

Frontline Test System[®]

Setup and Quick Start Guide

FTS[®] for Bluetooth[®]

and

SerialBlue[®]

FTSBLUE-QSG-012

Packing List for FTS for Bluetooth (Full Version)

- * Bluetooth ComProbe[®] USB Adapter
- * USB 3-foot Extension Cable (Can be used with Bluetooth ComProbe)
- * Cable Set, containing one Routing Cable, one Monitor Head (beige), one Source Head (black), three male 9-pin to female 25-pin adapters and one female 9-pin to male 25-pin adapter
- * This Setup and Quick Start Guide
- * Envelope with Product Registration Card and software CD-ROM

Packing List for FTS for Bluetooth (All Trial Versions)

- * Bluetooth ComProbe[®] USB Adapter
- * USB 3-foot Extension Cable (Can be used with Bluetooth ComProbe)

Some Trial Versions also include

- * Cable Set, containing one Routing Cable, one Monitor Head (beige), one Source Head (black), three male 9-pin to female 25-pin adapters and one female 9-pin to male 25-pin adapter
- * This Setup and Quick Start Guide
- * Software CD-ROM

Packing List for SerialBlue

- * Cable Set, containing one Routing Cable, one Monitor Head (beige), one Source Head (black), three male 9-pin to female 25-pin adapters and one female 9-pin to male 25-pin adapter
- * This Setup and Quick Start Guide

- * Envelope with Product Registration Card and software CD-ROM

System Requirements

Support for all Windows 9x family operating systems is being phased out. Therefore, it is recommended that you install FTS for Bluetooth on either a Windows 2000 or Windows XP (any version) machine. Should you install on a 9x machine and encounter a problem it is highly likely that our suggested resolution to the problem will be to switch operating systems.

- * PC with Windows 2000 or Windows XP and a Pentium processor or higher
- * RAM Requirements: 128MB
- * 50 MB free Hard Disk Space (capture file size is only limited by disk size)

For Air Sniffing

- * 1 USB Port

For Serial HCI Sniffing

- * Minimum of one COM port, two required for bi-directional monitoring when using cable set
- * FTS for Bluetooth supports COM1 through COM64
- * Maximum data rate supported is dependent on PC processor speed

Table of Contents

1	INTRODUCTION	1
2	FTS FOR BLUETOOTH INSTALLATION INSTRUCTIONS	3
2.1	SOFTWARE INSTALLATION.....	3
2.2	HARDWARE INSTALLATION	5
2.2.1	<i>Air Sniffing Mode</i>	5
2.2.1.1	Bluetooth ComProbe Installation	5
2.2.2	<i>Serial HCI Sniffing Mode</i>	7
2.2.2.1	Cable Installation.....	7
2.2.2.2	Connecting Cables to Monitor a Circuit.....	8
2.2.2.3	Connecting Directly to Serial Ports.....	10
2.2.2.4	Connecting to a Port Using Spy	11
2.2.2.5	Set I/O Configuration	11
2.2.3	<i>USB HCI Sniffing Mode</i>	12
2.2.4	<i>Virtual Sniffing Mode</i>	13
3	USING FTS FOR BLUETOOTH	13
3.1	HOW TO CAPTURE DATA.....	13
3.1.1	<i>Initiating Data Capture in All Sniffing Modes</i>	13
3.1.2	<i>Capturing Data in Air Sniffing Mode</i>	15
3.1.2.1	Synchronizing to the Piconet.....	15
3.1.2.2	Piconet Synchronization State.....	17
3.2	LOOKING AT FRAMES	18
3.2.1	<i>Protocol Navigator</i>	18
3.2.1.1	Hiding and Revealing Protocols.....	18
3.2.1.2	Filtering on a Protocol Layer.....	19
3.2.1.3	Using Named Filters.....	19
3.2.2	<i>Frame Display</i>	20
3.2.2.1	Panes.....	20

3.2.2.2	Frame Errors.....	20
3.2.2.3	Searching.....	20
3.2.2.4	Viewing Frames Live.....	21
3.2.2.5	Display Synchronization.....	21
3.3	STATISTICS.....	21
3.4	ADDITIONAL DISPLAYS.....	23
3.5	EXITING FTS FOR BLUETOOTH.....	23

1 Introduction

This Quick Start Guide is for FTS for Bluetooth and SerialBlue. Though we refer to FTS for Bluetooth throughout this document, this guide is applicable for SerialBlue if you only make use of the sections on Serial HCI Sniffing.

