# WaveWare STG

SIP to TAP Gateway

V1.10 January 9, 2018

## Contents

## Overview

The WaveWare STG is designed to perform the function of monitoring Rauland Responder® communication system alerts using SIP protocol and converting those alerts to TAP protocol outputs. The STG can support TAP outputs to both an Ethernet port and up to four serial ports.

As of STG V1.10, the STG is compatible with both the Responder 5 and the Responder 5000 communication systems.

The STG is configured via a web browser.

## Specifications

- Intel NUC computer, with an AC/DC power adapter
- Linux operating system
- 4 GB RAM
- 32 GB solid state drive
- Ethernet port
- 4 USB ports
- Belkin USB-to-Serial Portable Adapter, as required, per serial port connection

## Installation

To install the STG, you may need the following:

- Rauland Responder 5 or Rauland Responder 5000 Server on same LAN as STG.  Responder 5 and Responder 5000 will be referred to interchangeably in this document as Responder.
- Brekeke SIP Server™ on same LAN as STG
- Configure Responder and Brekeke SIP Server per Rauland instructions.  You will find a suggested Brekeke SIP Server Dialplan information below.
- Windows PC running the WaveWare Discover and Reset Tool, connected to LAN, for purposes of discovering the STG on the LAN (only required if using DHCP to assign an initial IP address to the STG, or if the static IP address is incompatible with the LAN the STG is connected to.
- An Ethernet controlled paging system and/or up to four serial port controlled paging systems or downstream devices that process TAP protocol.  Note: When connecting WaveWare paging systems to the STG USB ports, you will need a Belkin USB-to-Serial Portable Adapter for each paging system.
- UPS (uninterruptible power supply).  A UPS can reduce the instances of potential disk corruption or disk cleanup processes that might be required after a sudden loss of power event.

The STG should be installed using the following procedure:

- Before powering up the STG, make all of the connections, including:
    - Ethernet
    - One Belkin USB-to-Serial Portable Adapter per serial port connection
- Power up the STG.  Wait a few minutes for the STG to boot up.  The STG is designed to boot up automatically when power is applied.  The boot up method is adjustable in the BIOS, which is documented in the Troubleshooting section.

### Configure Static IP Address

The STG ships with DHCP enabled, so that it can obtain a dynamically assigned IP address when it is connected to a LAN.  The STG requires a static IP address assignment in order to have uninterrupted operation monitoring the Responder alerts.  Use the following procedures to set a static IP address in the STG.

## Discover the STG Using WaveWare Discover and Reset Tool

The WaveWare Discover and Reset Tool is designed to make it simple to install and configure an STG. Simply connect the STG to your LAN, then run the Discover and Reset Tool's Discovery function to discover the STG on the LAN.

You can download the WaveWare Discover and Reset tool at the following link:

http://www.wirelessmessaging.com/software/misc/discover_reset_setup.exe

Install the Discover and Reset Tool.  Note: WaveWare Discover and Reset Tool requires Microsoft .NET runtime files to be installed on the PC that will be used to run the app.

