



**GAI-TRONICS**  
A HUBBELL COMPANY

# SP2 Configuration

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# SP2 Configuration

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## Introduction

This guide provides information to configure and program GAI-Tronics' range of SP2 handset/speaker amplifier stations and HUBBCOM stations. A GAI-Tronics SP2/HUBBCOM system is a modular industrial multicast Voice over Internet Protocol (VoIP) communication system that includes two to 4,096 stations. SP2 handset/speaker amplifier stations mimic the behavior of GAI-Tronics' traditional analog Page/Party® stations using a 100 Mbps Ethernet network infrastructure rather than a multi-pair cable platform. Ethernet switches and routers detect and isolate network faults; so, the loss of a single station does not adversely affect the entire system.

SP2/HUBBCOM stations require a 100 Mbps link to an Ethernet switch or router and therefore require Category 5 or better Ethernet cable. Isolate SP2/HUBBCOM network traffic from other devices and properly configure network switches and routers for IGMP (Internet Group Management Protocol) snooping and multicast filtering to ensure the quality of SP2/HUBBCOM audio. Eliminate public connectivity to the SP2/HUBBCOM network to ensure the security of the SP2 network system. Maximum cable runs between SP2 stations and network switches is 100 meters to comply with Ethernet standards.

A major difference between digital SP2 systems and analog Page/Party systems is in the configuration of the communication channels. SP2 systems use logical communication channels rather than hardwired connections. This allows flexibility when establishing different communication zones throughout a system. Add additional stations to the system at any time.

GAI-Tronics SP2 handset/speaker amplifier stations are available in a variety of models & styles, including handset and amplifier only models. The configuration methods covered in this manual are common to all models.

## SP2 Station Design

SP2 stations have a DSP (digital signal processor) with integral Ethernet NIC and 64 MB of ram. The DSP's programming implements Ethernet, audio manager, command line interface (CLI), configuration monitor, general I/O manager, health monitor, SMTP, Telnet, and TFTP services. An on-board external supervision circuit detects issues in the running processes and services and automatically reboots the device if it detects a problem.

## SP2 System Configuration

There are three methods to configure SP2/HUBBCOM stations in an SP2 system: local, TFTP boot, and mutual provisioning. Using local configuration mode, define the configuration of each SP2 station by setting all locally stored configuration parameters on each device. For TFTP boot provisioning, configure the SP2 stations using individual station configuration files stored on a TFTP server. The mutual provisioning method allows an administrator to design an entire SP2 system architecture by setting up one or more SP2 stations as master stations. A master station serves a standardized configuration to all other SP2 stations in a system.

**SP2 RELEASE NOTE:** The second octet of the Page and Party Sockets changed from .0 to .1 in firmware version 1.3.2. Update SP2 stations running older firmware or change the second octet of the IP address to .1 for these stations to communicate with stations running newer firmware.

## SP2 Console

The SP2 Console is a graphical application that simplifies the configuration of SP2 systems and is the most straightforward method to implement an SP2 system using mutual provisioning. The application presents expandable groups of settings, arranged around the top down *system, group, station, and profile* hierarchy of the mutual provisioning configuration file. This organizes the information and facilitates the creation of the master file used by all SP2 stations in a mutually provisioned SP2 environment. The application supports pushing a configuration to an SP2 station to implement mutual provisioning and provides SP2 station information.

## Provisioning

### Local Provisioning

There are two ways to locally manage SP2 stations; in-band management and out-of-band management. In-band management entails connecting to a station through an existing network infrastructure using a telnet connection from an administrative computer. If the network is down or the station is unreachable; use out-of-band management to configure the device. Out-of-band management requires a direct USB cable connection from an administrative computer to the SP2 station for administration.

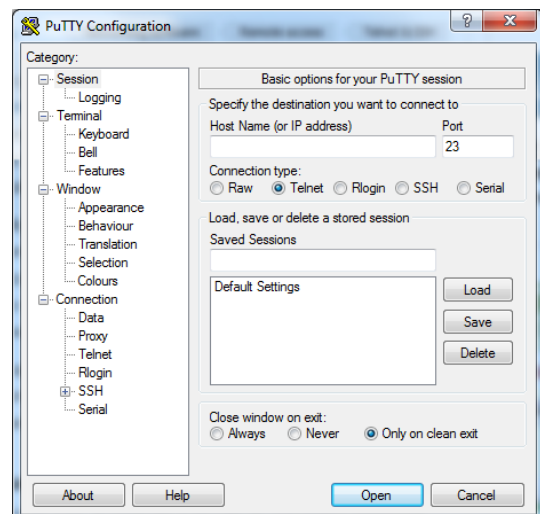
Upon accessing an SP2 station using either in-band or out-of-band management, the station prompts for credentials. Configure the station's parameters after successfully authenticating to the station. Connect to each station in turn and configure the individual configuration parameters as necessary.

### Using PuTTY for SP2 Administration

PuTTY is an open source application for telnet and file transfers. It supports several network protocols for in-band management and raw socket connections. For out-of-band management, the application supports a serial port connection since version 0.59.

Download the PuTTY application from the Internet, install it on an administrative computer on the SP2 network, and run the application.

Upon start-up, the PuTTY configuration screen appears as shown:



Prior to connecting to an SP2 station, enter the information that defines the type of connection (in-band or out-of-band). In-band connections communicate via the LAN and require the SP2 station's IP address and selection of telnet for the connection type. Set up out-of-band connections from the **SERIAL** page under the **CONNECTION** group in the **CATEGORY** panel in the **PUTTY CONFIGURATION** window.

### Serial Port Connection (Out-of-Band)

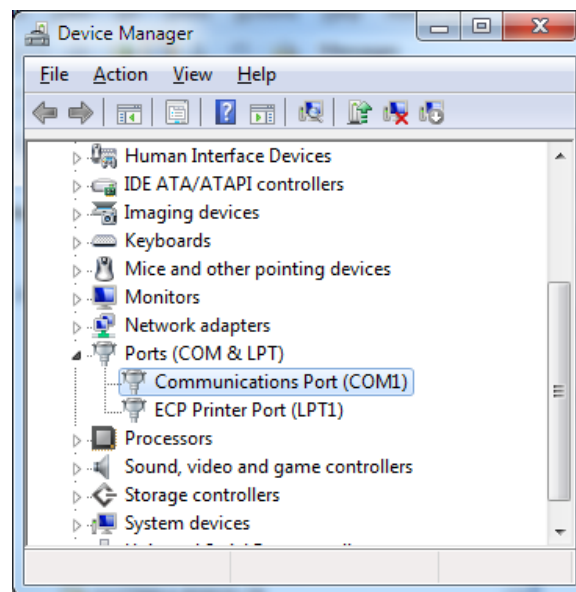
1. Energize the SP2 station and connect a USB cable between the administrative PC (Windows® 7 or later) and the SP2 PCBA.

Use a USB-A to USB-B type USB cable, as shown.

Upon connection to the SP2 station, the serial port drivers automatically load, and Windows® assigns a COM port number to the USB port on the administrative PC.



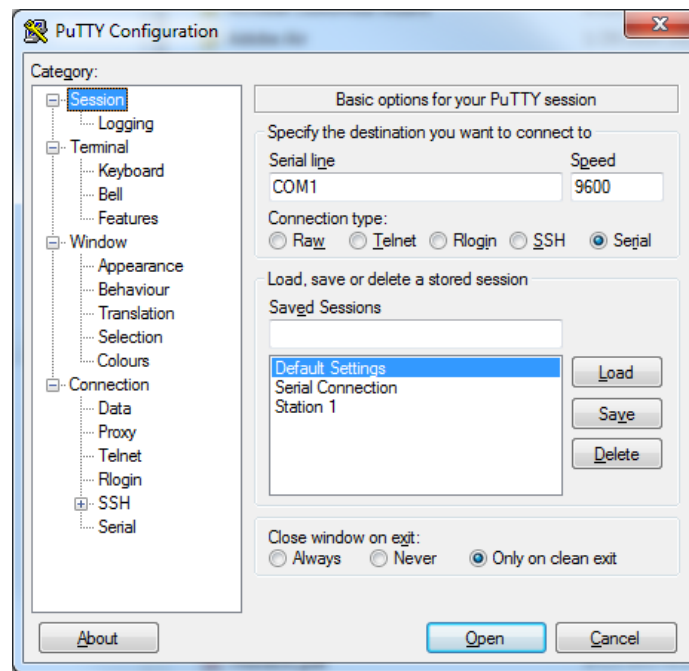
2. Find the assigned COM port number for this connection by looking it up in **Device Manager**, in the Windows control panel. Locate the COM port information on the Device Manager screen (see below).



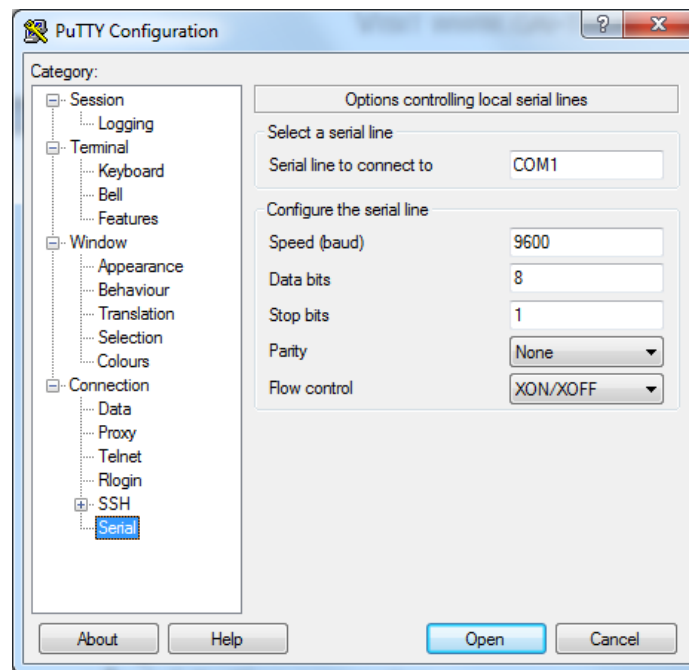
**NOTE:** If Windows doesn't automatically locate and install the proper VCP (virtual COM port) driver then download it from FTDI's website at <http://www.ftdichip.com>.

**NOTE:** Windows may assign a new COM port for each SP2 station the PC connects to. To avoid this, modify the registry to reuse the same COM port for all SP2 devices. See [Appendix A—Preventing Windows from Assigning Multiple COM Ports](#) for instructions.

3. Run the PuTTY application.
4. On the **SESSION** settings page, in the **CATEGORY** panel, select **SERIAL** for the connection type.  
The remaining serial port settings are set on the next screen.
5. Name and save each session for future use when connecting to multiple SP2 stations.



6. Navigate to the **SERIAL** settings page under the **CONNECTION** group in the **CATEGORY** panel.



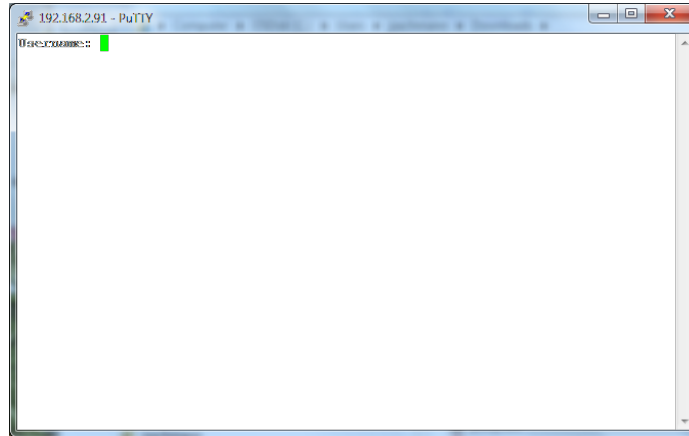
7. Enter the COM port number in the **SERIAL LINE TO CONNECT TO** field of the PuTTY Serial configuration screen.

8. Enter the serial line parameters in the PuTTY configuration screen above as follows:

**NOTE:** These values must match the values found on the port settings tab in the COM port properties dialog box in device manager.

- Speed (Baud): 57600
- Parity: None
- Data Bits: 8
- Follow Control: None
- Stop Bit: 1

9. Select OPEN. The following log-in screen appears upon successful connection to the SP2 station.

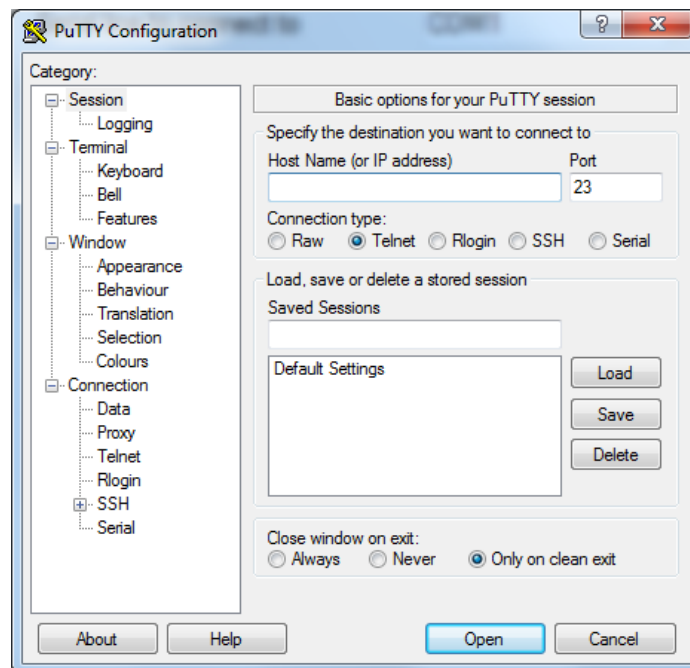


10. Enter the user name: **USER**

11. Enter the password: **PASS**

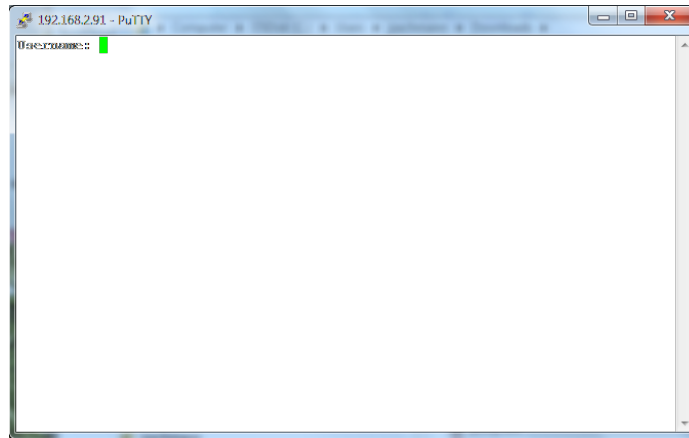
### Network Connection (In-Band)

1. Run the PuTTY software.
2. On the SESSION settings page in the CATEGORY panel, enter the host name or the IP address of the SP2 station.
3. For the CONNECTION TYPE, select the TELNET radio button
4. Select OPEN.





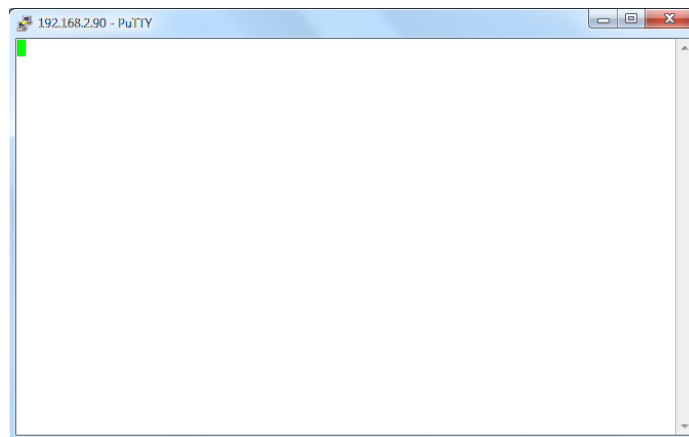
The following log-in screen appears upon successful access to the SP2 station:



5. Enter the user name: **USER**

6. Enter Password: **PASS**

**NOTE:** If the SP2 station does not respond, the screen appears blank (see below).



The CLI (Command Line Interface)

Alter a station's configuration parameters after connecting to the SP2 station using telnet via network or USB serial connection:

- Use the CLI to enter commands for the SP2 station to execute.
- An SP2 station carries out each command it understands.
- The syntax of SP2 commands has up to three parts:
  - the command name
  - the configuration parameter name
  - the setting name or value.

The command name is always first. The configuration parameter and setting come next but have different rules depending on the SP2 command. Some commands do not act upon parameters that store values. These commands simply execute when entered.

The following examples provide the command line syntax for some commonly used SP2 commands (see Table 1 through Table 11 on the following pages for descriptions of all valid commands, parameters, and settings):

1. Retrieve all current configuration parameters and their settings:

ENTER:

> **get ALL**

2. Retrieve the SP2 station's MAC address

ENTER:

> **get MAC**

3. Change the station's IP Address to 192.168.1.50

ENTER:

> **set ADDRESS 192.168.1.50**

4. Change the multicast socket (IP address & port number) assigned to party line #1.

- Address = 239.1.0.1
- Port = 50000

ENTER:

> **set PARTY\_1\_SOCK 239.1.0.1:50000**

5. Change the multicast socket (IP address & port number) that the SP2 will transmit on when the paging. If using the multi-zone page switch option, this would be position **A** on the page selector switch.

- Address = 239.1.1.1
- Port = 50002

ENTER:

> **set PAGETX\_A\_SOCK 239.1.1.1:50002**

6. Change the first multicast socket (IP address & port number) that the SP2 will monitor for incoming pages.

- Address = 239.1.1.1
- Port = 50002

ENTER:

> **set PAGERX\_1\_SOCK 239.1.1.1:50002**

Table 1. Command Line Interface Commands

Command Name	Description
<b>GET</b> <PARAMETER> or <PARAMETER GROUP>	<p>Returns the currently programmed value in the specified &lt;PARAMETER&gt; or &lt;PARAMETER GROUP&gt;</p> <p>The following tables provide information for each individual <i>PARAMETER</i>:</p> <p><a href="#">Table 2</a> for General Station Parameters,  <a href="#">Table 3</a> for IP Parameters,  <a href="#">Table 4</a> for Server Parameters,  <a href="#">Table 5</a> for I/O Parameters,  <a href="#">Table 6</a> for Multicast Socket Parameters,  <a href="#">Table 7</a> for Handset Timeout Parameters,  <a href="#">Table 8</a> for Firmware and Configuration Filename Parameters,  <a href="#">Table 9</a> for Audio Volume Parameters, and  <a href="#">Table 10</a> for Diagnostic Parameters.</p> <p>A parameter group is a collection of similar parameters. Valid <i>PARAMETER GROUPS</i> are:</p> <ul style="list-style-type: none"> <li>• ALL</li> <li>• OUTPUTS</li> <li>• PAGERX</li> <li>• VOLUME</li> <li>• IP</li> <li>• PARTY</li> <li>• PAGETX</li> </ul> <p>The GET command returns each parameter and its current setting, separated by carriage return/line feeds.</p>
<b>SET</b> <PARAMETER> <SETTING>	<p>Changes the &lt;SETTING&gt; for the specified &lt;PARAMETER&gt;</p> <p>Refer to the tables listed in the <b>GET</b> command above for information about each <i>PARAMETER</i>.</p>
<b>REBOOT</b>	<p>Resets the SP2 station.</p> <p><b>NOTE:</b> Reset the station to accept any value changes in its configuration. Following a <b>REBOOT</b> command; if necessary, the administrator must re-connect to the unit through a serial or network telnet connection.</p>
<b>SAVECFG</b>	<p>Sends the station's current configuration data to the TFTP server specified in the <i>TFTPSERVER</i> parameter. The station saves its configuration data to a text file using the pathname in the <i>CFG_FILENAME</i> parameter.</p> <p><b>NOTE:</b> If the file transfer is successful, the station returns the message <i>Configuration File Download Successful</i>.</p>
<b>LOADCFG</b>	<p>Retrieves the configuration file stored in the pathname specified in the <i>CFG_FILENAME</i> parameter from the TFTP server specified in the <i>TFTPSERVER</i> parameter.</p> <p><b>NOTE:</b> If the file transfer is successful, the station returns the message <i>Configuration File Upload Successful</i>.</p> <p>The station stores the parameters in <i>cfg_filename</i> as its new configuration and automatically reboots to implement the new configuration.</p>
<b>UPDATE</b> <FILE>	<p>Performs a firmware update from the TFTP server specified by the <i>TFTPSERVER</i> parameter using the pathname specified in the &lt;FILE&gt; argument.</p>
<b>RSTFAC</b>	<p>Restores all factory default settings from the SP2 station's firmware and automatically reboots the SP2 station.</p> <p><b>NOTE:</b> This command does not reset the <i>SPKRCALIB</i> value.</p>
<b>LOADFACCFG</b>	<p>Restores all station parameters from the <i>FAC_FILENAME</i> parameter on the TFTP server in the <i>TFTPSERVER</i> pathname.</p>

Command Name	Description
<b>EMAIL</b>	Sends a test email The <b>SMTPTO</b> and <b>SMTPFROM</b> parameters define the <i>To:</i> and <i>From:</i> email addresses. Define the <b>SMTPSERVER</b> , <b>SMTPPORT</b> , and <b>SMTPPASS</b> parameters in the station's configuration.
<b>STATUS</b>	Returns the status of the SP2 station, including the software version, configuration version, group and station IDs, currently selected page and party lines, the RTU I/O states, and fault status. If the <b>CFG_MODE</b> parameter is set to <b>MUTUAL</b> , it also reports the current master, group and station ID, master station IP address, mutual provisioning state, and the mutual provisioning checksum.
<b>TIME</b>	Returns the time currently stored in the station's real time clock in UTC.
<b>SPKRCALIB</b>	Performs a self-diagnostic speaker calibration test for speaker monitoring and stores the results in flash memory. Clear and repeat a station's speaker calibration when relocating a station or rewiring/replacing a speaker. The command <b>SET SPKR_CALIB 0</b> resets this parameter.