FTS for Bluetooth is a PC-based, Bluetooth protocol analyzer capable of sniffing Bluetooth data in four ways:

1. Through the air;
2. From the Serial HCI interface between a Bluetooth Host CPU and a Bluetooth Host Controller;
3. From the USB HCI interface between a Bluetooth Host CPU and a Bluetooth Host Controller;
4. By "virtual" sniffing via the product's Live Import feature, which permits any application to feed data into FTS for Bluetooth.

In this document, Serial HCI Sniffing Mode refers to sniffing over the HCI UART (also known as H4), HCI Three-Wire UART (also known as H5) and BCSP Transports.

If you have purchased SerialBlue then you have only mode 2, Serial HCI Sniffing.

This Setup and Quick Start Guide was designed to get you up and running quickly with FTS for Bluetooth. It provides a high level overview of product installation, initialization, and operation. The FTS for Bluetooth interface is easy to use without training, but you will want to read the FTS for Bluetooth Tutorial and the online Help manual to learn how to take maximum advantage of all the features.

We have tried to make the online Help complete and easy to use. You can reach the online Help by choosing Help Topics from the Help menu, or by pressing the *F1* key from any window.

2 FTS for Bluetooth Installation Instructions

2.1 Software Installation

Step 1.

(Note: If you intend to use FTS for Bluetooth in the air sniffing mode, DO NOT plug in the Bluetooth ComProbe yet.) Installation should begin when you insert the installation CD into your computer. If it does not, begin installing the software by double-clicking on *setup.exe* on the installation CD.

Step 2.

When prompted, enter your serial number and click *Next*.

Step 3.

Please read the license agreement and accept it. Note, that there is a separate license agreement which is required if you want to view the source code for the Bluetooth decoders. If you wish to do this, after installation go to the FTS for Bluetooth desktop folder and click on *Optional Components*. There will be a shortcut called *Decoder Source Code License*. Click on it and follow its directions.

Step 4.

You will need to install the serial driver after the rest of the software installation is complete if you intend to use FTS for Bluetooth in the Serial HCI sniffing mode. For instructions on how to install the serial driver, please go to the *FTS for Bluetooth* folder, then the *Setup* folder and click on the shortcut entitled *How to install the FTS Serial driver*.

Step 5.

Take a quick look at the *readme* file.

Step 6.

If this is the first Frontline Test System product installed on your system then accept the reboot option. If it isn't, then it probably isn't necessary to reboot (but it won't hurt to do so).

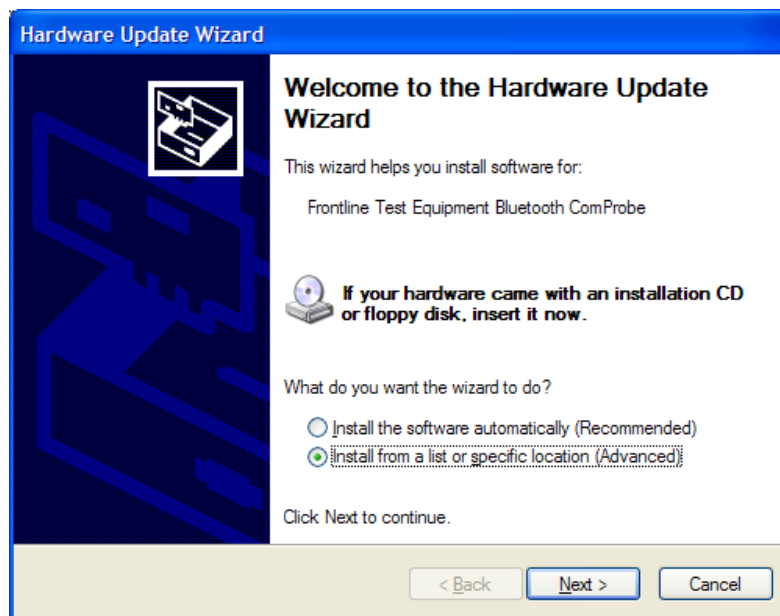
2.2 Hardware Installation

2.2.1 Air Sniffing Mode

2.2.1.1 Bluetooth ComProbe Installation

Step 1.

