



GW3-TRBO®
GenSPOut
Software Version 2.12
Module Book

GW3-TRBO®

600-2.12.0-K.1
1/8/2016

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Refer to the *Troubleshooting & Support* section of the GW3-TRBO Manual Shell (Book 600-2.12.0-AA.1) for complete support and contact information.

Document History

Revision	Description	Author
2.0.5	Release Revisions, updated screenshots for TRBO	REB
2.0.5	Replaced GW3-TRBO trademark with registered trademark.	JAW
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2.11	Converted to Docx format	CWF
2.12	Revisions Before Release	JAW

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Goals

This manual describes the role and function of the GenSPOut module in the GW3-TRBO solution.

Who Should Read This Manual?



This manual is written for the intended audience of mid-level MOTOTRBO radio system users and mid-level PC users.

How This Manual Is Organized

This manual is organized as follows:

- **Overview:** Describes the GenSPOut module and provides an overview of its features.
- **GenSPOut Setup:** Describes the process of setting up the GenSPOut module to suit your needs.

This manual contains the following images, used to indicate that a segment of text requires special attention:

-  **Additional Information:** Additional information is used to indicate shortcuts or tips.
-  **Warning:** Warnings are used to indicate possible problem areas, such as a risk of data loss, or incorrect/unexpected functionality.

Important Note

The MOTOTRBO “backbone” that GW3-TRBO uses is a powerful stream of data that, as time goes by, will be revealing much more of its power. You may notice GW3-TRBO terms, setup options or real-time activity properties that may not make sense in the current MOTOTRBO world. If you see terms, options or properties that are not adequately explained in your GW3-TRBO documentation, please contact support, look in the Glossary section of the GW3-TRBO Manual Shell, or on our GW3-TRBO web site. If you see terms, options or properties that you understand, but do not pertain to MOTOTRBO, please disregard them for the time being. As new MOTOTRBO features are added over time, you will begin to understand that your GW3-TRBO is ready for those MOTOTRBO enhancements!

This chapter describes the GenSPOut module and provides an overview of its features.

This chapter contains the following sections:

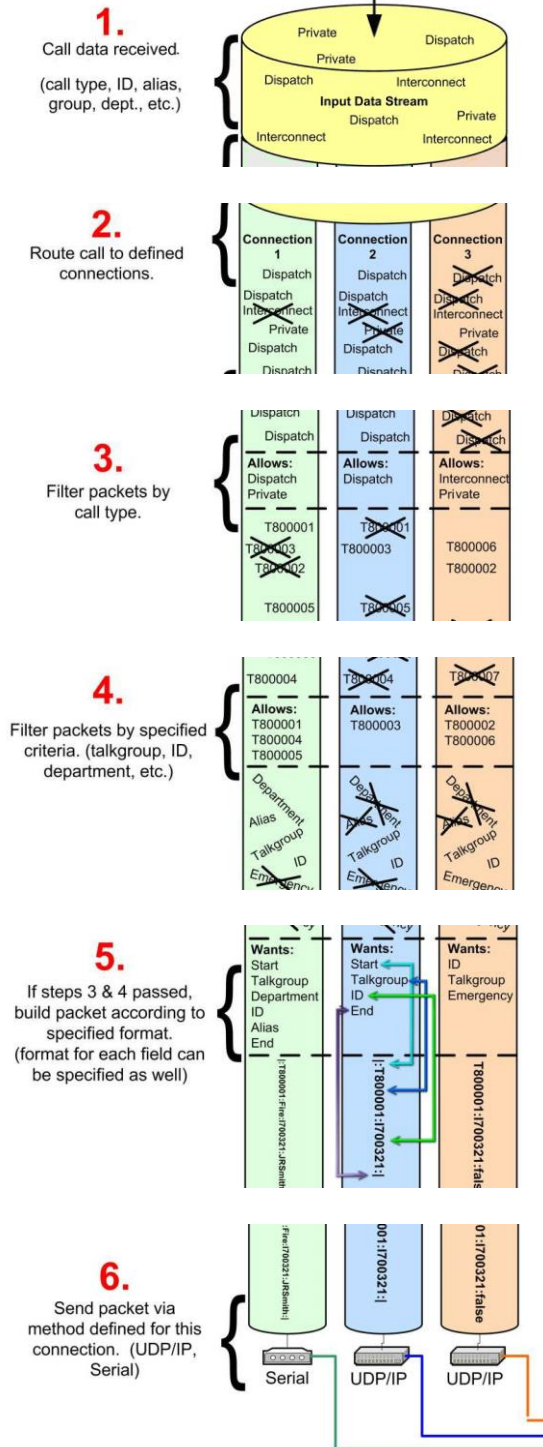
- **What is GenSPOut?:** A brief description of the purpose behind GenSPOut.
- **Features:** Describes the features provided by GenSPOut.
- **Display Overview:** Describes the GenSPOut graphical user interface (GUI) data entry and display areas.

What is GenSPOut?

The “**Genesis Specified Packet Output**” is a formatting and filtering engine for GW3-TRBO. GenSPOut allows GW3-TRBO to function as a powerful and flexible middleware solution.

GenSPOut starts with the packet stream flowing through GW3-TRBO. The packets are parsed and duplicated to feed all of the outbound connections that you have set up. Then the filters take over and eliminate any unnecessary data. Finally, GenSPOut reassembles the data you want to see in the order that you want to see it and passes it out to your device. Simple, huh?!

Let us break this down in detail



Features

The GenSPOut feature set:

- Receives data from any GW3-TRBO source.
- Filters data received.
 - Filter on any or all receivable fields.
 - Create complex (Boolean algebra) filters to specify *exactly* what information you want to see.
- Forms output from data received.
 - You select the fields to send out.
 - You set the format and order of the fields.
 - Specify prefix
 - Specify suffix
 - Trim
 - Pad
 - Replace
 - And more...
 - Add other fields
 - Static text that you specify
 - Time/date in many different formats
- Create timed output packets.
 - Can serve as heartbeat monitors or time sync packets.
- Send data out through one or more connection types.
 - TCP/IP Server
 - UDP Server
 - Serial Port
- Import/Export settings between GenSPOut installations.