Connect a Windows PC running the WaveWare Discover and Reset Tool to the LAN that the STG is connected to.  Launch the Discovery function to open the Discover WaveWare Systems screen.  Click on the Discover button (magnifying glass icon) to start the discovery process.  Any STGs and WaveWare systems on the LAN should appear in the list within a second or two.  Click on the displayed record of a discovered STG to launch the default browser and to pull up the STG configuration page.
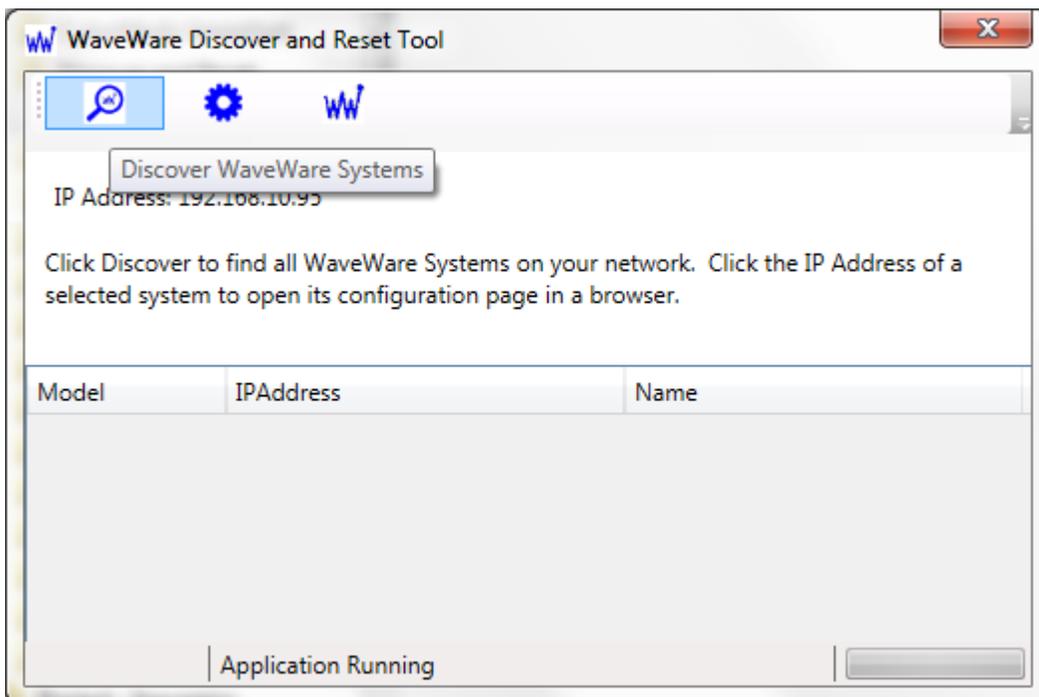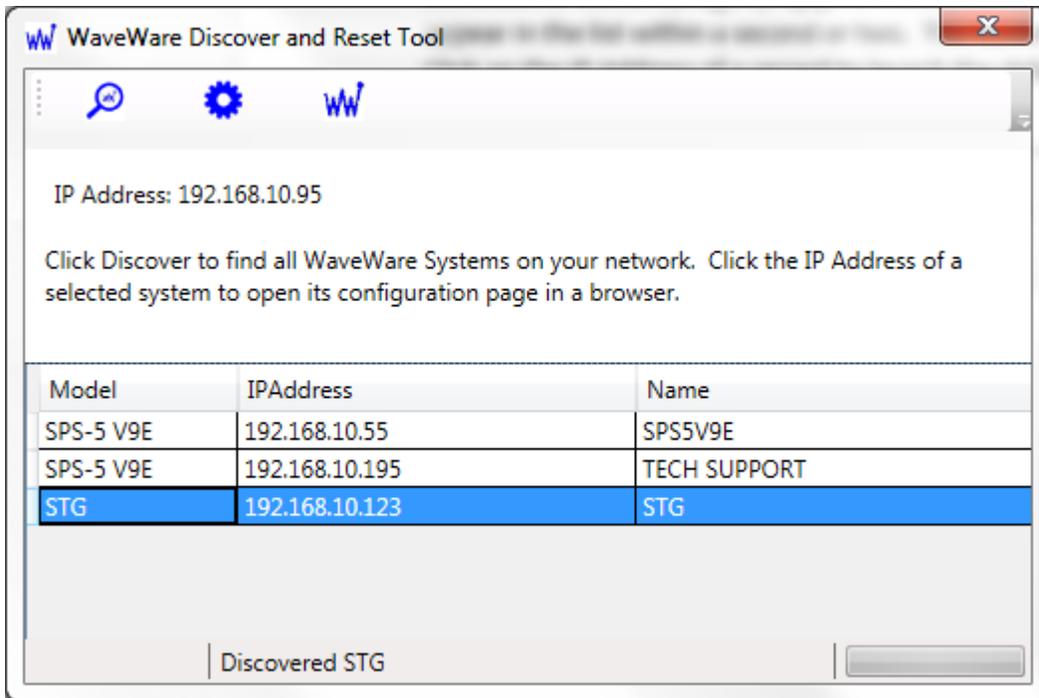
**Note:** If the STG is configured with DHCP disabled and the IP address assigned to the STG is incompatible with the LAN that the STG is connected to, when you click the the record of the discovered STG, a popup window will occur that tells you that you need to reset the STG to DHCP mode.

**Note:** The STG ships with DHCP enabled. If the LAN that the STG is connected to does not allow UDP broadcast packets, then the WaveWare Discover and Reset Tool will not discover the STG. Refer to Troubleshooting section for how to address this issue.

## Configure the STG

Once you click on the discovered STG, if there are no IP address configuration problems, you should be prompted for user name and password in the default browser. The default user name value is admin and the default password value is STGpass1234
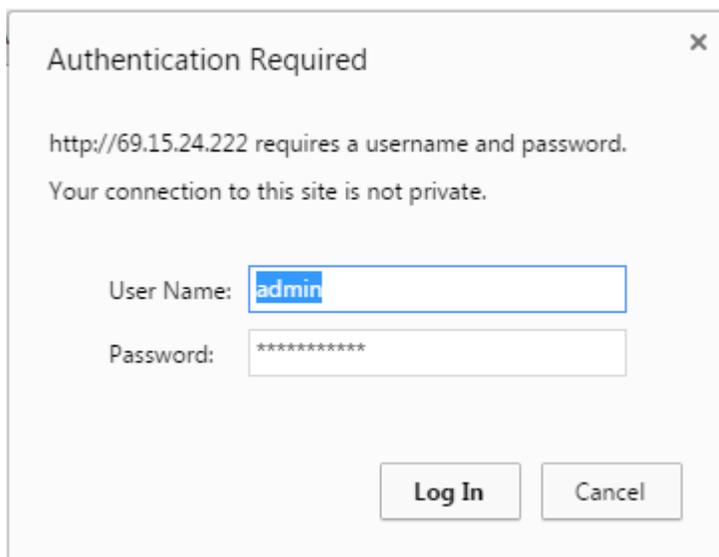


A successful login will cause display of the STG main page in the browser.

