can connect a fiber optic loop between the TX and RX ports, as described in the Installation Manual…

**WARNING!**

When shipped from the factory, your SONAbeam terminals are configured for maximum laser power so you may need to avoid saturating your FSO receivers while aligning your terminals! If your terminal reports an **Rx Power** of 600µW or more for your -E or 1250/622-M & -S terminals or 2000µW or more for your 52/155-M & -S terminals STOP! Then, use STC or CLI to reduce the opposing terminal’s laser power level so that the corresponding **Rx Power** is about 150µW (or 500µW on 52/155-M & -S systems) before continuing your optimization of your terminal alignment.
Post Alignment Setup

The Initial Configuration Wizard prepares your terminals specifically for link alignment. With this task completed, you will need to setup your new terminals for actual deployment in your system. These operational settings – required for BOTH terminals in your link – are discussed in this section.

**WARNING!**

Terminal configurations via STC are only allowed in the ADMIN MODE. See the section: Terminal Configuration Security earlier in this guide for more information.

Rx Power – Zero Rx Power

Zeroing your receive power will insure your terminal reports true receive power by compensating for the intrinsic offset level in your terminal’s detector. This is especially important for very long links and for proper operation of APC and low Rx Power alarming and fiber switching.

For BOTH terminals, in the STC’s Rx Power screen, click: Zero Rx Power

This action will popup the Warning message, as shown in Figure 18:

This step is meant to measure the zero-power receiver offset voltage for the terminal’s detector circuitry and store that value in the terminal’s non-volatile memory so that it can be used to accurately report the terminal’s true receive power.

This operation requires that the terminal’s receiver window be completely blocked (with a sheet of cardboard or similar opaque material) or that the Laser Power Level of the other terminal in your link be set to zero (Off).

When you have effectively prevented the terminal from receiving any laser signal, click Yes in the Confirm Zero Rx Power message to zero the terminal’s Rx power.

Rx Power – Rx Averaging

For aligning your terminals, the Initial Configuration Wizard sets the terminal’s Rx Averaging OFF in order to better display real-time Rx Power changes while you are adjusting your terminals’ alignment.

Once your link is aligned, turning the Rx Averaging ON will offer a ‘smoother’ Rx Power display that’s easier to read. In the Rx Power tab, set the Rx Averaging ON and then click Apply.
Rx Power – Low Rx Power Alarm Threshold

The SONAbeam terminal manages a low FSO receive power alarm based upon a user-configured low-receive-power threshold. Whenever the terminal detects an Rx Power level less than its configured low-power threshold, it logs the event and triggers a Low Rx Power Alarm trap to configured SNMP manager stations.

For aligning your terminals, the **Initial Configuration Wizard** turns this alarm OFF to avoid an otherwise flurry of (false) alarm events/messages. Once your link is aligned and ready for deployment, you may optionally set this feature back on by setting your terminal’s Rx low power threshold as follows:

In the **Settings** tab, simply select the **Rx Threshold** that is appropriate for your FSO system:

- **Off**  This option DISABLES the terminal’s low Rx Pwr alarm.
- **2.0 (uW)**  This option is the recommended threshold for most systems. This value provides ample margin to trigger a low RX Pwr alarm before the Rx Pwr drops to a level where link performance becomes affected, while also offering maximum margin against triggering false alarms.
- **4.0 (uW)**  This option offers a 3db higher threshold than the 2.0 (uW) for those links where an extra margin of low Rx Pwr warning is desired.
- **Custom**  This option allows a custom low Rx Pwr threshold to be entered using the terminal’s **Command Line Interface**. See `rx_power_threshold` in **Appendix D** for more information...

**NOTE...**

Consult your local fSONA Customer Service representative for help in selecting the best setting for your particular FSO system.

Simply set the **Rx Alarm Threshold** value that is appropriate for your FSO system and click **Apply**.

Rx Power – Link Distance

Recording your system’s link distance can be helpful in troubleshooting any problems you might encounter in the future.

*Enter* your terminal’s approximate link distance (in meters) in the **Link Distance** field, illustrated here, and click **Apply**...

**WARNING!**

If you leave your terminal’s link distance equal to ZERO (the factory default setting) STC will always start the **Initial Configuration Wizard** when connecting to that particular terminal!
Rx Power – Low Rx Power Fiber Output Control

In applicable FSO systems, where data switching to a backup system is implemented, your SONAbeam terminals can assist with Fiber Control, wherein the terminal’s TX fiber is made “dark” when its FSO Rx Power falls below a configured threshold.

Your terminal’s Fiber Control operating in one of three settable modes:

- **Off**  
  Turns the terminal’s fiber output OFF – yielding ‘dark’ fiber. This option is intended only for testing your backup system switching.

- **On** (NORMAL)  
  Enables the terminal’s fiber output always.

- **Auto**  
  Automatically controls the state of your terminal’s fiber output according to its FSO Rx Power. When selected, STC will let you set the low power threshold that will turn the terminal’s fiber output off and the Rx Power level required to return the fiber output to its normal on state.

**NOTE...**

The ON threshold must be greater than the configured OFF threshold.

Configuration – Adaptive Power Control

APC (Adaptive Power Control) allows you to utilize the full dynamic range of your terminal’s available laser power when the terminal is deployed in a link where the distance between your terminals is small enough to saturate the optical receiver when the opposing terminal transmits at maximum laser power.

Beyond a certain, model-dependent link distance, your terminal will be set up to operate at maximum laser output all of the time. APC will provide no benefit in such links.

In cases where the distance between your terminals is small enough to result in receiver saturation when the opposing terminal transmits at maximum laser power under clear-air conditions, your terminal must be set up to operate at a lesser laser output.

In this latter case, APC can be enabled to allow you to use your terminal’s ‘extra’ laser power whenever your system requires it during times of reduced visibility. Enabling APC also allows your terminal to operate its lasers at significantly reduced power under normal clear-air link conditions – and thus extend the life of the lasers – while automatically increasing laser power only when necessary to overcome reduced visibility.

The APC Applicability Table, shown below, provides a guide for you to assess whether APC should be enabled in your system.

<table>
<thead>
<tr>
<th>Terminal type</th>
<th>APC is applicable when the link distance is LESS THAN:</th>
</tr>
</thead>
<tbody>
<tr>
<td>155-S</td>
<td>500m (1650 ft)</td>
</tr>
<tr>
<td>52/155-M</td>
<td>1250m (4100 ft)</td>
</tr>
<tr>
<td>622/1250-S</td>
<td>650m (2130 ft)</td>
</tr>
<tr>
<td>622/1250-M</td>
<td>1700m (5580 ft)</td>
</tr>
</tbody>
</table>

*Table 1 – APC Applicability Table*
NOTE…

Enabling APC when your terminal is deployed with a link distance greater than shown in the APC Applicability Table will have no effect, either positive or negative, on your system.

WARNING!

APC can only be enabled if your terminal currently reports a Receive Power between 15 µWatts and 250 µWatts. (If necessary, use your terminal’s Power Level control to bring the other terminal in your link into this Rx Power range before attempting to enable APC.)

Enabling APC must always be performed for BOTH terminals in your link! Failure to do so may adversely affect your link’s performance!

To enable APC for your terminals:

1. Using the STC’s Power Level control, adjust both terminals so that the Rx Power for both terminals is between 15 and 250 µWatts.

NOTE…

Adjusting the Power Level on one terminal will change the Receive Power on the other!

2. Click the APC Enabled check box for both terminals.

3. Click Apply.
Management – Terminal Deployment Date

For record keeping purposes, you can optionally record your terminal’s deployment date.

Simply click the Edit Deployment Date button in the Management tab and then select the appropriate deployment date from the resulting popup Select Date calendar and click OK.

Then, click Apply.

Management – Limiting Network Access to your Terminal

If you will be connecting your terminal to a network, you can limit remote access to your terminal’s configuration and monitoring features by prescribing a list of IP addresses to which your terminal will respond.

If you do not want to limit network access to your terminal, just leave the Remotes list empty or add the IP address: 255.255.255.255 as the first address in the list.

If you choose to limit network access to your terminal:

1. Click the Add button for the Remotes list in the IP Settings frame...

2. In the resulting Enter IP Address dialog, enter an IP address from which your terminal will respond to network commands and click OK...

3. Repeat steps 1 & 2 to add other IP addresses to your Remotes list.

To delete an IP address from the Remotes list, simply select it and click the Del button.

Management – Enabling Optional SNMP Agent

If you purchased the optional embedded SNMP agent with your SONAbeam terminal(s), you can enable this feature now by loading the prescribed SNMP key for each qualified terminal and then enabling the terminal’s SNMP operation.

Your terminal-specific key(s) can be found on the SNMP Certificate shipped with your terminal(s).

To load your terminal’s SNMP key code:

1. Use STC to connect to both terminals in your link...

2. In the Settings tab, click Set Keycode...
3. In the resulting **Set Terminal SNMP Keycode** dialog, enter the terminal configuration password ("speedoflight") and your terminal-specific SNMP keycode and **click OK**.

---

**WARNING!**

SNMP key codes are serial number specific and thus valid only for the terminals for which they were issued. Make sure to enter the correct SNMP key created for the serial number of the terminal you are configuring.

---

**To enable the terminal’s SNMP operation:**

4. **Check** the **Enabled** checkbox in the **SNMP V1 Embedded** frame:

5. **Click Apply** to start th.

---

**WARNING!**

The embedded SNMP agent **CANNOT** be enabled unless a valid terminal-specific SNMP key code is first stored in the terminal’s internal memory!
Management – Optional SNMP Managers

If your terminal is configured with its SNMP keycode and the embedded SNMP agent is enabled, you can also choose to prescribe a list of IP addresses from which SNMP queries will be accepted and to which SNMP traps, i.e. alarms, will be sent.

If you leave your terminal’s Managers list empty, it will accept SNMP queries from any computer and broadcast SNMP traps (alarms).

Use the Add button and the Enter IP Address dialog to construct your list of SNMP Managers.

Use the Del button to remove an IP address from the Managers list.

Use the Broadcast button to add the IP address: 255.255.255.255 to the top of the Managers list. This will configure your terminal to broadcast SNMP traps on its local network.

NOTE...

With your terminal’s SNMP agent enabled, use the SONAbeam MIBs, included on your SONAbeam Utilities SW CD (See X:\Setup\Software\SNMP MIBs) and also installed with STC (See C:\Program Files\fSONA\STCV3\MIBs), to integrate your SONAbeam terminals with your SNMP browser or Network Management System...
Setting Up a New SONAbeam Terminal/Link
Using the SONAbeam Terminal Controller

While the previous section provided sufficient information to use the SONAbeam Terminal Controller software to set up a new terminal or link, this section offers more detailed information on all of the features and functionality of the STC program.

Starting the SONAbeam Terminal Controller

You can start the SONAbeam Terminal Controller program from the shortcut created on your Desktop when you installed the software, or from the Start button, as illustrated in Figure 19, the same as you would any Windows® program.

Figure 19 – Starting the STC Program

The SONAbeam Terminal Controller program’s main window offers a collection of five tabs, which provide comprehensive terminal monitoring and control features, as shown in Figure 20.

<table>
<thead>
<tr>
<th>Status</th>
<th>Summarizes basic terminal status and identification information…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration</td>
<td>Manages the operating parameters for the associated SONAbeam terminal…</td>
</tr>
<tr>
<td>Rx Power</td>
<td>Reports optical power received by the associated SONAbeam terminal…</td>
</tr>
<tr>
<td>Diagnostics</td>
<td>Monitors real-time operating parameters of the associated SONAbeam terminal…</td>
</tr>
<tr>
<td>Management</td>
<td>Manages the interfacing configurations for the associated SONAbeam terminal…</td>
</tr>
</tbody>
</table>

Figure 20– The STC Main Window
Using the SONAbeam Terminal Controller

**NOTE...**

*The STC Main window makes use of virtual colored LED’s to provide quick visualization of terminal status, where GREEN indicates “all is well”, AMBER indicates that while all is well now, one or more past alarm states have been reported (since the last terminal alarms reset) and RED reports a current alarm condition.*

**Connecting STC to a SONAbeam Terminal**

STC can be used to monitor and control multiple SONAbeam terminals – one terminal at a time – by allowing you to specify any terminal with which you have suitable connectivity.

**NOTE...**

*You can open multiple instances of STC to simultaneously monitor/manage multiple SONAbeam terminals...*

To specify a terminal, simply select any of the prescribed connections in the drop-down list.

**NOTE...**

*If the target terminal is NOT listed, you can add it to your list as explained in the next section...*

**Configuring Your List of Terminals**

*Click Edit List to open the Terminal List dialog, shown below, to configure a list of your terminals to which you want your STC to connect.*

To add another serial connection to your list, simply select the applicable Comm port from the Serial Connections list and then click Add. Your selection will be added to the list.

To add a network connection to your list, simply enter the IP address assigned to the terminal or the networked device server associated with the targeted terminal in the Network Connections field and then click Add. The specified IP will be added to the list.
To delete a listed terminal connection, simply select it from the list and click Delete.