With GenSPOut you can take one stream of data and send it out to many locations or even split the data into partial streams based on filters. You can also use GenSPOut to take several GW3-TRBO inputs and combine them into one easy-to-process formatted stream. The possibilities are nearly limitless!

Display Overview

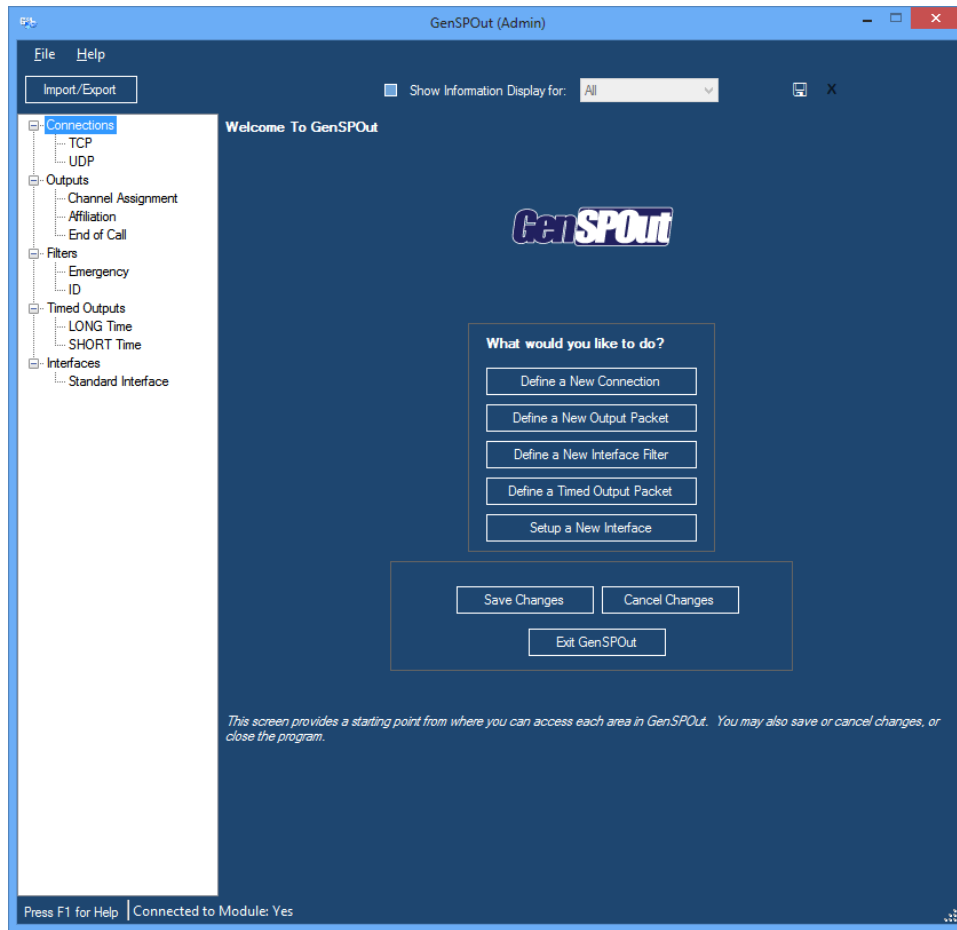


Figure 1.1 – GenSPOut GUI

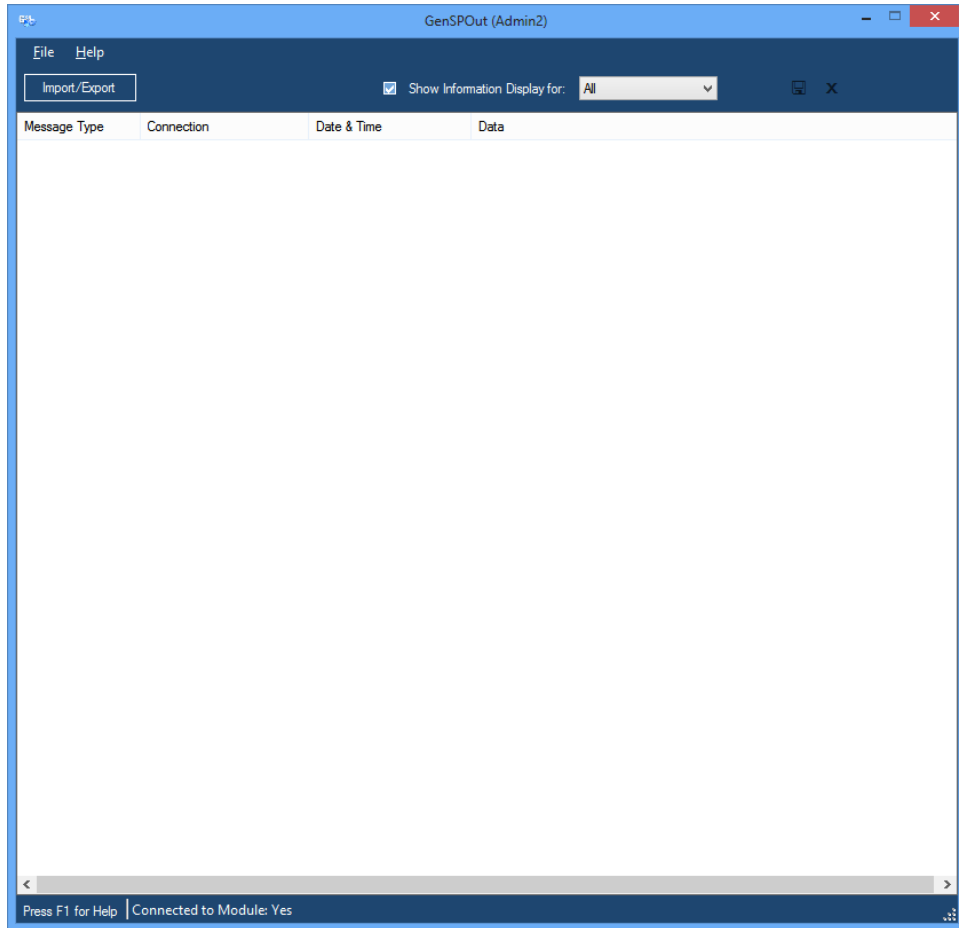


Figure 1.2 – Information Display

The *Information Display* allows you to see exactly what information is being sent out from one or all of the outbound connections.