**STG**

☑ DHCP (Assigned IP: 192.168.10.58)

IP Address: 192.168.10.8

Subnet Mask: 

Gateway IP: 

Time Server: 

**Ethernet Paging System**

IP Address: 

IP Port: 

**Serial Paging System(s)**

Baud Rate:
- ◉ 9600
- ○ 2400
- ○ 1200
- ○ 300

Data Bits:
- ◉ 8
- ○ 7

Parity:
- ◉ None
- ○ Even

Flow Control:
- ◉ Hardware (RTS/CTS)
- ○ Software (XON/XOFF)

ATI Keepalive:
- ○ Enabled
- ◉ Disabled

Legacy Dial Back:
- ○ Enabled
- ◉ Disabled

Demo Mode:
- ○ Enabled
- ◉ Disabled

**Click Here to View Log**

| | | |
|---|---|---|
| Sip Input | Listening | N/A |
| USB2 | Logged IN | 0 Messages in Queue. |
| USB4 | Trying to Login | 0 Messages in Queue. |
| IP | Logged IN | 0 Messages in Queue. |

Save Configuration

Update STG Software

Clear Message Queue

Reset STG to Default Settings

Restart STG

Uncheck the DHCP checkbox to allow assignment of a static IP address.  Edit the IP address value as required.  Note that when DHCP is enabled, the currently assigned IP address will be displayed next to the DHCP checkbox.  Only when DHCP is disabled will the IP Address field value be applied to the STG.

## Save the STG Settings

After editing the STG configuration settings, click the Save button in the browser.  You will see a red status message in the browser:  Your information has been submitted successfully, please restart system!

## Restart the STG

To apply your saved settings, click the Restart button on the STG main browser page to cause the STG to restart.  As the STG is restarting, you will see a red status message in the browser:  System is restarting, page will reload automatically in 30 seconds. If you have changed the system IP you may need to re-discover.

# Configuration

The STG is configured via a browser based configuration page that can be located at the current IP address of the STG.

**Notes:**

1. All configuration edits must be saved and the STG must be restarted before the configuration changes are applied by the STG.

2. STG does dynamically detect the attachment and un-attachment of USB to serial adapters, and automatically updates the status table on the configuration page.

3. The STG is hard coded to listen for SIP UDP communications on IP port 5060

4. The Serial Paging Systems configuration values apply to all connected Serial Paging Systems.  Typical Serial Paging Systems configuration uses 9600 baud, no parity, and 8 data bits.

5. Flow control on WaveWare paging systems can use a combination of hardware, software, or TAP response code flow control.  Flow control is typically used when a paging systems input message queue becomes full, requiring a signal to pause message output until that signal is reversed.  On the Ethernet Paging System output, the STG monitors for the 512 TAP response code to indicate full message input queue (see TAP output processing flow chart below)

## DHCP

DHCP mode allows the STG to obtain an IP address assignment from a DHCP server on the LAN that the STG is connected to.  DHCP should only be used when first installing the STG, so that the STG can acquire an IP address that allows its configuration page to appear in a browser on the same LAN that the STG is on.  The STG ships with DHCP enabled.  The WaveWare Discover and Reset Tool application is typically used during installation to discover the STG's assigned IP address, and to allow single click launch of the STG's browser based configuration page.  Note that when DHCP is enabled, the currently assigned IP address will be displayed next to the DHCP checkbox.  Only when DHCP is disabled will the IP Address field value be applied to the STG.

### STG IP Address

The STG IP Address field displays the currently assigned IP address of the STG and is used to assign a static IP address to the STG

### Subnet Mask

The Subnet Mask field displays the currently assigned subnet mask assigned to the STG.  The default value is 255.255.255.0.  If the Responder system is on a different network segment than the STG or if the Ethernet paging system is on a different network segment, e.g. STG is on 192.168.10.214 and Responder is on 192.168.18.214, then the Subnet Mask value would need to be adjusted to 255.255.0.0.

### Gateway IP

The Gateway IP field displays the IP address of a LAN gateway that the STG can use to connect to devices outside of the current STG network segment.  This setting only becomes important if connecting the STG to an Ethernet TAP output IP address that is outside of the current STG network segment.

### Time Server

The Time Server field displays the IP address of a custom time server, if the installation requires one.  The default value is blank, as the STG, by default, tries to use the internet to connect to nist.time.gov.  If the Time Server field is not blank, the STG will try to connect to the custom time server value.

### Ethernet Paging System IP Address

The Ethernet Paging System IP Address field displays the currently assigned IP address for any Ethernet paging system that you want the STG to communicate to.  If you do not want the STG to try to communicate to an Ethernet paging system, leave the Ethernet Paging System IP address field blank.

### Ethernet Paging System IP Port

The Ethernet Paging System IP Port field displays the Ethernet IP Port value that the STG should use when communicating with the Ethernet paging system.

### Baud Rate

The Baud Rate field displays the serial port baud rate value that the STG should use when communicating with all connected Serial Port Paging Systems.

### Data Bits

The Data Bits field displays the data bits value that the STG should use when communicating with all connected Serial Port Paging Systems.

### Parity

The Parity field displays the serial port parity value that the STG should use when communicating with all connected Serial Port Paging Systems.