Click OK to save your updated Terminal List and close the window.

**NOTE...**

The terminal names associated with any additions to the Terminal List will be automatically appended when you subsequently connect your STC to those terminals...

**WARNING!**

If you click Cancel, all of your changes will be CANCELLED!

---

**STC Connection Errors**

When selecting a new STC – terminal connection, you may encounter one of the following messages:

**IP connections:**

![IP connection failure](image1)

This message tells you that your SONAbeam terminal to which you tried to connect is already connected to another user...

![IP connection failure](image2)

This message tells you that the IP address to which you tried to connect is not responding...

**Serial connections:**

![Serial connection failure](image3)

This message tells you that the serial connection to your SONAbeam terminal is not functioning or the terminal is not powered up...
Terminal Configuration Security

When using STC to connect to your SONAbeam terminals, it will start each new connection with a request for the STC administrative password.

With the correct password, STC will connect to the selected terminal in Admin Mode, which provides full terminal configuration/management permissions.

**WARNING!**
The STC password is case-sensitive! Be sure the keyboard’s Caps Lock mode doesn’t interfere with your password entry...

Without the administrative password, (click Cancel) STC will connect to the selected terminal in User Mode, which allows only terminal monitoring with no configuration/management permissions.

In either case, STC allows you to change the operating mode of your current STC to terminal connection by using the Admin Mode or User Mode buttons.

**Disconnect/Reconnect**

You can use the Disconnect button to temporarily disconnect your STC from the selected terminal:

You can then use the Reconnect button to re-establish your STC to terminal connection.
CLI – Command Line Interface

Use the **CLI** button to start the **Command Line Interface** window, as shown in **Figure 21**.

The **Command Line Interface** window provides a ‘native language’ interface to your SONAbeam terminal that can be of assistance when troubleshooting a terminal problem.

See Appendix D at the end of this guide for a complete description of this feature and the SONAbeam CLI language.
Terminal Status

The **Status** tab offers a quick-glance assessment of the operational status of a selected SONAbeam terminal along with applicable terminal identification information.

**Figure 22 – The STC’s Status Tab**

**Terminal Status**

The **Terminal Status** frame provides an array of virtual LED’s that report the operating status of your SONAbeam terminal:

- **Fiber Input Detect**
  
  Reports the signal status at the terminal’s RX fiber optic interface…

- **Fiber Input Lock**
  
  Reports the status of the terminal’s CDR (Clock & Data Recovery) circuitry fed by the RX fiber optic interface…

- **FSO Lock**
  
  Reports the status of the terminal’s CDR (Clock & Data Recovery) circuitry fed by the FSO receiver…

- **Temperature Status**
  
  Reports the combined status of the terminal’s several internal temperature sensors…

- **PS Temp**
  
  Reports the status of the terminal’s power module temperature…

- **PS Alarm**
  
  Reports the low-voltage or over load status of the terminal’s power module…

- **Comm Connection**
  
  Reports the status of the connection between STC and your selected terminal…

- **Power Supply Status**
  
  Reports the combined status of the terminal’s power supply voltages, loads and temperature…

- **Transmitter Status**
  
  Reports any transmitter operation (modulation, bias and temperature) beyond prescribed limits…

- **Receive Power (units)**
  
  The displayed value reports calculated optical received power, in real-time, in either µW or dBm. This display’s background colour reports the status of the terminal’s low Rx Power alarm…

**WARNING!**

Some LED’s are excluded or disabled depending on either the model of the terminal you connected to or the current configuration of that terminal.
NOTE...

Each virtual LED conveys the following information:
- **GREEN** indicates “all is well”...
- **AMBER** indicates that while all is well now, one or more past alarm states have been reported since the last terminal alarms reset. See the terminal’s Event log for more details...
- **RED** reports a current alarm condition...

Terminal Identification

The **Terminal Identification** frame provides the name, rank and serial number of your connected SONAbeam terminal.

Terminal Availability Counters

The **Terminal Availability Counters** frame reports the following:
- **Available** reports the cumulative duration, in seconds, that the system maintains data lock on BOTH its fiber optic and FSO interfaces.
- **Unavailable** reports the cumulative duration, in seconds, that the system reports a loss of data lock on EITHER its fiber optic or FSO interfaces.

**WARNING!**

**Terminal Availability Counters** are only applicable to fixed, (crystal-controlled) data rates. They are NOT applicable in Bypass mode or when a variable data rate is configured.

**Terminal Availability Counters** are NOT supported by the SONAbeam 52-M terminal.

Clear Alarms

Use the **Clear Alarm** button, and the **Clear Alarms** confirmation, to clear the STC’s visual alarm indicators and thus display a “green board”.

Reset Counters

Use the **Reset Counters** button and the **Reset Counters** confirmation, to reset both of your terminal’s **Available** and **Unavailable** counters to zero.
Terminal Configuration

The Configuration tab affords you control of your terminal’s operating characteristics, including:

- Transmitter laser power levels
- System data rate
- Adaptive Power Control (APC)
- Fiber output control
- Loopback operation

**WARNING!**

Only a qualified fSONA installation or service technician should use the STC Configuration features! Incorrect terminal configurations may cause degradation or a complete loss of your SONAbeam link performance!

**NOTE...**

STC must be in Admin Mode for you to make terminal configuration changes....

System Control – Laser Power

Every SONAbeam terminal accommodates independent management of its multiple laser transmitters. Optimal terminal performance (and laser life) is achieved when the constituent terminals output only as much laser power as is necessary to maintain a reliable FSO link.

STC allows you to select any of the pre-configured laser power levels for your terminal (See Appendix F – SONAbeam Laser Power Levels at the end of this guide for more information.) or by selecting Power Level = Custom, you can then configure individual laser power levels, as illustrated to the right.

If your terminal is set up with its APC (Adaptive Power Control) enabled, control of your terminal’s laser power levels is automatically maintained by your terminal When APC is not implemented, the terminal’s laser power level needs to be manually setup to yield an optimal target Rx power at the far side terminal.
Both scenarios are discussed later in this section.

**WARNING!**

Only a qualified fSONA installation or service technician should adjust a terminal’s laser **Power Levels**! Incorrect terminal configurations may cause degradation or a complete loss of your SONAbeam link performance!

**NOTE...**

For users of earlier versions of STC, note the change from Laser Attenuation levels to Laser Power levels!

See Appendix F for more information on your terminal’s laser power levels....

**Setting Laser Power Level – No APC**

When installing a SONAbeam link **without APC**, perform the following post-alignment setups on both terminals to set their appropriate laser power level...

**WARNING!**

Explicitly setting your terminal’s Power Level is only necessary when APC is not enabled for the terminals in your link! In links where APC is enabled, see the Adaptive Power Control section later in this guide for more information...

1. **Setup** and **connect** STC to BOTH terminals

2. **Set** both STC’s in **Admin Mode**, using the STC security dialog discussed earlier in this guide.

   **Pick** EITHER terminal to start the process and for that terminal **only**, proceed as follows:

3. **Set** the power level to the largest setting that yields a clear-air rx power (at the far side terminal) that is less than or roughly equal to the target value specified in Table 2.

STC Configuration screen for the (near-side) terminal being configured:

- STC Rx Power screen for the associated (far-side) terminal:
Using the SONAbeam Terminal Controller

<table>
<thead>
<tr>
<th>Terminal Type</th>
<th>Target Clear-air Rx Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>52-M, 155-S &amp; 155-M</td>
<td>500 uW</td>
</tr>
<tr>
<td>622-S, 622-M, 1250-S &amp; 1250-M</td>
<td>210 uW</td>
</tr>
</tbody>
</table>

Table 2 – Target Clear-Air Rx Power for Terminals without APC

NOTE...

For longer link distances, where the target rx power cannot be obtained, set the laser Power Level to its maximum value...

4. Repeat step 3 for the associated terminal in your link.

WARNING!

Once completed, if the two terminals are properly aligned, they should both be set up to the same Power Level. If this is not the case, you are advised to double-check for optimal alignment.

System Control – Data Rate

Most SONAbeam terminals support more than a single data rate. Selecting the applicable Data Rate option sets the terminal data rate. STC will automatically seek the data rates supported by the connected terminal and present a list of valid data rate options.

Simply select the appropriate Data Rate for your link from the drop-down list.

Some SONAbeam terminals support a wide range of data rates, including both crystal-controlled fixed data rates plus selectable data rate ranges, covering applications from 31 to 1603 Mbps. When you select a data rate range, the terminal’s internal Clock & Data Recovery (CDR) circuitry will lock to any network signal within that range.

Some SONAbeam terminals also offer a “Bypass Mode” option. In this mode, your data bypasses the terminal’s internal Clock & Data Recovery (CDR) circuitry to allow that function to be managed by your own external CDR-equipped system device to support special case installations.
APC – Adaptive Power Control

Adaptive Power Control (APC) allows you to utilize the full dynamic range of your terminal’s available laser power when the terminal is deployed in a link where the distance between your terminals is small enough to saturate the optical receiver when the opposing terminal transmits at maximum laser power.

Beyond a certain, model-dependent link distance, your terminal will be set up to operate at maximum laser output all of the time. APC will provide no benefit in such links.

In cases where the distance between your terminals is small enough to result in receiver saturation when the opposing terminal transmits at maximum laser power under clear-air conditions, your terminal must be set up to operate at a lesser laser output.

In this latter case, APC can be enabled to allow you to use your terminal’s ‘extra’ laser power whenever your system requires it during times of reduced visibility. Enabling APC also allows your terminal to operate its lasers at significantly reduced power under normal clear-air link conditions – and thus extend the life of the lasers – while automatically increasing laser power only when necessary to overcome reduced visibility.

The APC Applicability Table, shown below, provides a guide for you to assess whether APC should be enabled in your system.

<table>
<thead>
<tr>
<th>Terminal type</th>
<th>Link distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>155-S</td>
<td>&lt; 500m</td>
</tr>
<tr>
<td>52/155-M</td>
<td>&lt; 1250m</td>
</tr>
<tr>
<td>622/1250-S</td>
<td>&lt; 650m</td>
</tr>
<tr>
<td>622/1250-M</td>
<td>&lt; 1700m</td>
</tr>
</tbody>
</table>

Table 3 – APC Applicability Table

**NOTE...**

*Enabling APC when your terminal is deployed with a link distance greater than shown in the APC Applicability Table will have no effect, either positive or negative, on your system.*

**WARNING!**

*APC can only be enabled if your terminal currently reports a Receive Power between 15 µWatts and 250 µWatts.*

*Enabling APC must always be performed for BOTH terminals in your link! Failure to do so may adversely affect your link’s performance!*
To enable APC for your terminals:

4. Using the STC’s **Power Level** control, adjust both terminals so that the **Rx Power** for both terminals is between 15 and 250 µWatts.

**NOTE…**

*Adjusting the Power Level on one terminal will change the Receive Power on the other!*

5. **Click** the **APC Enabled** check box for both terminals.

**Fiber Control**

The **Fiber Control** feature allows you to configure your terminal to turn OFF its fiber optic output (TX) port in the event that its FSO receive power falls below a prescribed low power threshold. Under such conditions, this feature turns the terminal’s fiber output off, yielding a definitive “dark fiber” state that can be detected by peripheral network equipment in order to switch your network traffic to a backup system.

The fiber output is returned within ten seconds of the FSO link acquiring sufficient receive power to once again reliably transport your network traffic.

**NOTE…**

*The Fiber Control – Auto feature must be enabled for BOTH terminals in order to work properly.*

**Fiber Control – On** is the default mode for normal operation unless you are using your SONAbeam terminals in conjunction with a secondary, backup link – like an RF system
The **Fiber Control** feature provides three operating modes:

- **Off**  
  This option holds the fiber output off indefinitely.

- **On**  
  This option keeps the fiber output on indefinitely. This is the *default* mode for normal operation where backup systems are not employed.

- **Auto**  
  This option controls the terminal’s fiber output, turning it OFF when its Rx power drops below the prescribed **Off Threshold** and turning it back ON when its Rx power rises to the **On Threshold**.

**WARNING!**

*When you are using the Fiber Control – Auto feature, consult your local fSONA Customer Service representative for help in configuring appropriate On & Off thresholds for your link.*

**Loopback**

The **Loopback** feature puts your SONAbeam terminal into a diagnostic state for troubleshooting your system.

Your SONAbeam terminal features some or all of the following loop back states:

- **None**  
  Use this setting for normal link operation.

- **Fiber**  
  This option loops the terminal’s fiber optic TX to its fiber optic Rx, with no output to the terminal’s laser transmitters.

- **FSO**  
  This option loops the terminal’s FSO Rx to its laser transmitters, with no output to the terminal’s fiber optic interface.

- **Both**  
  This option loops both the terminal’s fiber optic and FSO Tx and Rx.

The diagram below illustrates these two loop back modes:
Viewing Terminal Responses

The **Configuration** tab also provides a hidable window that logs your terminal’s confirmation responses to certain STC-issued commands, e.g. terminal configuration changes.

Use the toggling **Hide Info** and **Show Info** button to set this window to your preference.