Now we will go into each of the different configuration pages in GenSPOut.



Data exceeding 259 characters in length will be truncated at 256 characters and end with ‘...’ to indicate not all information is visible.

This chapter describes the process of setting up the GenSPOut module to suit your needs.

This chapter contains the following sections:

- **Default Page:** Describes the Default Page.
- **Connection Page:** Describes the Connection Page.
- **Output Page:** Describes the Output Page.
- **Filter Page:** Describes the Filter Page.
- **Timed Output Page:** Describes the Timed Output Page.
- **Interface Page:** Describes the Interface Page.

The Default Page

Shown in Figure 1.1, this page provides an access point for adding components to GenSPOut, saving or canceling changes, and exiting the program. You can always bring up the default window by clicking on one of the component names (e.g. “Connections”) in the navigation tree.

You can alternatively add new GenSPOut components by right-clicking on an item in the navigation tree.

The Connection Page

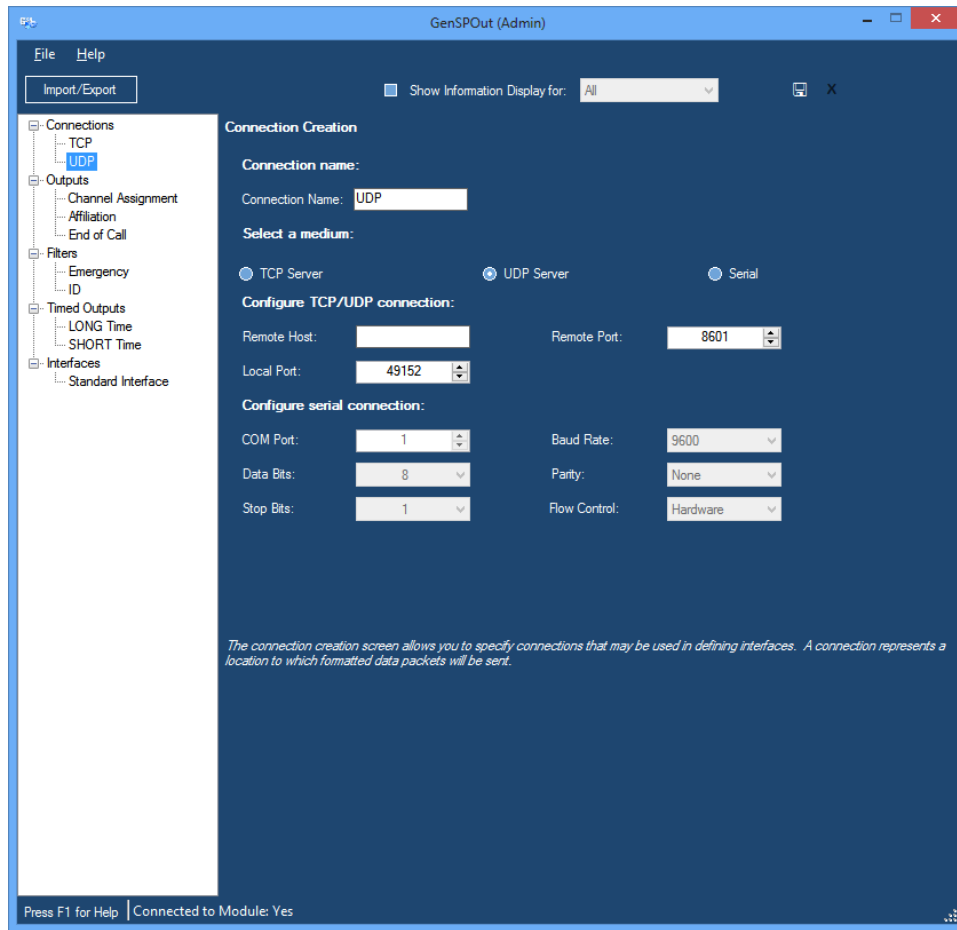


Figure 2.1 – Connection Page

Figure 2.1 shows the *Connection Page*. Adding a new connection or selecting an existing one in the navigation tree will show this page.

You may enter a name by which you can refer to this connection in the future. As you change the name, you will see the change reflected in the navigation tree.



A connection is a data path. It represents a destination (data stream) for data packets that will be sent from GenSPOut to another device.

Connection Protocols

There are three possible types for connections:

- TCP Server
- UDP Server
- Serial

TCP Server

A TCP Server connection binds to a port on the local GenSPOut machine and listens for clients to connect to it. Once a client has connected, GenSPOut will begin sending packets out to that client.

Required Fields

Local Port: The only required field for a TCP Server connection. This value identifies the port on the GenSPOut machine that will be used for communication. This is the port number that must be specified for any client looking to communicate with GenSPOut.

Optional Fields

Remote Host: The remote machine that is allowed to connect to this server. This value can be either a quad dotted IP address (xxx.xxx.xxx.xxx) or a machine name.



If this value is specified, only clients originating from this computer name or IP address will be allowed to successfully connect. Leaving this value blank will allow any client to connect.

Remote Port: The remote port that is allowed to connect to this server.