### SP2 Station Local Configuration

Each SP2/HUBBCOM station stores its own configuration containing the values for each parameter for proper operation within the SP2 system. The configuration defines many parameters such as:

- the station identity on the network
- audio connections to other stations
- operating parameters such as volume levels, etc.

The sample configuration files below show the factory default settings of all parameters for an SP2 station (see [Table 2](#) through [Table 10](#) below for information on each parameter, grouped by function). [Table eleven](#) provides the I/O states that control the internal LEDs and the output RTU contacts.

## Listing 1. Default SP2 Station Parameters

```
UNIT=SP2;
SERIAL=0000;
DESIGNATION=FACTORY;
VERSION=0;
CFG_MODE=MUTUAL;
MASTERLIST=0.01.0.02.0.03;
MAC=00:17:AE:00:00:F6;
HOSTNAME=GTC-0000;
NWMODE=DHCP;
ADDRESS=0.0.0.0;
MASK=0.0.0.0;
GATEWAY=0.0.0.0;
DNS=0.0.0.0;
ACTTL=8;
MCTTL=8;
TFTPSEVER=0.0.0.0;
SMTPSEVER=0.0.0.0;
SMTPPORT=25;
SMTPFROM=PHONENAME@NETWORK.COM;
SMTPTO=NAME@COMPANY.COM;
SMTPPASS=pass;
SNTPSEVER=0.0.0.0;
SNMPSEVER=0.0.0.0;
SNMPPORT=162;
CONTROL_SOCKET=239.239.239.239:50000;
PROVISION_SOCKET=239.245.0.245:1000;
LED1=OFF;
LED2=OFF;
LED3=OFF;
LED4=OFF;
LED5=OFF;
RTU_OP1=OFF;
RTU_IP1=OFF;
RTU_IP2=OFF;
RS_IP1=OFF;
RS_IP2=OFF;
PARTY_1_SOCKET=239.1.0.1:50000;
PARTY_2_SOCKET=239.1.0.2:50000;
PARTY_3_SOCKET=239.1.0.3:50000;
PARTY_4_SOCKET=239.1.0.4:50000;
PARTY_5_SOCKET=239.1.0.5:50000;
PAGERX_1_SOCKET=239.1.1.1:50002;
PAGERX_1_PRIO=1;
PAGERX_1_OUT=BOTH;
PAGERX_2_SOCKET=239.1.1.2:50002;
PAGERX_2_PRIO=2;
PAGERX_2_OUT=BOTH;
PAGERX_3_SOCKET=239.1.1.3:50002;
PAGERX_3_PRIO=3;
PAGERX_3_OUT=BOTH;
PAGERX_4_SOCKET=239.1.1.4:50002;
PAGERX_4_PRIO=4;
PAGERX_4_OUT=BOTH;
PAGERX_5_SOCKET=239.1.1.5:50002;
PAGERX_5_PRIO=5;
PAGERX_5_OUT=BOTH;
PAGERX_6_SOCKET=0.0.0.0:0;
PAGERX_6_PRIO=6;
PAGERX_6_OUT=BOTH;
PAGERX_7_SOCKET=0.0.0.0:0;
PAGERX_7_PRIO=7;
PAGERX_7_OUT=BOTH;
PAGERX_8_SOCKET=0.0.0.0:0;
PAGERX_8_PRIO=8;
PAGERX_8_OUT=BOTH;
PAGETX_A_SOCKET=239.1.1.1:50002;
PAGETX_A_DEFER=TRUE;
PAGETX_A_PRE=FALSE;
PAGETX_B_SOCKET=239.1.1.2:50002;
PAGETX_B_DEFER=TRUE;
PAGETX_B_PRE=FALSE;
PAGETX_C_SOCKET=239.1.1.3:50002;
PAGETX_C_DEFER=TRUE;
PAGETX_C_PRE=FALSE;
PAGETX_D_SOCKET=239.1.1.4:50002;
PAGETX_D_DEFER=TRUE;
PAGETX_D_PRE=FALSE;
PAGETX_E_SOCKET=239.1.1.5:50002;
PAGETX_E_DEFER=TRUE;
PAGETX_E_PRE=FALSE;
600OHM_TX_SOCKET=0.0.0.0:0;
600OHM_TX_DEFER=TRUE;
600OHM_TX_PRE=FALSE;
MUTE_SPKR=TRUE;
HSINVERT=FALSE;
HSTIMEOUT=8;
PBTIMEOUT=2;
CFG_FILENAME=%HOST-CFG.TXT;
FAC_FILENAME=FILENAME.TXT;
HANDSETVOL=250;
HEADSETVOL=100;
MICVOL=0;
AMPVOL=4;
ALS_ENABLE=FALSE;
ALS_OFFSET=10;
600OHM_OUT_VOL=775;
MUTE1=00:00:00:00;
MUTE2=00:00:00:00;
MUTE3=00:00:00:00;
MUTE4=00:00:00:00;
MUTE5=00:00:00:00;
MUTE6=00:00:00:00;
EZALLCALL=FALSE;
DIAGS=HANDSET+SPEAKER;
PROFILE=0;
TELNET_LOCK=FALSE;
ENC=FALSE
```

**NOTE:** Additional parameters and their stored values may appear when executing *GET* commands. These parameters are for future functions that this version does not include.

The following tables provide information about the various system parameters. When a parameter has a default setting, that setting is **bold** in the tables below.

Table 2. General Station Parameters

Parameter Name	Description & Valid Settings
<b>UNIT</b>	Defines the device as belonging to the SP2/HUBBCOM family of stations. Character String (Read Only) 1—SP2/SP2 Fiber Station, 4—HUBBCOM
<b>SERIAL</b>	GAI-Tronics assigns the station's serial number during manufacturing. ( <b>read only</b> )
<b>DESIGNATION</b>	A 1 to 32-character string indicating the name of the SP2 system when <b>CFG_MODE</b> is set to <b>MUTUAL</b> . <b>NOTE:</b> Only create one system designation on a network.
<b>VERSION</b>	The station's current configuration version. Stations use this parameter when <b>CFG_MODE</b> is set to <b>TFTP</b> or <b>MUTUAL</b> . It is important to update the <b>VERSION</b> parameter in the configuration file by one whenever making a change to the configuration. The SP2 stations use this in conjunction with the CRC of the file to determine whether to save and use these parameters.
<b>CFG_MODE</b>	Defines how a station acquires its configuration parameters on boot-up. Valid settings are: <ul style="list-style-type: none"> <li>• <b>STD</b>—Load the locally stored configuration settings.</li> <li>• <b>TFTP</b>—Load the configuration settings from the pathname specified in <b>CFG_FILENAME</b> from the TFTP server specified in <b>TFTPSERVER</b></li> <li>• <b>MUTUAL</b>—Load a master configuration file that contains information for all SP2 stations on a network. The <i>master</i> SP2 station distributes these parameters to the SP2 stations.</li> </ul>
<b>MASTERLIST</b>	A list of one to nine SP2 stations by station group and number in a system that are the system's master stations, in order from highest to lowest priority. Format the list as follows: G.SS, G.SS, ... (G=Group, S=Station Number). Example 0.01, 0.02, 0.03 Only applicable if <b>CFG_MODE</b> = <b>MUTUAL</b> . <b>Do NOT</b> modify this parameter.
<b>PROFILEn</b> (n = 0–9)	When <b>CFG_MODE</b> is set to <b>MUTUAL</b> a station with a value for this parameter applies the settings in the [PROFILEn] section of the mutual configuration file that the master station provides; where n:=0–9.
<b>MAC</b>	(Media Access Control) address; also known as the physical address—the network interface's unique identifier to communicate on a physical network segment. GAI-Tronics' prefix is: 0017AE; therefore, all MAC addresses for all SP2 and HUBBCOM stations are: 00:17:AE:xx:xx:xx (where "x" can be 0–F). <b>NOTE:</b> Each device on a network must have a unique address. <b>NOTE:</b> GAI-Tronics factory configures the MAC address. ( <b>read only</b> )
<b>HOSTNAME</b>	A unique name to identify a station on the network. Use a maximum of 32 characters consisting of a–z, 0–9 and - characters. The default hostname uses the station's serial number.
<b>NWMODE</b>	Defines how the station acquires its IP Address. Valid settings are: <ul style="list-style-type: none"> <li>• <b>Static</b>—set using the <b>ADDRESS</b> parameter.</li> <li>• <b>DHCP</b>—acquires the address from a DHCP Server on the network.</li> </ul> <b>NOTE:</b> If <b>NWMODE</b> is set to <b>DHCP</b> and no DHCP server is present; then, after four minutes, the station assigns itself an APIPA (Automatic Private IP Address). If the page and party sockets are correct, the stations will function properly. <i>Resolve this condition as quickly as possible.</i>

Parameter Name	Description & Valid Settings
<b>TELNET_LOCK</b>	<p>This setting controls the telnet service on the SP2 stations. Valid settings are:</p> <ul style="list-style-type: none"><li>• <b>TRUE</b>—The station disables the telnet service.</li><li>• <b>FALSE</b>—The station keeps the telnet service enabled.</li><li>• <b>Not Configured</b></li></ul> <p><b>NOTE:</b> SP2 stations with the <b>TELNET_LOCK</b> parameter configured in their configuration file override the telnet lock function in the SP2 Dashboard.</p>
<b>ENC</b>	<p>This setting controls the encryption of the provisioning channel. Valid settings are:</p> <ul style="list-style-type: none"><li>• <b>TRUE</b>—stations encrypt the provisioning channel they use to obtain the configuration from the master.</li><li>• <b>FALSE</b>—The stations do not encrypt the provisioning channel.</li></ul> <p><b>NOTE:</b> This setting is only compatible with SP2 hardware versions <math>\geq 1.3.0</math>.</p>

Table 3. IP Parameters

Parameter Name	Description & Valid Settings
<b>ADDRESS</b>	The station's IP address: IPv4 format: 0.0.0.0–255.255.255.255 (see the <i>Private IP Addresses</i> entry in the <u>Glossary of Terms</u> section of this manual for valid IPv4 addresses and formatting). <b>NOTE:</b> If the <i>NWMODE</i> parameter is set to <b>DHCP</b> , the DHCP server provides this parameter.
<b>MASK</b>	The station's subnet mask that identifies the subnet the IP address belongs to. IPv4 format: 0.0.0.0–255.255.255.254. The default SP2 network is class C with the corresponding mask set to 255.255.255.0. <b>NOTE:</b> If the <i>NWMODE</i> parameter is set to <b>DHCP</b> , the DHCP server provides this parameter.
<b>GATEWAY</b>	The IP address of the subnet's default gateway in IPv4 format. <b>NOTE:</b> If the <i>NWMODE</i> parameter is set to <b>DHCP</b> , the DHCP server provides this parameter.
<b>DNS</b>	The IP address of the domain name server in IPv4 format. <b>NOTE:</b> If the <i>NWMODE</i> parameter is set to <b>DHCP</b> , the DHCP server provides this parameter.
<b>ACTTL</b>	Audio TTL (Time to Live) determines the number of router hops that audio data will traverse before a router discards the data. Valid settings: 1 to 255
<b>MCTTL</b>	Multicast TTL determines the maximum router hops for a multicast IP data packet before a router discards the data packet. The control and provisioning sockets use this parameter. Valid settings: 1 to 255
<b>CONTROL_SOCK</b>	The SP2 Dashboard and Console use this multicast socket to discover and control SP2/HUBBCOM units in a network. Do NOT modify this parameter. IPV4 format: 239.XXX.YYY.ZZZ:PORT, XXX = 1 to 255 excluding 128, YYY and ZZZ = 0 to 255, PORT = 0 to 65534 must be even. Default: <b>239.239.2393.239:50000</b> , disabled 0.0.0.0:0
<b>PROVISION_SOCK</b>	SP2 stations use this channel to communicate when <i>CFG_MODE</i> is set to <b>MUTUAL</b> . Do NOT modify this parameter. IPV4 format 239.XXX.YYY.ZZZ:PORT, XXX = 1 to 255 excluding 128, YYY and ZZZ = 0 to 255, PORT = 0 to 65534 must be even, 0.0.0.0:0 disables provisioning, Default: <b>239.255.0.255:1000</b> (EXCEPTION: 225.71.84.67:10085 is VALID)



Table 4. Server Parameters

Parameter Name	Description & Valid Settings
<b>TFTPSERVER</b>	IP address of the TFTP Server in IPv4 format.
<b>SMTPSERVER</b>	IP address of the SMTP server in IPv4 format.
<b>SMTPPORT</b>	The port number for the email server. Commonly used SMTP ports: 25 or 587
<b>SMTPFROM</b>	The email address of the mailbox account for sending email. It appears in the <b>FROM</b> field when the SP2 station sends an email. e.g. PHONENAME@NETWORK.COM
<b>SMTPTO</b>	This is the email address appearing in the <b>TO</b> field when the SP2 station sends an email. e.g. NAME@COMPANY.COM
<b>SMTPPASS</b>	Password of the sending account for authentication to the SMTP server
<b>SNTPSERVER</b>	IP address of the time server in IPv4 format
<b>SNMPSERVER</b>	IP address of the SNMP (simple network management protocol) server for monitoring. Default is <b>0.0.0.0</b> for disabled The SNMP MIB is on the resources tab at <a href="http://www.gai-tronics.com">www.gai-tronics.com</a> .
<b>SNMPPORT</b>	The SNMP monitoring server's port address.

Table 5. Input/Output Parameters

Parameter Name	Description & Valid Settings
<b>LED<sub>n</sub></b> ( <b>n</b> = 1,2,3,4, or 5)	The SP2 circuit board contains five LEDs. Use these LEDs for diagnostic purposes. Configure the LEDs to turn ON when various station conditions change. Program each LED (1–5) individually (see <a href="#">Table 11</a> for valid output conditions).
<b>RTU_OP1</b>	SP2 stations have an output relay contact. Use the output contact for signaling or activation of external devices. Configure the relay to turn ON during various station operating conditions (see <a href="#">Table 11</a> for the valid output conditions to control RTU_OP1).
<b>RTU_IP<sub>n</sub></b> ( <b>n</b> = 1 or 2)	<p>SP2 stations provide two input circuits to monitor voltage free switch contacts, beacon cabling, or speaker loop cabling. Configure each input for the function used.</p> <ul style="list-style-type: none"> <li>• When monitoring input switch(s), configure the SP2 to send an email and/or activate the RTU relay output. Install end-of-line resistors to monitor the input switch cabling for line faults.</li> <li>• When monitoring a beacon or speaker loop's cabling, configure the station to send an email when it detects a line fault.</li> </ul> <p>Refer to the SP2 hardware manual for connection details. Valid settings are:</p> <ul style="list-style-type: none"> <li>• <b>Off</b>: Input circuit default</li> <li>• <b>NO</b>: Normally open switch with no line supervision</li> <li>• <b>NC</b>: Normally closed with no line supervision</li> <li>• <b>NO_S</b>: A single normally open switch with line supervision</li> <li>• <b>MNO_S</b>: Multiple normally open switches with line supervision</li> <li>• <b>NC_S</b>: Normally closed switch with line supervision</li> <li>• <b>SB_S</b>: Single beacon supervised</li> <li>• <b>HV_S</b>: 70/100 V speaker monitoring</li> </ul> <p><b>NOTE:</b> Use this option only on stations with the No. 69652 70-volt/100-volt termination PCBA.</p> <p><b>NOTE:</b> RTU input one is not available for use with the 70-volt/100-volt termination PCBA installed.</p>
<b>RS_IP<sub>n</sub></b> ( <b>n</b> = 1 or 2)	<p>The SP2 station provides two inputs on remote subsets.</p> <p><b>NOTE:</b> <b>RS_IP1</b> uses the party switch input; therefore, only single party subsets can monitor input one.</p> <p><b>RS_IP2</b> uses the page switch input; therefore, only stations that do not have a page selection switch can monitor input two.</p> <p>Valid functions are:</p> <ul style="list-style-type: none"> <li>• <b>Off</b></li> <li>• <b>NO</b>: Normally Open</li> <li>• <b>NC</b>: Normally Closed</li> </ul>
<b>EZALLCALL</b>	<p>This parameter is only valid on handset stations with an ALL CALL paging pushbutton. This parameter determines whether the user must depress the handset pressbar when making a page to the <b>PAGETX_B SOCK</b> multicast socket. Valid values are:</p> <ul style="list-style-type: none"> <li>• <b>TRUE</b>—Only press the ALL CALL button after lifting the handset to start paging to the <b>PAGETX_B SOCK</b> multicast address. The user does not need to press the handset pressbar to initiate the page. Pressing the handset pressbar without holding the ALL CALL button initiates a page on <b>PAGETX_A SOCK</b>.</li> <li>• <b>FALSE</b>—The user must always press the handset pressbar to make a page, including when using the ALL CALL button.</li> </ul> <p><b>NOTE:</b> Do not set this parameter to TRUE on stations that do not have an ALL CALL button.</p>

## Multicast Audio Communications

All audio communications (page and party lines) between SP2 stations use multicast sockets. A multicast socket consists of a multicast IP address and a port number. The IPv4 multicast address range is: 224.0.0.0–239.255.255.255.

Network protocols reserve certain blocks of multicast addresses. For example, the range of addresses between 224.0.0.0 and 224.0.0.255, inclusive, is for use by routing protocols and other low-level topology discovery or maintenance protocols. When configuring SP2 stations, use the *admin-local scoped* address block 239.0.0.0–239.255.255.255 (excluding 239.0.X.Y and 239.128.X.Y) to avoid conflicts with other network protocols.

Port numbers, assigned to processes, allow processes on computers to transmit and receive information on an IP network. The valid port number range is: 1–65535. There are three ranges for port number assignments: system ports (0–1023), user ports (1024–49151), and dynamic and/or private ports (49152–65535). When configuring SP2 stations, use only even numbered *private ports* 49152–65534 to avoid conflicts with other network protocols.