**NOTE...**

For a complete log of your terminals communications with STC, use the Command Line Interface (CLI) feature. See **Appendix D** at the end of this guide for more information.

Updating your Terminal Firmware

You can use STC to update your terminals to the latest FW version over a serial (-M & -S series terminals) or an Ethernet connection (-M, -S & -E series terminals).

**WARNING!**

Updating your terminal firmware will result in your FSO link being down for the duration of the operation, which can take a few minutes. **DO NOT PROCEED** unless such a link outage can be tolerated.

Make sure your version of STC is compatible with the FW version you seek to install! **ALWAYS consult the FW Release Notes** before proceeding.

Before starting an update procedure, be sure you have all of the required update files saved in a DOS-compatible-path location on your computer.

**ALWAYS update BOTH terminals in a link!**

STC’s **Update FW** feature supports three separate Update FW cases for:

- Updating your -M and -S series terminals running any 3.x.x version firmware.
- Updating your -E series terminals running version 1.0.2 or later firmware.
- Updating your terminals running other version firmware.

The sections following will guide you through the first two applets while **Appendix A** and **Appendix B**, at the end of this guide, walks you through the third option.
Using the SONAbeam Terminal Controller

Update FW: Late Model -M & -S Series Terminals

This section guides you through the FW update process for –M and –S series terminals running any version 3.x.x. firmware.

Using a Serial Connection

Firmware updates can be uploaded to your terminal over a 19200 baud serial connection, as detailed below:

**WARNING!**

*Before starting the upgrade procedure via a serial connection, set your terminal’s serial interface’s baud rate to 19200!*

To update your terminal’s firmware over a serial connection:

1. **Connect** STC to your terminal via a serial connection...

2. **Click** Update FW and confirm your intentions in the Confirm SONAbeam FW Update dialog, as shown here, by clicking Yes...

3. **Click** Browse in the resulting Firmware Upload dialog and using the popup Open dialog, browse to the location of your update files and select *all* of the necessary files, as illustrated here, and **click** Open…

A typical firmware update will require the following files:
- setup.exe
- crc.exe
- setup.crc
- cexec.bat
4. With the required files identified, **click Send** in the **Firmware Upload** dialog to start uploading the new file(s):

As the update files are uploaded to your terminal, the **Firmware Upload** dialog reports its progress, as shown to the left:

5. When the last update file has been uploaded to your terminal, you may choose to reboot your terminal to start it running the new firmware immediately (click **Yes**) or you may choose to delay implementation of the newly uploaded firmware to a later time (click **No**).

**WARNING!**

*Rebooting your terminal will interrupt your link traffic for a minute or two!*

6. When you choose to start the new uploaded firmware immediately, a simple pop up window reports the progress of your restarting terminal, as shown here..

If you choose to wait, STC will popup a message box telling you how to later complete your firmware update...
7. When the update is finished, verify that your terminal now reports the updated FW version:

Using a Network Connection

Firmware updates can be uploaded to your terminal over an Ethernet connection, as detailed below:

To update your terminal’s firmware over an Ethernet connection:

1. Connect STC to your terminal via a network connection...

2. Click Update FW and confirm your intentions in the Confirm SONAbeam FW Update dialog, as shown here, by clicking Yes...

3. Using the resulting Open dialog, browse to the location of your update files and select all of the necessary files, as illustrated here, and click Open...

A typical firmware update will require the following files:
- setup.exe
- CRC.exe
- setup.crc
- cexec.bat

STC will start an FTP session with your terminal to manage uploading the selected update files...
4. When the last update file has been uploaded to your terminal, you may choose to reboot your terminal now to start it running the new firmware immediately (click Yes) or you may choose to delay implementation of the newly uploaded firmware to a later time (click No).

**WARNING!**

Rebooting your terminal will interrupt your link traffic for a minute or two!

5. When you choose to start the new uploaded firmware immediately, a simple pop up window reports the progress of your restarting terminal, as shown here..

6. If you otherwise choose to delay your terminal’s reboot, STC will popup a message box telling you how to later complete your firmware update...

7. When the update is finished, verify that your terminal now reports the updated FW version:
Update FW: -E Series Terminals

This section guides you through the FW update process for -E series terminals running version 1.0.2 or later firmware.

Using a Network Connection

Firmware updates can be uploaded to your -E series terminal over an Ethernet connection, as detailed below:

**WARNING!**

Any live FSO communications will be interrupted briefly (for a few minutes) during SONAbeam terminal firmware upgrades.

DO NOT INTERRUPT your terminal power or STC connection during the firmware update process. Doing so may corrupt your terminal’s operating system and render your terminal inoperable! Refer to Appendix B – SONAbeam -E Series FW Recovery for instructions on re-commissioning your terminal.

BEFORE you begin, be sure you have all of the applicable upgrade files accessible on your computer and know the paths to those files.

You will typically need the following files:

* The updated terminal firmware file, e.g. SBEfirmware_1_0_3.bin
* The RAM Loader utility program, e.g. DL-RCM3000.bin.

**NOTE:** To update a SONAbeam -E series terminal without a network connection or one with firmware earlier than version Appendix B – SONAbeam -E Series FW Recovery for more information.

To update your terminal’s firmware:

1. Unlock the STC configuration management features as illustrated in the Terminal Configuration Security section above.

2. Click Update Firmware and then confirm your intentions to open the Network Download Utility applet.

3. In the RAM Loader field, enter the complete path to the RAM loader file: DL-RCM3000.bin, or use the … button to browse for and select the file.

4. In the User Program field, enter the complete path to the updated SONAbeam firmware file, e.g. SBEfirmware_1_0_3.bin, or use the … button to browse for and select the file.
5. **Click Search** to view a list of all terminals accessible through your network. The IP address and the associated firmware version of each detected terminal will be displayed.

If your terminal isn’t displayed in the resulting list, it might be located across a gateway from the PC that is running the **Network Download Utility** applet. This is a result of the **Network Download Utility** broadcasting its searching query for terminals only within the prescribed subnet of the hosting PC. If this is the case, use the Ping button in the **Network Download Utility** to ping the specific terminal you want to update. Then, press the Search button again and this time the terminal should show up in the Search results list.

6. **Click Download** to download the specified SBEfirmware_x_x_x.bin file. If only one SONAbeam –E terminal was discovered on the network, the download will commence immediately.

If two or more SONAbeam –E terminals are located by the utility, you will be prompted with a list of discovered IP addresses from which you must select the applicable one. **Select** the IP address and then **click OK**.

7. As the download proceeds, the **Network Download Utility** will display a progress bar along with a series of status messages in its **Status Log**.

The **Network Download Utility** will conduct two separate download operations – one for the RAM Loader and one for the terminal firmware – each with its own progress graph. When the terminal firmware download is complete – as indicated by a completed progress display, e.g. **Progress 223 of 223**, the terminal will reboot automatically.

You should then **click Search** again to confirm that your terminal has rebooted and that it is in fact now running the updated version of firmware.

8. **Repeat** steps 6 and 7 for any other terminals that require updating.
9. **Click Exit** to quit the **Network Download Utility** program. Then, returning to the STC program, **click Reconnect** to reconnect STC to the terminal. Upon reconnecting with the updated terminal, confirm that the STC reports the new firmware version in its **Status** page.

### Terminal Receive Power

The **Rx Power** tab allows you to monitor your terminal’s FSO receive power and to configure your terminal’s Rx Power related properties, including:

- Report Rx Power in µW or dBm
- Turn Rx Averaging on & off.
- Set a low power alarm threshold
- Zero FSO receiver offset
- Reset Rx Power Peak display

**Figure 24 –Rx Power Tab**

### Rx Power Monitor

The Rx Power monitor provides an oversized display (made for easier rooftop viewing) of your terminal’s FSO received power in either µW or in dBm (use the **uWatt** or **dBm** buttons to set your preferred units):

The monitor also displays a **Peak** value, which is useful when optimizing your terminal alignment.
Rx Power Chart

The Rx Power Chart provides a graphical indicator of your terminal’s FSO receiver power. This auto-scaling chart can be set to display any of the following:

- Rx power readings every second over the last 1 min
- Rx power readings every minute over the last 1 hr
- Rx power readings every 15 minutes over the last 15 hrs

This chart helps you visualize your terminal’s current rx power along with recent fluctuations.

You can use the toggling Pause/Resume button to control the animation of your Rx Power Chart.

Peak Rx Power

The Rx Power tab also displays a Peak Rx power reading, which can be very handy during alignment as well as other terminal management purposes. This value, stored in the terminal’s memory, simply displays the maximum received power recorded since the terminal powered up or since the last time the Reset Peak command was sent to that terminal.

Use the Reset Peak button reset the Peak value.

Zero Rx Power

The Zero Rx Power feature is meant to provide compensation for long-term detector circuitry drift and/or ambient optical ‘noise’ to allow a terminal to maintain an accurate representation of a ‘ZERO receive level’ and thus more accurately report actual receive power (especially when very small) and thus better manage low rx power conditions.

In order to properly use this feature, you will need to make sure that no FSO signal enters the terminal’s receive window. You can satisfy this requirement by completely blocking the terminal’s receive window with a sheet of cardboard (or similar) or by turning the transmitters of the associated terminal OFF.

**WARNING!**

Operating the Zero Rx Power feature without blocking the terminal’s receive window or turning off the laser transmissions of its associated terminal can impede normal operation of the terminal!
Rx Power Settings

The **Rx Power** frame allows configuration of the following terminal properties:

![Rx Power Settings](image)

**Rx Averaging**

The instantaneous optical power received by a SONAbeam terminal is affected by many atmospheric conditions and thus STC reports a calculated average of received power in order to convey meaningful information.

The **Rx Averaging** setting defines an averaging period for reporting a terminal’s receive power. Longer averaging periods provide a more stable display while shorter periods yield a more real-time, albeit noisier, power display/report.

The following settings are offered when using the current firmware:

- **Off**  
  This (default) setting disables Rx Pwr averaging and reports instantaneously sampled Rx Pwr.

- **On**  
  This setting provides an averaged Rx Pwr over a 1-second period.

When using certain earlier firmware, the following settings are offered:

- **None (0s)**  
  This setting disables Rw Pwr averaging and reports instantaneously sampled Rx Pwr.

- **Fast (1s)**  
  This setting provides averaged value based on sampling Rx Power over a 1-second period.

- **Slow (2s)**  
  This setting provides averaged value based on sampling Rx Power over a 2-second period.

- **Very Slow (10s)**  
  This setting provides averaged value based on sampling Rx Power over a 10-second period.

- **Custom**  
  This setting allows you to configure a custom averaging period using the terminal’s Command Line Interface. See `rx_power_window` in Appendix D – Using SONAbeam Command Line Interface for more information…
Rx Alarm Threshold

Each of your SONAbeam terminals manage a low receive power alarm based upon a configured Rx power threshold. Whenever the terminal detects an Rx Pwr level smaller than the configured threshold, it logs the event and triggers an alarm state for Rx Pwr. Such warnings can be directed to managing computers running STC or your SNMP browser.

STC will indicate the occurrence of a low Rx power alarm by adding a coloured background to the Receive Power LED in the Terminal Status frame, as show to the right.

The **Rx Alarm Threshold** sets the terminal’s minimum receive power necessary to avoid triggering a low receive power alarm. STC provides these options:

- **Off** This option DISABLES the terminal’s low Rx Pwr alarm.
- **2.0 (µW)** This option is the recommended threshold for most systems. This value provides ample margin to trigger a low RX Pwr alarm before the Rx Pwr drops to a level where link performance becomes affected, while also offering maximum margin against triggering false alarms.
- **4.0 (µW)** This option offers a 3db higher threshold than the 2.0 (µW) for those links where an extra margin of low Rx Pwr warning is desired.
- **Custom** This option allows a custom low Rx Pwr threshold to be entered…

**NOTE…**

Consult your local fSONA Customer Service representative for help in selecting the best setting for your link.

Link Distance

The link distance at which your terminal operates is an important piece of information when troubleshooting a SONAbeam related problem.

Use the STC’s **Link Distance** field to record this value in your terminal’s memory.
Terminal Diagnostics

The **Diagnostics** tab offers a detailed status report of the critical internal terminal operating parameters:

Additionally, the **Diagnostics** tab provides a terminal response window, access to your terminal’s internal log files (where applicable) and management of PC logging.