Plug the Bluetooth ComProbe into a USB port. After you do that you should see a *Found New Hardware Wizard* dialogue box. Choose *Install from a list or specific location* and click *Next*. This process may vary slightly depending on your operating system. The screen shot below is from Windows XP.



Note that if you have already installed a Bluetooth ComProbe on your system you might not get the *Found New Hardware Wizard*. You may get this dialog in the future if

you plug the Bluetooth ComProbe into a USB port that is different than one you have previously used.

Step 2.

Press the **Browse** button and browse to the directory where you installed FTS for Bluetooth (the default is \Program Files\Frontline Test System II\[version #] FTS For Bluetooth) and then browse down one more level to Bluetooth ComProbe USB Driver. Select this directory and click *OK*. This directory contains the Bluetooth ComProbe USB Driver and the Windows driver information file (bluetoothcomprobe.inf) needed to install the driver.

Step 3.

Click the *Next* button to finish the Bluetooth ComProbe installation. If you get a dialog box like the one below, don't worry—Click *Continue Anyway*.



Step 4.

Your computer will now install the Bluetooth ComProbe driver from the directory you selected; you'll get a dialog box saying that the installation is finished. Click the *Finish* button to close the wizard.

The installation of the FTS for Bluetooth software and the Bluetooth ComProbe hardware is now complete.

Go to Section 3: *Using FTS for Bluetooth* to find out how to begin Air sniffing.

2.2.2 Serial HCI Sniffing Mode

2.2.2.1 Cable Installation

If you don't have the serial HCI sniffing cables that are provided with the full version of FTS for Bluetooth or if

those cables are not practical for you to use (for example, if you are developing an embedded device) then see the section called *Connecting Directly to Serial Ports*.

The exact details of how to tap the circuit vary widely depending on the application or hardware being developed. There are two basic methods for feeding signals from the circuit into the serial ports of the PC running FTS for Bluetooth. One method uses the cable set provided with FTS for Bluetooth and the other sends signals directly to the serial ports. In either case, if the signals coming from the system under test are not RS-232, it might be necessary to use a converter.

If your Bluetooth Application is running on the PC that is running FTS for Bluetooth, an alternative is to run FTS for Bluetooth in Spy mode. Spy monitors data directly from the serial port on the PC running the Bluetooth application. In this situation, no cables or converters are needed and no extra wiring needs to be done.

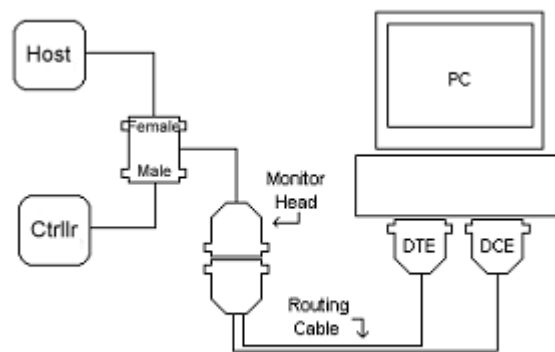
It is strongly recommended that you set the Host to be DTE and the Host Controller to be DCE; otherwise the Commands and Events may be reversed.

2.2.2.2 Connecting Cables to Monitor a Circuit

The instructions and diagram below explain how to connect the cables to the PC running FTS for Bluetooth and to the circuit being monitored. This information assumes that you have two serial ports available on the PC running FTS for Bluetooth. Two serial ports are required in order to see both sides of the circuit. If you have only one serial port, you will only be able to monitor one side of the circuit. See the

Online Help under Cable Configuration for instructions on setting up the cables with one serial port.

1. Connect the two 9-pin connectors on the Routing Cable to the two serial ports on the PC running FTS for Bluetooth.
2. Connect the Monitor Head (beige) to the 25-pin connector on the Routing Cable. The cable set includes a beige Monitor Head and a black Source Head which look very similar other than color; be sure you have the correct cable Head.
3. Connect the T-connector on the Monitor Head to the circuit. The Monitor Head is a straight-through connector. Use the adapters provided to convert between the 25-pin Monitor Head and any 9-pin connections on your circuit.