Table 6. Multicast Socket Parameters

Parameter Name	Description & Valid Settings
<b>PARTY_n SOCK</b> (n = 1–5)	The standard SP2 station includes five party lines for conversations. Each <i>PARTY</i> socket (1–5) consists of a multicast IP address and a port number. Configure a multicast socket for each party line (1–5) or disable the party line by setting the IP address and port to 0.0.0.0:0. The <i>PARTY_n SOCK</i> parameter corresponds to the party line selector switch position 1–5 on the SP2 station. IPv4 format: xxx.xxx.xxx.xxx:P x = Address P = Port number (49152–65534)
<b>PAGERX_n SOCK</b> (n = 1–8)	SP2 stations can receive page audio from eight different multicast network sockets. Each <i>PAGERX</i> socket (1–8) consists of a multicast IP address and a port number. Configure a multicast socket for each page line (1–8) or disable the page line by setting the IP address and port to 0.0.0.0:0. IPv4 format: xxx.xxx.xxx.xxx:P x = Address P = Port number (49152–65534)
<b>PAGERX_n PRIO</b> (n = 1–8)	This parameter determines the priority of the <i>PAGERX</i> (1–8) sockets above. If a station receives audio from more than one <i>PAGERX</i> socket at the same time, it only processes the highest priority page. The station passes the processed audio to the path configured via the <i>PAGERX_n OUT</i> parameter; speaker, and/or 600-ohm audio output. Priority 1 is the highest and 8 is the lowest. <ul style="list-style-type: none"> <li>• PAGERX_1_PRIO: 1</li> <li>• PAGERX_2_PRIO: 2</li> <li>• PAGERX_3_PRIO: 3</li> <li>• PAGERX_4_PRIO: 4</li> <li>• PAGERX_5_PRIO: 5</li> <li>• PAGERX_6_PRIO: 6</li> <li>• PAGERX_7_PRIO: 7</li> <li>• PAGERX_8_PRIO: 8</li> </ul>

Parameter Name	Description & Valid Settings
<b>PAGERX_n_OUT</b> (n = 1–8)	This parameter determines the audio output path for each of the eight <b>PAGERX_n SOCK</b> sockets above. The station provides a contact closure that indicates when the 600-ohm output is active. Valid settings for output are: <ul style="list-style-type: none"> <li>• <b>600OHMOUT</b>—sends the received audio stream only to the 600-ohm output. The <b>600OHM_OUT_VOL</b> parameter stores the output volume setting.</li> <li>• <b>SPEAKER</b>—sends the received audio stream only to the speaker output. The <b>AMPVOL</b> parameter stores the output volume setting.</li> <li>• <b>BOTH</b>—sends the received audio stream to both the 600 ohm &amp; speaker output. The <b>AMPVOL</b> parameter stores the output volume setting.</li> </ul>
<b>PAGETX_n SOCK</b> (n = A–E, SP2 stations n = A–P, HUBBCOM stations)	SP2 stations transmit page audio on five different multicast network sockets. Each <b>PAGETX</b> multicast socket (A–P) consists of a multicast IP address and a port number. Configure a multicast socket for each page line (A–P). Disable page lines by setting the IP address and port to 0.0.0.0:0. The <b>PAGETX_n SOCK</b> parameter corresponds to the page selector switch position on SP2 stations. Stations without a page selector switch transmit all paging audio on <b>PAGETX_A SOCK</b> . Set all unused sockets to 0.0.0.0:0. IPv4 format is: 239.xxx.yyy.zzz:P xxx = 1–255 excluding 128, yyy and zzz = 0–255, P = Port number (49152–65534) (must be even); Exception: 225.71.84.67:10085 is valid. <ul style="list-style-type: none"> <li>• <b>PAGETX_A SOCK</b>: 239.1.1.1:50002</li> <li>• <b>PAGETX_B SOCK</b>: 239.1.1.2:50002</li> <li>• <b>PAGETX_C SOCK</b>: 239.1.1.3:50002</li> <li>• <b>PAGETX_D SOCK</b>: 239.1.1.4:50002</li> <li>• <b>PAGETX_E SOCK</b>: 239.1.1.5:50002</li> </ul> HUBBCOM stations use 1 to 16 page transmit zones (A–P).
<b>PAGETX_n DEFER</b> (n = A–E, SP2 stations n = A–P, HUBBCOM stations)	This parameter prevents two SP2 stations from simultaneously sending a page on the same <b>PAGETX</b> socket. Valid settings are: <ul style="list-style-type: none"> <li>• <b>TRUE</b>—if a page is already in progress on the currently selected <b>PAGETX</b> line (A–E), the station will NOT transmit, and the station's handset receiver emits an alert tone.</li> <li>• <b>FALSE</b>—the station transmits audio onto the currently selected <b>PAGETX</b> line (A–E) regardless of the current paging status.</li> </ul>
<b>PAGETX_n PRE</b> (n = A–E stations n = A–P, HUBBCOM stations)	This parameter determines if the speakers play a <i>pre-announcement tone</i> prior to each outgoing page on the channel. Valid settings are: <ul style="list-style-type: none"> <li>• <b>TRUE</b>—The speakers play a fixed <i>pre-announcement tone</i> before each outgoing page from the channel.</li> <li>• <b>FALSE</b>—The speakers broadcast the page without playing the pre-announcement tone.</li> </ul>
<b>600OHM_TX SOCK</b>	This parameter configures the multicast socket for transmission of 600-ohm audio. The 600-ohm input is always the highest priority audio source. IPv4 format is: xxx.xxx.xxx.xxx:P x = Address P = Port number (49152–65534) Default: <b>0.0.0.0 (disabled)</b>
<b>600OHM_TX DEFER</b>	This parameter prevents 600-ohm audio transmission if the station is currently receiving an audio stream on the same multicast socket. Valid settings are: <ul style="list-style-type: none"> <li>• <b>TRUE</b>—Do not transmit audio to a multicast socket that is currently receiving an audio stream.</li> <li>• <b>FALSE</b>—Transmit the audio without regard for incoming audio on the same multicast socket.</li> </ul>

Table 7. Handset Timeout Parameters

Parameter Name	Description & Valid Settings
<b>HSINVERT</b>	This parameter enables the inversion of the current physical state of the hook-switch represented by the ON-HOOK and OFF_HOOK variables. Valid settings are: <ul style="list-style-type: none"> <li>• <b>TRUE</b>—ON-HOOK and OFF-HOOK values are opposite of the current hookswitch state.</li> <li>• <b>FALSE</b>—ON-HOOK and OFF-HOOK values represent the actual current state of the handset.</li> </ul>
<b>HSTIMEOUT</b>	Use the hook-switch timeout parameter to limit the period that an SP2 station can be off hook. Configure this parameter in minutes. The default is <b>8 minutes</b> . Set the hookswitch timeout to zero to disable the timeout.
<b>PBTIMEOUT</b>	Use this parameter to limit the period that a page can continue. Configure this parameter in minutes. The default is <b>2 minutes</b> . Set the pressbar timeout setting to zero to disable the timeout.

Table 8. F/W and Configuration Filename Parameters

Parameter Name	Description & Valid Settings
<b>CFG_FILENAME</b>	The pathname of an SP2 station's configuration file on the TFTP Server. The filename must have a <b>.txt</b> extension. Example pathname: <b>folder/folder/filename.txt</b> When the <i>CFG_MODE</i> parameter is set to <b>TFTP</b> , use the following tokens to differentiate separate SP2 stations' configuration filenames: <ul style="list-style-type: none"> <li>• %MACID = MAC address of the SP2 station.</li> <li>• %ip = IP address of the SP2 station. (<b>NOTE:</b> Only use this variable when <i>NWMODE</i> = <b>STATIC</b>.)</li> <li>• %name = Designation of the SP2 station.</li> <li>• %grp = Current setting of the hexadecimal address switch.</li> <li>• %stn = Current setting of the hexadecimal station switches.</li> </ul> <p><b>Important Note:</b> Use unique filenames for each SP2 station when using TFTP provisioning to avoid duplicate Hostnames, IP addresses, etc.</p>
<b>FAC_FILENAME</b>	This parameter stores the pathname for an additional/alternate SP2 configuration file. Use the configuration file that this parameter defines to store a site-specific default configuration or use it to test alternate settings without losing the settings in the <i>CFG_FILENAME</i> parameter.

Table 9. Audio Volume Parameters

Parameter Name	Description & Valid Settings
<b>HANDSETVOL</b>	Sets the volume of the handset receiver. The value represents the amplitude in millivolts (mV) <sub>RMS</sub> . Valid settings are: 100, 125, 150, 175, 200, 225, <b>250</b> , 275, 300, 325, 350 <b>NOTE:</b> Configuring this setting in the configuration file overrides any adjustments made to the potentiometer on the SP2 PCBA.
<b>HEADSETVOL</b>	Sets the volume of the headset receiver. The value represents the amplitude in millivolts (mV) <sub>RMS</sub> . Valid settings are: 75, <b>100</b> , 125, 150, 175, 200 <b>NOTE:</b> Configuring this setting in the configuration file overrides any adjustments made to the potentiometer on the SP2 PCBA.
<b>MICVOL</b>	Sets the gain of the handset microphone in decibels (dB). Valid settings are: -12, -6, <b>0</b> , 6, 12, 18, 24, 30 <b>NOTE:</b> Configuring this setting in the configuration file overrides any adjustments made to the potentiometer on the SP2 PCBA.
<b>AMPVOL</b>	Used with the <b>PAGERX_n_OUT</b> parameter, this parameter sets the audio volume level of the output amplifier. The value stored represents the power output of the station amplifier in watts (W) <sub>RMS</sub> . Valid settings are: .008, .016, .032, .063, .125, .25, .5, 1, 2, <b>4</b> , 9, 14, 18, 24, 30 <b>NOTE:</b> Configuring this setting in the configuration file overrides any adjustments made to the potentiometer on the SP2 PCBA.
<b>MUTE_SPKR</b>	Allows muting of incoming pages during page transmission on any PAGETX socket (A–E). Valid settings are: <ul style="list-style-type: none"> <li>• <b>TRUE</b>—Mutes all locally generated and received page audio while transmitting audio pages.</li> <li>• <b>FALSE</b>—Broadcasts received page audio over the station’s external speaker simultaneously while transmitting an outgoing page.</li> </ul>
<b>ALS_ENABLE</b>	Enables the ambient level sensing (Smart Volume) feature of the SP2 station. Valid Settings are: <ul style="list-style-type: none"> <li>• <b>TRUE</b>—enables Smart Volume</li> <li>• <b>FALSE</b>—disables Smart Volume</li> </ul>
<b>ALS_OFFSET</b>	Determines the speaker broadcast volume level above the measured ambient noise level. The value represents the offset in decibels (dbA). Valid settings are: <b>10</b> dB to 80 dB SPL
<b>600OHM_OUT_VOL</b>	Use this parameter with the <b>PAGERX_n_OUT</b> parameter. This parameter sets the audio level of the 600-ohm audio output. The value represents the amplitude in millivolts (mV) <sub>RMS</sub> . If the <b>PAGERX_n_OUT</b> parameter is set to <b>BOTH</b> , then the value in the <b>AMPVOL</b> parameter overrides this setting. Valid Settings are: 100, 200, 300, 500, 700, <b>775</b> , 900, 1000 <b>NOTE:</b> Configuring this setting in the configuration file overrides any adjustments made to the potentiometer on the SP2 PCBA
<b>MUTE1...</b> <b>MUTE6</b>	Use these parameters to prevent feedback by mutually muting stations near a station that is transmitting a page. Configure this parameters with the last four octets of the MAC addresses of the stations that cause feedback while they are transmitting. Format: 00:00:00:00

Table 10. Diagnostic Parameters

Parameter Name	Description & Valid Settings
<b>DIAGS</b>	This parameter determines what tests take place each time the diagnostic self- test runs. Set this to <b>HANDSET+HEADSET+SPEAKER</b> to execute all diagnostics, any combination of the three, or OFF.

The SP2 station's general I/O manager maintains I/O parameters in RAM while the SP2 station is running. These parameters are variables containing information regarding the current state of the SP2 station. Use these logical states to control the function of the five LEDs and the RTU output.

Table 11. SP2 Input/Output States

Variable Name	Description& Valid Values
<b>RXPAGEANY</b>	A page line is receiving a page.
<b>RXPAGEn</b>	Page line <i>n</i> , where <i>n</i> :=1–8, is receiving a page.
<b>TXPAGEANY</b>	One of the page lines is transmitting a page.
<b>TXPAGEn</b>	page line <i>n</i> , where <i>n</i> :=A–E, is transmitting a page ( <i>n</i> = A–P for HUBBCOM stations).
<b>PARTY</b>	The station is receiving audio on one or more party lines.
<b>PARTYn</b>	The station is receiving audio on party line <i>n</i> , where <i>n</i> :=1–5.
<b>ONHOOK</b>	The handset is on-hook.
<b>OFFHOOK</b>	The handset is off-hook.
<b>ON</b>	Always ON.
<b>OFF</b>	Always OFF.
<b>HEALTHY</b>	The station is not detecting a fault condition.
<b>FAULTY</b>	The station is detecting a fault condition.
<b>LINKUP</b>	The network interface physical link is up.
<b>LINKDOWN</b>	The network interface physical link is down.
<b>RTUIP1ACTIVE</b>	RTU input one is in the active state.
<b>RTUIP1INACTIVE</b>	RTU input one is in the idle state.
<b>RTUIP1OPEN</b>	RTU input circuit one is detecting an open circuit fault.
<b>RTUIP1SHORT</b>	RTU input circuit one is detecting a short circuit fault.
<b>RTUIP1GROUND</b>	RTU input circuit one is detecting an earth ground fault.
<b>RTUIP1LINE</b>	RTU input circuit one is detecting a short circuit line fault.
<b>RTUIP2ACTIVE</b>	RTU input two is in the active state.
<b>RTUIP2INACTIVE</b>	RTU input two is in the idle state.
<b>RTUIP2OPEN</b>	RTU input circuit two is detecting an open circuit fault.
<b>RTUIP2SHORT</b>	RTU input circuit two is detecting a short circuit fault.

Variable Name	Description& Valid Values
<b>RSIP1ACTIVE</b>	The desktop subset's input one is active.
<b>RSIP1INACTIVE</b>	The desktop subset's input one is inactive.
<b>RSIP2ACTIVE</b>	The desktop subset's input two is active.
<b>RSIP2INACTIVE</b>	The desktop subset's input two is inactive.

## TFTP Boot Provisioning

Configure SP2 stations to access a TFTP server to retrieve (download) a configuration file containing their parameter settings rather than manually setting SP2 station parameters on every device. SP2 stations, configured for TFTP boot, use locally stored settings on startup and then check the TFTP server for configuration changes. Each SP2 station compares the running configuration version with the version downloaded from the TFTP server. The station implements the new settings and reboots if the configuration file obtained from the TFTP server is a newer version. If the configuration version is the same; the station continues to run with the existing settings loaded at boot-up.

To utilize TFTP boot configurations:

1. Install and configure a TFTP server.
2. Create a configuration file for each station.
3. Store the configuration files on the TFTP server.

To accomplish this:

1. Manually configure the first station to obtain an initial configuration file.
2. Copy and modify it for each station that will obtain its configuration from the TFTP server.
3. Configure the individual stations to look for their configuration from the TFTP server.
  1. Initially power each station up using the factory default settings.
  2. Access each station using local provisioning to set the **CFG\_MODE**, **TFTPSERVER**, and **CFG\_FILENAME** parameters (See [The CLI \(Command Line Interface\)](#) and [SP2 Station Local Configuration](#) sections).
  3. Reboot each station to apply the settings.

Upon reboot, each station:

- connects to the TFTP server
- downloads the proper configuration
- reboots again to apply the settings

If a DHCP server is not available on the network:

1. Set the **NWMODE** parameter to **STATIC**.
2. Locally configure the **ADDRESS**, **MASK**, **GATEWAY**, and **DNS** parameters on each station to access the TFTP server.



## Mutual Provisioning

This design technique allows SP2 stations in a system to obtain their system configuration without requiring a fixed central configuration server or human administration. This also streamlines the initial set-up process by separating the system design and planning stages from the system installation phase. These features minimize cost and effort when adding, maintaining, or replacing SP2 stations in an existing system.

Actual station operation does not require mutual provisioning and mutual provisioning has no effect on SP2 station operation. SP2 stations operating in mutual provisioning mode combine the system configuration from the master SP2 station with their locally stored configuration parameters to obtain their running parameter values. The stations merge the system settings with their local settings so that the system settings override any locally configured parameters. It is therefore important not to configure any parameters in the system file for SP2 stations with those parameters locally configured.

**NOTE:** The one exception to this is the **TELNET\_LOCK** parameter. Configuring the **TELNET\_LOCK** parameter in the local configuration file overrides the telnet lock function in the SP2 Dashboard.

### System Configuration File

Mutual provisioning uses a single system-wide configuration that the master stations store. The system-wide configuration file contains the same parameters as a local configuration with the addition of *section labels* and *comments*.

The system configuration file contains every setting necessary for every station to operate in the system. The system configuration file size limit is 100 KB.

System wide control is via a single *master* station. Provision master stations with a local configuration. The values in the **MASTERLIST** parameter determine the master station and any backup master stations, in the system. The **STATION** order in the **MASTERLIST** parameter determines which station is the master. Backup master stations act like normal SP2 stations until the current master station fails. Stations listen for the heartbeat packet on the command channel to determine the failure of the current master station.

SP2/HUBBCOM stations obtain the system configuration through a provisioning channel. A provisioning channel is a special multicast socket that SP2 stations use to download the system configuration from the master station. SP2 stations store the system configuration alongside the local configuration in non-volatile ram. The system's master SP2 station sends a heartbeat packet on the provisioning channel every three seconds. The heartbeat packet contains a check sum for the current system configuration. SP2 stations in the system compare the check sum to the check sum of their currently stored system configuration. Stations download the new system configuration and reboot if the checksum in the heartbeat packet is different from their currently stored configuration checksum.

Configure additional SP2 stations for mutual provisioning by adjusting the *group* and *station number* hex switches, on the main PCBA in each SP2 station. These switches also control the group and station number that applies system settings to individual groups and/or stations via the *labels* in the system configuration file. The **CFG\_MODE** parameter's factory default setting is **MUTUAL** so the remaining SP2 stations in the system do not require configuration before installation.

## Section Labels

Section labels in the mutual provisioning configuration file divide the SP2 station parameters into a hierarchy that governs the precedence in which the parameters containing values apply. There are four section labels in the mutually provisioned configuration file.

[SYSTEM]—The system configuration file requires this label for mutual provisioning to function. Place this label at the top (first line) and bottom (last line) of the configuration file. Include all global parameters, meant for all SP2 stations, at the top of the configuration file under the [SYSTEM] label.

[GROUPn]—Where n can be 0–F (in hex). SP2 stations with their group hex switch set for a particular group will utilize the parameters specified under the matching group label.

[G.SS]—Where G = group number (0–F) and S = Station number (00–FF). An SP2 station with its group and station number hex switches set to a particular group and station number implement the parameters containing values under that label. Assign only one station to each unique G.SS station identifier.

[PROFILEn]—Where n can be 0–9. Use profiles to implement a unique set of parameters for a set of stations. Place this label and the parameters defined under it at the bottom of the system configuration file, before the ending [SYSTEM] label.

**NOTE:** Although parameters may be under any label; ensure that the *DESIGNATION*, *VERSION*, *CFG\_MODE*, and *MASTERLIST* parameters are only under the first [SYSTEM] label, making them global. Do not repeat these settings under any other label.

//—This label, at the beginning of a line, indicates the line is a comment. Comments are ignored by SP2 stations.

## Profiles

Use profiles in the configuration file to set unique configuration options for special situations such as having one station in each zone or group having special features. This is implemented in the system configuration file by assigning a profile number to a station in the [G.SS] section of the system configuration and then adding the [PROFILEn] section to the configuration file containing any special settings that might be needed. Configure up to nine unique profiles in an SP2 system.

## Listing 2. Example System Configuration File

```

[SYSTEM];
//GLOBAL SETTINGS START
DESIGNATION=CUSTOM_DESIGNATION;
VERSION=0;
CFG_MODE=MUTUAL;
MASTERLIST=0.01,0.02,0.03;
NWMODE=DHCP;
TFTPSEVER=0.0.0.0;
SMTPSERVER=0.0.0.0;
SMTPPORT=25;
SMTPFROM=PHONENAME@NETWORK.COM;
SMTPTO=NAME@COMPANY.COM;
SMTPPASS=pass;
SNTPSERVER=0.0.0.0;
//GLOBAL SETTINGS END
//GROUP1 SETTINGS START
[GROUP1];
LED1=ON;
LED2=OFF;
LED3=OFF;
LED4=OFF;
LED5=OFF;
//GROUP1 SETTINGS END
//GROUP2 SETTINGS START
[GROUP2];
LED1=OFF;
LED2=ON;
LED3=OFF;
LED4=OFF;
LED5=OFF;
//GROUP2 SETTINGS END
//STATION 0.01 SETTINGS START
[0.01];
PARTY_1_SOCK=239.1.0.1:50000;
PARTY_2_SOCK=239.1.0.2:50000;
PARTY_3_SOCK=239.1.0.3:50000;
PARTY_4_SOCK=239.1.0.4:50000;
PARTY_5_SOCK=239.1.0.5:50000;
PAGERX_1_SOCK=239.1.1.1:50002;
PAGERX_1_PRIO=1;
PAGERX_1_OUT=BOTH;
PAGERX_2_SOCK=239.1.1.2:50002;
PAGERX_2_PRIO=2;
PAGERX_2_OUT=BOTH;
PAGERX_3_SOCK=239.1.1.3:50002;
PAGERX_3_PRIO=3;
PAGERX_3_OUT=BOTH;
PAGERX_4_SOCK=239.1.1.4:50002;
PAGERX_4_PRIO=4;
PAGERX_4_OUT=BOTH;
PAGERX_5_SOCK=239.1.1.5:50002;
PAGERX_5_PRIO=5;
PAGERX_5_OUT=BOTH;
PAGERX_6_SOCK=0.0.0.0:0;
PAGERX_6_PRIO=6;
PAGERX_6_OUT=BOTH;
PAGERX_7_SOCK=0.0.0.0:0;
PAGERX_7_PRIO=7;
PAGERX_7_OUT=BOTH;
PAGERX_8_SOCK=0.0.0.0:0;
PAGERX_8_PRIO=8;
PAGERX_8_OUT=BOTH;
PAGETX_A_SOCK=239.1.1.1:50002;
PAGETX_A_DEFER=TRUE;
PAGETX_A_PRE=FALSE;
PAGETX_B_SOCK=239.1.1.2:50002;
PAGETX_B_DEFER=TRUE;
PAGETX_B_PRE=FALSE;
PAGETX_C_SOCK=239.1.1.3:50002;
PAGETX_C_DEFER=TRUE;
PAGETX_C_PRE=FALSE;
PAGETX_D_SOCK=239.1.1.4:50002;
PAGETX_D_DEFER=TRUE;
PAGETX_D_PRE=FALSE;
PAGETX_E_SOCK=239.1.1.5:50002;
PAGETX_E_DEFER=TRUE;
PAGETX_E_PRE=FALSE;
600OHM_TX_SOCK=0.0.0.0:0;
600OHM_TX_DEFER=TRUE;
600OHM_TX_PRE=FALSE;
MUTE_SPKR=FALSE;
HSINVERT=FALSE;
HSTIMEOUT=8;
PBTIMEOUT=2;
CFG_FILENAME=%HOST-CFG.TXT;
FAC_FILENAME=FILENAME.TXT;
HANDSETVOL=250;
HEADSETVOL=100;
AMPVOL=4;
ALS_ENABLE=FALSE;
ALS_OFFSET=10;
600OHM_OUT_VOL=775;
MUTE1=00:00:00:00;
MUTE2=00:00:00:00;
MUTE3=00:00:00:00;
MUTE4=00:00:00:00;
MUTE5=00:00:00:00;
MUTE6=00:00:00:00;
EZALLCALL=FALSE;
DIAGS=HANDSET+SPEAKER;

```

## Configuration File Generation

Create a template to start from by generating a local configuration from the first SP2 station.