**Figure 25 – Terminal Diagnostics Tab**

**NOTE...**

*Different SONAbeam models may display different terminal parameters...*

Transmitters

The **Transmitters** frame reports real-time individual laser operating parameters, including:

- **Bias** Laser DC bias current for each transmitter
- **Mod** Laser RF modulation current for each transmitter
- **Temp** Laser temperature for each transmitter
- **Pwr Lvl** Laser Power Level for each transmitter

Environmental

The **Environmental** frame reports real-time internal terminal operating parameters, including:

- **RH** Reports the relative humidity of the air inside the terminal’s housing, in %.
- **MEB** Reports the surface temperature of the Main Electronics Board, in °C.
- **Frame** Reports the temperature of the terminal’s housing, in °C.
- **Internal** Reports the terminal’s internal air temperature, in °C.
- **APD** Reports the operating temperature of the terminal’s APD detector, in °C.
- **Heater** Reports the (on/off) status of the terminal’s internal heater(s).
Power Supply

The **Power Supply** frame reports real-time power supply operating parameters, including:

- Main 5V – voltage & current
- CPU 5V – voltage & current
- 12V – voltage & current
- -12V – voltage & current
- -5V – voltage & current
- +3.3V – voltage & current
- Detector APD voltage (Applicable SONAbeam series only)

**NOTE...**

*Hover your cursor over any of the reported values and the associated tool tip popup will report that parameters critical minimum or maximum value...*

Viewing Terminal Responses

Like the **Configuration** tab, the **Diagnostics** tab also provides a hidable window that logs your terminal’s confirmation responses to certain STC-issued commands, e.g. terminal configuration changes.

Use the toggling **Hide Info** and **Show Info** button to set this window to your preference.
Access Internal Logs

Your -M & -S series SONAbeam terminals running v3.2.0 firmware or later maintains internal log files that record sampled terminal operating parameters, terminal alarm events, terminal configuration change events and FTP connection requests. STC provides you with access to these records by downloading selected terminal log files to your computer, where the file can subsequently be opened and/or exported to other applications.

NOTE...

To open a terminal log file for viewing or exporting, a copy of it must first be downloaded to your computer...

WARNING!

The terminal’s Adaptive Power Control (APC) is temporarily suspended while a log file is downloaded!

Applicable SONAbeam terminals manage the following two internal log files:

**DATA** Three separate data log files are used by your terminal in rotation to record prescribed terminal operating parameters, at 30-second intervals, for a period prior to and after an alarm event is registered. Log entries are also posted for all terminal power up and reboot events...

**EVENT** Your terminal’s event log file records all configuration changes and alarm events...

*Figure 26 – Retrieve Logs Dialog*

Each log file is allotted a prescribed amount of disk space (200 kB for EVENTS log and 500 kB for each DATA log). When the EVENTS log grows to its maximum size, the terminal will automatically delete earlier entries in order to ensure ample space for new ones. Initially, data logs are recorded to a file named **Data1**. When this log reaches its maximum size, it is renamed **Data2** and a new **Data1** file is created to record current log activity. When this file becomes ‘full’, **Data2** is renamed **Data3**, **Data1** is again renamed **Data2** and a new **Data1** file started to record current log activity. Subsequently, whenever the current **Data1** file becomes ‘full’, the (oldest) **Data3** log is deleted, **Data2** is renamed **Data3**, **Data1** is renamed **Data2** and a new **Data1** file started to record current log activity.
To access your Terminal Log Files

1. Click **Internal Logs** in the **Diagnostics** tab to open the **Retrieve Logs** dialog, which you can use to download, view and manage your SONAbeam terminal log files:

2. The **Retrieve Logs** dialog provides a DOS-like directory list of the log files currently held by the terminal connected to STC. Simply select a listed file, as shown to the right, and click **Get**.

3. In the resulting **Save As** dialog, specify a filename and destination for your retrieved log file and then click **Save**:

   When STC is IP connected, the **FTP Transfer Status** popup will report the progress of the download to your PC.
When copied to your computer, STC assigns filenames to the retrieved files that indicated the type of log file it contains along with the product serial number of the terminal that wrote the log. When successive downloads of the same file log are retrieved, STC will append the filename of each new file with “_n”, where “n” is just a successively incrementing number.

*Figure 27* illustrates the typical contents of a ...STC\logs folder after several downloads:

*Figure 27 – Typical STC logs Folder*

**WARNING!**

STC will not automatically delete older downloaded log files!

**NOTE...**

Log files starting with “ftp_...” denote retrieved internal logs  
Log files starting with “PCData_...” denote PC log files.

**To access your Terminal Log Files**

4. STC also allows you to open any log file that has already been downloaded from the terminal. Simply select a listed file and click View.

**NOTE...**

If the View button is not enabled when you select a file, simply download (Get) the selected file and STC will then allow you to view it...

Depending on how your computer is configured to open .log files – typically using the Windows Notepad program – STC will likely advise you that the file is too large for Notepad and needs to be opened using Microsoft's WordPad program.
Click **Yes**, and STC will open the selected log file:

![Figure 28 – Typical STC Log File](image)

**NOTE...**

*In Step 3, if you specify a **Save as type** as “CSV” (Comma Separated Values) extension, the data can later be opened or imported using Microsoft Excel...*

**To delete your Terminal Log Files**

STC also allows you to delete any of the current internal log files.

Simply **select** the file you wish to delete from the terminal and **click Del**.

STC will ask you to confirm your intention to delete the selected log file from the terminal:

Click **Yes**, and STC will delete the selected terminal log file from the terminal’s internal memory.

**NOTE...**

*The terminal will automatically start a new (empty) log file to replace the deleted one...*
Enable PC Logging

Use the **PC Logging** feature to start an STC-managed log file on your PC for the selected terminal, which will continuously update with prescribed terminal operating parameters at one minute intervals and with alarm events as they are encountered.

Using the **Save As** dialog, specify a filename and destination for your PC log file and **click Save**.

STC will then commence to continually poll your terminal and log its responses in the specified log file.

**WARNING!**

When PC logging is enabled, your STC will not allow you to connect to a different terminal!

Nor can another instance of STC (or 3rd party application) connect to the “busy” terminal!

**NOTE...**

Log files starting with “ftp...” denote retrieved internal logs
Log files starting with “PCData...” denote PC log files.

To terminate PC logging, **click** the same button, now labeled **Disable Logging**.
Terminal Management

The Management tab offers additional terminal configuration controls that prescribe how you manage your SONAbeam terminal. This includes:

- Serial interface data rate…
- TCP properties and remote accessibility…
- SNMP configuration parameters (for terminals with optional SNMP)…
- Real-Time Clock
- Deployment date

Figure 29 – Management Tab

NOTE...

Most changes made in the Management tab become effective when you subsequently click Apply. Additionally, terminal IP changes (except Remotes) require your terminal to be rebooted before the changes take effect...

Serial Settings

The Serial Settings frame allows you to set your terminal’s serial port baud rate.

NOTE...

Only the baud rate is user configurable, data format is fixed at: 8 bits, one stop bit, no parity bit...

Terminal Clock

Your SONAbeam terminal runs its own real-time clock, which is set at the factory. To set this clock to your time, simply click Sync Clock to PC.

WARNING!

Be sure your computer has the correct date and time before sharing this information with your terminal!
Terminal Deployment Date

For record keeping purposes, you can optionally record your terminal’s deployment date.

Simply click the Edit Deployment Date button in the Management tab and then select the appropriate deployment date from the resulting popup Select Date calendar and click OK.

Then, click Apply.

Terminal IP Settings

STC allows you to manage both the TCP settings of your terminal and the IP addresses that can access your terminal from the network.

WARNING!

Consult with your network manager when prescribing your SONAbeam terminal’s IP settings...

NOTE...

A terminal reboot is required before terminal IP settings changes take effect.

Setting your Terminal’s TCP Properties

NOTE...

SONAbeam -M and -S series terminals support BootP, DHCP and Static IP management of its IP address. SONAbeam -E series terminal support only Static IP management...
To enable BootP or DHCP management, simply click the appropriate option.

For Static IP management, specify your terminal’s IP Address, Subnet, and Gateway properties using the Edit buttons and the resulting Enter... dialog, as illustrated to the left.

**NOTE...**

If BOOTP or DHCP is used, the IP address assigned to the terminal can be read using the (CLI) command: “get ip_info”. (See Appendix D for more information on Command Line Interface.) If SNMP is enabled, the terminal, and its IP address, may be ‘discovered’ using an SNMP manager application.

**Limiting Network Access to your Terminal**

If you will be connecting your terminal to a network, you can limit remote access to your terminal’s configuration and monitoring features by prescribing a list of IP addresses to which your terminal will respond.

If you do not want to limit network access to your terminal, just leave the Remotes list empty or add the IP address: 255.255.255.255 as the first address in the list.

If you choose to limit network access to your terminal:

1. Click the Add button for the Remotes list in the IP Settings frame...
2. In the resulting Enter IP Address dialog, enter an IP address from which your terminal will respond to network commands and click OK...
3. Repeat steps 1 & 2 to add other IP addresses to your Remotes list.

To delete an IP address from the Remotes list, simply select it and click the Del button.

**NOTE...**

A reboot of your terminal is NOT necessary for new Remotes settings to take effect...
Embedded SNMP Agent Settings

All current model SONAbeam terminals support an optional embedded SNMP (Simple Network Management Protocol) agent to let you manage your terminal as part of your SNMP network management system.

**NOTE...**

The embedded SNMP agent is a SEPARATELY ordered terminal option that can only be enabled after a valid fSONA-supplied key code is loaded into the terminal’s memory...

The **SNMP V1 Embedded** frame allows configuration of your terminal’s (optional) SNMP agent parameters.

Configuring SNMP System Group Objects

If you are using the optional embedded SNMP agent, STC let’s you define your terminal’s SNMP System Group objects illustrated below.

Simply enter or edit these optional terminal settings and **click Apply** to save your entries/edits to your terminal.

**WARNING!**

The **Community** property is a case sensitive string that must exactly match the Community setting on your Network Management System!

**NOTE...**

The **Name** object is also used by STC when displaying its user-selectable list of terminals...
Using the SONAbeam Terminal Controller

Enabling your Terminal’s SNMP Agent

**WARNING!**

The embedded SNMP agent CANNOT be enabled unless a valid terminal-specific SNMP key code is first stored in the terminal’s internal memory!

If you purchased the optional embedded SNMP agent with your SONAbeam terminal(s), you can enable this feature now by loading the prescribed SNMP key for each qualified terminal and then enabling the terminal’s SNMP operation.

Your terminal-specific key(s) can be found on the SNMP Certificate shipped with your terminal(s).

**To load your terminal’s SNMP key code:**

1. Use STC to connect to both terminals in your link...

2. In the **Settings** tab, click **Set Keycode**...

3. In the resulting **Set Terminal SNMP Keycode** dialog, enter the terminal configuration password (“speedoflight”) and your terminal-specific SNMP keycode and click **OK**.

**WARNING!**

SNMP key codes are serial number specific and thus valid only for the terminals for which they were issued. Make sure to enter the correct SNMP key created for the serial number of the terminal you are configuring.

**To enable the terminal’s SNMP operation:**

4. Check the **Enabled** checkbox in the **SNMP V1 Embedded** frame:

5. Click **Apply** to start your terminal’s embedded SNMP agent.
Specifying your SNMP Managers

If your terminal is configured with its SNMP keycode and the embedded SNMP agent is enabled, you can also choose to prescribe a list of IP addresses from which SNMP queries will be accepted and to which SNMP traps, i.e. alarms, will be sent.

If you leave your terminal’s Managers list empty, it will accept SNMP queries from any computer and broadcast SNMP traps (alarms).

Use the Add button and the Enter IP Address dialog to construct your list of SNMP Managers.

Use the Del button to remove an IP address from the Managers list.

Use the Broadcast button to add the IP address: 255.255.255.255 to the top of the Managers list. This will configure your terminal to broadcast SNMP traps on its local network.

NOTE...

With your terminal’s SNMP agent enabled, use the SONAbeam MIBs, included on your SONAbeam Utilities SW CD (See X:\Setup\Software\SNMP MIBs) and also installed with STC (See C:\Program Files\SONA\STCV3\MIBs), to integrate your SONAbeam terminals with your SNMP browser or Network Management System...
Appendix A – Updating Legacy –M & –S Series FW

The current STCv3 program is compatible only with SONAbeam terminals running firmware versions 3.0.0 or newer. For terminals with legacy firmware, running versions: 1.x.x or 2.x.x, the following procedure describes how to update your older terminal with the current firmware to allow compatibility with today’s STC.

Updating terminals with legacy firmware includes deleting select files from the terminal’s internal memory and uploading new files. The SONAbeam Terminal Controller v3 program provides a convenient utility applet to accomplish all of the necessary tasks.

**WARNING!**

Carefully follow all instructions! Failure to do so may result in terminal malfunction and/or loss of your FSO link!

Always use the latest version of STC to install the latest version of firmware.

Your link will be down for the duration of the upgrade! It will take a few minutes to complete.

Before commencing this operation, be sure you have the following update files available in any chosen folder on your computer:

- SETUP.EXE
- CRC.EXE
- SONABEAM.CRC
- CEXEC.BAT

Upgrading your terminal’s firmware will result in the loss of your current terminal configuration settings, including terminal identification and operating data rate. BEFORE commencing the upgrade procedure, record your terminal settings and then use those setting after the upgrade procedure to quickly re-deploy your upgraded terminal to normal network operation.

**ALWAYS upgrade BOTH terminals in a link!**

**Terminal FW recovery procedure:**

Follow this procedure to update your v1.x.x or v2.x.x terminal firmware:

**WARNING!**

Before starting the upgrade procedure, set your terminal’s (serial Interface) baud rate to 19200!