If this value and a Remote Host value are specified, then only the Remote Host connecting from this Remote Port will be allowed to connect to the TCP server. If the Remote Host is not specified, a client from any host can connect, but only if it is bound to this port. Setting this value to zero will not restrict incoming connections to a specific remote port.

UDP Server

A UDP Server broadcasts packets over a network using UDP protocol. This protocol does NOT guarantee arrival of packets at the receiving end.

Required Fields

Remote Host: The IP address to which this server will send UDP packets. This value can be either a quad dotted IP address (xxx.xxx.xxx.xxx) or a machine name. To send packets to the entire network, enter 255.255.255.255 as the IP address. Alternatively you can specify group broadcasts via 192.168.255.255, etc. To send UDP packets to a specified host only, enter a specific IP address here.

Local Port: The port on the local GenSPOut machine from which this UDP Server will send data packets. This is the port that UDP clients will need to monitor.

Optional Fields

Remote Port: The port to which the UDP Server will attempt to send packets. If this is specified (set to a value other than 0), UDP packets will be directed at specific ports as opposed to general broadcasting.

Serial

A serial connection uses RS232 protocol to communicate to a remote device over a wired cable.

Required Fields

COM Port: The serial port number on the local GenSPOut computer that the wired cable data should be sent on.

Baud Rate: The speed at which data should be communicated over the serial connection. The most common value here is 9600.



Baud rates lower than 2400 may result in serial errors displayed and data loss in GenSPOut when sending large amounts of data.

Data Bits: The number of data bits per byte transferred over a serial connection. The default and most common value here is 8.

Parity: This represents the parity-checking protocol. The default and most common here is “None.”

Stop Bits: Used to synchronize serial data transmission. The default and most common here is 1.

Flow Control: The handshaking protocol for serial port transmission of data. The default and most common here is “Hardware.”

Optional Fields

N/A

Once you have finished entering all data for a connection, it is always a good idea to click **Save** from in the control bar. However, it is not required that this be done until closing the program.

Output Page

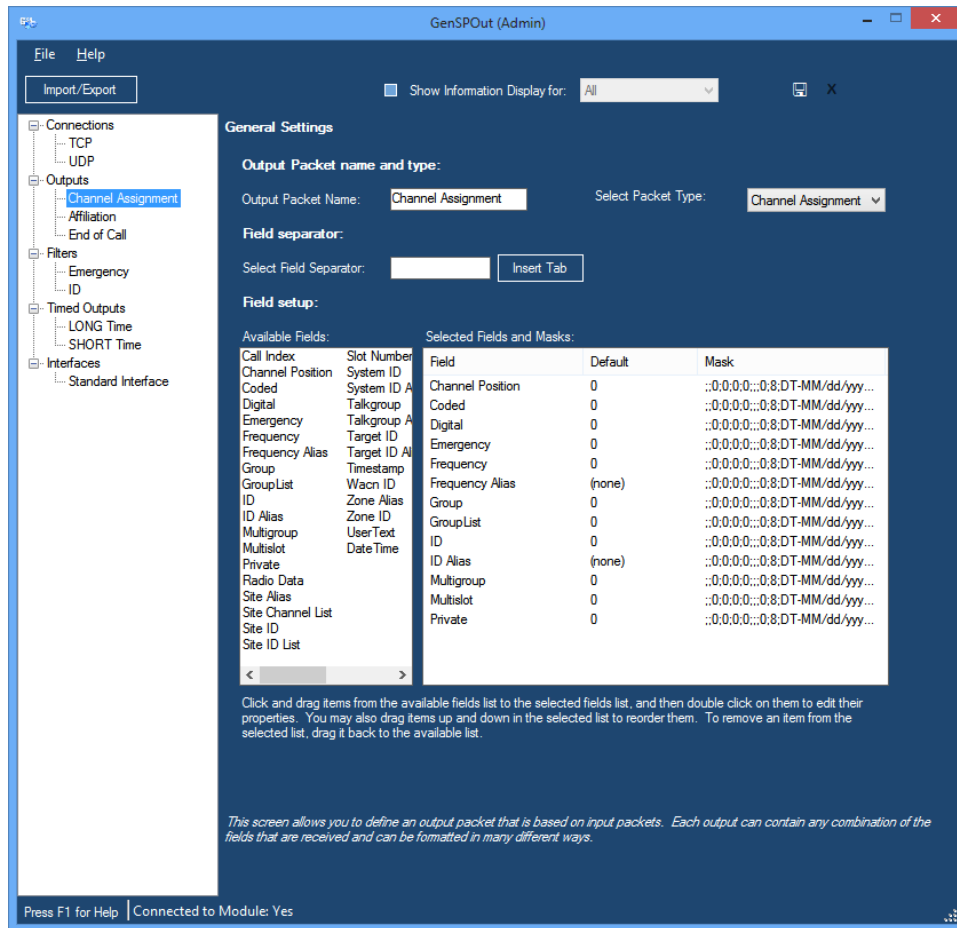


Figure 2.2 – Output Page

Figure 2.2 shows the *Output Page*. Adding a new output or selecting an existing one in the navigation tree will bring up this page.

You may enter a name by which you can refer to this output in the future. As you change the name, you will see the change reflected in the navigation tree.

What is an Output?

An output is a packet of data that will be sent out on one or more connections each time a certain packet type of information is received by GenSPOut. There are many radio system packet types, the most common of which are:

- **Affiliation:** When a radio reports affiliated group information to the system.
- **Busy:** Indicates that a busy condition has occurred.
- **Call Update:** Received when a call has been updated.
- **Channel Assignment:** Indicates an RF channel has been activated on the system.
- **Current Control Channel:** Indicates which repeater slot is currently being used as a control channel.
- **Deaffiliation:** Issued by a radio when it is powered off.
- **Emergency Alarm:** Received when the emergency button is pushed on a radio.
- **Emergency Alarm Ack:** Received when an emergency alarm is acknowledged by another device.
- **End of Busy:** Issued when a busy is ended.
- **End of Call:** Issued when a call is ended.
- **End Session:** Issued when a session ends.
- **New Session:** Issued when a session begins.