**NOTE:** The TFTPSEVER IP address and CFG\_FILENAME values are implementation specific.

Set up a system using mutual provisioning mode as follows:

1. Connect to the first station using local provisioning.
2. Issue the following commands:
3. >> **SET CFG\_MODE STD**
4. >> **SET TFTPSEVER 192.168.1.221**
5. >> **SET CFG\_FILENAME SYSTEM1.TXT**
6. >> **REBOOT**

After the reboot, reconnect to the station and execute the following command:

7. >> **SAVECFG**

This saves the system configuration file to the TFTP server.

8. Adjust the local configuration to conform with the example below to make a valid system configuration.
  - Maintain all the default local configuration parameters in the system configuration file.
  - If a parameter is not in the system configuration file, an SP2 station will use what is locally configured at the station for that value.
  - A system configuration must start and end with the [SYSTEM] label.
  - SP2 stations read the configuration file parameters from the top down.  
If a parameter is listed more than once; the SP2 station uses the last valid setting that applies.

**NOTE:** Do not configure volume settings in the system configuration if the stations will use local adjustments.

## Configure the First SP2 Station

Configure the first SP2 station with the station ID (group/zone and station number) of the highest priority station in the **MASTERLIST** parameter, in the configuration file. Connect the station to a laptop/PC using a network cable or USB cable and power up the station.

**NOTE:** Create or update a system configuration only on the current master station. For initial configuration, set the group/station switches of the first station to 0.01 to force the assignment of the static IP address 192.168.1.125. Obtain the master station's IP address information by connecting to any SP2 station and executing the **STATUS** command.

An administrator must connect to the station and either update the existing system configuration or load an existing system configuration file as follows.

1. >> **SET CFG\_MODE STD**
2. >> **SET TFTPSEVER 192.168.1.221**
3. >> **SET CFG\_FILENAME SYSTEM1.TXT**
4. >> **REBOOT**

Once a valid system configuration exists on the TFTP server, execute the **LOADCFG** command to reboot the unit, making it the master station; providing the system configuration to additional stations as they power on. Be sure to have **CFG\_MODE=MUTUAL** and a **DESIGNATION** other than **FACTORY** for the system's configuration.

### 3. >> **LOADCFG**

To load additional units set the station ID (group/zone and station number) as desired and then power on the unit. The master station transfers the system configuration to the unit. The unit reboots and implements the settings in the system configuration file.

**NOTE:** Always reboot a station after changing the group/station hex switches to a different address.

## SP2 Console

Use the SP2 Console application to logically organize and simplify the configuration and modification of SP2 systems running in mutual provisioning mode. The SP2 Console has two parts: the SP2 Dashboard and the SP2 Configuration Utility. The SP2 Dashboard provides information and control of the SP2 stations in a mutually provisioned system. The SP2 Configuration Utility displays the SP2 station parameters in expandable panes of configuration settings for the *system*, *group*, *station*, and *profile* levels of the SP2 configuration hierarchy to facilitate system configuration.

## Installation Requirements

The SP2 Console application is an Adobe AIR application. Install Adobe AIR on the host computer prior to installing the SP2 Console application. The Adobe AIR software is free. Download and install the newest version from Adobe's Internet website, <http://get.adobe.com/air>.

Install the SP2 Console application, as described below, after installing Adobe AIR.

## Installation Procedure

1. Navigate to the location of the **SP2Console.air** installation package and double click it to begin the installation.
2. Click the **INSTALL** button when the screen below appears.

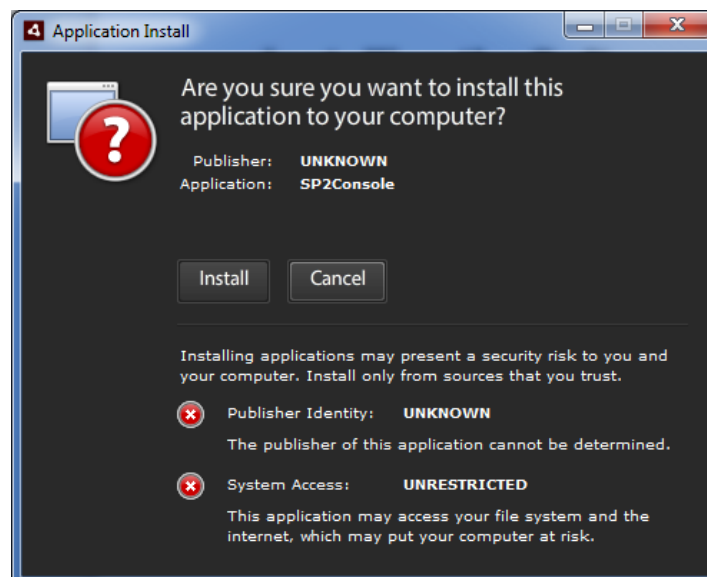


Figure 1. Installing the SP2 Console

4. Keep the default INSTALLATION PREFERENCES and INSTALLATION LOCATION and click CONTINUE.

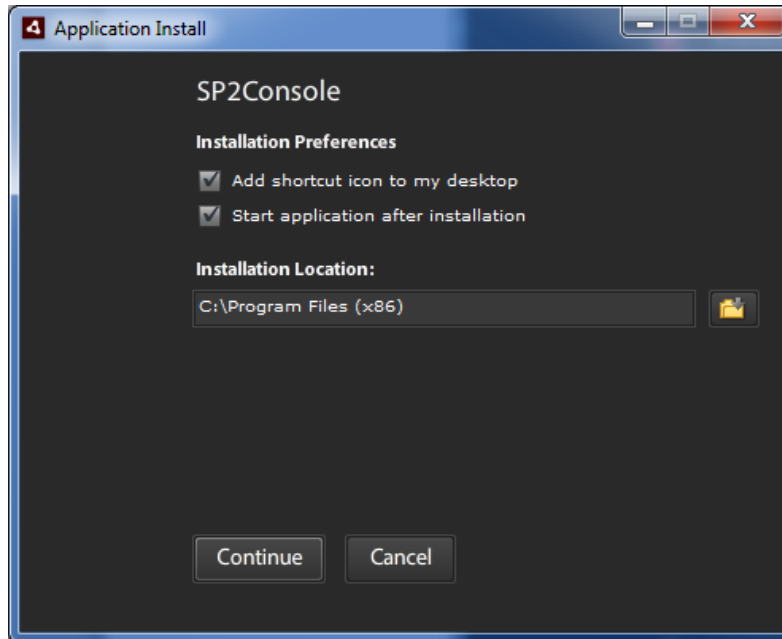
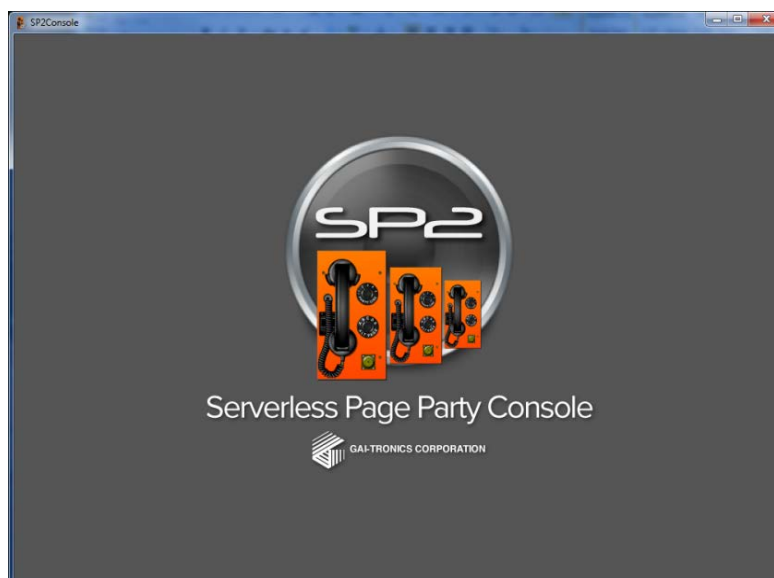


Figure 2. Installation Preferences

5. Accept any security warnings as necessary to continue the installation.
6. The SP2 Console automatically launches when the installation completes.

## Run the SP2 Console Application

Start the SP2 Console application from the start-menu, desktop, or taskbar shortcut, created during installation. The splash screen below appears while the program opens. The console opens to a three-button menu; providing options to create a new configuration, load an existing configuration, or open the SP2 Dashboard. The next section describes the SP2 Dashboard functionality, followed by the mutual provisioning configuration details.



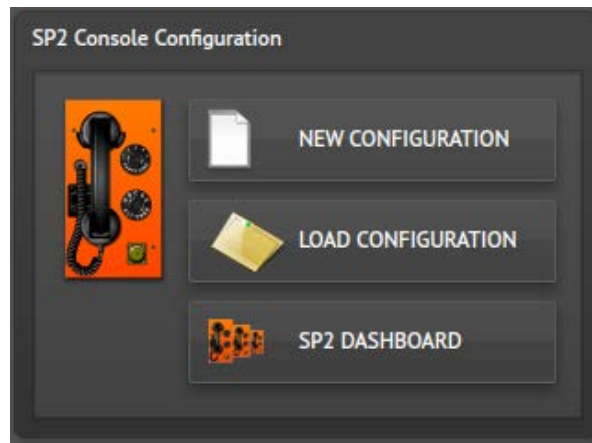


Figure 3. SP2 Console Initial Menu

### SP2 Dashboard

Click the SP2 DASHBOARD button to open the station information and control utility for SP2 stations. SP2 station discovery takes place while the dashboard loads. Click the toolbar refresh button to execute a station discovery. All stations with the default CONTROL SOCKET parameter in their configuration file will respond to the discovery and show up in the discovered stations list (see Figure 5). If no master station responds, the *Master Station Not Found* message appears in the first line. The dashboard opens displaying the master station (if found) and the SP2 stations on the network.

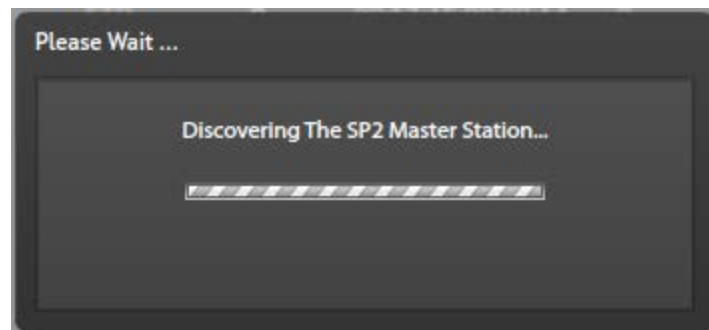


Figure 4. Master Station Discovery

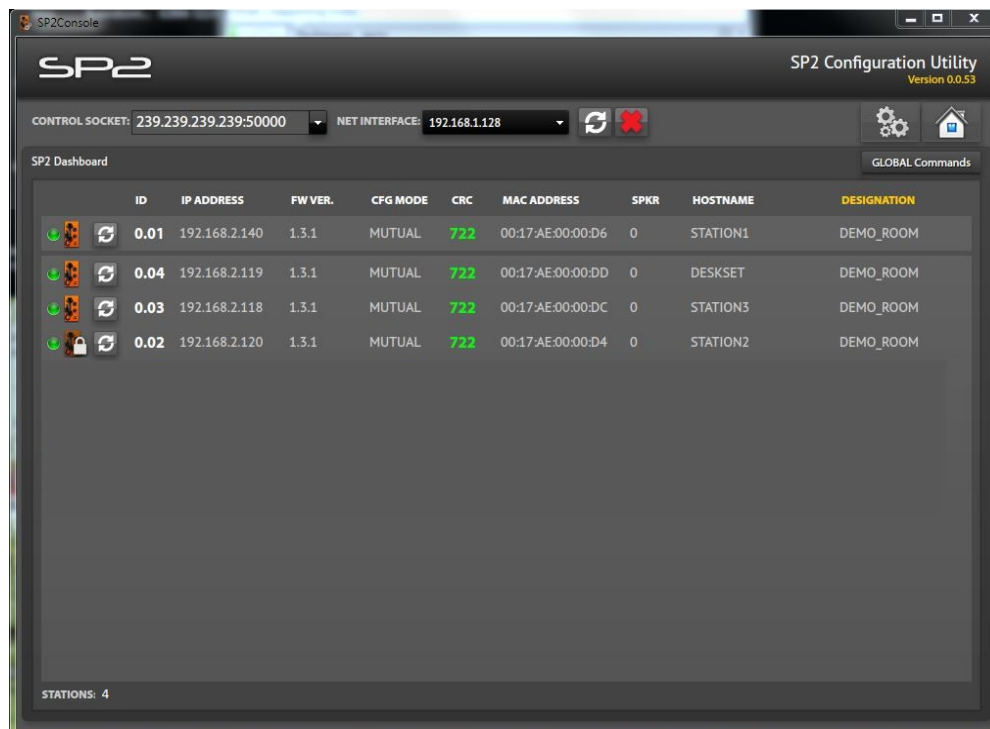


Figure 5. SP2 Discovered Stations

## Dashboard Toolbar

At the top of the SP2 Dashboard window is the toolbar. The toolbar displays the CONTROL SOCKET and NET INTERFACE system parameters followed by the *refresh*, *clear result*, *system options*, and *home* buttons.

- **CONTROL SOCKET**—the multicast socket that SP2 stations use to send and receive station control information.
- **NET INTERFACE**—the IP address of the PC's network interface on the network containing the SP2 stations.

Use the dropdown list to select a different subnet to search for stations if the PC has multiple network cards that connect to individual networks.



Figure 6. SP2 Dashboard Menu

- **Refresh**—forces an SP2 discovery to take place immediately.
- **Clear Result**—clears all information from the SP2 dashboard discovered in previous discoveries.
- **Dashboard Options**—opens the DASHBOARD OPTIONS dialog box (see [Figure 7](#)).

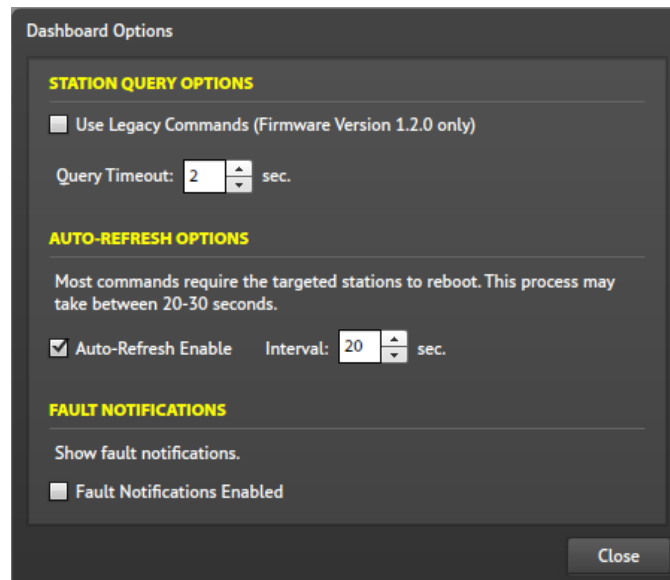


Figure 7. Dashboard Options Dialog Box

## STATION QUERY OPTIONS

- **Use Legacy Commands (firmware Version 1.2.0 only)**— modifies the SP2 station query to find only the stations running this firmware version. This only applies to installations with SP2 stations using firmware version 1.2.0. Selecting this option prevents the dashboard from discovering stations running newer firmware.
- **Query Timeout**—sets the dashboard timeout for listening for replies from the SP2 stations.



AUTO-REFRESH OPTIONS

- **Auto-Refresh Enable**—enables/disables an automatic refresh query of the SP2 station after issuing a command.
- **Interval:**—sets the period (in seconds) before the automatic refresh query takes place after issuing a command.

FAULT NOTIFICATIONS

**Fault Notifications Enabled**—enables/disables the display of fault notifications in the dashboard. Enable this option to set the status icon LED to blink red for all stations with faults. Execute an SP2 discovery to refresh the display after toggling this option. Exiting the application resets this option.

- **Home**—The HOME button closes the dashboard and returns the user to the initial SP2 console menu.

SP2 Station Information and Control

An SP2 station discovery displays each discovered station’s status, configuration CRC, firmware version, and network information in the **SP2 DASHBOARD** (see [Figure 8](#)).

- The SP2 Dashboard organizes SP2 station information in columns.
- The master station is always at the top of the list with the remaining discovered stations initially sorted by station ID.
- Click on any column to sort the stations by that attribute.

The column heading turns yellow, indicating the current sort column.

- The status bar, at the bottom of the panel, displays the number of stations discovered.
- On the far-right end of the dashboard title bar is the **GLOBAL COMMANDS** button (see the [Global Commands](#) section).

ID	IP ADDRESS	FW VER.	CFG MODE	CRC	MAC ADDRESS	SPKR	HOSTNAME	DESIGNATION
0.01	192.168.2.140	1.3.1	MUTUAL	722	00:17:AE:00:00:D6	0	STATION1	DEMO_ROOM
0.04	192.168.2.119	1.3.1	MUTUAL	722	00:17:AE:00:00:DD	0	DESKSET	DEMO_ROOM
0.02	192.168.2.120	1.3.1	MUTUAL	722	00:17:AE:00:00:D4	0	STATION2	DEMO_ROOM
0.03	192.168.2.118	1.3.1	MUTUAL	722	00:17:AE:00:00:DC	0	STATION3	DEMO_ROOM
5.01	192.168.1.207	0.1.0.4273	STD	6131	00:17:AE:00:01:B0	0	GTC-SVS-002-02	FACTORY
0.00	192.168.1.183	1.3.1	MUTUAL	0	00:17:AE:00:00:FB	-3325	GTC-0000	FACTORY
0.00	192.168.1.176	1.3.1	STD	0	00:17:AE:00:00:A4	0	GTC-0123456789	GT_TESTBED
0.0F	192.168.1.173	1.3.1	MUTUAL	9E23	00:17:AE:00:01:0E	0	GTC-SERIAL-1234	JUHL

Figure 8. SP2 Dashboard

**Status LED icon**—displays green for all stations without faults. Enable fault notifications in the DASHBOARD OPTIONS dialog box (see the Dashboard Options section) to configure the status LED icon to blink red for all stations with faults.

- It is not possible to determine the exact nature of the fault from the SP2 Console application.
- A dark status LED icon indicates a station found in a previous discovery did not reply to the most recent discovery.

**Station Icon**—indicates the SP2 device type. SP2 stations with fiber connectivity display a different icon.

**Padlock Icon**—indicates that the station's telnet service is currently disabled.

**Refresh Button**—performs an SP2 discovery for the station to refresh its data.

**ID**—provides the group and station number from the SP2 station's main PCBA, formatted as GROUP.STATION, (0–F).(01–FF).

**IP Address**—the current network address of the station.

**FW Ver.**—the firmware version currently running on the station.

- Store all SP2 firmware files on a TFTP server defined in the **TFTPSERVER** field in the configuration file.
- Firmware filename formats (*Version* is the current firmware version, Ex. 1.3.1):
  - SPP\_*Version*.LDR—100BaseT stations
  - SPP\_Fiber*Version*.LDR—fiber optic stations

**CFG Mode**—provides the current configuration mode for the station; STD, TFTP, or MUTUAL

**CRC**—Every station in an SP2 system calculates a CRC (Cyclical Redundancy Checksum) based on a hash of the current configuration.