1. Establish a good serial connection between your computer’s COM port and the terminal.
2. Start the STC v3 program and DO NOT select a terminal.

3. Click Update FW in the Configuration tab.

4. Confirm your intentions to proceed with the firmware update by clicking Yes:

5. Using the resulting Upgrade V1/V2 Firmware dialog, select the appropriate Com Port that connects your computer to the terminal and then click Start.

   The Upgrade V1/V2 Firmware dialog will initialize your terminal to ready it for the firmware upload.

6. After a brief delay to allow the terminal to reboot, the Firmware Upload dialog will replace the Upgrade V1/V2 Firmware dialog.

   In the Firmware Upload dialog, click Browse and use the resulting Open dialog to find and select all of the files needed for your upgrade and click Open.
7. Use the **Firmware Upload** dialog to confirm your selections and **click Send**.

8. The **Firmware Upload** dialog will report its progress as the upload proceeds…

9. A popup message will report the completion of the file uploads. **Click OK** to reboot your terminal to start running the new firmware.

10. While your terminal is restarting its new firmware, a progress bar will provide you with an indication of how long you’ll need to wait...

Upon filling the progress bar, STC returns you to its main window, which you can then use to connect to your now updated terminal.
Appendix B – -E Series FW Recovery

This procedure describes how to re-commission a non-operational SONAbeam -E series terminal that has suffered a catastrophic firmware failure – typically only encountered as a result of an interrupted firmware update operation.

**WARNING!**

This firmware recovery procedure requires a custom serial connection, using a SPECIAL FW LOAD CABLE (fSONA part number: 25-0139A) between the SONAbeam –E terminal and a computer equipped with a serial port plus the firmware recovery utility software plus the assorted files required to execute the recovery operation.

While you may be able to go to the installed terminal location and perform the firmware recovery, in many cases this option may be deemed unsafe and/or impractical and thus you will find it necessary to remove the terminal from its installed location and perform the recovery operation in a more accommodating environment.

Keep in mind you will need to power the terminal during the recovery operation and so an appropriate power source will be required.

The required files are all available from your SONAbeam Utilities Software CD @ Setup\Software\Firmware_E_Series_Vx_x_x

You are advised to copy the entire contents of this folder to your computer to facilitate the recovery operation.

**Terminal FW recovery procedure:**

1. Power down the SONAbeam terminal.

2. Using the special SONAbeam –E Firmware Load Cable (fSONA part number: 25-0139A), connect your computer’s COM port to the –E terminal’s firmware load connector, illustrated in Figure 30.
3. Power up the SONAbeam terminal.

4. Launch the RFU program.

5. Using the Rabbit Field Utility, select Setup → Communications... from the menu.
6. In the resulting **Communications Options** dialog, specify **Use Serial Connection** and select the **Comm Port** to be used on your computer.
   
   Be sure that **Enable Processor Detection** is also 'ticked' and **click OK**.

7. Using the **Rabbit Field Utility** again, select **SetupÆFile Locations...** from the menu.

8. In the resulting **Chose File Locations** dialog, specify the complete paths to the following utility files:
   
   - coldload.bin
   - pilot.bin
   - flash.ini
   
   You may enter or paste the complete paths into their respective fields or use the corresponding ... (browse) buttons to find and select the files.
   
   When you have finished, **click OK**.

   **NOTE...**

   *If the three utility files are stored in the same folder as the RFU program, the **Chose File Locations** dialog will open with the complete paths of all three files automatically inserted.*

9. Using the **Rabbit Field Utility** again, select **FileÆLoad Flash Image...** from the menu.
10. In the resulting **Choose Flash Image** dialog, specify the complete path to the appropriate SONAbeam –E firmware file (SBEfirmware_x_x_x.bin).

You may enter or paste the complete path in the **File Location** field, or use the ... button to find and select this file.

When you have finished, **click OK**.

11. The **Rabbit Field Utility** will immediately begin the firmware recovery operation, displaying its progress...

12. Upon completion of the firmware recovery operation, the **Rabbit Field Utility** will simply display the final results of the file transfer, as shown in the illustrated example.
Appendix C – SONAbeam Terminal Log Files

Each SONAbeam terminal manages its own internal log files to record terminal operating parameters plus alarm and configuration change events:

**DATA**
Three separate Data log files are stored to record terminal operating parameters, at 30-second intervals, for the period 20 minutes prior to and 20 minutes after any recorded SONAbeam terminal alarm event…

**EVENTS**
The Events log records terminal configuration change events, alarm events and FTP connection requests…

This section describes the content and format of these terminal information logs.

**NOTE...**

The internal EVENT and DATA logs can be retrieved using any FTP client program or STC’s built-in FTP client.

For more information, see the sections FTP Access and Access Internal Logs, earlier in this guide...

**DATA**
The terminal records a summary of prescribed terminal operating parameters during a prescribed time period before and after SONAbeam terminal alarm events:

**NOTE...**

For continuous data logging, a PC must be connected (using STC) and used as the collection device; using the STC’s Enable PC Logging feature to start the data collection operation.

For more information, see the section Enable PC Logging, earlier in this guide...

Each summary report includes the following fields:

Date & Time
Optical receive power (rx_power)
Laser bias current for each transmitter (laser_biasN where N indicates the laser position)
Laser modulation current for each transmitter (laser_modN where N indicates the laser position)
Laser temperature for each transmitter (laser_tempN where N indicates the laser position)
System voltage for +5V supply (voltage_p5v)
System current from +5V supply (current_p5v)
System voltage for +5V CPU supply (voltage_p5v_cpu)
System current from +5V CPU supply (current_p5v_cpu)
Appendix C – SONAbeam Terminal Log Files

System voltage for +12V supply (voltage_p12v)
System current from +12V supply (current_p12v)
System voltage for -12V supply (voltage_n12v)
System current from -12V supply (current_n12v) (applicable SONAbeam series only!)
System voltage for -5V supply (voltage_n5v) (applicable SONAbeam series only!)
System current from -5V supply (current_n5v) (applicable SONAbeam series only!)
System voltage for +3.3V supply (voltage_p3v3) (applicable SONAbeam series only!)
System current from +3.3V supply (current_p3v3) (applicable SONAbeam series only!)
Terminal internal temperature (temp_internal)
Terminal casting temperature (temp_casting)
Terminal’s MEB (Main Electronics Board) temperature (temp_meb)
APD voltage (voltage_apd) (applicable SONAbeam series only!)
APD temperature (temp_apd) (applicable SONAbeam series only!)
System error code (error_code)
Terminals accumulated Available Seconds (AS)
Terminals accumulated Unavailable Seconds (UAS)

Each of the three data log files is allotted 500k of disk space. Initially, data logs are recorded to a file named Data1. When this log reaches its maximum size, it is renamed Data2 and a new Data1 file is created to record current log activity. When this file becomes ‘full’, Data2 is renamed Data3. Data1 is again renamed Data2 and a new Data1 file started to record current log activity. Subsequently, whenever the current Data1 file becomes ‘full’, the (oldest) Data3 log is deleted, Data2 is renamed Data3, Data1 is renamed Data2 and a new Data1 file started to record current log activity.

EVENTS

The terminal writes a summary of all terminal configuration changes, alarm occurrences as well as FTP and TCP connection requests as they happen:

The EVENTS log file is allotted 200k of disk space. When the EVENTS log grows to its maximum size, the terminal will automatically delete earlier entries, i.e. circular buffer, in order to ensure ample space for new ones.
Appendix D – SONAbeam Command Line Interface

This section offers information on using the SONAbeam terminal’s Command Line Interface (CLI) to ‘micro-manage’ your SONAbeam terminals.

**WARNING!**
The Command Line Interface is designed for trained service personnel! Incorrect use of the CLI can result in terminal malfunction and/or a loss of link condition.

STC provides CLI access to your terminal through the use of its **CLI** feature described later in this section. You can alternatively use Hyper Terminal, Hyper Access or any similar terminal-emulator program, to communicate with your SONAbeam terminal, using either a serial or IP connection, to access and manage your terminal through CLI.

**Network Access Security**

You can choose to protect your terminals from unauthorized network connections by configuring a terminal access password. If your terminal is configured with an access password, the terminal will immediately prompt you for the prescribed password when you make a network connection to that terminal. See the CLI channel: `tcp_password` in this section for more information.

```
Password>mypassword
SONAbeam>...
```

If the terminal password is incorrectly entered, the terminal will immediately terminate you network connection, forcing you to re-connect to try again.

Additionally, if you are using STC to manage a password protected terminal, you will need to configure all applicable instances of STC to include the prescribed password whenever the program attempts a TCP connection to the terminal. This configuration is made in each program’s STCv3.INI file as illustrated in the example file fragment below:

```
Term4=Comm 1
TCPInit=mypassword
termcount=4
...
```

**WARNING!**
There is NO password-protected access to your terminal when you connect to it through its serial port!
Using CLI with STC

Use STC’s CLI feature to access or manage your SONAbeam terminal using CLI, as illustrated below.

The Command Line Interface window provides a comprehensive control panel that you can use to issue CLI commands to your terminal and to monitor your STC terminal and terminal STC communications in detail. The Command Line Interface window also provides the ability to capture those communications to a user-specified text file.

The auto-scrolling communications log is started when the Command Line Interface window is opened. This display will reflect the current STC/terminal communications and it will vary depending upon what STC tab – Status – Configuration – Rx Power – Diagnostics – Management – is currently selected.

Use the Pause button to freeze the display and Resume to start it going again.

Select any line and the complete message will display in the frame below, as illustrated above.

Click the Capture To File box to copy the accumulated communication messages to a file you’ve specified in the associated text field. Use the Browse feature to help you specify a file destination.
Enter commands (described in detail later in this section) to your terminal in the Enter Command field and click Send Cmd or press Enter to issue the command to your terminal.

NOTE...

The STC’s Command Line Interface ‘hides’ the SONAbeam> prompt.

Using CLI with your Terminal Emulator

When making a serial or network connection to your terminal with a 3rd party terminal emulator program, like HyperTerminal® or HyperAccess®, the terminal will indicate its readiness to accept your entries by displaying the prompt: SONAbeam>, as illustrated below.

```
SONAbeam> get nms_list
nms_1=192.168.55.1;nms_2=nms_3=nms_4=nms_5=
```

For commands that produce a terminal reply, the terminal will preface the reply with a semi colon. Where multiple parameters are returned, the terminal will separate each value with a semi colon, as illustrated above.

SONAbeam CLI Syntax

All SONAbeam Command Line Interface statements assume the following format:

```
command [channel] [param1] [param2]
```

Where:

- command is one of the eleven supported CLI commands...
- channel (optional) identifies specific information to be written to or read from the terminal...
- param1 (optional) provides data to be written or channel modifier...
- param2 (optional) provides additional data to be written or channel modifier...

EXAMPLE: remove nms 192.168.0.113
Appendix D – SONAbeam Command Line Interface

CLI Command Set

Your terminal supports the following CLI command set:

**Terminal Configuration/Monitoring**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>get</strong></td>
<td>Queries the terminal for specified channel information.</td>
<td>get ip_client_list</td>
</tr>
<tr>
<td><strong>set</strong></td>
<td>Writes specified terminal configuration settings.</td>
<td>set data_rate 1250c</td>
</tr>
</tbody>
</table>

**WARNING!**

Some SET commands will change the same terminal settings made previously by other SET commands!

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>poll</strong></td>
<td>Initiates the terminal polling mode wherein the terminal will return periodic samplings of the designated channel</td>
<td>poll rx_power 60</td>
</tr>
</tbody>
</table>

**NOTE**

Applicable channels: all_io, rx_power and terminal_status.

**WARNING!**

All poll commands need to be subsequently terminated with an unpoll command!

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>unpoll</strong></td>
<td>Terminates ALL current terminal polling modes.</td>
<td>unpoll</td>
</tr>
</tbody>
</table>

**Terminal IP Properties Configuration**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>add</strong></td>
<td>Add a new item to the specified IP properties collection.</td>
<td>add ip_client 192.168.0.13</td>
</tr>
<tr>
<td><strong>remove</strong></td>
<td>Removes an item from the specified IP properties collection.</td>
<td>remove ip_client 192.168.0.13</td>
</tr>
</tbody>
</table>
Appendix D – SONAbeam Command Line Interface

Terminal File System

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
</table>
| dir | Returns a directory listing of the terminal’s (flash) hard drive. | dir | Displays the directory of the terminal’s \LOGS directory...  
|        |              | dir .. | Displays the terminal’s root directory...  
|        |              | dir upload | Displays the terminal’s upload directory... |

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>del</td>
<td>Deletes a specified file from the terminal’s \LOGS directory...</td>
<td>del event.log</td>
</tr>
</tbody>
</table>

update

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Syntax</th>
<th>Returns</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>update</td>
<td>Copy files uploaded via FTP to the root directory. Issue this command AFTER upgrade via FTP.</td>
<td>update</td>
<td>nothing</td>
<td>System needs to be rebooted after this command is issued. If command appears unsuccessful, repeat the command and reboot again.</td>
</tr>
</tbody>
</table>

Terminal Operating System

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Syntax</th>
<th>Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>help</td>
<td>Displays CLI help file</td>
<td>help</td>
<td>Contents of help file.</td>
</tr>
</tbody>
</table>

reboot

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Example</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>reboot</td>
<td>Restarts the SONAbeam application.</td>
<td>reboot</td>
<td>Use ONLY after upgrading firmware or making IP configuration changes. The reboot command will cause momentary link outages if the command is issued to a terminal in an operating link!</td>
</tr>
</tbody>
</table>

Channels

Each channel designator identifies specific terminal configuration or operating parameters. The following lists summarize these channels according to functionality. A more detailed description of each channel follows.