Each of these packet types has its own set of fields that are available for output when they are received. Selecting a packet type from the packet type list will populate the **Available Fields** list with these fields.

Adding Fields to an Output

Add fields to an output by clicking on a field in the **Available Fields** list and dragging it into the **Selected Fields** list. Upon doing this, you will see the field show up as selected with a default value and mask. The **Available Fields** list also supports multiselect. To select more than one field at a time, click on the first field you wish to add, then Shift-click or Ctrl-click additional fields. You can then drag all the selected items from the **Available Fields** list into the **Selected Fields** list.

To rearrange the order of fields you have selected, click and drag them up and down in the **Selected Fields** list.

To remove a field from the **Selected Fields** list, click on it and drag it out of the **Selected Fields** box.



Certain fields will always be set to the default value depending on the information provided by your system. Use the Activity GUI's packet details view to ensure a field contains the value you wish to include in your output packet.

Editing Selected Fields

Once you have selected your fields, you can edit their properties by double clicking on them in the selected fields list. If the field you double-clicked is a **User Text** field, you will see the following window:

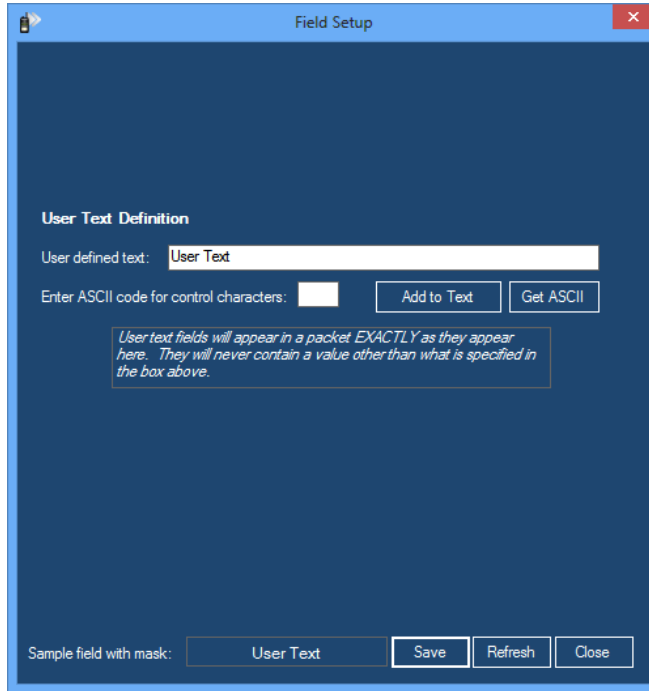


Figure 2.3 – User Text Definition Window

Here you can enter static text that will be sent out as the value for this field every time the packet type for this output is received.

If you wish to add ASCII control characters to the text, enter the numeric value for them in the ASCII control character field and click **Add to Text**. The **Get ASCII** button opens the *ASCII Values* screen which displays the ASCII number for each character in the **User defined text** box.

An example of the output can be seen at the bottom of the window.

If you double-clicked on a DateTime or Timestamp field, you will see the following window:

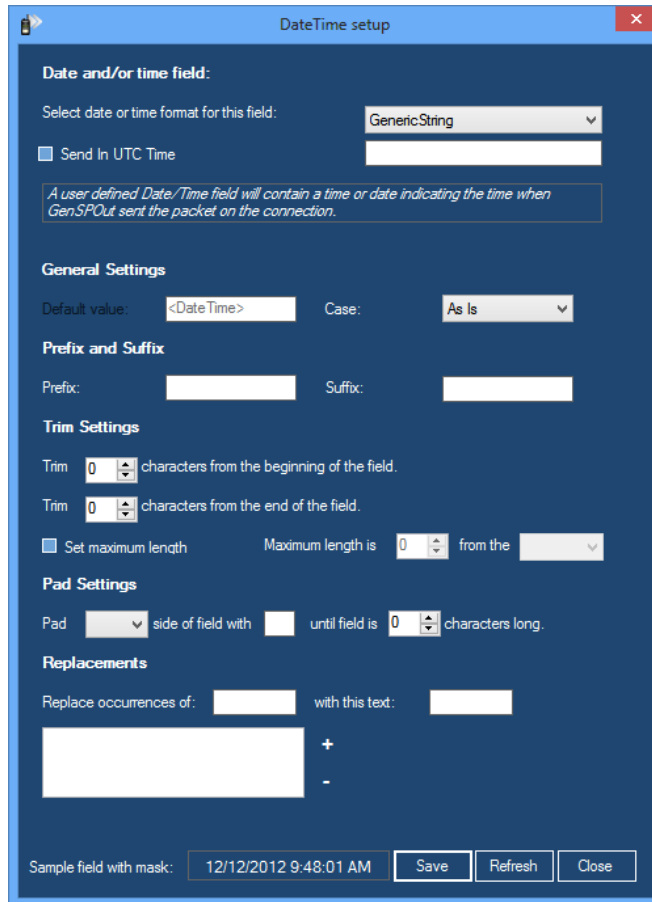


Figure 2.4 – Date and Time Field Window

Here you can select the format in which you would like the date or time to appear. You can also select to send the time in UTC if desired as well as the generic fields described below. An example of the output can be seen at the bottom of the window.