- Green CRC value—The master station and all stations with matching CRCs are running identical configurations.
- Gray CRC value—Stations with CRC values differing from the master have a different configuration.

**NOTE:** If an SP2 station has the same designation but a different CRC as the master; provision the SP2 station from the master station and restart it.

**MAC Address**—the Media Access Control (hardware) address for the network interface in the SP2 station.

**SPKR**—the currently configured load calibration value for the SP2 station speaker. A zero value indicates that calibration has not taken place.

**Hostname**—the network name of the SP2 station.

**Designation**—the currently running configuration on each station. Stations with identical designations are operating in the same SP2 mutually provisioned system.

Global Commands

Access the **COMMANDS TO ALL STATIONS** menu (see Figure 9) by clicking the **GLOBAL COMMANDS** button on the far-right end of the **SP2 DASHBOARD** title bar, directly under the **OPTIONS** and **HOME** buttons. Commands executed here affect all stations on the network that receive the command.

**Reboot**—causes all stations that receive the command to reboot. The following confirmation dialog box appears.

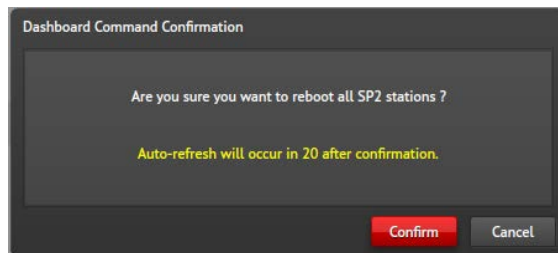


Figure 10. Reboot Confirmation Dialog Box

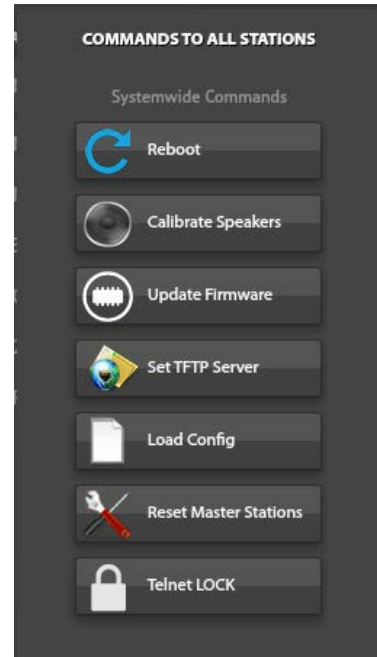


Figure 9. Global Commands

**Calibrate Speakers**—each station performs a speaker calibration to determine if any changes have occurred that prevent the proper functioning of the station's speaker.

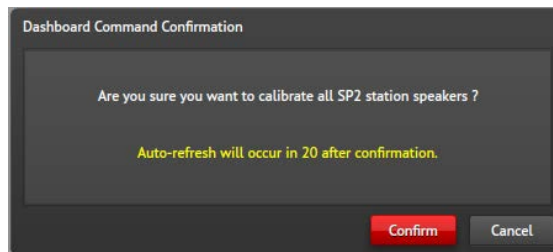


Figure 11. Speaker Calibration Confirmation

**Update Firmware**—all stations will request the latest firmware from the TFTP Server configured in the **TFTPSERVER** parameter and then reboot to apply the settings. Enter the pathname of the firmware in the dialog box to the right. A pathname includes the complete path including the filename on the TFTP Server for the file.

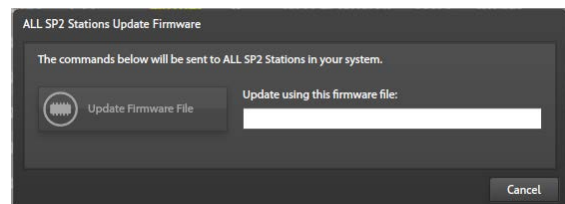


Figure 12. Update Firmware Confirmation

**Set TFTP Server**—The TFTP server stores the firmware and configuration files. Click the **SET TFTP SERVER** button to change the IP address of the TFTP server. The SP2 Console validates the value to ensure entry of a valid IP address.

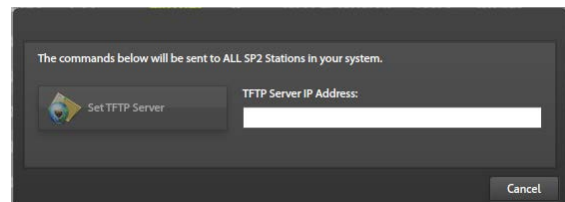


Figure 13. Setting TFTP Server IP Address

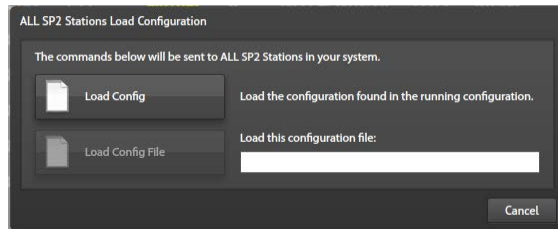


Figure 14. Load Configuration

**Reset Master Stations**—causes all master SP2 stations in a mutually configured system to perform a factory reset. This includes any potential master stations. The IDs of the reset stations are [0.01], [0.02], and [0.03] if they exist.

**Load Config**—opens the load configuration dialog box to instruct the SP2 stations to load the existing or a new configuration. Enter the pathname to the configuration to activate the **LOAD CONFIG FILE** button.

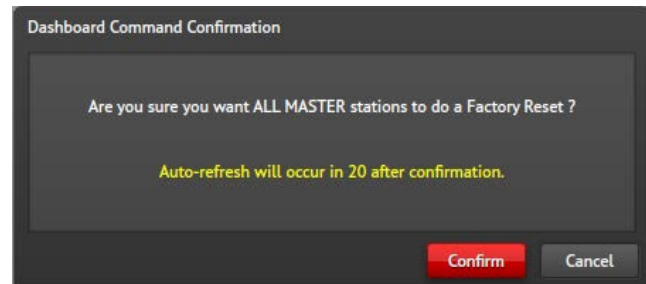


Figure 15. Reset Master Confirmation

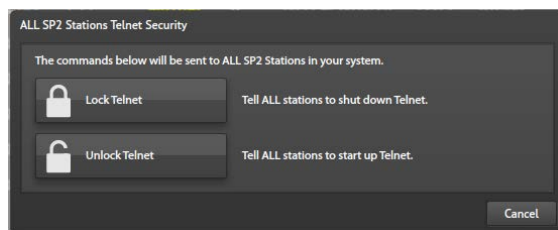


Figure 16. Telnet Lock/Unlock

**Telnet Lock**—opens the dialog box to the left. The **LOCK TELNET** and **UNLOCK TELNET** buttons instruct the stations to stop or start the telnet service. Stations that have the **TELNET\_LOCK** parameter in their local configuration override this setting.

Click the **GLOBAL COMMANDS** button to close the **COMMANDS TO ALL STATIONS** menu.

### Individual Station Commands

Double click any station from the **SP2 DASHBOARD** to open the **SP2 STATION COMMANDS** dashboard for that station. The master station dashboard varies slightly from the remaining member stations in the system (see [Figure 17](#)).

- Execute commands from a station's command dashboard to affect only the station whose command dashboard is open.
- The configuration information, at the top of the command dashboard, is the same as the main **SP2 DASHBOARD** window, except:
  - the configured TFTP server IP address is displayed
  - the speaker gain setting is omitted.
- The master station's command dashboard includes:
  - a Master Station label
  - the **DOWNLOAD CONFIGURATION** command button is active (inactive for all member stations).
- Executing a command displays a dialog box, like those for the global system commands, for confirmation as necessary.

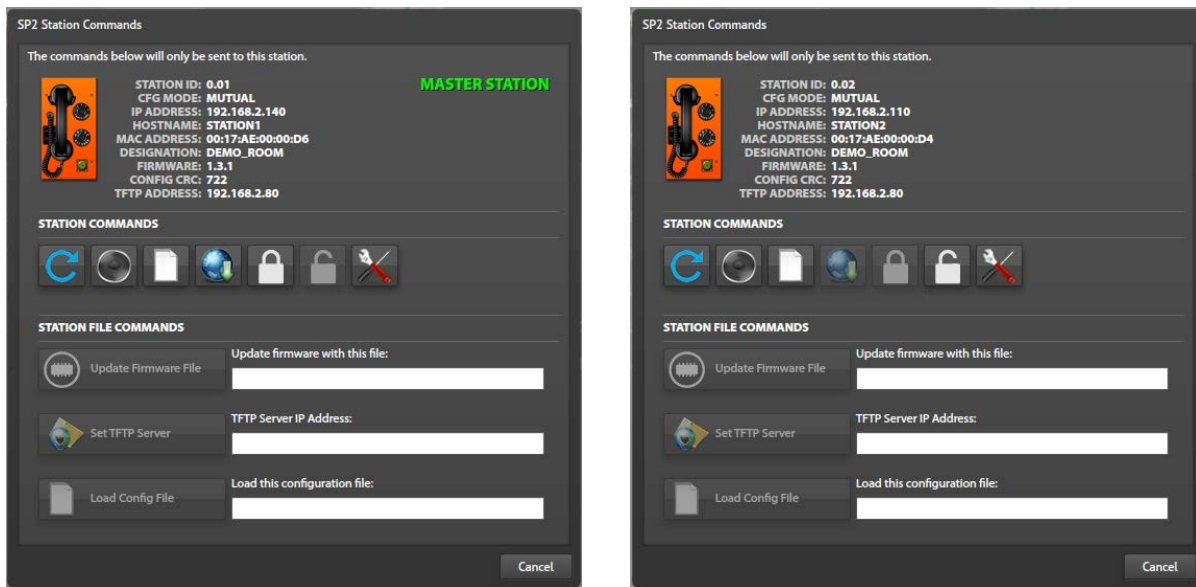


Figure 17. Master and Member SP2 Station Dashboards

## Create or Load a Mutual Provisioning Configuration

### Create a New Configuration

1. Click the “NEW CONFIGURATION” button from the initial menu to open the CREATE NEW CONFIGURATION dialog box. The CURRENT DIRECTORY, below the dialog box title bar, shows the current storage location for SP2 configurations.
2. If desired, click the **CHANGE...** button and select a different location to store and access SP2 configurations.
3. Enter a valid filename and click the **CREATE CONFIGURATION** button. If a configuration with that name already exists, a confirmation to replace the existing configuration with a new configuration appears.
4. Click the **OVERWRITE** button to replace the existing configuration with the default configuration. The console creates the configuration file and opens the SYSTEM PROPERTIES screen in the SP2 Configuration Utility.

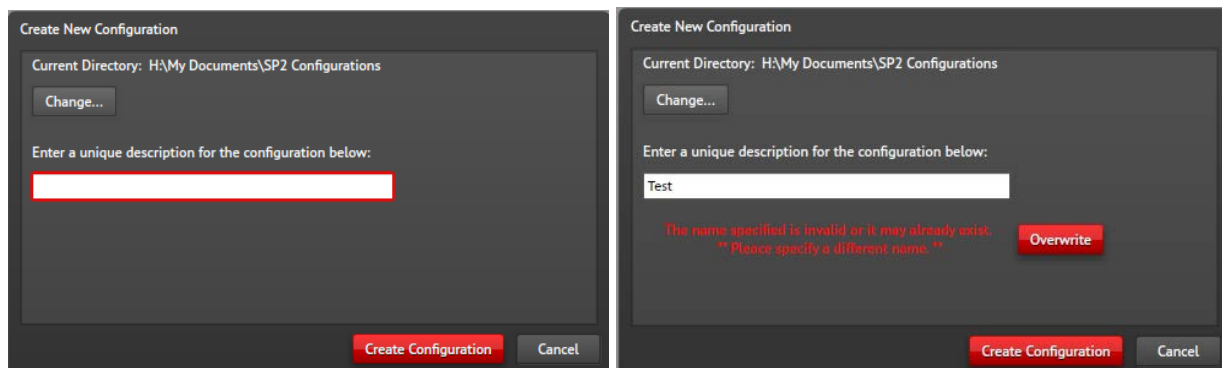


Figure 18. Creating a New Configuration

## Load an Existing Configuration

Click the LOAD CONFIGURATION button from the initial menu to open the file open dialog box to select an existing SP2 configuration. Browse to the storage location, if necessary, then select and open the desired configuration. The SP2 Configuration Utility screen opens upon loading a configuration.

## Mutual Provisioning with the SP2 Configuration Utility

The SP2 Configuration Utility has a title and menu bar at the top of the window. Four buttons, corresponding to the configuration file section labels, are down the left side of the window, with the FIND STATION, MULTICAST SOCKETS, and SOFTWARE PATHS auxiliary utilities directly below them.

1. Select a configuration section button to display the expandable parameter panes containing the configurable parameters in the main pane.
2. Access individual parameters by clicking the parameter group corresponding to the setting type requiring modification.

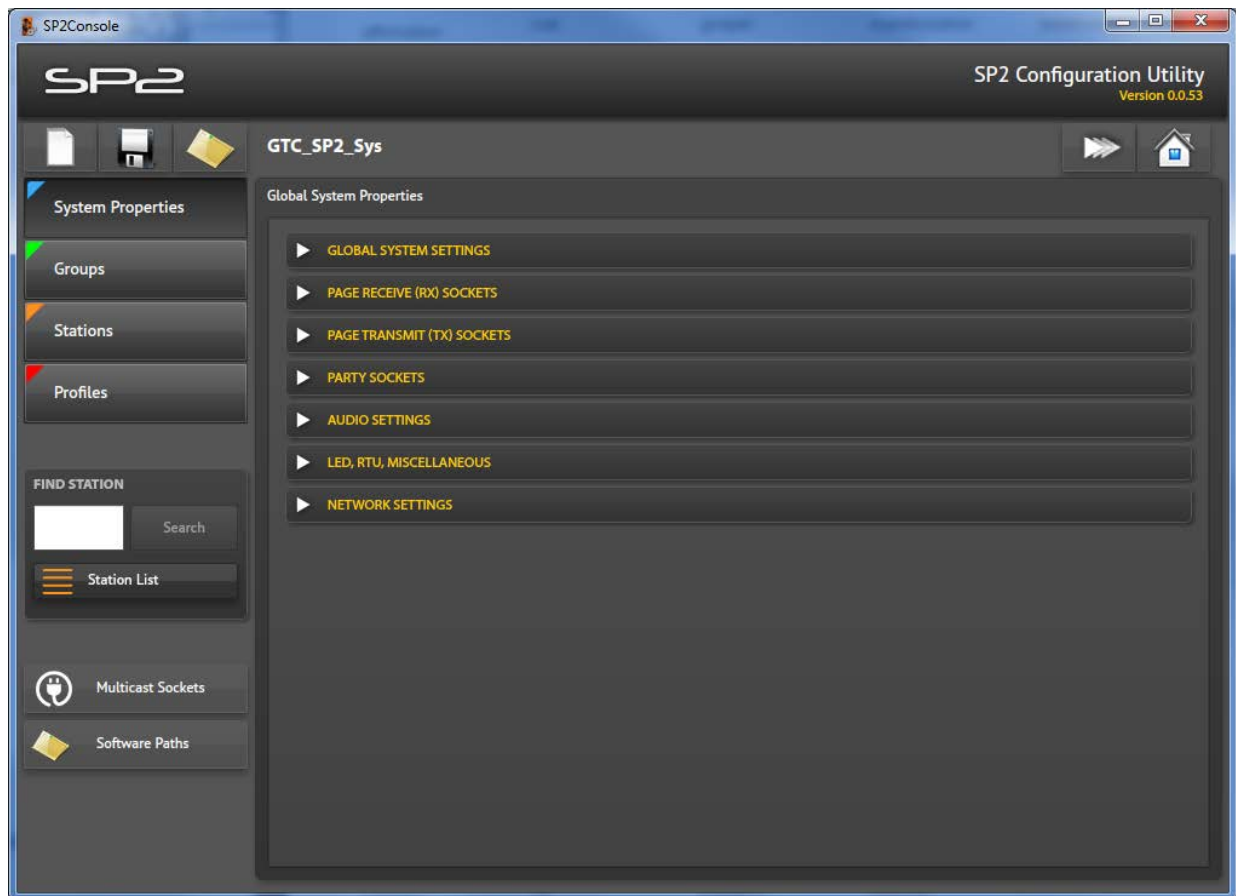


Figure 19. SP2 Configuration Utility—System Properties Button

## Configuration Utility Menu Bar

At the top of the screen is a menu bar containing five system wide functions. Access these functions from any configuration screen. The function of the menu bar buttons is as follows:



Figure 20. Configuration Utility Menu Bar

**New**—displays the **SAVE CHANGES?** dialog box before opening the **CREATE NEW CONFIGURATION** dialog box (see the [Create a New Configuration](#) section).

**Save**—opens the **SAVE CONFIGURATION CHANGES?** dialog box. This dialog box allows changing the current directory and saving the configuration to a new name and provides the current configuration filename.

**Open**—opens the **SAVE CHANGES?** dialog box before opening the file open dialog box to select a new configuration to load into the console.

**Collapse All**—collapses all parameter groups on the currently selected panel.

**Home**—displays the **SAVE CHANGES?** dialog box before opening the initial SP2 Console menu.

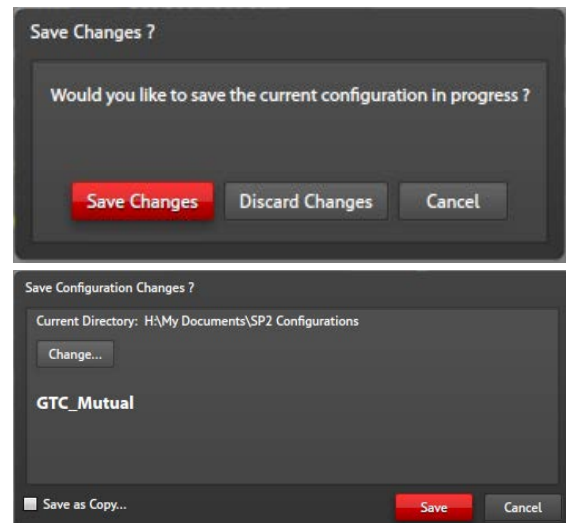


Figure 21. Save Changes Dialog Boxes

## SP2 Auxiliary Tasks

The SP2 Console includes three auxiliary functions to add stations to the mutual configuration, add multicast sockets to the configuration, and to modify TFTP server root path. The buttons to access these functions are on the lower left side of the SP2 Console. The **MULTICAST SOCKETS** and **SOFTWARE PATHS** utilities are only accessible while the **SYSTEM PROPERTIES** button is active because these settings are only meaningful at the global system level of the configuration.

### Find Station

The find station utility locates existing SP2 stations in the configuration for assignment of specific parameter values at the [GROUP], [STATION], or [PROFILE] levels of the mutually provisioned system. It also provides the ability to add additional SP2 station identifiers to the system configuration.

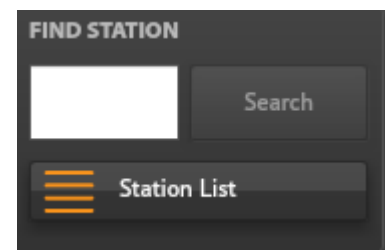


Figure 22. Find Station Utility

**Search Button**—locates stations already in the configuration. Enter a valid station ID with the format G.SS, where G is the group number to which the station belongs and SS is the station number in that group. Enter a valid station ID to activate the **SEARCH** button. The utility display's:

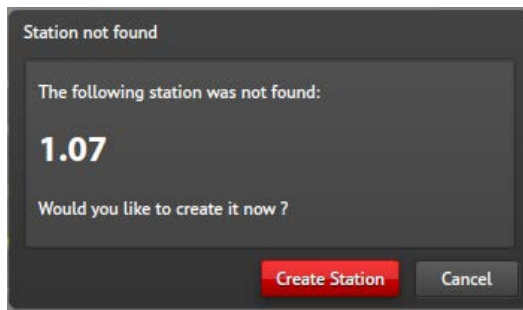


Figure 23. Station Not Found Dialog Box

- the station's **STATION VIEW** pane if the station identifier exists (see the [Station View](#) section).
- a prompt to add the station to the configuration if the station is not found (see [Figure 23](#)).

Click the **CREATE STATION** button to add the station's ID to the configuration or **CANCEL** to exit the dialog box without adding the station to the configuration.

Adding a station to the configuration opens that station's **STATION VIEW** pane.

**Station List Button**—opens the **MANAGE STATIONS** screen (see [Figure 24](#)). This screen displays filtered lists of station identifiers in the SP2 mutual configuration. All stations in the configuration appear in the list of stations when no filter is applied. The list displays the SP2 stations with the **UNIT** parameter preceding the station identifier. Double click any station in the list to open the **STATION VIEW** pane for that station.