### Flow Control

The Flow Control setting displays the flow control method that the STG should use when communicating with all connected Serial Port Paging Systems.  Typically flow control is only used when a paging system input queue is full and the paging system needs to signal a pause in message flow and then to signal a return to normal message flow.  If TAP 512 response code of 512 is used for flow control, the STG waits 5 seconds before retrying the same message (see TAP output processing flow chart below)

## ATI Keepalive Mode

The ATI Keepalive setting displays whether or not the ATI Keepalive feature is enabled in the STG.  When the ATI Keepalive mode is enabled in the STG, the STG will output an ATI<CR> to each of the TAP outputs once per minute and monitor for any response.  If no response occurs, the STG will log a communication failure event and change the status field value in the configuration screen to **Trying to Login**, and will attempt to log back into the paging system.  WaveWare paging systems always respond to ATI<CR> prompts.

## Legacy Dial Back

The Legacy Dial Back setting cause the STG to format all TAP paging messages using the Rauland Legacy Dial Back method.  Following is an example showing the difference between the normal and Legacy Dial Back methods of formatting TAP paging messages.

**4West402:1 Patient OT** is normal TAP message formatting

**4*402*1 Patient OT** is Legacy Dial Back TAP message formatting

## Demo Mode

The Demo Mode setting causes the STG to output demonstration TAP paging messages, at the rate of one message every 2 seconds.  The purpose of the Demo Mode is to allow the TAP compatibility testing to occur without requiring a Rauland nursecall system or a Brekeke SIP Server.

Following is an example of how the demo TAP paging messages are logged by the STG:

Fri Sep 16 2016 16:39:09 GMT-0500 (Central Daylight Time) **PagerId:** 101 **Message:** 1Demo101:1 Patient OT


====================================
INTERNALLY GENERATED DEMO MESSAGE
====================================

The STG will always output demo messages using a Pagerid value of 101, with the Message formatted as 1Demo10N:1 Patient OT, where the N value cycles from 1 to 5 repeatedly.

Demo Mode will continue until disabled and the STG restarted via the STG main browser page.

Note that the STG will process SIP messages simultaneously with Demo Mode operation.

## System Status Table

The STG System Status table is displayed in the STG configuration page.  The System Status Table is updated automatically as system status changes.  The System Status Table indicates the state of the SIP Input, and any Ethernet and/or Serial Port Paging Systems.

The first column of the System Status Table identifies the STG system element, including Sip Input, USB0, USB1, USB2, USB3, and IP.  Records for these elements appear if they are detected on startup or dynamically during operation.  The Ethernet Paging System record is created when an IP address and IP port are defined for the Ethernet Paging System and recognized on startup of the STG.  The Serial Port Paging System records are automatically created when the STG detects USB to Serial Port adapters being connected or disconnected from the STG, and upon startup.

The second column of the System Status Table indicates the state of each of the STG system elements. A green state is good and a red state indicates an issue. A normal state for the Sip Input element is **Listening**, and a normal state for a TAP output is **Logged IN**. Problem states can include **USB Disconnected**, and **Trying to Login**.

The third column of the System Status Table is used to indicate how many messages are in each output queue. A normal state is indicated by "**0 Messages in Queue.**" The STG maintains a message queue for any paging system that is detected and logged into at startup, as well as any paging system that is detected and logged into after a USB adapter connection is dynamically detected. If a paging system is disconnected and reconnected, the queued messages will be delivered to that paging system.

## View Log

The Click Here to View Log link under the Status Table allows you to view the communications logs for the STG (See *Examining STG Log Data* section below).

## Update STG Software

The Update STG Software button allows the STG to detect and apply any software changes. Upon click of the Update Software button, the system attempts to retrieve an update script from the WaveWare web site. In combination with update script retrieval, the system restarts and applies the update script. This feature requires the STG to have internet access. **Note that the update process can take up to 25 minutes and the STG should not be interrupted as it goes through up to two restart cycles. You can observe the status of the upgrade process by connecting a monitor to the STG HDMI port. Once fully updated, the HDMI output will display the STG configuration page in a web browser. If the update process fails, please take a photograph of the HDMI output for troubleshooting purposes.**

## Clear Message Queue

The Clear Message Queue button allows the outgoing message queue(s) to be cleared. The purpose of this feature is primarily to reduce the amount of radio paging output when paging system overrun conditions occur. The only practical applications of the Clear Message Queue feature are when load testing the STG, when a paging system is not connected to a serial port during periods of activity, when exercising the system during installation, and when paging system communication failures occur, causing the output queue to build up.

## Reset STG to Default Settings

The Reset STG to Default Settings button allows the STG default settings to be restored. In addition the system log files will be cleared.

## Brekeke SIP Server Dialplan Configuration

The simplest Dialplan Rule to use with the Brekeke SIP Server is:

## Matching Pattern:

$request = ^INVITE
$registered = ^false
To = sip:(.+)@

Deploy Pattern:

To = sip:%1@<STG IP>

Where <STG IP> is the STG IP address.   Following is a screenshot of the Brekeke SIP Server Dialplan configuration.

## Rules

☒ Hide Disabled Rules

```
New Rule
```

| Pri | Name | Matching Patterns | Deploy Patterns | |
|-----|------|-------------------|-----------------|---|
| 1 | To OMNI | $request = ^INVITE<br>$registered = ^false<br>To = sip:(.+)@ | To = sip:%1@192.168.10.253 | 🗔❌ |

This configuration will forward all unregistered sip invites to the STG.

The matching pattern "To = sip:(.+)@" can be changed to use a different regular expression.