The following formats have fixed UTC settings

- **LocalTime** – Always uses local time (non-UTC).
- **FileTime & FileTimeUTC** – 100-nanoseconds since Jan 1, 1601

If you double-clicked on any other field, you will see the following window:

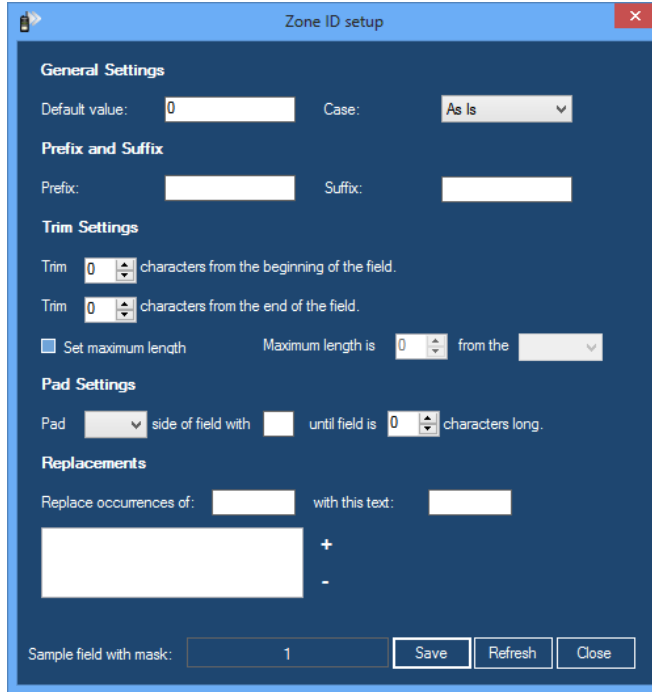


Figure 2.5 – Setup Window

Here you can format how the value will appear. You have the following options:

Default Value

The value entered here will be passed on if no value is received for this field.

Case

Here you can select whether you would like text received in this field to be passed on in upper case, lower case, or as it is received.

Prefix

The value entered here will be added to the beginning of the value received before it is passed on.

Suffix

The value entered here will be added to the end of the field before it is passed on.

Trim

A number of characters equal to the values entered here will be removed from either the beginning or end of the value received.

Set Maximum Length

By selecting this option, you can limit the size of the value in this field. Choose a maximum length and which side of the value you want to start counting from.



A given value of 123456789 with a maximum length of 5 from the right would equal 56789, and from the left would equal 12345.

Pad

By entering values here you can pad a character (typically '0') to the left or right side of the value until the field is a certain number of characters long.



For example, by selecting Left, entering a 0, and selecting 5, a value of 123 would become 00123.

Replacements

This allows you to replace certain characters found in the received value with different characters. Enter the value you want replaced, what you want it replaced with, and click **Add to list**. To remove a replacement, select it in the list and click **Remove from list**. A typical use of this feature would be to replace all occurrences of "0" with "False" and all occurrences of "1" with "True."

As before, you can always see an example output using the mask you have created at the bottom of the window.

When you are done, click **Save**.



This will not save the output, only the field. To save the output you must click the **Save** button in the control bar.



The order of operations for formatting fields is as follows:

1. Trim Left
2. Trim Right
3. Max Length
4. Replacements
5. Pad Left
6. Pad Right
7. Prefix
8. Suffix
9. Case

Filter Page

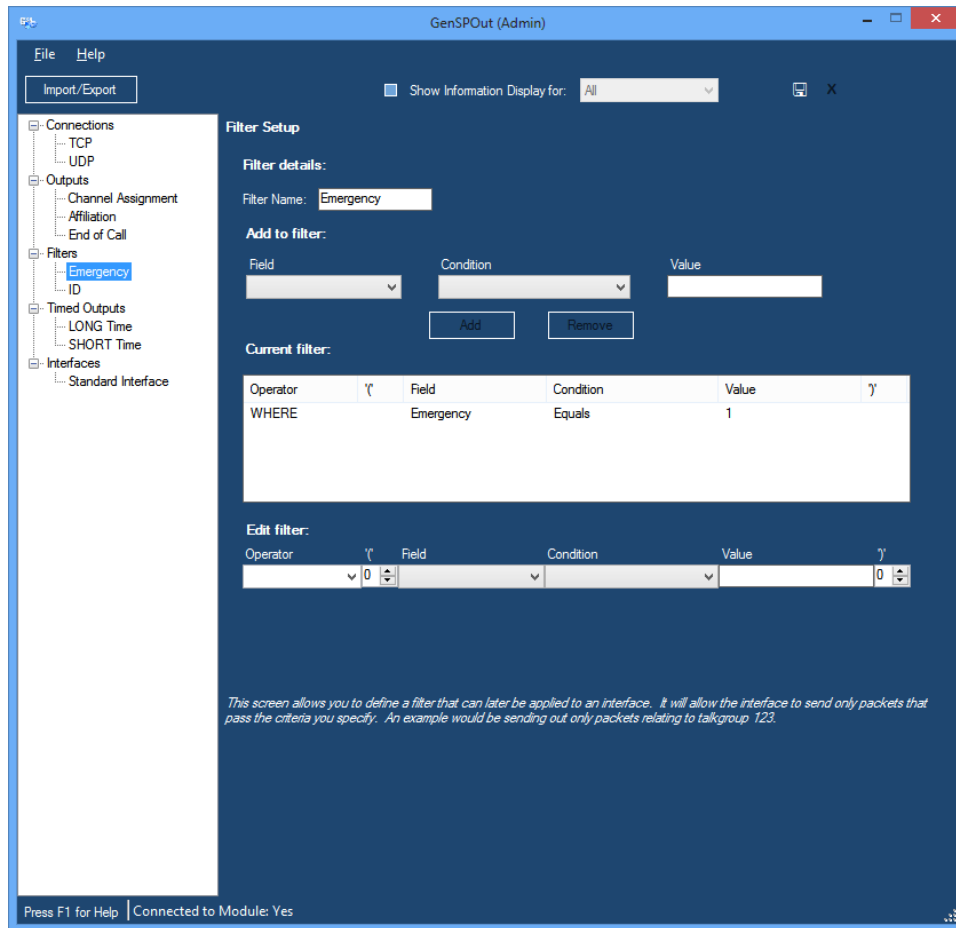


Figure 2.6 – Filter Page

Figure 2.6 shows the *Filter Page*. Adding a new filter or selecting an old one in the navigation tree will bring up this page.