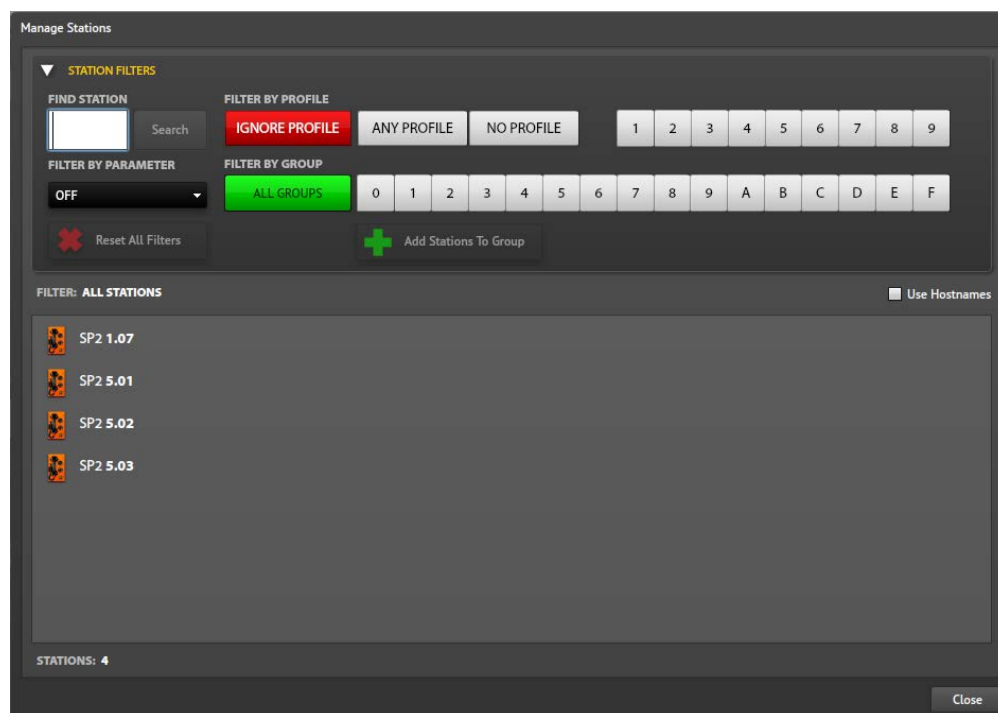


Figure 24. Manage Stations Screen

**STATION FILTERS**—provides multiple methods to display the desired stations. Expand and collapse the filter pane by clicking on the **STATION FILTERS** expansion button.

**Find Station/Search**—facilitates finding stations in the configuration that the active filter is hiding (see the [Find Station](#) information in the previous section).

**Filter by Parameter**—display the stations with the selected parameter configured in the [G.SS] section of the configuration by selecting a parameter from the dropdown list. All station parameters configurable at the station level are selectable from the list.



**Reset All Filters**—removes all applied filters in the pane to display all stations with identifiers in the configuration.

**Filter by Profile**—has four selectable options; IGNORE PROFILE, ANY PROFILE, NO PROFILE, or PROFILE 1–9. The **RED BUTTON** indicates the current selection (see the [Manage Profiles](#) section for information on profiles).

- **Ignore Profile**—(the default option) display all stations regardless of profile assignment.
- **Any Profile**—displays all stations that have any profile assigned.
- **No Profile**—lists only those stations that do not have a profile assigned.
- **Profile 1–9**—finds and lists the stations that apply the selected profile.

**Filter by Group**—locates all stations in the configuration with their group selector switch set to the selected group number, 0–F.

**Add Stations to Group**—opens the dialog box at the right to add stations to the configuration in the group selected above.

**STATIONS TO ADD:**—the number of stations, 1–250, to add to the configuration where their group selector switch is set to the group number selected in the filter.

**SET NWMODE STATIC**—selecting this checkbox sets the station's **NW-MODE** parameter to *static*. Configure static IP addresses for all stations with NWMODE set to **STATIC** in the configuration.

**START ADDRESS**—Enter the class C IP address of the first station. The console adds the remaining stations with incremental IP addresses assigned.

**CREATE STATIONS**—creates the number of stations in the **STATIONS TO ADD:** field. Selection of **SET NWMODE STATIC** requires entry of a valid class C address IP address.

**CANCEL**—closes the dialog box without creating any stations in the configuration.

**FILTER**—Displays the applied filters. Ex. GROUP1, IGNORING PROFILES

**Use Hostnames**—lists the SP2 stations by their host names instead of by their station IDs. Valid SP2 station hostnames can be 28 characters long. With this option selected, fewer stations are visible on the screen.

**Stations**—Shows the number of stations in the list on the **MANAGE STATIONS** pane. Apply a group filter to also display the number of remaining stations that can be created in that group.

**Close**—Closes the **MANAGE STATIONS** pane.

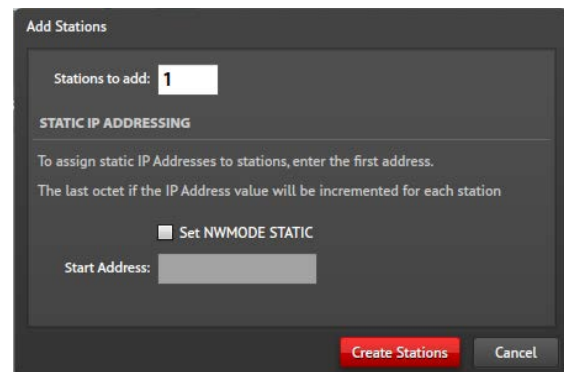


Figure 25. Add Stations Dialog Box

### Multicast Sockets

The multicast sockets button opens the MULTICAST SOCKETS dialog box (see Figure 26) to add new IP multicast sockets to the SP2 mutual configuration. Define new IP multicast sockets for non-default configurations.

**Add Multicast Socket**—Enter a valid IP multicast socket address in the field and click the ADD MULTICAST SOCKET button to add the new socket to the list. Valid SP2 sockets have IP addresses and ports in the following range: (239.1–127|129–255.0–255.0–255: 0–65534).

**Multicast Sockets Available**—lists the multicast sockets already defined in the system.

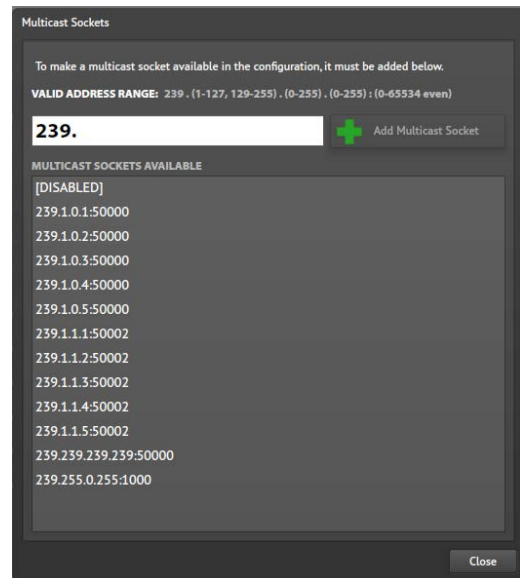


Figure 26. Multicast Sockets Dialog Box

### Software Paths

Use the CONFIGURATION SOFTWARE PATHS dialog box to modify the path to the parent directory of the configuration file on the TFTP server.



Figure 27. Configuration Software Paths Dialog Box

**Config Path:**—enter the path to the parent folder of the configuration file on the TFTP Server.

### Configuration Parameter Field Flags

The SP2 configuration utility uses colored flags on all parameter field labels to indicate the configuration location for that setting in the SP2 configuration hierarchy. The flags are colored triangular overlays on the upper left corner of each attribute’s field label and match the flag overlay color on the section label button from where it was set. This determines the section label in the configuration for each configured setting. The flag colors are:

- blue for parameters under the [SYSTEM] label
- green for parameters under the [GROUP] label
- orange for parameters under the [STATION] label
- red for those in the [PROFILES] label section

The flags are visible on every field in the configuration utility and appear exactly as displayed on the section label buttons.

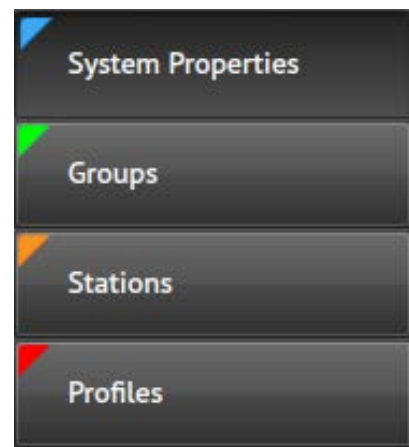


Figure 28. Section Label Buttons Showing Flag Colors

## Parameter Sets

The SP2 Configuration Utility screens organize SP2 station attributes by function, in expandable *parameter panes*. The parameter panes are:

- GLOBAL SYSTEM SETTINGS
- PAGE TRANSMIT (TX) SOCKETS
- AUDIO SETTINGS
- NETWORK SETTINGS
- PAGE RECEIVE (RX) SOCKETS
- PARTY SOCKETS
- LED/RTU/ MISCELLANEOUS

GLOBAL SYSTEM SETTINGS are only applicable at the system label level; this parameter pane does not appear under any other section label.

Use the buttons on the left side of the SP2 Console to access the screens that correspond to the section labels in the configuration file. Except for the GLOBAL SYSTEM SETTINGS parameters, the remaining parameter sets are identical under each section label in the configuration file, so each parameter set is only covered once (see the [Expandable Parameter Panes](#) section). The function of each individual station attribute is in the tables in the [SP2 Station Local Configuration](#) section of this manual. Links to the associated table containing the information for each attribute are provided.

## Station Parameter Configuration and Precedence

All SP2 station essential parameters are preconfigured at the global level a mutually provisioned SP2 configuration hierarchy. They appear with a slightly dimmed flags, indicating they have default settings. Change attribute values at this level of the hierarchy by clicking the desired field and modifying the value using the method for the field type.

At the group, station, and profile levels of the hierarchy, it is necessary to click on the field label to activate the field at that level before clicking in the field to modify the value. The configuration utility displays the value for each attribute with the flag illustrating the configuration level for the parameter.

**NOTE:** Do not implement audio settings in the system configuration that affects stations with physical hardware adjustments made. Mutual provisioning configuration settings overwrite configured hardware audio settings with the last applied value. Attempting to modify one of these parameters will superimpose a red exclamation point over the field name to draw attention to the operation of this parameter when configured in mutual provisioning.

**NOTE:** Configuring the **TELNET\_LOCK** parameter in a station's configuration file overrides the telnet lock function in the SP2 Dashboard for the stations to which the setting applies.

## Global System Properties

Access GLOBAL SYSTEM PROPERTIES by clicking on the SYSTEM PROPERTIES button on the left side of the window. Configure settings here that correspond to the [SYSTEM] label in the configuration file. Opening a configuration in the SP2 Console displays the GLOBAL SYSTEM PROPERTIES panel with the GLOBAL SYSTEM SETTINGS parameter group expanded.

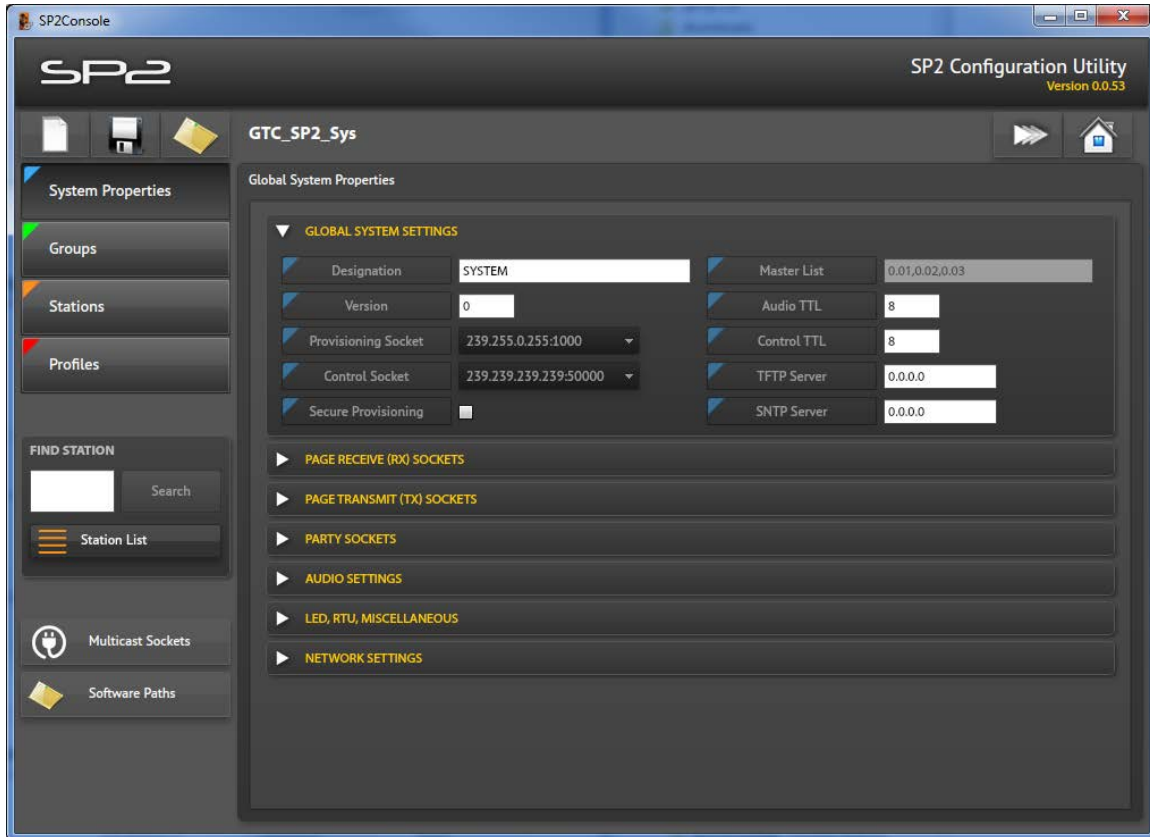


Figure 29. Global System Properties with Global System Settings Expanded

## Manage Groups

Click the **GROUPS** button on the left side of the SP2 Configuration Utility to display the **MANAGE GROUPS** pane. Configure settings that correspond to the [GROUPn] label in the configuration file here. Groups in an SP2 configuration relate to the hexadecimal group-selector switch position in the physical SP2 stations. All stations with the same switch setting are in the same group. Station organization is by group and station with up to 16 groups of up to 250 stations each.

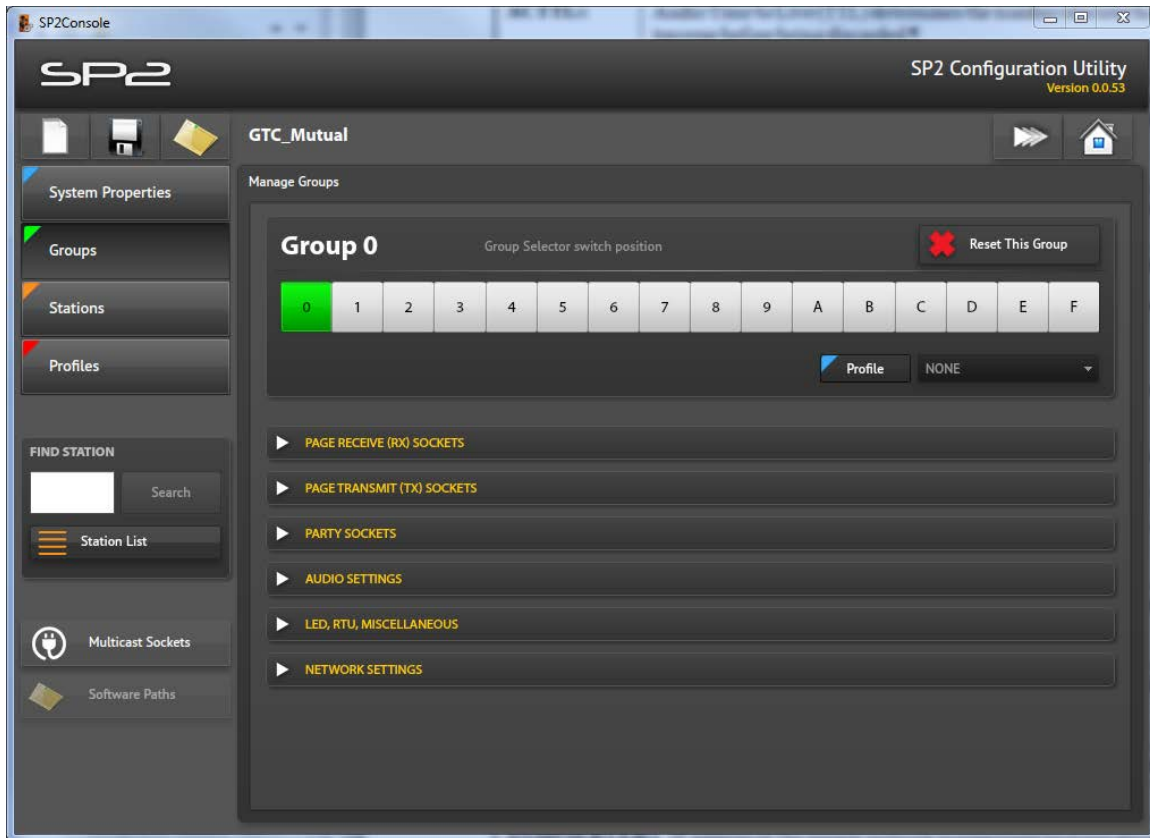


Figure 30. Manage Groups Panel

**Group Selector Switch Position**—Select a group from the 16 available groups when the SP2 stations need the same parameter values at this level in the hierarchy.

**Reset this Group**—Click the **RESET THIS GROUP** button to remove all attribute settings for the selected group.

**Profile**—Assign SP2 stations with the same group selector switch position a profile, if necessary. Profiles provide a method to override attribute values on stations receiving attribute assignments from the group and station levels of the hierarchy. To assign a profile to a group, click the **PROFILE** field label and select profile one through nine from the dropdown list.

**Collapsed Parameter Groups**—The collapsed parameter groups display below the station information pane. Click the expand arrow to open the group containing parameters needing modification. See the [Expandable Parameter](#) section for information on the settings in each parameter group.

## Station View

Click the **STATIONS** button on the left side of the SP2 Configuration Utility to access the **STATION VIEW** pane. **STATION VIEW** permits configuration of attributes for individual SP2 stations in a mutually configured system. **STATION VIEW** works with the **STATION LIST** utility to open the properties of an individual station in the configuration.

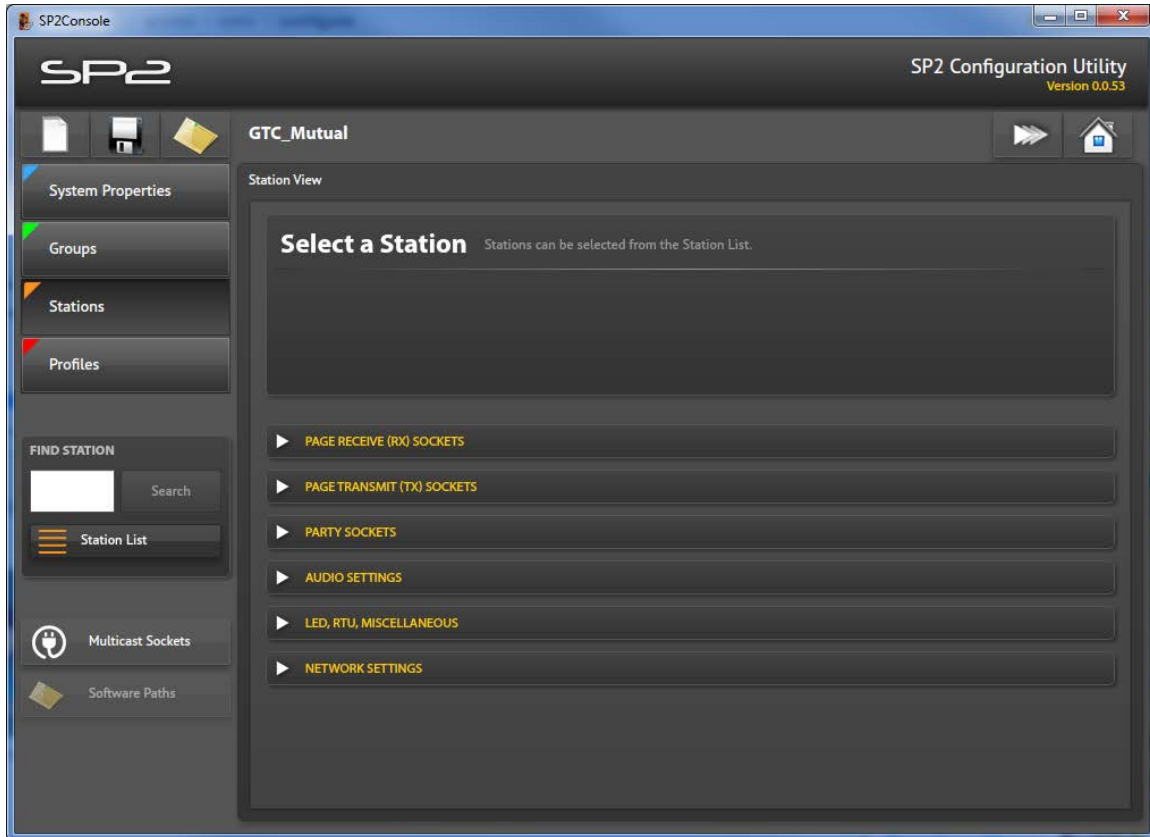


Figure 31. Station View Panel (No Station Selected)

**Select a Station**—Select stations from the station view list (see the [Find Station](#) section for information on the **STATION LIST** utility). Select a station to display the configuration properties for that station in the **STATION VIEW** pane.