Terminal Configuration

<table>
<thead>
<tr>
<th>Channel</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>apc</td>
<td>Sets/reports the state of the terminal’s APC feature.</td>
</tr>
<tr>
<td>baudrate</td>
<td>Sets the communications rate for the terminal’s serial port.</td>
</tr>
<tr>
<td>data_rate</td>
<td>Configures or reports the terminal’s operating data rate.</td>
</tr>
<tr>
<td>date</td>
<td>Set internal terminal date for internal logs.</td>
</tr>
<tr>
<td>fiber_output_enable</td>
<td>Controls the behaviour of the terminal’s fiber optic output port.</td>
</tr>
<tr>
<td>fiber_output_threshold</td>
<td>Sets the low rx power threshold used to switch the fiber output</td>
</tr>
<tr>
<td>laser_power</td>
<td>Sets the laser power for a specified laser.</td>
</tr>
<tr>
<td>laser_powers</td>
<td>Reports the laser power levels of all transmitters.</td>
</tr>
<tr>
<td>laser_power_index</td>
<td>Sets all of the terminal’s laser transmitter power levels.</td>
</tr>
</tbody>
</table>
Appendix D – SONAbeam Command Line Interface

*link_distance* Sets the link distance for the APC Configuration Wizard
*rx_offset* Record or report receiver offset voltage.
*rx_peak* Resets the stored Rx Peak value for the terminal.
*rx_power_log* Sets Rx power logging mode
*rx_power_threshold* Sets the (low) power threshold for the terminal’s low Rx Pwr alarm
*rx_power_window* Sets the window size for Rx Pwr averaging.
*terminal_info* Reports the terminal identification and component information.
*terminal_config* Reports the terminal’s current configuration settings.
*time* Reports the terminal’s time clock for internal logs.

**Terminal IP Configuration**

*ip_address* Sets the terminal’s IP address.
*ip_client* Adds/removes an IP address to the terminal’s list of remotes with TCP access authority.
*ip_client_list* Reports the terminal’s list of remote IP addresses authorized to access the terminal via a TCP connection.
*ip_info* Reports the complete IP configuration of the terminal.
*ip_gateway* Sets the terminal’s IP gateway.
*ip_subnet_mask* Sets the terminal’s IP subnet mask.
*tcp_password* Sets the security password to access the terminal via TCP connections.
*tcp_port* Sets the port for TCP connections.

**Terminal Control**

*alarm_clear* Clears all internal alarms and resets the terminal’s AS & UAS counters
*file* Outputs a specified terminal log file through the terminal’s serial port.
*fileboss* Stops normal terminal operation and restarts it in Fileboss utility mode for uploading new firmware or associated ini files.

**Terminal Operation**

*all_io* Reports all internal analog and digital channels monitored by the terminal.
*rx_power_fast* Continuous reports instantaneous, calculated average and peak Rx Pwr
*rx_power* Reports the current calculated average Rx Pwr
*terminal_status* Reports all un-cleared alarms plus the terminal’s Available and Unavailable counters.

**Terminal SNMP Agent Configuration**

*nms* Adds/removes a specified IP address from the terminal’s list of trap managers.
*nms_list* Reports the terminal’s list of SNMP trap managers.
*snmp_community* Sets the terminal’s SNMP community string.
*snmp_contact* Sets the terminal’s SNMP contact property.
*snmp_enable* Enables/disables SNMP features including MIB requests and traps.
*snmp_location* Sets the terminal’s SNMP location property.
*snmp_name* Sets the terminal’s SNMP name property.
*snmpkey* Sets the terminal’s SNMP key code to enable optional SNMP feature.
# Appendix D – SONAbeam Command Line Interface

## Terminal Configuration

### apc

<table>
<thead>
<tr>
<th>Description</th>
<th>Sets/reports the state of the terminal’s APC feature.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>set apc &lt;S&gt; Where S is either &quot;on&quot; or &quot;off&quot;</td>
</tr>
<tr>
<td>Example</td>
<td>set apc on</td>
</tr>
<tr>
<td>Returns</td>
<td>*** mm/dd/yyyy hh:mm:ss apc &lt;enabled/disabled&gt;</td>
</tr>
<tr>
<td>NOTE</td>
<td>When APC is on (enabled), laser power and laser power index parameters cannot be set.</td>
</tr>
</tbody>
</table>

### baudrate

<table>
<thead>
<tr>
<th>Description</th>
<th>Sets the communications rate for the terminal’s serial port.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>set baudrate &lt;R&gt; Where R is one of the following: 9600/192000/57600/115200</td>
</tr>
<tr>
<td>Example</td>
<td>set baudrate 9600</td>
</tr>
<tr>
<td>Returns</td>
<td>None</td>
</tr>
</tbody>
</table>

### data_rate

<table>
<thead>
<tr>
<th>Description</th>
<th>Configures or reports the terminal’s operating data rate (in Mbs).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>get data_rate</td>
</tr>
<tr>
<td>Example</td>
<td>set data_rate &lt;R&gt; Where R is the terminal’s new configured data rate in Mbs</td>
</tr>
<tr>
<td>Returns</td>
<td>***mm/dd/yyyy hh:mm:ss Data rateset to&lt;R&gt;; Where R is the terminal’s configured data rate in Mbs.</td>
</tr>
<tr>
<td>Values</td>
<td>The param R specifies the terminal data rate in Mbs. On applicable data rates, a &quot;c&quot; suffix will designate a crystal-controlled data clock as opposed to a synthesized data clock. Valid options for SONAbeam 52-X include: &quot;bypass&quot;, &quot;bypass&lt;tx&gt;&quot;, &quot;bypass&lt;rx&gt;&quot;, 31-62 Mbps Valid options for SONAbeam 155-X include: &quot;bypass&quot;, &quot;bypass&lt;tx&gt;&quot;, &quot;bypass&lt;rx&gt;&quot;, 125c, 155c, 31-62 Mbps. Valid options for SONAbeam 622-X include: &quot;bypass&quot;, &quot;bypass&lt;tx&gt;&quot;, &quot;bypass&lt;rx&gt;&quot;, 125c, 155c, 270c, 622c, 31-715 Mbps. Valid options for SONAbeam 1250-X include: &quot;bypass&quot;, &quot;bypass&lt;tx&gt;&quot;, &quot;bypass&lt;rx&gt;&quot;, 125c, 155c, 270c, 622c, 1024c, 1250c, 31-1602 Mbps.</td>
</tr>
</tbody>
</table>

### date

<table>
<thead>
<tr>
<th>Description</th>
<th>Set internal terminal date for internal logs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>set date mm/dd/yyyy</td>
</tr>
<tr>
<td>Example</td>
<td>set date 5/5/2004</td>
</tr>
<tr>
<td>Returns</td>
<td>;date=mm/dd/yyyy;</td>
</tr>
</tbody>
</table>

### fiber_output_enable

<table>
<thead>
<tr>
<th>Description</th>
<th>Controls the behaviour of the terminal’s fiber optic output port.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>set fiber_output_enable &lt;off&gt;/&lt;on&gt;/&lt;auto&gt; Where: &lt;off&gt; turns the fiber output OFF &lt;on&gt; turns the fiber output ON (normal) &lt;auto&gt; turns the fiber output ON and automatically switches it OFF when the terminal’s Rx power falls below the value set by fiber_output_threshold</td>
</tr>
<tr>
<td>Example</td>
<td>set fiber_output_enable auto</td>
</tr>
<tr>
<td>Returns</td>
<td>*** mm/dd/yyyy hh:mm:ss Fiber Output &lt;enabled/disabled/set to auto&gt;</td>
</tr>
<tr>
<td>NOTE</td>
<td>Use get terminal_config for report.</td>
</tr>
</tbody>
</table>
Appendix D – SONAbeam Command Line Interface

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Syntax</th>
<th>Example</th>
<th>Returns</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>fiber_output_threshold</td>
<td>Sets the low rx power threshold used to switch the fiber output when fiber_output_enable is set to “auto”</td>
<td>set fiber_output_threshold &lt;value&gt; Where &lt;value&gt; is the low rx power threshold in uW</td>
<td>set fiber_output_threshold 5</td>
<td>None</td>
<td>Use get terminal_config for report.</td>
</tr>
<tr>
<td>laser_power</td>
<td>Sets the laser power for a specified laser. Level 0 is off and level 5 is maximum power. Value is stored as the terminal's power up default.</td>
<td>set laser_power &lt;T&gt;&lt;L&gt; Where &lt;T&gt; specifies the transmitter position (&quot;1&quot;, &quot;5&quot;, &quot;7&quot; or &quot;11&quot; for M-series terminals or &quot;6&quot; or &quot;12&quot; for S-series terminals) and &lt;L&gt; specifies the laser power level. See Appendix F - SONAbeam Laser Power Level Tables for more information...</td>
<td>set laser_power 5 4</td>
<td>*** mm/dd/yyyy hh:mm:ss &lt;T&gt; o'clock laser set to power level &lt;L&gt;</td>
<td>NOTE The laser_power command is not applicable to SONAbeam 52-M terminals. The terminal will ignore laser_power commands whenever its APC is enabled!</td>
</tr>
<tr>
<td>laser_powers</td>
<td>Reports the laser power levels of all transmitters.</td>
<td>get laser_powers</td>
<td>get laser_powers</td>
<td>:laser_power12=9;laser_power6=8</td>
<td></td>
</tr>
<tr>
<td>laser_power_index</td>
<td>Sets the terminal's individual laser transmitter power levels according to the terminal's Laser Power table.</td>
<td>set laser_power_index &lt;I&gt; Where &lt;I&gt; specifies one of the terminal's prescribed power index. See Appendix F - SONAbeam Laser Power Level Tables for more information...</td>
<td>set laser_power_index 9</td>
<td>*** mm/dd/yyyy hh:mm:ss 1 o'clock laser set to power level &lt;I&gt; *** mm/dd/yyyy hh:mm:ss 5 o'clock laser set to power level &lt;I&gt; *** mm/dd/yyyy hh:mm:ss 7 o'clock laser set to power level &lt;I&gt; *** mm/dd/yyyy hh:mm:ss 11 o'clock laser set to power level &lt;I&gt; ;laser_power_index=&lt;I&gt;;</td>
<td>NOTE Index 0 sets all lasers OFF, while the maximum power index specified for the terminal sets all lasers to maximum power.</td>
</tr>
<tr>
<td>link_distance</td>
<td>Sets the link distance for the APC Configuration Wizard</td>
<td>set link_distance &lt;D&gt; Where &lt;D&gt; is the ACCURATELY measured link distance in meters.</td>
<td>set link_distance 965</td>
<td>*** mm/dd/yyyy hh:mm:ss Link distance set to &lt;D&gt;</td>
<td>NOTE An error is returned if link_distance is set while the terminal’s APC feature is enabled. In earlier terminals (FW v3.2.1 or earlier) setting the link distance results in an associated change to the terminal’s power_level setting.</td>
</tr>
</tbody>
</table>
### rx_offset

**Description**  
Record or report receiver offset voltage.

**Syntax**  
```
get rx_offset
set rx_offset <V>  
```

Where `<V>` is the Rx offset voltage in volts. If no param is included, the terminal will read the current detector output and apply the value read as the terminal’s rx offset.

**Example**  
```
set rx_offset
```

**Returns**  
```
*** mm/dd/yyyy hh:mm:ss Rx offset set to <V>  
```

Where `<V>` specifies the stored Rx offset voltage.

**NOTE**  
Values greater than 0.550 volts are clamped to this maximum value.

### rx_peak

**Description**  
Resets the stored Rx Peak value for the terminal.

**Syntax**  
```
set rx_peak
```

**Returns**  
None

### rx_power_log

**Description**  
Sets Rx power logging mode. When enabled, the terminal will begin continuous logging of its rx power.

**Syntax**  
```
set rx_power_log <0>/<1>  
```

Where `<0>` disables logging and `<1>` enables logging

**Example**  
```
set rx_power_log 1
```

**Returns**  
```
*** mm/dd/yyyy hh:mm:ss Rx power logging enabled/disabled
```

**NOTE**  
Rx power logging is NOT recommended for normal terminal operation. It is intended only for test situations. See the section: [Access Internal Logs](#) for more information.