Click on *Hardware Settings* and select *Use FTS Cables*. You will also need to select which COM Ports you will be using.

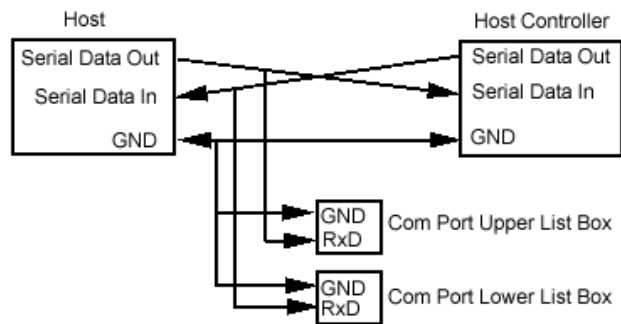
Skip to the section called *Set I/O Configuration*.

2.2.2.3 Connecting Directly to Serial Ports

In order for FTS for Bluetooth to correctly capture data when not using the cable set, TxD, RxD and Signal Ground need to be fed to the proper pins on the serial ports of the PC running FTS for Bluetooth. Note that FTS for Bluetooth will not be able to monitor control signals without the cable set.

1. Connect the Serial Data Out of the Host to the Serial Data In of the Host Controller. Connect this also to the RxD of the COM Port that will be selected in the Upper List Box of the Hardware Settings.
2. Connect the Serial Data In of the Host to the Serial Data Out of the Host Controller. Connect this also to the RxD of the COM Port that will be selected in the Lower List Box of the Hardware Settings.
3. Connect the Signal Ground of the Host to the Signal Ground of the Host Controller and to both COM Ports.
4. Click on *Hardware Settings* and select *Use FTS Cables*.
5. Also in *Hardware Settings* select which COM Ports you will be using as directed in steps 1 and 2.
6. Disable *Notify if Auto Detect Fails*. This will prevent FTS for Bluetooth from looking for FTS

Cables.



Skip to Section 3: *Using FTS for Bluetooth.*

2.2.2.4 Connecting to a Port Using Spy

Important! In order to monitor an internal port, FTS for Bluetooth must be started before the application using the port. This ensures that both FTS for Bluetooth and the application use the FTS for Bluetooth serial driver.


The computer running Spy should be the Host talking to the external Host Controller.

Click on *Hardware Settings* and select *Spy*. You will also need to select which COM Ports you will be using.

No special hardware setup needs to be done to monitor an internal port. Skip to the section titled *How to Capture Data.*

2.2.2.5 Set I/O Configuration

Start FTS for Bluetooth in Serial HCI mode by running *Serial HCI Sniffer (H4)*, *Serial HCI Sniffer (H5)* or *Serial HCI Sniffer (BCSP)*.

Before you can begin capturing data, you need to tell FTS for Bluetooth whether you intend to monitor or transmit data, and at what data rate. You give FTS for Bluetooth this information in the *Set I/O Configuration* window. Click on the Set I/O Configuration icon  on the Control window toolbar, or choose Set I/O Configuration from the Window menu.

1. In the *Operating Mode* box, choose *Monitor Both*. If you have only one serial port, choose either *Monitor DTE* or *Monitor DCE*, depending on which side you want to see.
2. Set the baud, parity, word length and stop bits to the correct settings for both sides of the circuit. For Spy, it is not necessary to set these values, as the Bluetooth application will do this when it is started. In Spy Mode these boxes automatically reflect the values being used by the application.
3. Click the *Close* button.

2.2.3 USB HCI Sniffing Mode

The USB HCI Datasource Dialog allows the user to select which Bluetooth device to sniff and to initiate and terminate the sniffing process.

The dialog has a list containing the Bluetooth Devices connected to your system. If the *Show Connected Only* checkbox is unchecked then all USB devices that have ever been connected to your system will be listed.

If you have connected or disconnected a device while this dialog is open, Click on Refresh List to update the list.

Select the device you wish to sniff then click on the *Start Sniffing* button. You must click on the *Start Capture to Buffer* or *Capture to Disk* buttons in FTS to capture data.