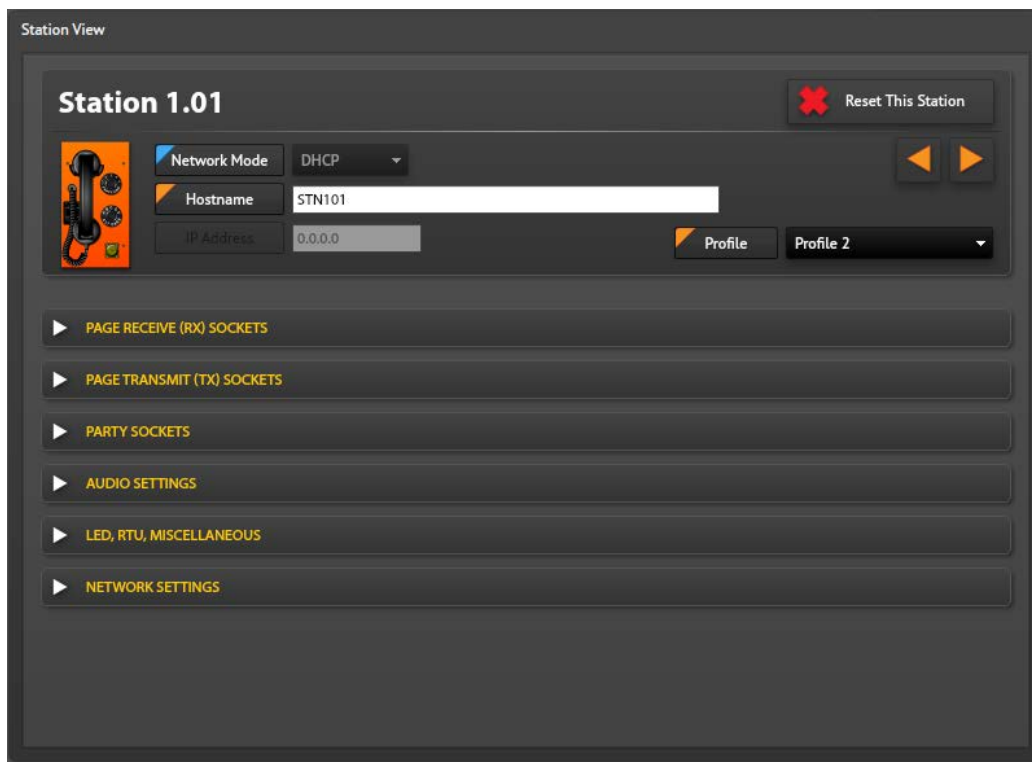


Figure 32. Station Shown in Station View Pane

**Station 1.01**—The current station displays at the top of the STATION VIEW panel.

**Reset This Station**—Click this button to remove all changes to this station’s parameters. This is an undo action for all parameters in all the parameter groups for this station.

**Network Mode**—The NETWORK MODE field designates the current mode used by this station to obtain its IP address.

◀ ▶—These two navigation buttons cycle through the SP2 stations that have identifiers in the system. This allows browsing to a different station’s settings without having to use the station list utility.

**Hostname**—This field holds the name that this station will have on the IP network. The orange flag shows that the default name filtered down from the system level is being overridden with a different value.

**IP Address**—This field is not because the network mode for this station is DHCP. The NETWORK MODE parameter can be changed for this station, which would unlock this field enabling the entry of a valid IP address.

**Profile**—The profile button allows additional parameter changes to this station by adding any settings contained in the profile assigned to the station. The flag button is orange to denote that this setting is being changed at the [STATION] level in the hierarchy. Configure profiles on the MANAGE PROFILES PANEL (see the next section).

**Collapsed Parameter Groups**—The collapsed parameter groups are below the station information pane. Click the expand arrow to open the group containing parameters needing modification. See the [Expandable Parameter](#) section for information on the settings in each parameter group.

## Manage Profiles

Assign profiles to groups and stations. The mechanism that enables the application of settings in a profile are at the [GROUP] and/or [STATION] level in the mutual provisioning configuration (see the [Manage Groups](#) or the [Parameter Sets](#) sections).

**NOTE:** Configuration changes to any parameter that are implemented in a profile will override the previously set value for all parameters assigned in the profile.

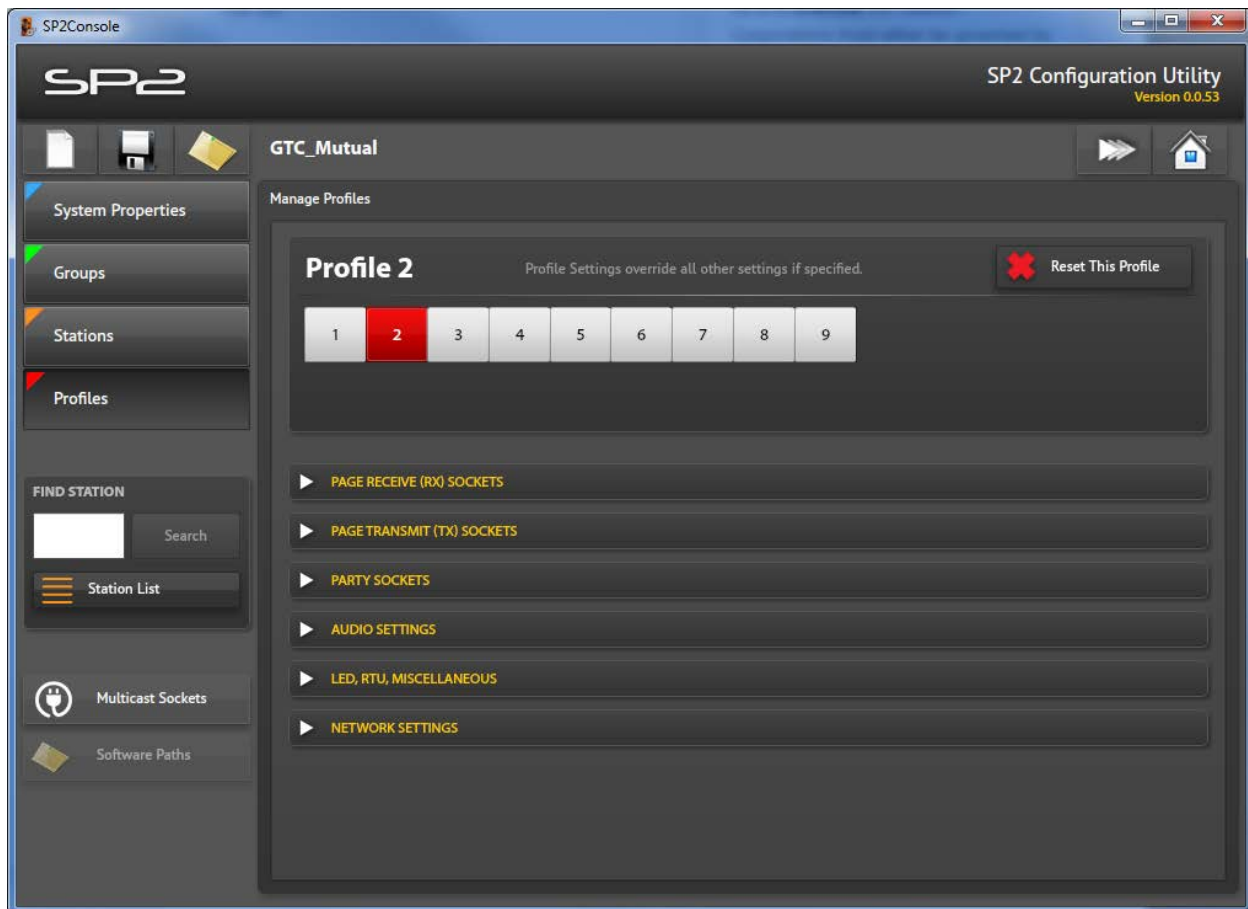


Figure 33. Manage Profiles Panel

**Profile 2**—The current profile appears at the top of the **MANAGE PROFILES** panel. The box for the current profile is red.

**Reset This Profile**—Clicking this button will remove all changes made to this profile.

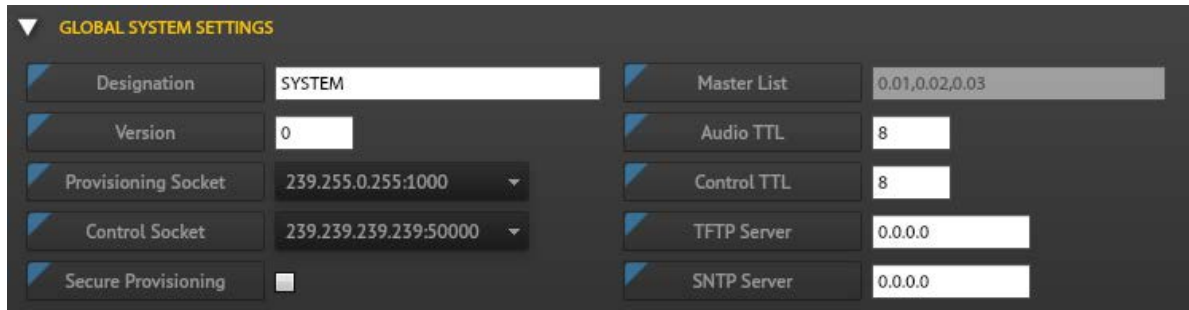
**Collapsed Parameter Groups**—The collapsed parameter groups are below the station information pane. Click the expand arrow to open the group containing the parameter needing modification (see the [Expandable Parameter Panes](#) section).



## Expandable Parameter Panes

### Global System Settings

The GLOBAL SYSTEM SETTINGS parameter group contains settings that apply to the entire system and are only incorporated at the [SYSTEM] level in the mutual provisioning configuration hierarchy. The flags on the field names are grayed slightly to indicate that the system default settings are the current settings to be applied.



The screenshot displays the 'GLOBAL SYSTEM SETTINGS' panel with the following fields and values:

Parameter	Value
Designation	SYSTEM
Version	0
Provisioning Socket	239.255.0.255:1000
Control Socket	239.239.239.239:50000
Secure Provisioning	<input type="checkbox"/>
Master List	0.01,0.02,0.03
Audio TTL	8
Control TTL	8
TFTP Server	0.0.0.0
SNTP Server	0.0.0.0

Figure 34. Global System Settings Panel

**Designation**—[Table 2](#)

**Version**—[Table 2](#)

**Provisioning Socket**—[Table 3](#)

**Control Socket**—[Table 3](#)

**Secure Provisioning**—This SP2 Console setting is for compatibility with stations having firmware earlier than version 3.2.0.

**Master List**—[Table 2](#)

**Audio TTL**—See the ACTTTL parameter in [Table 3](#)

**Control TTL**—See the MCTTL parameter in [Table 3](#)

**TFTP Server**—[Table 4](#)

**SNTP Server**—[Table 4](#)

## Page Receive (Rx) Sockets

The screenshot shows a configuration panel titled "PAGE RECEIVE (RX) SOCKETS". It is divided into two main sections: "Multicast Socket Assignments" and "Incoming Page Routing".

Multicast Socket Assignments		Incoming Page Routing	
Page Receive (RX) 1	239.1.1.1:50002	Audio Output	BOTH
Page Receive (RX) 2	239.1.1.2:50002	Audio Output	BOTH
Page Receive (RX) 3	239.1.1.3:50002	Audio Output	BOTH
Page Receive (RX) 4	239.1.1.4:50002	Audio Output	BOTH
Page Receive (RX) 5	239.1.1.5:50002	Audio Output	BOTH
Page Receive (RX) 6	[DISABLED]	Audio Output	BOTH
Page Receive (RX) 7	[DISABLED]	Audio Output	BOTH
Page Receive (RX) 8	[DISABLED]	Audio Output	BOTH

Figure 35. Page Receive (RX) Sockets Panel

**Multicast Socket Assignments**—the **PAGERX\_n SOCK** parameters configure the page receive sockets (see [Table 6](#)), where  $n$  is the page receive socket number ranging from one through eight. Create additional multicast sockets using the **MULTICAST SOCKETS** utility, if necessary. (See the [Multicast Sockets](#) section).

**Incoming Page Routing**—the **AUDIO OUTPUT** fields configure the **PAGERX\_n\_OUT** parameters, where  $n = 1-8$  (see [Table 6](#)).

## Page Transmit (TX) Sockets

PAGE TRANSMIT (TX) SOCKETS		Page Transmit Defer	Pre-Announcement Tone
Page Transmit (TX) A	Default Page Receive (RX) 1	DEFER <input checked="" type="checkbox"/>	PRE <input type="checkbox"/>
Page Transmit (TX) B	Default Page Receive (RX) 2	DEFER <input checked="" type="checkbox"/>	PRE <input type="checkbox"/>
Page Transmit (TX) C	Default Page Receive (RX) 3	DEFER <input checked="" type="checkbox"/>	PRE <input type="checkbox"/>
Page Transmit (TX) D	Default Page Receive (RX) 4	DEFER <input checked="" type="checkbox"/>	PRE <input type="checkbox"/>
Page Transmit (TX) E	Default Page Receive (RX) 5	DEFER <input checked="" type="checkbox"/>	PRE <input type="checkbox"/>
Page Transmit (TX) F	Default Page Transmit (TX) F	DEFER <input checked="" type="checkbox"/>	PRE <input type="checkbox"/>
Page Transmit (TX) G	Default Page Transmit (TX) G	DEFER <input checked="" type="checkbox"/>	PRE <input type="checkbox"/>
Page Transmit (TX) H	Default Page Transmit (TX) H	DEFER <input checked="" type="checkbox"/>	PRE <input type="checkbox"/>
Page Transmit (TX) I	Default Page Transmit (TX) I	DEFER <input checked="" type="checkbox"/>	PRE <input type="checkbox"/>
Page Transmit (TX) J	Default Page Transmit (TX) J	DEFER <input checked="" type="checkbox"/>	PRE <input type="checkbox"/>
Page Transmit (TX) K	Default Page Transmit (TX) K	DEFER <input checked="" type="checkbox"/>	PRE <input type="checkbox"/>
Page Transmit (TX) L	Default Page Transmit (TX) L	DEFER <input checked="" type="checkbox"/>	PRE <input type="checkbox"/>
Page Transmit (TX) M	Default Page Transmit (TX) M	DEFER <input checked="" type="checkbox"/>	PRE <input type="checkbox"/>
Page Transmit (TX) N	Default Page Transmit (TX) N	DEFER <input checked="" type="checkbox"/>	PRE <input type="checkbox"/>
Page Transmit (TX) O	Default Page Transmit (TX) O	DEFER <input checked="" type="checkbox"/>	PRE <input type="checkbox"/>
Page Transmit (TX) P	Default Page Transmit (TX) P	DEFER <input checked="" type="checkbox"/>	PRE <input type="checkbox"/>
600 Ohm Transmit (TX)	[DISABLED]	DEFER <input checked="" type="checkbox"/>	PRE <input type="checkbox"/>

\*\* Page Transmit (TX) F - Page Transmit (TX) P Hubbcom ONLY \*\*

Figure 36. Page Transmit (TX) Sockets Panel

**Multicast Socket Assignments**—The **PAGETX\_n SOCK** parameters configure the page transmit sockets, where n = A–E. The 600 OHM TRANSMIT (TX) field configures the **600OHM\_TX SOCK** parameter (see [Table 6](#)). Create additional multicast sockets using the **MULTICAST SOCKETS** utility, if necessary. (See the [Multicast Sockets](#) section.)

**Page Transmit Defer**—The **PAGETX\_n DEFER** parameter, where n = A–E, is a true/false value defaulting to **TRUE**. To modify this field, select the field to enable it and then check or uncheck the checkbox as necessary.

**Pre-Announcement Tone**—The **PRE** fields under the **PRE-ANNOUNCEMENT TONE** heading configure the **PAGETX\_n PRE** parameter, where n = A–E (see [Table 6](#)). This parameter is a true/false parameter defaulting to **FALSE**.

## Party Sockets



Figure 37. Party Line Sockets Panel

**Multicast Socket Assignments**—The **PARTY\_n SOCK** parameters store the party line IP sockets, where  $n = 1-5$  (see [Table 6](#)).

## Audio Settings

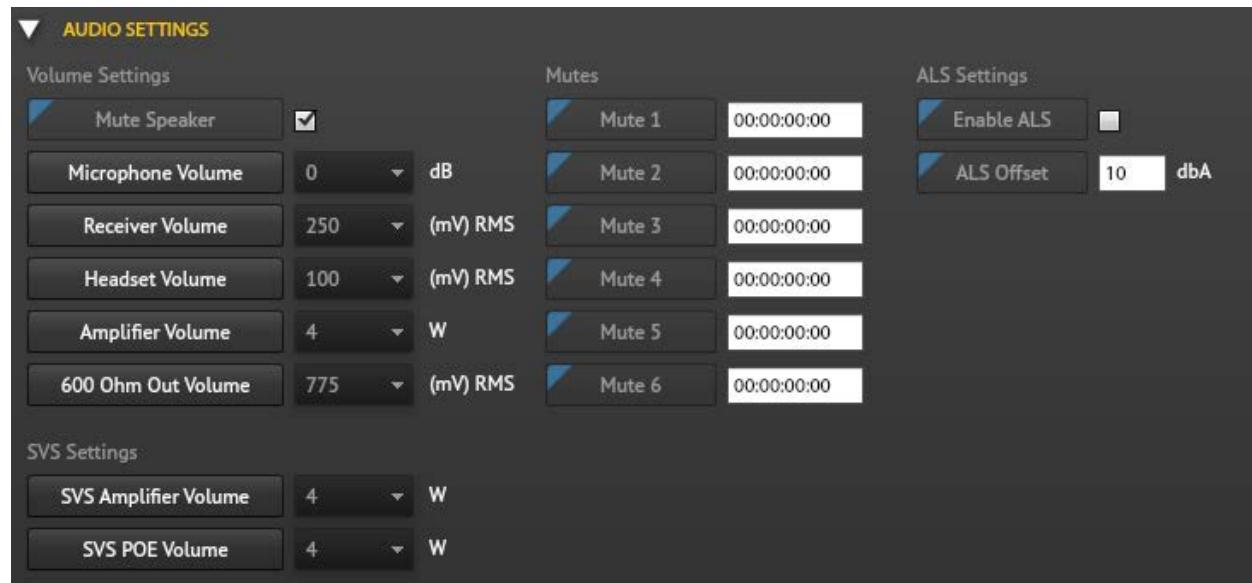


Figure 38. Audio Settings Parameter Group

**Volume Settings**—see [Table 9](#)

**NOTE:** The MICROPHONE VOLUME, RECEIVER VOLUME, HEADSET VOLUME, AMPLIFIER VOLUME, and 600 OHM OUT VOLUME settings do not have a field flag indicating where they received their original settings. This is because any settings assigned here overwrite the hardware settings, if configured on the local stations.