### rx_power_threshold

**Description**  
Sets the (low) power threshold for the terminal’s low Rx Pwr alarm.

**Syntax**  
```
set rx_power_threshold <P>  
```

Where `<P>` specifies the Rx Pwr threshold in uW

**Example**  
```
set rx_power_threshold 10
```

**Returns**  
None

**NOTE**  
Set to param to ZERO or a negative value to disable low Rx Pwr alarm reporting.

### rx_power_window

**Description**  
Sets the window size for Rx Pwr averaging. 18 samples are taken per second so a window size of 18 yields a 1 second window while a window size of 1 yields no averaging. Valid values are between 1 and 1000.

**Syntax**  
```
set rx_power_window <value>  
```

Where `<value>` specifies the number of samples used to calculate average Rx Pwr

**Example**  
```
set rx_power_window 100
```

**Returns**  
None

### terminal_info

**Description**  
Reports the terminal identification and component information.

**Syntax**  
```
get termina_info
```

**Example**  
```
get termina_info
```

**Returns**  
```
;version=3.3.0;serial_number=1C30090229;model=SONAbeam 622-S;model_number=SB1250-01-;manufacturing_date=5/5/04;transmitter_type=2;meb_type=2;cpu_type=1;heater_type=0;
```
## Appendix D – SONAbeam Command Line Interface

### terminal_config

<table>
<thead>
<tr>
<th>Description</th>
<th>Reports the terminal's current configuration settings.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td><code>get terminal_config</code></td>
</tr>
<tr>
<td>Example</td>
<td><code>get terminal_config</code></td>
</tr>
<tr>
<td>Returns</td>
<td><code>;laser_power12=6;laser_power6=6;laser_power_index=11;data_rate=155c;rx_offset=0.000;rx_power_threshold=40.0;data_log_buffer=20;data_log_interval=30;data_log_size=500000;rx_power_samples=10;rx_power_window=36;rx_power_log=0;rx_power_log_buffer=30;link_distance=1500;apc=off;deployment_date=;fiber_output_enable=on;fiber_output_threshold=5.0;snmp_name=name;snmp_location=loc;snmp_contact=contact;snmp_port=;snmp_community=public;snmp_enable=off;nms_1=;nms_2=;nms_3=;nms_4=;nms_5=;snmp_ip_address=;ip_subnet_mask=255.255.255.0;ip_gateway=10.0.0.254;tcp_port=5001;ip_addres=s=10.0.0.1;ip_client_1=;ip_client_2=;ip_client_3=;ip_client_4=;tcp_password=;</code></td>
</tr>
</tbody>
</table>

### time

<table>
<thead>
<tr>
<th>Description</th>
<th>Reports the terminal's time clock for internal logs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td><code>get time</code></td>
</tr>
<tr>
<td>Example</td>
<td><code>set time 14:25:00</code></td>
</tr>
<tr>
<td>Returns</td>
<td><code>;time=hh:mm:ss;</code></td>
</tr>
<tr>
<td>NOTE</td>
<td>Use 24 hour format!</td>
</tr>
</tbody>
</table>

### Terminal IP Configuration

#### ip_address

<table>
<thead>
<tr>
<th>Description</th>
<th>Sets the terminal's IP address.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td><code>set ip_address &lt;IP&gt;</code></td>
</tr>
<tr>
<td>Example</td>
<td><code>set ip_address 10.0.0.1</code></td>
</tr>
<tr>
<td>Returns</td>
<td>None</td>
</tr>
<tr>
<td>Notes</td>
<td>For BOOTP, set IP address to 0.0.0.0 For DHCP, set IP address to 0.0.0.1 For dynamically assigned settings, the address assigned can be read back on the serial port with the command &quot;get tcpinfo&quot;. Subnet mask and gateway settings are ignored when dynamically assigned.</td>
</tr>
</tbody>
</table>

#### ip_client

<table>
<thead>
<tr>
<th>Description</th>
<th>Adds/removes an IP address to the terminal's list of remotes with TCP access authority.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td><code>add ip_client &lt;IP&gt;</code> Where IP specifies the IP address of a computer authorized to manage the terminal. remove ip_client &lt;IP&gt;`</td>
</tr>
<tr>
<td>Example</td>
<td><code>add ip_client 192.169.10.109</code></td>
</tr>
<tr>
<td>Returns</td>
<td><code>;ip_client_1=192.168.0.10; ip_client_2=192.168.0.32;ip_client_3=&lt;IP 3&gt;; ip_client_4=&lt;IP 4&gt;;</code></td>
</tr>
<tr>
<td>NOTE</td>
<td>The terminal supports only four remote IP addresses. These addresses are used for both TCP and FTP connection. If this list is blank, or the first IP is 255.255.255.255 then connections are accepted unconditionally.</td>
</tr>
</tbody>
</table>

#### ip_client_list

<table>
<thead>
<tr>
<th>Description</th>
<th>Reports the terminal's list of remote IP addresses authorized to access the terminal via a TCP connection.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td><code>get ip_client_list</code></td>
</tr>
<tr>
<td>Example</td>
<td><code>get ip_client_list</code></td>
</tr>
<tr>
<td>Returns</td>
<td><code>;ip_client_1=192.168.0.10; ip_client_2=192.168.0.32;ip_client_3; ip_client_4=;</code></td>
</tr>
<tr>
<td></td>
<td><code>;ip_client_1=; ip_client_2=;ip_client_3; ip_client_4=;</code> (Reported when free access is configured.)</td>
</tr>
</tbody>
</table>
Appendix D – SONAbeam Command Line Interface

**ip_info**

Description: Reports the complete IP configuration of the terminal.

Syntax: `get ip_info`

Example: `get ip_info`

Returns: Reading Waterloo TCP configuration file
- Ethernet Address: 0:60:92:0:26:44
- IP Address: 192.168.1.89
- Network Mask: 255.255.255.0
- Gateways: GATEWAY’S IP
  - SUBNET: 192.168.1.254 DEFAULT
  - SUBNET MASK: 192.168.1.1
  - Nameservers: 192.168.1.2, 192.168.1.3
- Cookieserver: NONE DEFINED
- Domain: "(null)"
- BOOTP: USED
  - Server: BROADCAST
  - Timeout: 10 seconds

**ip_gateway**

Description: Sets the terminal’s IP gateway.

Syntax: `set ip_gateway <IP>` Where IP is an IP subnet mask in dot notation.

Example: `set ip_gateway 10.0.0.254`

Returns: None

Notes: Only valid for static IP configuration

**ip_subnet_mask**

Description: Sets the terminal’s IP subnet mask.

Syntax: `set ip_subnet_mask <IP>` Where IP is an IP subnet mask in dot notation.

Example: `set ip_subnet_mask 255.255.255.0`

Returns: None

Notes: Only valid for static IP configuration

**tcp_password**

Description: Sets the security password to access the terminal via TCP connections.

Syntax: `set tcp_password <PASSWORD>` Where PASSWORD is the designated security password.

Example: `set tcp_password mypassword`

Returns: None

Notes: If no argument is included, the security password for TCP connections is disabled. If a TCP password is set, it must likewise be recorded in any associated STCv3.ini file(s) to allow TPC connections by the STC sw.

**tcp_port**

Description: Sets the port for TCP connections

Syntax: `set tcp_port <N>` Where N is a port number.

Example: `set tcp_port 5001`

Returns: None

Notes: If this is not set, the default port of 5001 is used.
Appendix D – SONAbeam Command Line Interface

Terminal Control

**alarm_clear**

<table>
<thead>
<tr>
<th>Description</th>
<th>Clears all internal alarms and resets the terminal’s counters for Available and Unavailable seconds.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>set alarm_clear</td>
</tr>
<tr>
<td>Returns</td>
<td>*** mm/dd/yyyy hh:mm:ss All alarms cleared</td>
</tr>
</tbody>
</table>

**file**

<table>
<thead>
<tr>
<th>Description</th>
<th>Outputs a specified terminal log file through the terminal’s serial port.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>get file &lt;filename&gt; Where &lt;filename&gt; specifies a valid filename.</td>
</tr>
<tr>
<td>Example</td>
<td>get file data1.log</td>
</tr>
<tr>
<td>Returns</td>
<td>===FILE START=== filename=data1.log - Hit any key to abort&lt;br&gt;contents of data1.log&lt;br&gt;===FILE END===</td>
</tr>
</tbody>
</table>

**NOTE** The transmission of the file can be aborted by pressing any key. Response may take several seconds!

**fileboss**

<table>
<thead>
<tr>
<th>Description</th>
<th>Stops normal terminal operation and restarts it in Fileboss utility mode for uploading new firmware or associated ini files.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>set fileboss</td>
</tr>
<tr>
<td>Example</td>
<td>set fileboss</td>
</tr>
<tr>
<td>Returns</td>
<td>None: The terminal will stop running its SONAbeam program and start Fileboss operation.</td>
</tr>
</tbody>
</table>

**NOTE** In Fileboss mode, the terminal’s serial port operates at 19200 baud by default. Exit fileboss mode when finished and send reboot command to restart terminal. **WARNING:** If you use the STC interface to set the terminal to Fileboss mode, you will need to close STC and re-connect to the terminal using HyperTerminal or similar terminal-emulator programs to EXIT the Fileboss mode and return the terminal to normal operation! Fileboss can only be used for serial transfers.

Terminal Operation

**all_io**

<table>
<thead>
<tr>
<th>Description</th>
<th>Reports all internal analog and digital channels monitored by the terminal.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>poll all_io &lt;I&gt; Where &lt;I&gt; is the polling interval in seconds&lt;br&gt;get all_io</td>
</tr>
<tr>
<td>Returns</td>
<td>A string containing all analog and digital channels monitored by the terminal</td>
</tr>
</tbody>
</table>

**rx_power_fast**

<table>
<thead>
<tr>
<th>Description</th>
<th>Continuous reports instantaneous, calculated average and peak Rx Pwr (in uW) 18 times/sec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>poll rx_power_fast</td>
</tr>
<tr>
<td>Returns</td>
<td>;date=mm/dd/yyyy;time=hh:mm:ss;rx_power=&lt;value&gt;;rx_power_noavg=&lt;value&gt;;rx_peak=&lt;value&gt;;</td>
</tr>
</tbody>
</table>

**rx_power**

<table>
<thead>
<tr>
<th>Description</th>
<th>Reports the current calculated average Rx Pwr (in uW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>poll rx_power &lt;I&gt; Where &lt;I&gt; is the polling interval in seconds&lt;br&gt;get rx_power</td>
</tr>
<tr>
<td>Returns</td>
<td>;date=mm/dd/yyyy;time=hh:mm:ss;rx_power=&lt;value&gt;;rx_power_noavg=&lt;value&gt;;rx_peak=&lt;value&gt;; (get rx_power returns only averaged rx_power.)</td>
</tr>
</tbody>
</table>
Appendix D – SONAbeam Command Line Interface

**terminal_status**

<table>
<thead>
<tr>
<th>Description</th>
<th>Reports all un-cleared alarms plus the terminal's Available and Unavailable counters.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>poll terminal_status &lt;I&gt; Where &lt;I&gt; is the polling interval in seconds</td>
</tr>
<tr>
<td></td>
<td>get terminal_status</td>
</tr>
<tr>
<td>Example</td>
<td>poll terminal_status 60</td>
</tr>
<tr>
<td></td>
<td>get terminal_status</td>
</tr>
<tr>
<td>Returns</td>
<td>;fiber_in_alarm=ok;sys_alarm=error;transmit_alarm=ok;ps_alarm=error;temp_alarm=ok;</td>
</tr>
<tr>
<td></td>
<td>rxpwr_alarm=ok;AS=0;UAS=7116;rx_power=88.4;date=12/02/2003;time=13:53:04;</td>
</tr>
</tbody>
</table>

**Terminal SNMP Agent Configuration**

*NOTE...*

*Your terminal’s embedded SNMP agent features only work when you purchase and install the terminal-specific SNMP key code. Contact customer service if you wish to upgrade your firmware with this option.*

**nms**

<table>
<thead>
<tr>
<th>Description</th>
<th>Adds/removes a specified IP address from the terminal’s list of trap managers.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>add nms &lt;IP&gt; Where &lt;IP&gt; specifies the IP address of a terminal manager.</td>
</tr>
<tr>
<td></td>
<td>remove nms &lt;IP&gt;</td>
</tr>
<tr>
<td>Example</td>
<td>add nms 192.169.10.109</td>
</tr>
<tr>
<td></td>
<td>remove nms 192.169.10.113</td>
</tr>
<tr>
<td>Returns</td>
<td>nms_1=192.169.10.102;nms_2=192.169.10.104;nms_3=192.169.10.109;nms_4=;</td>
</tr>
</tbody>
</table>

**nms_list**

<table>
<thead>
<tr>
<th>Description</th>
<th>Reports the terminal’s list of SNMP trap managers.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>get nms_list</td>
</tr>
<tr>
<td>Example</td>
<td>get nms_list</td>
</tr>
<tr>
<td>Returns</td>
<td>nms_1=192.168.0.10;nms_2=192.168.0.32;nms_3=;nms_4=;</td>
</tr>
</tbody>
</table>