Go to section 3: *Using FTS for Bluetooth* for more details on capturing data.

2.2.4 Virtual Sniffing Mode

There is no Hardware Installation necessary for Virtual Sniffing. During the Software Installation a sample Virtual Sniffing Application is installed. To use Virtual Sniffing in your environment modify the sample application to import data from your software. For more information please consult Tech Support.

3 Using FTS for Bluetooth


The first window to open is the *Control Window*, which is the small rectangular window at the top. FTS for Bluetooth is organized around this window. From the Control window you control data capture and have access to the other windows used to view data.


3.1 How To Capture Data


3.1.1 Initiating Data Capture in All Sniffing Modes


FTS for Bluetooth can capture data to a memory buffer or to a file on disk. Data capture can be initiated from the Control


window, the Event Display or the Frame Display. You do not need any window other than the Control window open to capture data.

To capture to the buffer, click the *Start Capture to Buffer* icon .

To capture to a file, click the *Start Capture to Disk* icon  and type a filename when prompted.

To stop capture and reset the buffer, click the *Clear* icon . Clearing the buffer throws away the data in memory. If you want to save the data in the buffer, pause capture (see below) and save the buffer before clearing it.

To stop capture to a file and close the file, click the *Close* icon .

To pause capture, click the *Pause/Resume* icon . Click the Pause/Resume icon again to resume capture. Pausing capture means that no data will be added to the capture buffer or file until capture is resumed, but the previously captured data remains in the buffer or file.

If the buffer/file becomes full, data capture will begin to wrap, which means the oldest data will be overwritten by new data. You can tell how full the buffer/file is by checking the bar graphic next to Capture Status on the status bar of the Control window. If you do not want the buffer/file to wrap, choose *System Settings* from the *Options* menu on the Control window and uncheck the *Wrap Buffer/File* box. If you have *Wrap Buffer/File* unchecked then capturing will stop when the buffer/file becomes full.

3.1.2 Capturing Data in Air Sniffing Mode.

This Quick Start Guide only describes *Air Sniffer (Basic)*. You can find more information about the other air sniffing modes under the *What's New* section in the online Help and by calling Tech Support.

There are two steps to capturing data in the FTS for Bluetooth Air Sniffing mode. The first is initiating data capture (see previous section), and the second is synchronizing the Bluetooth ComProbe to the Bluetooth piconet. Data capture is initiated via the Control window, as explained in the previous section. We recommend beginning data capture before synchronizing the ComProbe so that when data begins arriving, FTS for Bluetooth is ready to capture it.

3.1.2.1 Synchronizing to the Piconet

Step 1 - Connect the ComProbe

Make sure the Bluetooth ComProbe is connected to a USB port.

Step 2 - Start Air Sniffer

Open the FTS for Bluetooth folder on your desktop and double-click *Air Sniffer (Basic)*. This will cause FTS for Bluetooth to start and the Bluetooth ComProbe icon to appear in your system tray in red with a line through it. Also, the Datasource dialog box will appear.

Step 3 - Select a ComProbe Device

If you have multiple Bluetooth ComProbes installed then you will need to click the *Hardware Settings* button on the Datasource dialog to pick which one you want to use.

Step 4 - Synchronization

You must next tell FTS for Bluetooth which synchronization mode to use. Click the *I/O Parameters* button on the Datasource dialog.

At the top of the Set I/O window, choose a synchronization mode. The preferred mode is *Slave Inquiry*. In this mode, FTS for Bluetooth asks the slave device for its clock and then waits for the master to page the slave.

In Bluetooth, the device that initiates the connection is always the master at connection time. You only need to know the master and slave at connection time when setting up the I/O parameters. Afterwards a role switch may occur, but FTS for Bluetooth will automatically follow the role switch.

The rest of these instructions assume you have selected Slave Inquiry mode. For more information on the other synchronization modes, see the online Help.

Enter in the Slave Device box the Bluetooth Device Address of the slave device that FTS for Bluetooth should sync to. If you know the device address, you can simply enter it using the *12 hex digits* box or *UAP*, *LAP* and *NAP*. Otherwise, click the *Discover Bluetooth Devices* button and then select the correct device from the drop-down list. You may wish to specify a Master Device as well if you want to be certain of monitoring a specific piconet.