**Mutes**—see [Table 9](#)

**ALS Settings**—see [Table 9](#)

**SVS Settings**—SVS is not functional in this version.

LED/RTU/Miscellaneous

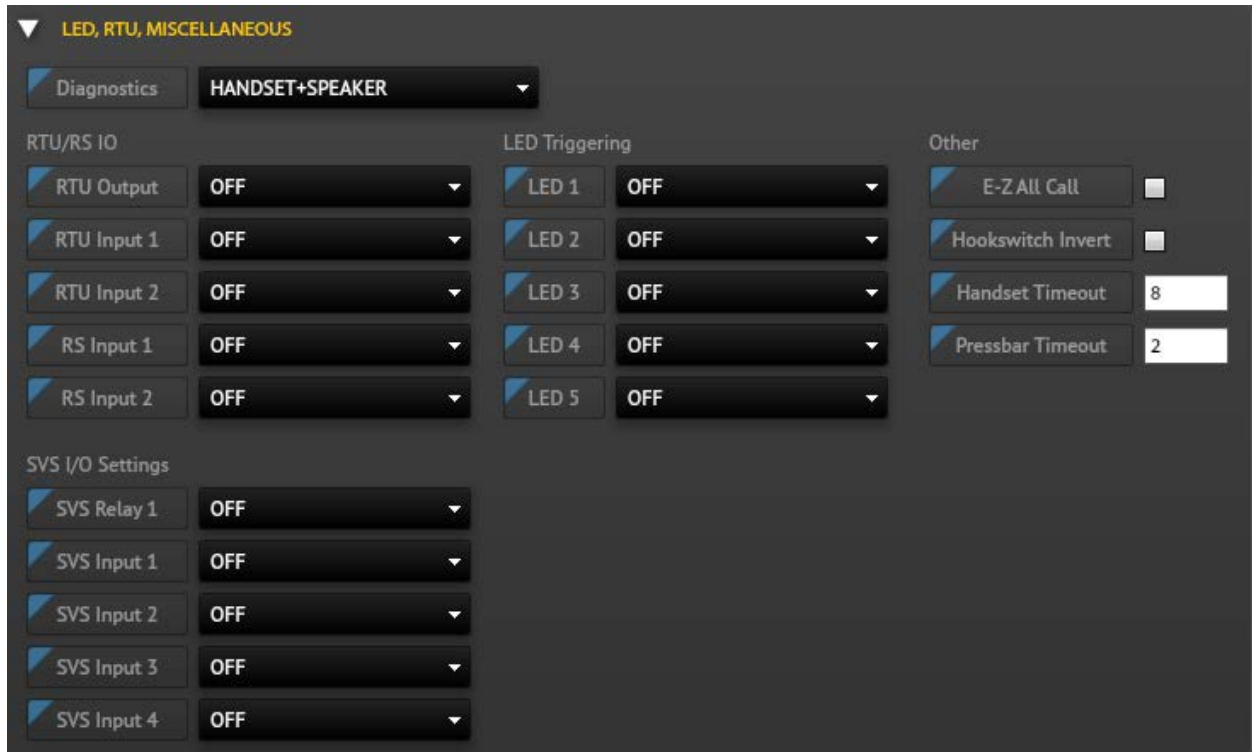


Figure 39. LED, RTU, and Miscellaneous Parameters

**Diagnostics**—see [Table 10](#)

**RTU/RS IO**—see [Table 5](#)

**SVS I/O Settings**—Not functional

**LED Triggering**—see [Table 5](#)

**Other**—see [Table 5](#) and [Table 7](#)

Network Settings

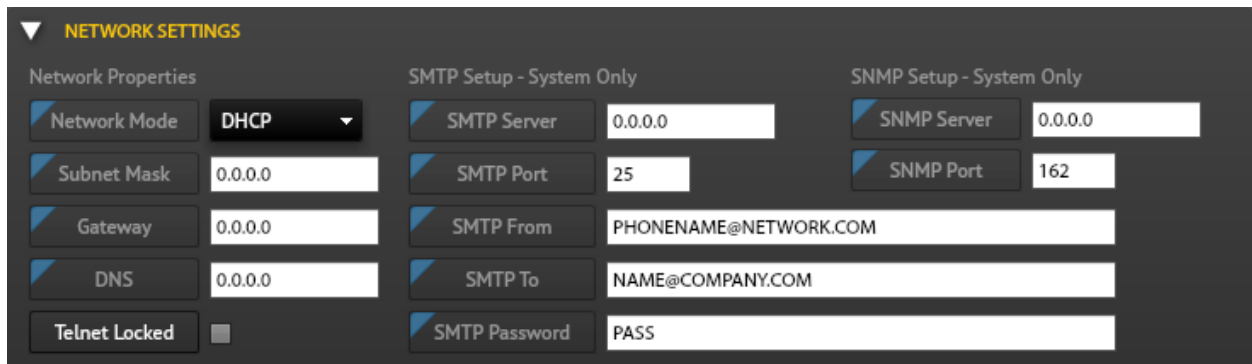


Figure 40. Network Settings Parameters

**Network Properties**—see [Table 2](#) and [Table 3](#)

**SMTP Setup—System Only**—These settings are here for informational purposes only. These settings are in the global system settings parameter group which is only accessible from the global system properties panel.

**SNMP Setup—System Only**—These settings are here for informational purposes only. These settings are in the global system settings parameter group that is only accessible from the global system properties panel.

## Appendix A—Preventing Windows from Assigning Multiple COM Ports

**⚠ WARNING ⚠** **Serious problems might occur if you modify the registry incorrectly. These problems might require that you reinstall the operating system.**

To prevent Windows from assigning a new COM port number each time a new device with a FT232RL IC is plugged into a USB port, the FTDI enumeration instructions must be DISABLED. Do this by editing the registry on the Administrative computer. Set the following two entries in the following key: HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Control\UsbFlags register.

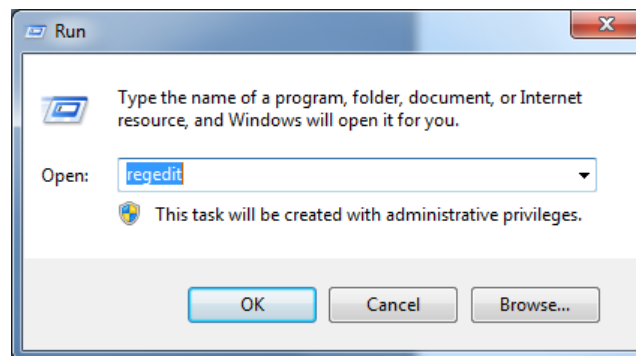
They are:

- IgnoreHWSerNum04036001
- IgnoreHWSerNum04036010

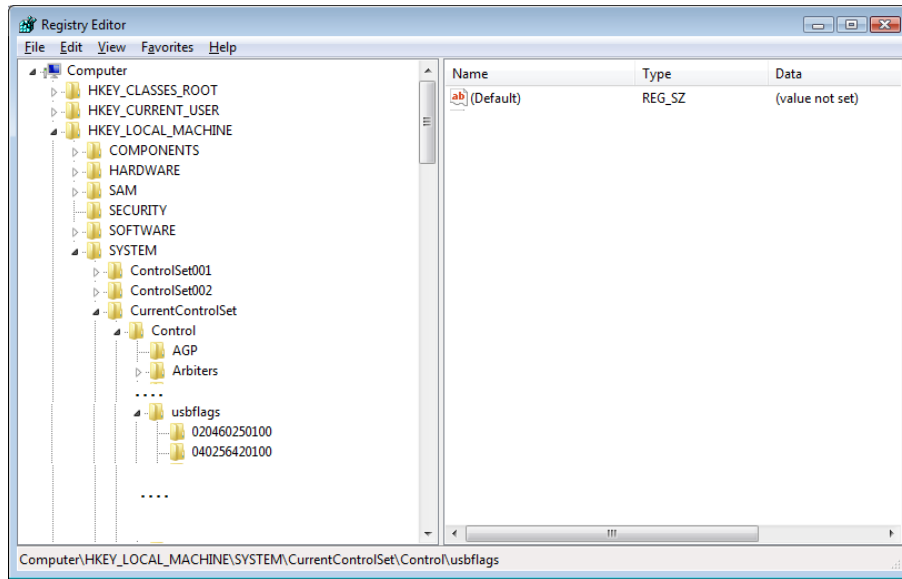
Each entry must have a value of *01*.

Step by step instructions are outlined below:

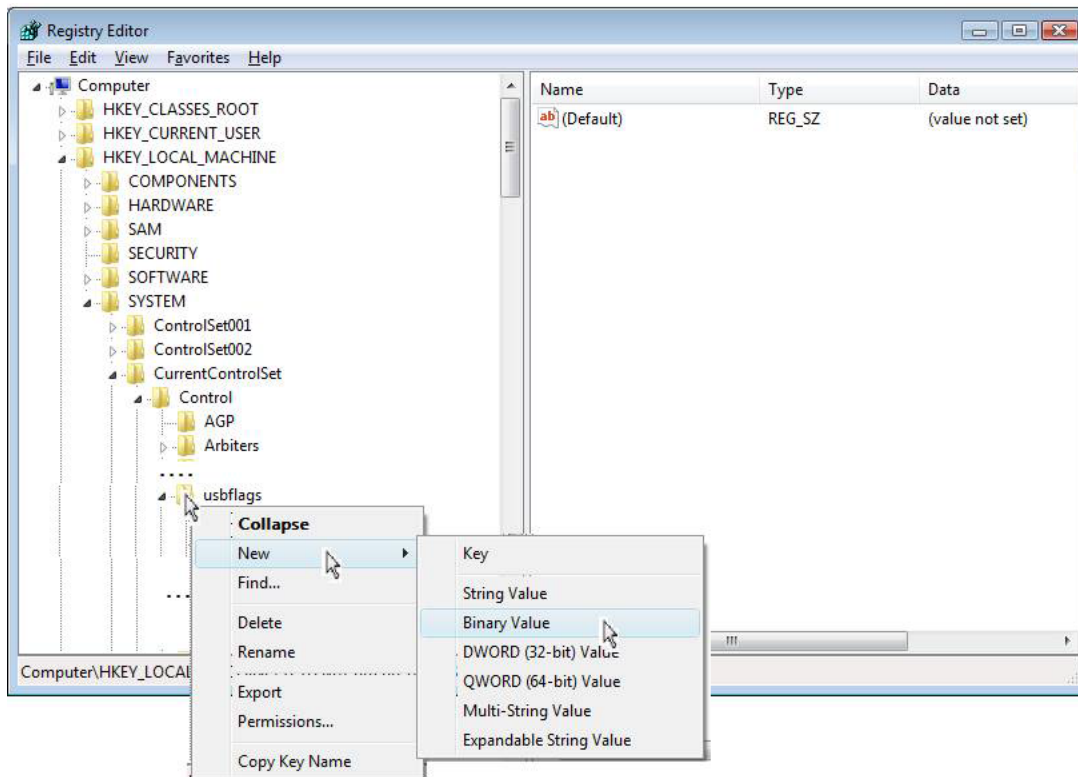
1. Click the Start Menu, select RUN and type *regedit*.



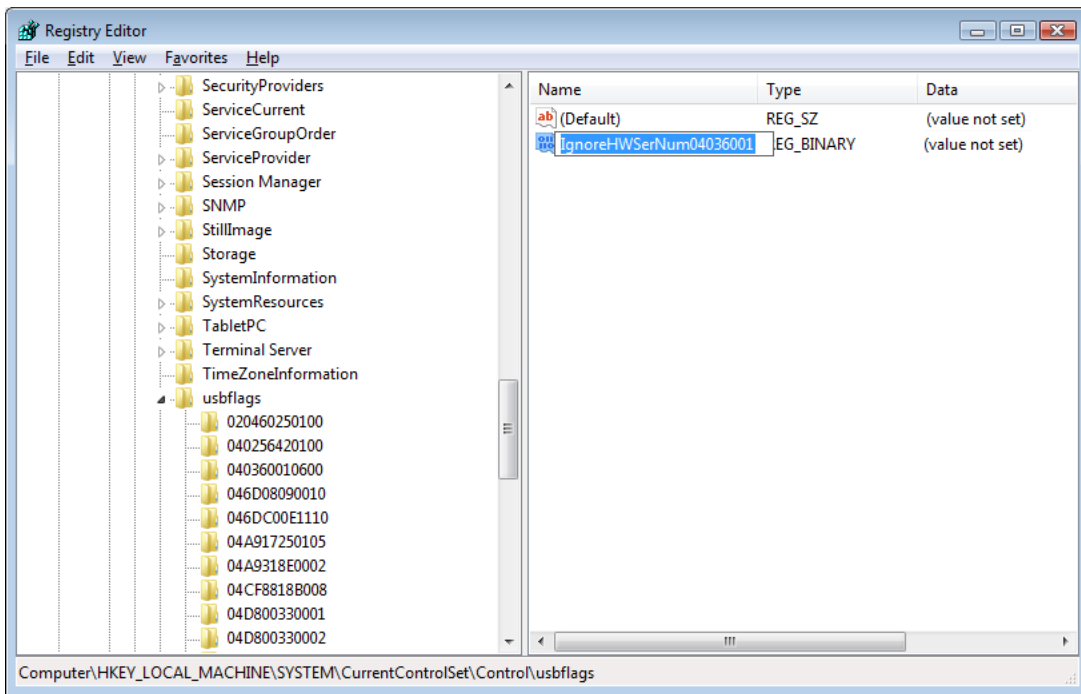
3. Navigate to HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Control\usbflags



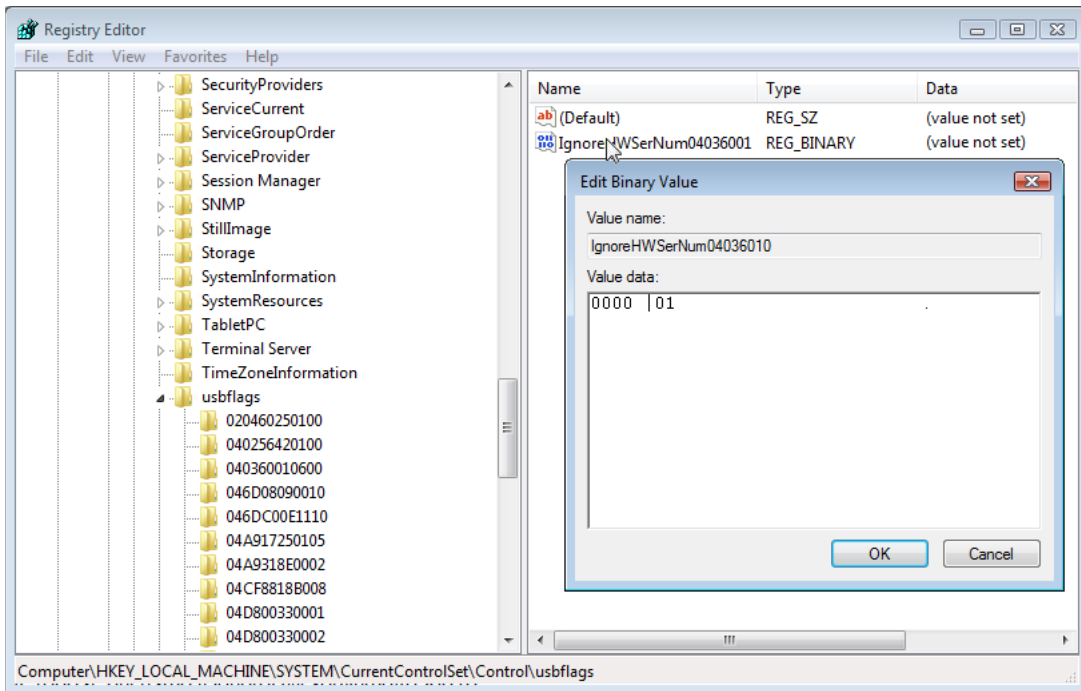
4. Right-click usbflags.
  - A. Select New
  - B. Select Binary Value.



5. Name the new entry: IgnoreHWSerNum04036001

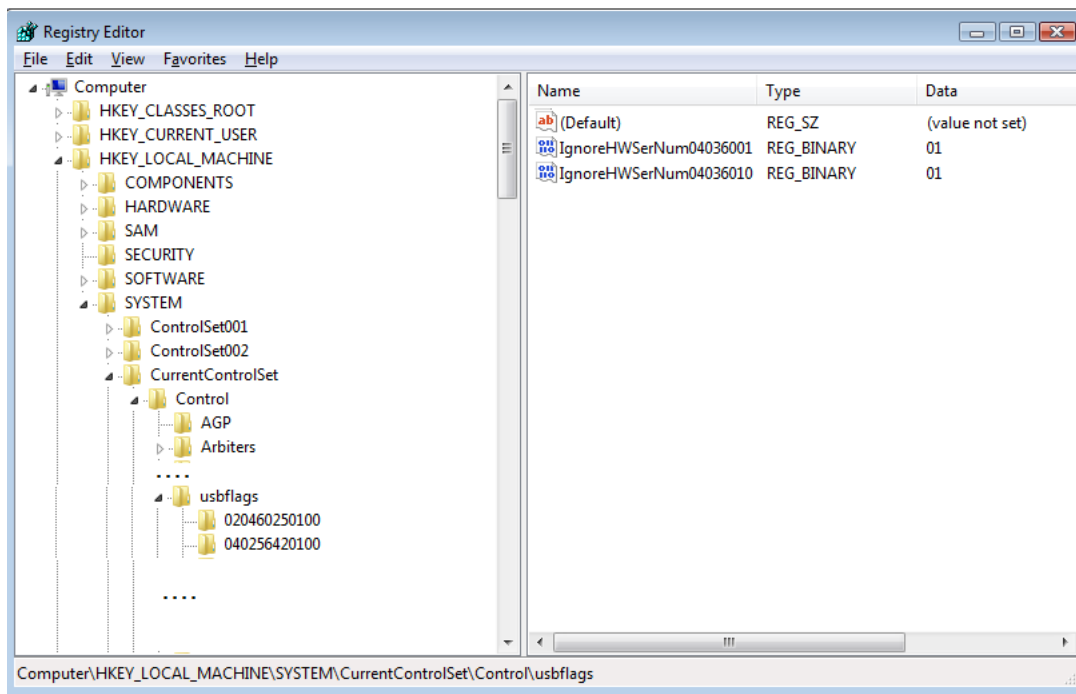


6. Double-click the new entry  
Enter: **01** then click **OK**



7. Add another new Binary Value entry to usbflags as described above.
  - A. Name the new entry: IgnoreHWSerNum04036010
  - B. Assign value of: 01





## Glossary of Terms

### ALS

Ambient Level Sensing uses the speaker as a microphone to sense ambient noise levels to adjust speaker volumes.

### MAC ADDRESS

A MAC (Media Access Control) address, also called the physical address, enables communication on a physical network segment. NIC manufacturers assign MAC addresses in each device's firmware. Each NIC must have a unique MAC address on a physical network.

### IP ADDRESS

An (Internet Protocol) address is a numerical address that network hosts (*devices*) use to send and receive data packets using the TCP/IP protocol suite for communication. Two versions of the Internet Protocol (IP) are in use: IP Version 4 (IPv4) and IP Version 6 (IPv6). Each version defines an IP address differently.

- An IPv4 address consists of 32 (4 octets).
- Example: 192.168.1.100
- An IPv6 address consists of 128 bits. Eight groups of four digits

Example: 2001:0db8:0:0:0:ff00:0042:8329

### PRIVATE IP ADDRESS

IP Address ranges that are only for use on private networks. Hosts with private IP addresses cannot connect directly to the Internet.

IPv4:

- 10.0.0.0–10.255.255.255
- 172.16.0.0–172.31.25.255
- 192.168.0.0–192.168.255.255

### SUBNET MASK

A subnet mask separates the IP address into logical network and host address components. Every host on a unique logical network must have the same subnet mask. Subnet Mask format—xxx.xxx.xxx.xxx (where xxx = 0–255)

### DEFAULT GATEWAY

The IP address of the router to which all packets route for hosts that are not on the same logical networks. Network routers connect devices on a different networks.

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<b>HOSTNAME</b>	Hostnames are human-readable nicknames that resolve to the IP address of a device on a network. Hostnames typically appear in computer browser lists, active directory lists, email headers, etc.
<b>DHCP</b>	Dynamic Host Configuration Protocol is a network service that automatically assigns IP address configuration data to hosts that request it upon boot-up. A DHCP server typically assigns an IP address, subnet mask, default gateway, and DNS server addresses.
<b>DNS</b>	Domain Name System is a network service used by IP network hosts to convert host names to IP addresses
<b>IGMP</b>	Internet Group Management Protocol is a communications protocol used by hosts, switches, and routers for creating, joining, and leaving multicast groups.
<b>TIME-TO-LIVE (TTL)</b>	This is a mechanism that limits the lifespan of IP data packets in a network. Each time an IP data packet passes through a router, the router decrements the TTL value by 1. When the value reaches 0, the router discards the IP data packet. A TTL of 1 restricts an IP data packet to the originating subnet since a router won't forward the packet after decrementing the TTL.
<b>SMTP</b>	Simple Mail Transfer Protocol is the procedure behind the flow email on the Internet.
<b>SNMP</b>	Simple Network Management Protocol collects information from and sends configuration commands out to network devices.
<b>SNTP</b>	Simple Network Time Protocol is the method used by IP network devices to obtain standardized time from a time server.
<b>TFTP</b>	Trivial File Transfer Protocol is a subset of the FTP file transfer protocol used by network clients to issue requests to read or write to/from a particular file on an FTP server computer.
<b>CONFIGURATION</b>	A named collection of settings that defines a station's behavior.
<b>NETWORK SOCKET</b>	A network socket is the endpoint address of a service used in between hosts on a computer network. A port address is a number assigned to a service running on a particular host. A socket address is the combination of the IP address of the host and IP address and port number of the service, much like one end of a telephone connection is the combination of a phone number and a particular extension. Based on this address, Internet sockets deliver incoming data packets to the appropriate application IP address, process, or thread.