For example, "To = sip:(10[0-9])@" would match extensions 100-109.

"To = sip:(999999)@" would forward only invites from extension 999999.

Please note that, if you review the Brekeke Session Logs, the STG related log entries will show that each session was terminated by a 404 error, as shown in the figure below.  That is normal, due to the need to use 404 Not Found signaling to the Responder so that the SIP call invitation is only attempted once by Responder, so that STG only outputs a single TAP message per active Responder call directed toward the STG.

## Session Logs ( 2017-12-11 )

Show Filter

| SID | From URI | To URI | Talking Length | Invite Start Time | Talk Start Time | End Time | Result | Error |
|-----|----------|--------|----------------|-------------------|-----------------|----------|--------|-------|
| 279 | sip:alex@192.168.10.66 | sip:101@192.168.10.58 | 00:00:00.000 | 2017-12-11 10:40:22.828 | | 2017-12-11 10:40:22.832 | Failure | 404 |
| 281 | sip:alex@192.168.10.66 | sip:101@192.168.10.58 | 00:00:00.000 | 2017-12-11 10:40:28.300 | | 2017-12-11 10:40:28.303 | Failure | 404 |
| 283 | sip:alex@192.168.10.66 | sip:101@192.168.10.58 | 00:00:00.000 | 2017-12-11 10:40:32.086 | | 2017-12-11 10:40:32.089 | Failure | 404 |
| 285 | sip:alex@192.168.10.66 | sip:102@192.168.10.58 | 00:00:00.000 | 2017-12-11 10:40:36.734 | | 2017-12-11 10:40:36.737 | Failure | 404 |
| 287 | sip:alex@192.168.10.66 | sip:103@192.168.10.58 | 00:00:00.000 | 2017-12-11 10:40:40.107 | | 2017-12-11 10:40:40.110 | Failure | 404 |
| 289 | sip:alex@192.168.10.66 | sip:104@192.168.10.58 | 00:00:00.000 | 2017-12-11 10:40:47.126 | | 2017-12-11 10:40:47.128 | Failure | 404 |

# Troubleshooting

## Recovery from Loss of Power

It is highly recommended that the STG obtain power through a UPS (uninterruptible power supply), to avoid sudden loss of power events.  Sudden loss of power conditions could cause the STG to need to perform an fdisk process to clean up the drive before becoming fully operational.

NOTE: Pressing the STG power button, to cause a restart or shut down during a startup process, could cause a compounding effect that may cause the STG to become unrecoverable. Avoid pressing the STG power button during startup and shutdown cycles.

If you are unsure about what state the STG is in after initiating a startup or shutdown cycle, you can connect a monitor to the STG's HDMI port and be able to directly configure the STG.

## Resetting an STG From Discover and Reset Tool

If the STG is configured with DHCP disabled and the IP address assigned to the STG is incompatible with the LAN that the STG is connected to, when you click the the record of the discovered STG, a popup window will occur that tells you that you need to reset the STG. Resetting an STG primarily enables DHCP mode in the STG and restarts the STG.
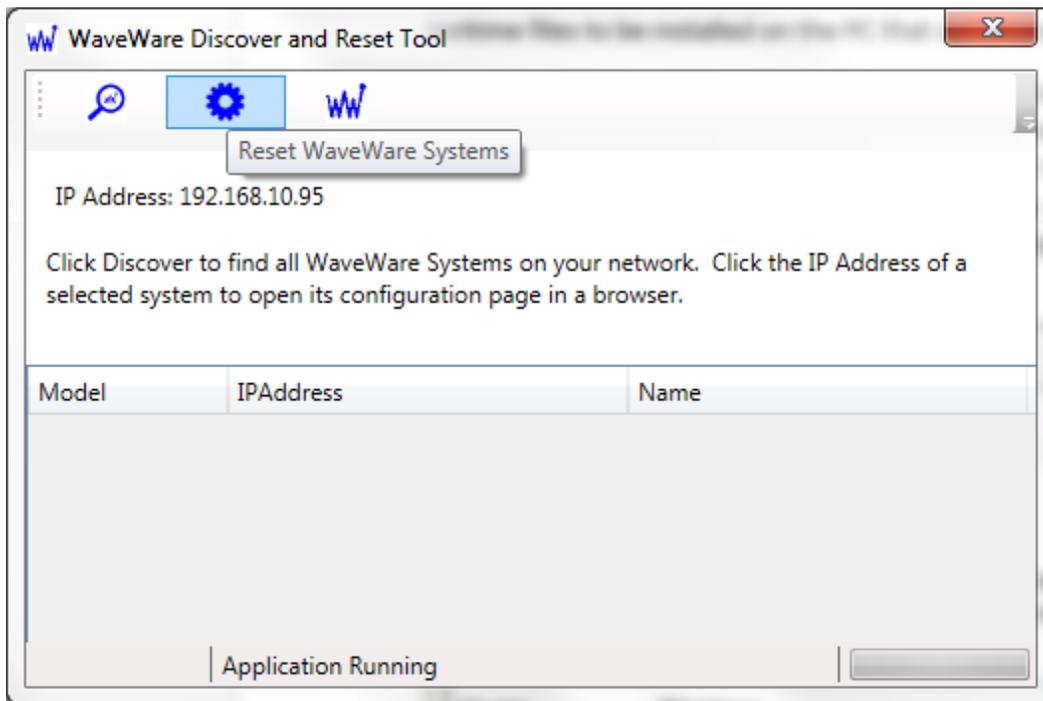


To reset an STG, click on the reset button (gear icon). A Reset WaveWare Systems window will appear. Click on the Reset STG Settings button. A Reset STG window will appear.