If you are sniffing an encrypted session, you must set the encryption settings correctly. For the details on these settings consult the *Encryption* topic in the online Help.

Finally, there are some optional settings for capture filtering and for using inquiry access codes to limit the list of devices returned when *Discover Bluetooth Devices* is clicked. See

the information on the *Set I/O Parameters* window in the online Help if you wish to change these settings.

Click *OK* when finished.

3.1.2.2 Piconet Synchronization State

As data is being captured, the Status box at the top of the Datasource dialog will update to show the piconet synchronization status of the Bluetooth ComProbe.


You will also note that the color of the Bluetooth ComProbe icon in the system tray and in the Status box will vary in color depending on the state of the Bluetooth ComProbe:

- Blue indicates that the Bluetooth ComProbe is running and in sync with the piconet.
- Green indicates that the Bluetooth ComProbe is running and waiting to synchronize.
- Yellow indicates that the Bluetooth ComProbe will attempt to resynchronize within 5 seconds,
- Red indicates that the Bluetooth ComProbe is attempting to synchronize,
- Red with a “Not” symbol means the Bluetooth ComProbe is stopped.

Typically, you can focus your attention on the FTS for Bluetooth data displays and not worry about the Bluetooth ComProbe. But if you aren't seeing data when you think you should, then check the Datasource dialog.

3.2 Looking At Frames

3.2.1 Protocol Navigator

Click the *Protocol Navigator* icon  on the Control window toolbar to open the Protocol Navigator. The Protocol Navigator window presents decodes of multiple protocol layers within multiple data frames. It simplifies the process of understanding the complex relationships between multiple data frames and the protocol layers that comprise the frames. The three window panes on the left of the Protocol Navigator enable you to select or suppress protocols of interest.

3.2.1.1 Hiding and Revealing Protocols

Hiding means that the selected protocol is not displayed in the main window pane, even though it may be present in a frame. This allows you to zoom in on protocols of interest by hiding all of the ones that aren't of interest.

There are two ways to hide a protocol in the Protocol Navigator window.

1. Right-click on the protocol and choose *Hide [Protocol Layer Name]*.
2. There are three panes on the left side of the window. The middle box is the Hidden From View pane. Check the boxes next to the protocols you want to hide.

To reveal a hidden protocol, right-click anywhere in the main window and select the protocol you want to show from the right-click menu, or uncheck the box next to the protocol name in the Hidden From View pane.

When one or more layers are hidden, a note will appear at the top of the Protocol Navigator saying, "Some layers are hidden. Right-click to see." This warns you that some layers are hidden.

Two special options are *All But the Last Layer* and *All Special Information Nodes*.

All But the Last Layer hides all layers in each frame except for the last one, regardless of which protocol is present in the last layer.

3.2.1.2 Filtering on a Protocol Layer

Note: Changes to filtering will affect the Frame Display and Protocol Navigator.

You can filter on one or more protocol layers by using the top window pane, the Filtered In pane. Check the boxes next to the names of the protocols you want to filter in. The filter is inclusive, which means that filtering on a protocol displays only frames that contain that protocol. Frames that do not contain the protocol will not appear. You can filter on one or more protocols.

3.2.1.3 Using Named Filters

FTS for Bluetooth comes with many predefined Named Filters. You can apply one or more of these filters by checking the boxes next to the names of the filters you want to use. If you want to create your own filters please consult the online Help under *Filtering*.

3.2.2 Frame Display

Click the Frame Display icon  on the Control window toolbar to open the Frame Display. This display allows you to have bit level visibility on your protocol.


3.2.2.1 Panes


The Frame Display is divided into panes, where each pane shows a different view of the data. The Summary pane stretches across the top of the display. Each line in the Summary Pane represents one frame. The Decode pane contains a detailed decode of the frame selected in the Summary pane, and is located on the left side of the Frame Display window. The three smaller panes on the bottom right of the Frame Display show the data in hex, binary and ASCII. The user can choose to have these panes show the data in other radices or character sets. Select any field in the Decode pane and the corresponding bit(s) or byte(s) will be selected in the data panes.

3.2.2.2 Frame Errors


Frame numbers in red indicate an error in the frame. Select the frame, and look at the top of the Decode pane to determine the type of error.