**snmp_community**

<table>
<thead>
<tr>
<th>Description</th>
<th>Sets/clears the terminal’s SNMP community string.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>set snmp_community &lt;C&gt; Where &lt;C&gt; is a space-less string with the specified community value.</td>
</tr>
<tr>
<td>Example</td>
<td>set snmp_community mystring</td>
</tr>
<tr>
<td></td>
<td>set snmp_community</td>
</tr>
<tr>
<td>Returns</td>
<td>None</td>
</tr>
<tr>
<td>Notes</td>
<td>When no community string is configured, the default string “public” is used. Use get terminal_config for report.</td>
</tr>
</tbody>
</table>

**snmp_contact**

<table>
<thead>
<tr>
<th>Description</th>
<th>Sets the terminal’s SNMP contact property.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>set snmp_contact &lt;C&gt; Where &lt;C&gt; is a space-less string with the specified terminal’s contact name.</td>
</tr>
<tr>
<td>Example</td>
<td>set snmp_contact Lamont_Cranston</td>
</tr>
<tr>
<td></td>
<td>set snmp_contact</td>
</tr>
<tr>
<td>Returns</td>
<td>None</td>
</tr>
<tr>
<td>Notes</td>
<td>Use get terminal_config for report.</td>
</tr>
</tbody>
</table>
### snmp_enable

**Description**: Enables/disables SNMP features including MIB requests and traps.

**Syntax**: `set snmp_enable <S>`  Where **S** is either "on" or "off"

**Example**: `set snmp_enable on`

**Returns**: `*** mm/dd/yyyy hh:mm:ss SNMP <S> ` Where **S** is either "enabled" or "disabled"

**Notes**: SNMP can only be enable if the terminal-specific SNMP key code is configured.

### snmp_location

**Description**: Sets the terminal's SNMP location property.

**Syntax**: `set snmp_location <L>`  Where **L** is a space-less string with the specified terminal's location.

**Example**: `set snmp_location AEC18_NW`

**Returns**: None

**Notes**: Use get terminal_config for report.

### snmp_name

**Description**: Sets the terminal's SNMP name property.

**Syntax**: `set snmp_name <N>`  Where **N** is a space-less string with the specified terminal name.

**Example**: `set snmp_name Link_D_far_side`

**Returns**: None

**Notes**: Use get terminal_config for report.

### snmpkey

**Description**: Sets the terminal's SNMP key code to enable optional SNMP feature.

**Syntax**: `set snmpkey <keycode>`  Where **keycode** is an fSONA-supplied, terminal-specific SNMP key code.

**Example**: `set snmpkey 289246`

**Returns**: None
This section provides technical reference information for using SONAbeam SNMP with your SNMP network management system:

**NOTE...**

SONAbeam SNMP is an OPTIONAL feature, enabled by an fSONA supplied key code. See Enabling SNMP, in the Terminal Management section of this guide for more information...

To integrate SONAbeam terminals into your SNMP network management system, use the MIBs installed with STC (Look in C:\Program Files\fSONA\STCV3\MIBs) or located on your SONAbeam Utilities SW CD:

- mib_ii.mib
- smi.mib
- traps.mib
- SONAbeamSNMP.mib (Use SONAbeamESNMP.mib for your –E terminals running v1.0.2 fw...)

With SNMP enabled, your terminal can be monitored simultaneously by multiple SNMP browsers/managers.

**MIB-II System Group**

The SONAbeam terminal supports the following MIB-II System group objects:

<table>
<thead>
<tr>
<th>Object ID</th>
<th>Name</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3.6.1.2.1.1.1.0</td>
<td>sysDescr</td>
<td>SONAbeam SNMP Agent</td>
</tr>
<tr>
<td>1.3.6.1.2.1.1.2.0</td>
<td>sysObjectID</td>
<td>1.3.6.1.4.1.13404</td>
</tr>
<tr>
<td>1.3.6.1.2.1.1.3.0</td>
<td>sysUpTime</td>
<td>System up time</td>
</tr>
<tr>
<td>1.3.6.1.2.1.1.4.0</td>
<td>sysContact</td>
<td>User supplied string *</td>
</tr>
<tr>
<td>1.3.6.1.2.1.1.5.0</td>
<td>sysName</td>
<td>User supplied string *</td>
</tr>
<tr>
<td>1.3.6.1.2.1.1.6.0</td>
<td>sysLocation</td>
<td>User supplied string *</td>
</tr>
<tr>
<td>1.3.6.1.2.1.1.7.0</td>
<td>sysServices</td>
<td>1</td>
</tr>
</tbody>
</table>

* These objects can be defined using the STC’s Setting tab.
SONAbeam Enterprise Specific MIB

The SONAbeam terminal supports the following SONAbeam objects:

<table>
<thead>
<tr>
<th>Object ID</th>
<th>Name</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3.6.1.4.1.13404.1.1.1.0</td>
<td>sbManufacturer</td>
<td>fSONA Systems</td>
<td>String</td>
</tr>
<tr>
<td>1.3.6.1.4.1.13404.1.1.2.0</td>
<td>sbModel</td>
<td>Model name</td>
<td>String</td>
</tr>
<tr>
<td>1.3.6.1.4.1.13404.1.1.3.0</td>
<td>sbSerialNo</td>
<td>Serial number</td>
<td>String</td>
</tr>
<tr>
<td>1.3.6.1.4.1.13404.1.1.4.0</td>
<td>sbFirmwareVer</td>
<td>Firmware version</td>
<td>String</td>
</tr>
<tr>
<td>1.3.6.1.4.1.13404.1.1.5.0</td>
<td>sbDeploymentDate</td>
<td>Deployment date</td>
<td>String</td>
</tr>
<tr>
<td>1.3.6.1.4.1.13404.1.2.1.0</td>
<td>sbFiberInput</td>
<td>Fiber Input Alarm Status</td>
<td>String *</td>
</tr>
<tr>
<td>1.3.6.1.4.1.13404.1.2.2.0</td>
<td>sbSystem</td>
<td>System Alarm Status</td>
<td>String *</td>
</tr>
<tr>
<td>1.3.6.1.4.1.13404.1.2.3.0</td>
<td>sbTemperature</td>
<td>Temperature Alarm Status</td>
<td>String *</td>
</tr>
<tr>
<td>1.3.6.1.4.1.13404.1.2.4.0</td>
<td>sbPowerSupply</td>
<td>Power Supply Alarm Status</td>
<td>String *</td>
</tr>
<tr>
<td>1.3.6.1.4.1.13404.1.2.5.0</td>
<td>sbTransmitter</td>
<td>Transmitter Alarm Status</td>
<td>String *</td>
</tr>
<tr>
<td>1.3.6.1.4.1.13404.1.2.6.0</td>
<td>sbRxPower</td>
<td>Low Rx Power Alarm Status</td>
<td>String *</td>
</tr>
<tr>
<td>1.3.6.1.4.1.13404.1.3.1.0</td>
<td>sbRxPowerLevel</td>
<td>Receive Power</td>
<td>Integer</td>
</tr>
<tr>
<td>1.3.6.1.4.1.13404.1.3.2.0</td>
<td>sbAS</td>
<td>Available Seconds</td>
<td>Integer</td>
</tr>
<tr>
<td>1.3.6.1.4.1.13404.1.3.3.0</td>
<td>sbUAS</td>
<td>Unavailable Seconds</td>
<td>Integer</td>
</tr>
</tbody>
</table>

* Response will be one of the following: ok, error or warn.

SONAbeam Enterprise Specific Traps

The SONAbeam terminal supports the following SONAbeam traps:

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>sbTrapFiberInput</td>
<td>Fiber Input Alarm</td>
</tr>
<tr>
<td>1</td>
<td>sbTrapSystem</td>
<td>System Alarm</td>
</tr>
<tr>
<td>2</td>
<td>sbTrapTransmitter</td>
<td>Transmitter Alarm</td>
</tr>
<tr>
<td>3</td>
<td>sbTrapPowerSupply</td>
<td>Power Supply Alarm</td>
</tr>
<tr>
<td>4</td>
<td>sbTrapTemperature</td>
<td>Temperature Alarm</td>
</tr>
<tr>
<td>5</td>
<td>sbTrapRxPwr</td>
<td>Rx Power Alarm</td>
</tr>
</tbody>
</table>
Appendix F – SONAbeam Laser Power Level Tables

This section provides reference information for SONAbeam terminal laser power levels:

The terminal’s power level settings are found on the Configuration screen within the System Control frame. Setting the terminal’s Power Level causes the power levels of the constituent laser transmitters to be adjusted as detailed in the tables below.

(Late Model) SONAbeam 155-S, 622-S & 1250-S Terminals

_Table 4_ prescribes the individual laser power levels for each terminal Power Level for late model SONAbeam 155-S and 622-S terminals and all SONAbeam 1250-S terminals:

<table>
<thead>
<tr>
<th>POWER LEVEL</th>
<th>LASER POWER LEVELS for each TRANSMITTER POSITION:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12 o’clock</td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>13</td>
<td>7</td>
</tr>
</tbody>
</table>

_Table 4 – Laser Power Levels vs. Terminal Power Level – SONAbeam 1250-S and (late model) SONAbeam 155-S & 622-S_
(Late Model) SONAbeam 52-M, 155-M, 622-M & 1250-M Terminals

*Table 5* prescribes the individual laser power levels for each terminal *Power Level* for late model SONAbeam 52-M, 155-M and 622-M terminals and all SONAbeam 1250-M terminals:

<table>
<thead>
<tr>
<th>POWER LEVEL</th>
<th>LASER POWER LEVELS for each TRANSMITTER POSITION:</th>
<th>1 o'clock</th>
<th>5 o'clock</th>
<th>7 o'clock</th>
<th>11 o'clock</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>OFF</td>
<td>1</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>OFF</td>
<td>1</td>
<td>1</td>
<td>OFF</td>
</tr>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>OFF</td>
</tr>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>OFF</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>2</td>
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<td>1</td>
<td>OFF</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
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</tr>
<tr>
<td>7</td>
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<td>2</td>
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<td>OFF</td>
</tr>
<tr>
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<td>2</td>
<td>2</td>
<td>2</td>
<td>OFF</td>
</tr>
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<td>OFF</td>
</tr>
<tr>
<td>11</td>
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<td>3</td>
<td>3</td>
<td>3</td>
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</tr>
<tr>
<td>12</td>
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<td>4</td>
<td>4</td>
<td>3</td>
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</tr>
<tr>
<td>13</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>OFF</td>
</tr>
<tr>
<td>14</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>OFF</td>
</tr>
<tr>
<td>15</td>
<td>5</td>
<td>4</td>
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<td>4</td>
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</tr>
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<tr>
<td>28</td>
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<td>7</td>
<td>7</td>
<td>7</td>
<td>OFF</td>
</tr>
</tbody>
</table>

*Table 5 – Laser Power Levels vs. Terminal Power Level – SONAbeam 1250-M and (late model) SONAbeam 52-M, 155-M & 622-M*
(Early Model) SONAbeam 155-S Terminals

*Table 6* prescribes the individual laser power levels for SONAbeam 155-S terminals:

<table>
<thead>
<tr>
<th>POWER LEVEL</th>
<th>LASER POWER LEVELS for each TRANSMITTER POSITION:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12 o’clock</td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
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<tr>
<td>3</td>
<td>3</td>
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<tr>
<td>4</td>
<td>4</td>
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<tr>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>5</td>
</tr>
</tbody>
</table>

*Table 6 – Laser Power Levels vs. Terminal Power Level – (early model) SONAbeam 155-S*

(Early Model) SONAbeam 155-M Terminals

*Table 7* prescribes the individual laser power levels for each terminal *Power Level* for early model SONAbeam 155-M terminals:

<table>
<thead>
<tr>
<th>POWER LEVEL</th>
<th>LASER POWER LEVELS for each TRANSMITTER POSITION:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 o’clock</td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
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</tr>
<tr>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>16</td>
<td>5</td>
</tr>
</tbody>
</table>

*Table 7 – Laser Power Levels vs. Terminal Power Level – SONAbeam 155-M – with (early model) Type 0 transmitters*
Laser Power Level vs. Laser Attenuation Index

Earlier versions of STC (pre v3.0.0) controlled the terminal’s overall transmitter power according to a Laser Attenuation Index. STC v3 and newer versions replace this concept with a Laser Power Index. The following table shows the relationship between the new and old labels:

<table>
<thead>
<tr>
<th>Laser Power Level</th>
<th>Laser Attenuation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (OFF)</td>
<td>OFF</td>
</tr>
<tr>
<td>1</td>
<td>-13.5db</td>
</tr>
<tr>
<td>2</td>
<td>-8db</td>
</tr>
<tr>
<td>3</td>
<td>-5db</td>
</tr>
<tr>
<td>4</td>
<td>-3db</td>
</tr>
<tr>
<td>5 (Max Pwr)</td>
<td>0db</td>
</tr>
</tbody>
</table>
Customer Service Contact Information

Telephone: 877.463.7662 (inside North America)
           604.273.6333 (outside North America)
Fax:       604.273.6343
Web:       www.fSONA.com
Email:     customerservice@fSONA.com