Follow the instructions in the Reset STG window. **Note:** You will require both a Belkin USB-to-Serial Portable Adapter and a null modem adapter to enable the PC to STG serial port connection.
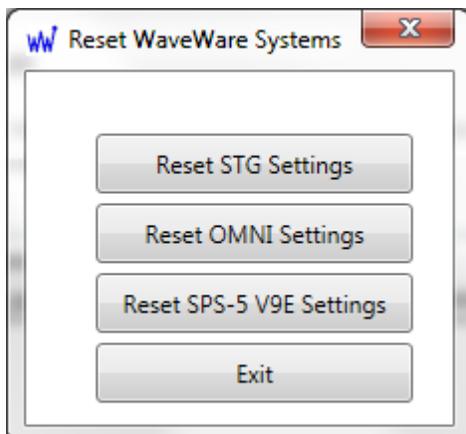


When the Reset button is clicked, if the STG is reset successfully, a popup window will appear indicating success.

Once you have successfully reset the STG, and have waited at least one minute for the STG to restart, you can click Cancel, then Exit, and return to the main Discover and Reset Tool screen and try the Discovery process again.
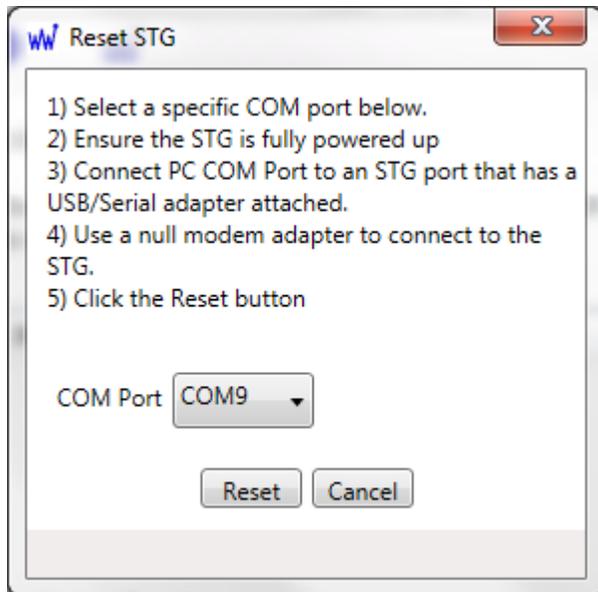
## Troubleshooting STG Communications Status

The STG main page in the browser displays the status of the SIP input status and all of the detected TAP outputs. A green status text is good. A red status text indicates a problem. A typical problem might be a **Trying to Login** status, which usually indicates a paging system that is disconnected or not powered up. If you do not intend to output to a particular paging system, the affected USB to serial adapter should be removed, and the STG restarted. A **USB Disconnected** status indicates that a USB adapter was disconnected after the STG has powered up and detected an adapter on that USB port.

You can click on the Data Log link for each input or output to review the communications on each of the input and/or outputs, as an additional means of troubleshooting communications.

You can e-mail all or part of a particular Data Log to WaveWare support team, at support@wirelessmessaging.com, with a description of your symptoms, and we will help you troubleshoot the connection problem.

## Troubleshooting Connected Equipment That Indicates a Synchronization Problem

The STG reverts to a Logged Out state on a given serial port, without going through a TAP logout process, under the following conditions:

- When the STG is restarted
- When the serial port parameters are modified
- When the USB connector is removed and re-connected

When the STG initializes the serial port, it first outputs **BYE<CR>**, followed by **<CR>** at 3 second intervals, to try to get a login response from the downstream equipment. If the STG encounters an **ID=** during

this process, it will respond with the standard **<ESC>PG1<CR>** per TAP 1.8 protocol specs, to continue the TAP login process.

In these cases, the downstream equipment may consider itself to be in a TAP Logged In state and may not properly respond to the TAP log in communications from the STG, and may need to be restarted.

## Troubleshooting Inability to Discover the STG using the WaveWare Discover and Reset Tool

The STG is shipped with DHCP enabled.  The WaveWare Discover and Reset Tool using broadcast UDP packets to discover the STG.  If the network that the STG is connected to prevents broadcast UDP packets, then the WaveWare Discover and Reset Tool will be unable to discover the STG.

In that case, there are a number of workarounds, as follows:

1. Move the STG to a LAN that does allow UDP broadcast, so that is becomes discoverable with the WaveWare Discover and Reset Tool

2. Create a LAN using a laptop, a wireless router, and the STG, so that the router can provide DHCP services to the STG.  Run WaveWare Discover and Reset Tool on the laptop to discover the STG

3. Attach a video monitor to the HDMI port or mini DisplayPort on the STG.  You should be able to see the STG configuration page.

## Troubleshooting Problems During Software Update Process

If the STG does not return to normal operation in 10 minutes after starting the Update Software process, you can attach a monitor to the STG's HDMI port and observe any error notices, which you can report to WaveWare Tech Support department.