You may enter a name by which you can refer to this filter in the future. As you change the name, you will see the change reflected in the navigation tree.

What is a Filter?

A filter restricts what packets of information will be passed on by GenSPOut on any given *interface* (this may apply to more than one *output*).

Adding Filter Items

Any field that can be received by GenSPOut will be available to be selected as a field to filter by (even though it may not be receivable, given the outputs selected for an interface). Select one of these fields, select a condition (Equals, Less than, Greater than, etc.), enter a value, and click **Add**.



Note that there is a limit of 10 filter items per filter. Once the maximum number of filter items has been added, the controls in the **Add to Filter** section will become disabled until an existing filter item is removed.

Editing Filter Items

This item is now part of the filter. Click it in the filter list to edit it in the area at the bottom of the page. Change the operator field to determine how filter items should relate to each other (And, Or, And not, Or not). The first filter item in the list must always be “Where” or “Where not.” Use the parentheses to correctly define the order of operations for the filter. Algebraic rules apply.

You can also click **Remove** to remove the selected filter item from the filter.

Timed Output Page

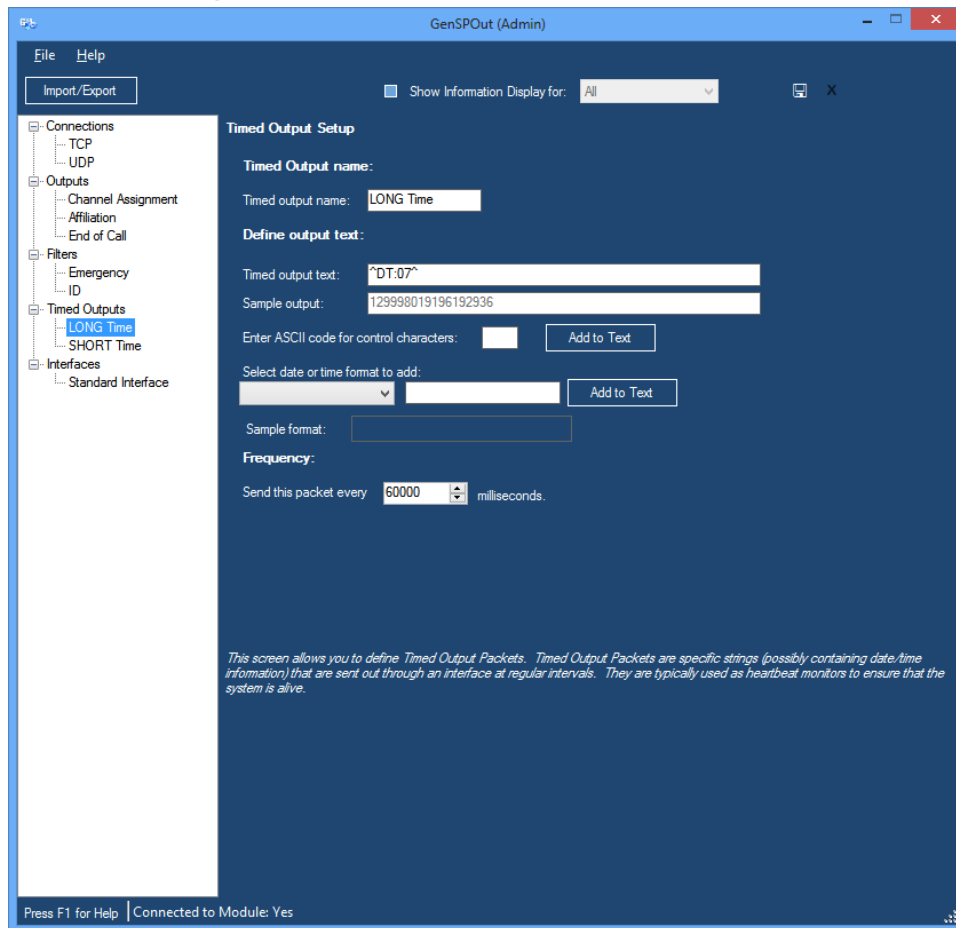


Figure 2.7 – Timed Output Page

Figure 2.7 shows the *Timed Output Page*. Adding a new timed output or selecting an existing one in the navigation tree will bring up this page.

You may enter a name by which you can refer to this timed output in the future. As you change the name, you will see the change reflected in the navigation tree.

What is a Timed Output?

A timed output is a defined string of text that is sent out at specified intervals by GenSPOut that may or may not contain the current date and/or time in a specified format. This feature is typically used as a heartbeat monitor to assure a client that the GenSPOut module is still connected.

To add control characters to the text, enter the numeric value of the code in the ASCII field and click **Add to Text**.

If invalid characters are entered into the textbox, GenSPOut will remove the invalid characters as you type. In this case, you will see the following message: *This textbox contained invalid characters. These characters were removed.*

To add a date and/or time to the text, select a date/time format from the list and click **Add to Text**.

To change the frequency at which this packet will be sent, change the value in the frequency section to the number of milliseconds by which you wish the packets to be separated.