3.2.2.3 Searching

Use the *Find* feature to search for a pattern in the decode or errors in the frames. Click the *Find* icon  to open the Find window. In the Decode tab, type the string you want to look for and click *Find Next*. To search for errors, choose *Search For All Errors*. Click the *Help* button for more information.

The *Duplicate* icon  creates a second Frame Display, identical to the first. The advantage of additional Frame Displays is that you can look at two different frames at the same time and they can be filtered differently.


3.2.2.4 Viewing Frames Live

Click the *Freeze/Resume* icon  to toggle between having the Summary pane automatically update or not update as new data is captured.

3.2.2.5 Display Synchronization


The Frame Display is synchronized with the Event Display and Protocol Navigator. Select a frame in the Frame Display and the Protocol Navigator and Event Display will automatically update to highlight the bytes in the frame. Select a byte in the Event Display or Protocol Navigator, and the Frame Display will update to show the frame containing the byte, with the byte highlighted.

3.3 Statistics

Click the Statistics icon  on the Control window toolbar to open the Statistics window.

The Statistics window provides a statistical overview of all the data on the circuit. In Serial HCI Sniffing mode, FTS for Bluetooth is always monitoring the circuit and gathering statistics, even when it is not capturing the data. In the Air Sniffing Mode FTS for Bluetooth only gathers statistics when it is synchronized with the piconet.

There are three tabs on the Statistics window: Session, Resetable and Buffer. The Session tab shows statistics from the time FTS for Bluetooth was started. The Resetable tab can be reset to show statistics from the time the Reset icon was last pressed. The Buffer tab shows statistics on the data in the capture buffer. If data capture has not been started or if the buffer has wrapped, most of the statistics on the Buffer tab will be “n/a”.


Some tables on the Statistics window can display data in graphic form. Click the Graph icon  on any header that has one for a chart of that table.



The *Frame Status Table* can be useful for determining where to place the Bluetooth ComProbe. The different statistics in the table are defined as follows.

- *Bad* - Number of Frames that FTS for Bluetooth receives damaged at the RF level.
- *Retransmitted* - Number of Frames that FTS for Bluetooth receives undamaged at the RF level but that a piconet member receives damaged at the RF level and therefore get retransmitted.
- *Ratio* - This number is derived from the Bad and Retransmitted statistics which will give you information on Bluetooth ComProbe placement. If the ratio is 0 then both Bad and Retransmitted frames are 0. If the number is positive then there are more bad frames than retransmitted frames. If this number is large you may want to move the Bluetooth ComProbe to get a better signal. If the number is negative then there are more retransmitted frames than bad frames. If this number is a large negative number it means that the Bluetooth ComProbe is picking up the RF signal better than the members of the piconet.

3.4 Additional Displays

There are additional displays that may be of value to those doing serial HCI sniffing.

The Event Display  can be used to see the data transferred between a Host and a Host Controller before the data is decoded. Communications errors on the serial data circuit, such as overrun, framing, and parity can only be seen on the Event Display. The Event Display shows where each frame begins and ends. This can be helpful when diagnosing transport synchronization problems.

When a transport such as HCI UART (H4) uses hardware flow control, the Breakout Box  and Signal Display  windows can be used to help diagnose problems with missed messages and data overruns.

3.5 Exiting FTS for Bluetooth

To exit FTS for Bluetooth:

Go to the File menu on the Control window, and choose Exit FTS for Bluetooth, or close the Control window using the X icon in the top right corner of the title bar.

If you are in Air Sniffing mode you will also need to close the Datasource by choosing *Terminate* from the *File* Menu on the Datasource or using the X icon in the top right corner.

Technical Support

Technical support is available in several ways. The answers to many questions can be found in the online help. Frontline's web site has documentation on common problems, as well as software upgrades and utilities to use with our products.

Web: <http://www.fte.com>, go to the Technical Support Area

Email: tech_support@fte.com

FTP: <ftp.fte.com>

If you need to talk to a technical support representative, support is available between 9am and 5pm, Eastern time (GMT-5:00), Monday through Friday. Technical support is not available on U.S. national holidays.

Phone: +1 (434) 984-4500

Fax: +1 (434) 984-4505

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