If the STG returns to normal operation but the software version did not change, then there was a problem with connecting to the wirelessmessaging.com web site to grab the update script.  This is commonly caused by not having an adequate internet connection for the STG.

## Examining STG Log Data

### Sip Input Data Log

When you click on the View Logs link, up to 2,000 SIP processing records will be displayed by default. When you adjust the Begin and End Date/Time values and click the update button, the STG will display up to the newest 2,000 records within the selected date/time range.

**Begin Date/Time:**

[ ] 📅

**End Date/Time:**

[ ] 📅

[update]

**Showing from:**

Thu Jul 07 2016 14:57:17 GMT-0500 (Central Daylight Time)

**To:**

Thu Jul 07 2016 15:57:17 GMT-0500 (Central Daylight Time)

**Displaying 1 Records**

---

Thu Jul 07 2016 15:44:34 GMT-0500 (Central Daylight Time) **PagerId:** 123 **Message:** STG test message 1
- USB 4: DELIVERED @ Thu Jul 07 2016 15:44:35 GMT-0500 (Central Daylight Time)

    ○ Serial Out: <STX>123<CR>STG test message 1<CR><ETX>6=9<CR>

    ○ Response: <LF>211<CR><ACK><CR>

```
======================
INVITE sip:123@10.0.1.131 SIP/2.0
Via: SIP/2.0/UDP 192.168.10.66:5060;branch=z9hG4bKcf77e587b325-30-2e8684;received=70.119.213.30
Via: SIP/2.0/UDP 192.168.10.90:61101;branch=z9hG4bK-524287-1---ddf86e1847c7c304;rport=61101
Max-Forwards: 69
Contact: <sip:alex@192.168.10.66:5060;rinstance=0e84a8e8c08fa753>
To: <sip:123@10.0.1.131>
From: "STG test message 1"<sip:alex@192.168.10.66>;tag=9ad1a94d
Call-ID: 79048ZTM1MjAwYjM5NzI0MzdiM2RjNmQxYTEyMjhhMDA3MDQ
CSeq: 1 INVITE
Allow: SUBSCRIBE, NOTIFY, INVITE, ACK, CANCEL, BYE, REFER, INFO, MESSAGE, OPTIONS
Supported: replaces
User-Agent: X-Lite release 4.9.2 stamp 79048
Record-Route: <sip:192.168.10.66:5060;lr>
Content-Type: application/sdp
Content-Length: 274

v=0
o=- 13112397867237688 1 IN IP4 192.168.10.90
s=X-Lite release 4.9.2 stamp 79048
c=IN IP4 192.168.10.90
t=0 0
m=audio 58118 RTP/AVP 9 8 120 0 84 101
a=rtpmap:120 opus/48000/2
a=rtpmap:84 speex/16000
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
a=sendrecv
======================
```

## Restarting the STG

To restart an STG, click the Restart button in the STG browser main window.

Alternatively, you can momentarily press the button on top of the STG, observe the LED in the button to start blinking, wait several seconds for the illumination of the button to stop, then press the button again to restart the STG.

## STG Throughput Capabilities

The STG has the ability to process message at the following rates:

- Approximately 90 incoming SIP messages per second

- Approximately 9 outgoing TAP messages per second, on a serial port, at 9600 baud

- Approximately 14 outgoing TAP messages per second, on an Ethernet connection

## Adjusting the STG Boot Up Method

The STG is designed to boot up immediately when power is applied.  If you want the STG to only boot up when you press the power button, you can adjust the STG (Intel NUC) BIOS.  The following BIOS screen shows an After Power Failure drop box in the Secondary Power Settings section of the Power tab.  The options are:

- Power On

- Stay Off

- Last State

The STG should be configured to use the Power On option, which allows a full boot up process to automatically occur each time power is applied.  If you need to adjust the STG BIOS, attach a mouse, keyboard, and monitor with HDMI adapter to the STG.  BIOS Setup is accessed by pressing F2 after the Power-On Self-Test (POST) memory test begins and before the operating system boot begins.
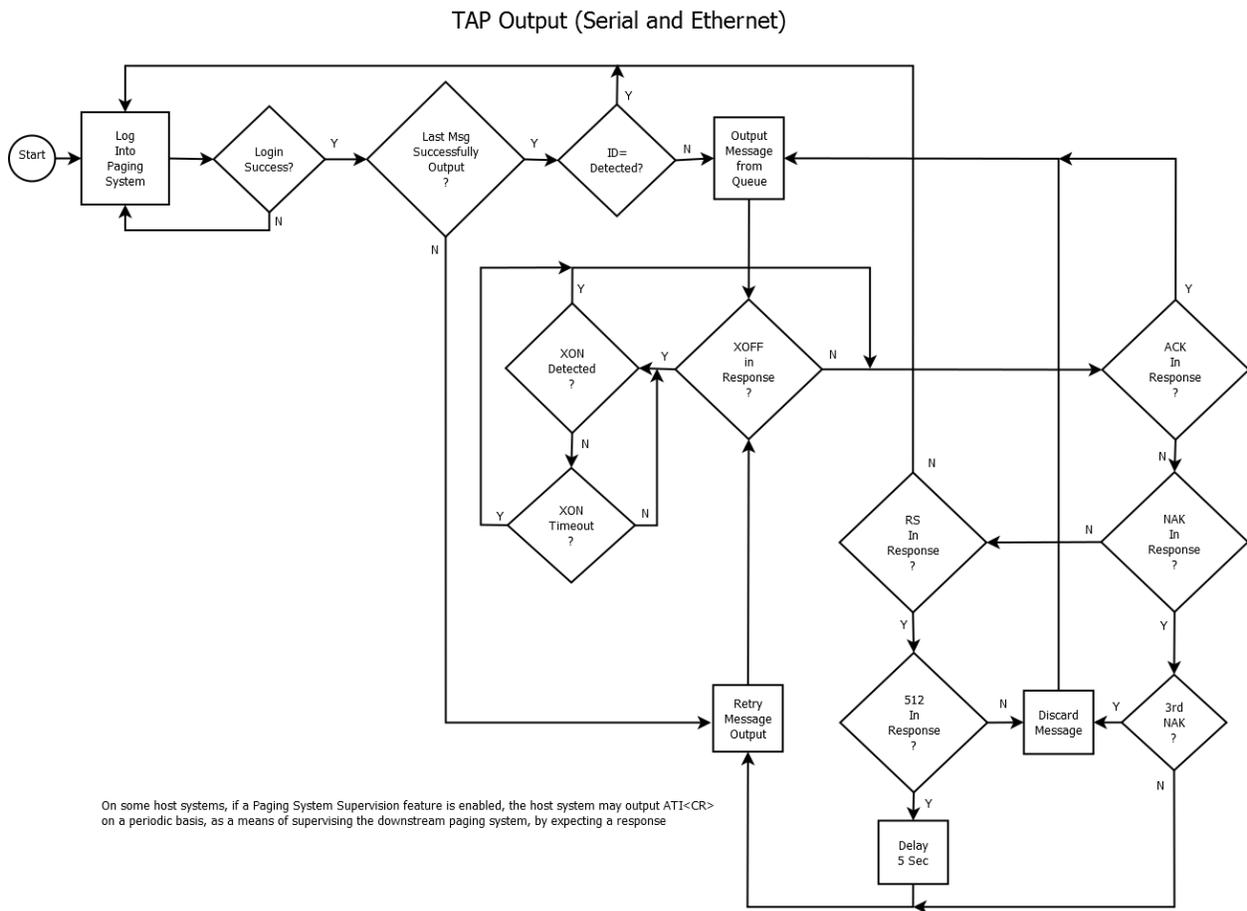


## TAP Output Processing Flow Chart

Following is a flow chart that documents how the STG manages both Ethernet and serial port TAP output.  This flow chart is designed to accommodate a wide variety of devices that support TAP protocol.

**Notes:**

1. The STG logs into a paging system when first connecting, assumes that the Logged IN state is persistent, and outputs multiple messages with indeterminate periods of time between the messages, until it detects that a new login process needs to occur.

2. When an STG initially attempts a login after a settings change, it will output **BYE<CR>**, then will output a **<CR>** every 3 seconds if the **ID=** response is not detected.

3. An odd response to a paging message, such as an **ID=** triggers a new login process, as a means of re-establishing synchronization with the paging system.  If the odd response is **ID=,** the STG will respond with **<ESC>PG1<CR>**.  For any other odd response, the STG will respond with **BYE<CR>**, then will output a **<CR>** every 3 seconds if the **ID=** response is not detected.

4. An **ID=**, sensed in any state of the STG, will cause the STG to respond with **<ESC>PG1<CR>** as a means of responding to the paging system request to re-establish synchronization.

5. The STG maintains an independent outgoing message queue for each paging system, in order to not allow a failed message output on one paging system affect the throughput of messages on good paging system connections.

6. If ATI Keepalive mode is enabled, the output of a message from the queue will reset the ATI Keepalive one minute timer.

TAP Output (Serial and Ethernet)

Start

Log Into Paging System

Login Success?

Last Msg Successfully Output?

ID= Detected?

Output Message from Queue

XON Detected?

XOFF in Response?

ACK In Response?

XON Timeout?

RS In Response?

NAK In Response?

Retry Message Output

512 In Response?

Discard Message

3rd NAK?

Delay 5 Sec

On some host systems, if a Paging System Supervision feature is enabled, the host system may output ATI<CR> on a periodic basis, as a means of supervising the downstream paging system, by expecting a response

## Update History

V1.10 – Added custom time server.  Added configurability through HDMI port.  Increased stability of file system and database.  Added display of assigned IP address when DHCP is enabled.  Modified STG update script on 1/9/2018, to include installation of XWindows so that older STG versions can achieve the feature of STG configurability through the HDMI port.

V1.09 – Modified TAP over Ethernet output driver to correct a long term socket connectivity issue

V1.08 – Modified TAP output driver to alternately output BYE<CR> and <CR> at the beginning of any new paging system connection being established, to maximize paging system compatibility

V1.07 – Modified TAP output driver to correct a problem introduced in V1.06

V1.06 – Modified TAP output driver to handle periodic ID= output from paging system, regardless of system state

V1.05 – Modified Legacy Dial Back driver to try to extract more useful information when the SIP Cancel feature is enabled in Responder