Interface Page

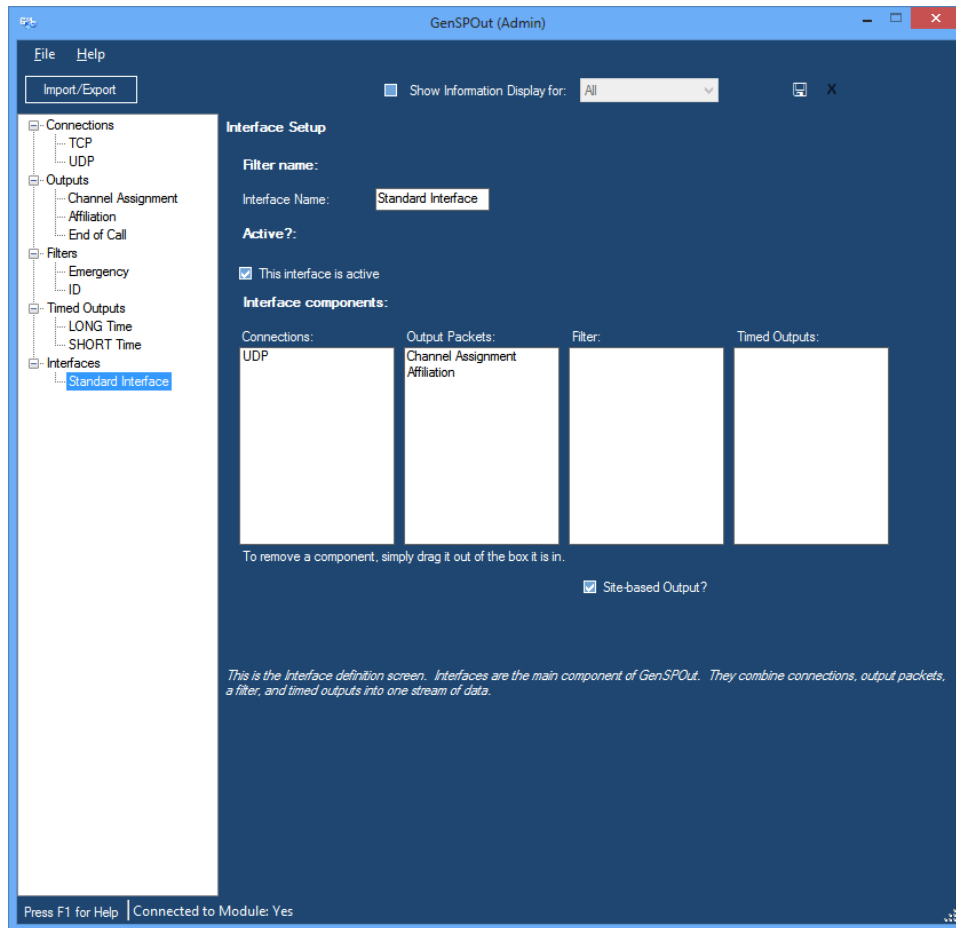


Figure 2.8 – Interface Page

Figure 2.8 shows the *Interface Page*. Adding a new interface or selecting an existing one in the navigation tree will bring up this page.

You may enter a name by which you can refer to this interface in the future. As you change the name, you will see the change reflected in the navigation tree.

What is an Interface?

An interface is the main component of GenSPOut; it ties each of the other components together into one stream of data.

Building an Interface

To build the interface:

1. Drag one or more connections from the tree into the **Connections** box. Packets received on this interface will be sent to all connections in this box.
2. Drag one or more outputs from the tree into the **Output Packets** box. This interface will process any incoming packets that correspond to any of the outputs in this box.
3. Drag a filter from the tree into the **Filter** box. You may only select ONE filter here, and it will apply to the entire interface (all outputs).
4. Drag one or more timed outputs from the tree into the **Timed Outputs** box. Any timed outputs in this box will be sent out on all outputs assigned to this interface.

To make an interface active and operational, check the **This interface is active** box. Unchecking this is an easy way to temporarily deactivate an interface without losing its settings.

Site-based Output?: This option sends a site specific data packet for each site involved in an output. This option, *Checked by default*, only applies to multisite data.



To remove an item from one of the boxes, click and drag it out of the box. When dragging items from the tree, click-and-drag them; do not click then click-and-drag them.

Make sure to click **Save** in the control bar after finishing your settings so that all of your changes will be saved to the database.

This completes the setup of a GenSPOut interface. Repeat this process for each set of outputs. Data should start streaming out of the connections you established (frequency will vary depending on filter) as long as the GW3-TRBO service is running and GW3-TRBO is connected to a source of data.

Importing and Exporting

It is also possible to import and export settings to and from installations of GW3-TRBO.

Exporting

To export settings that you have configured in GenSPOut, click on the **Import/Export** button at the top-left of the screen.

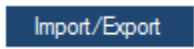


Figure 2.9 – Import/Export button

This will bring up the *Import/Export* window.

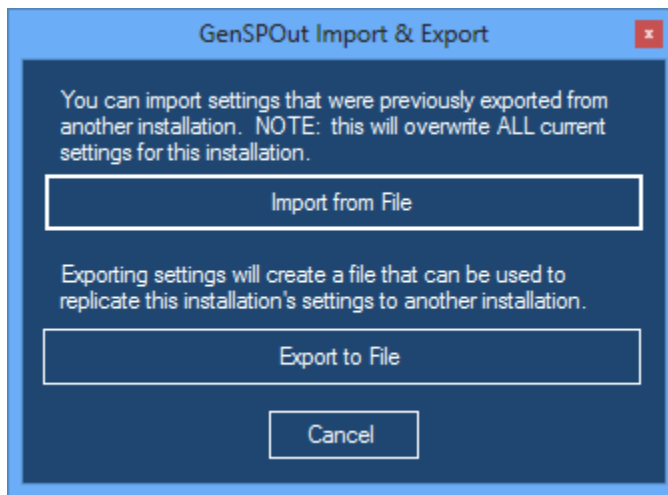


Figure 2.10 – GenSPOut Import & Export window

Click on **Export to File**. This will prompt you for a location and name for the export file. When you have specified the name and location, the export will immediately proceed and prompt you when it is done. The resulting file can then be imported into another GenSPOut installation.

Importing

To import settings that were previously exported to a file, click on the **Import/Export** button at the top left of the GUI (see above). This will bring up the same *Import/Export* dialog shown above, at which point you will click on **Import from File**.

You will be prompted for the file that you want to import. Simply browse to the file that you previously exported and select it. The import will proceed immediately after you select a file. You will be notified when the import is complete, and you will notice that your settings are updated.



The import process will **OVERWRITE** any settings you currently have configured in GenSPOut. It is recommended that you perform an export prior to adding any additional settings to an installation.