

Agilent N5343A Exerciser for DigRF

User's Guide



Agilent Technologies

Notices

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CAUTION









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WARNING

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Safety Summary

Safety Symbols on Instruments

Safety Symbol	Description
	Indicates warning or caution. If you see this symbol on a product, you must refer to the manuals for specific Warning or Caution information to avoid personal injury or damage to the product.
	Frame or chassis ground terminal. Typically connects to the equipment's metal frame.
	Indicates hazardous voltages and potential for electrical shock.
	Indicates that antistatic precautions should be taken.
	Indicates hot surface. Please do not touch.
	Indicates laser radiation turned on.
	CSA is the Canadian certification mark to demonstrate compliance with the Safety requirements.
	CE compliance marking to the EU Safety and EMC Directives. ISM GRP-1A classification according to the international EMC standard. ICES/NMB-001 compliance marking to the Canadian EMC standard.

General Safety Precautions

The following general safety precautions must be observed during all phases of operation of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument.

Agilent Technologies Inc. assumes no liability for the customer's failure to comply with these requirements.

Before operation, review the instrument and manual for safety markings and instructions. You must follow these to ensure safe operation and to maintain the instrument in safe condition.

General

This product is a Safety Class 1 instrument (provided with a protective earth terminal). The protective features of this product may be impaired if it is used in a manner not specified in the operation instructions.

All Light Emitting Diodes (LEDs) used in this product are Class 1 LEDs as per IEC 60825-1.

Environment Conditions

This instrument is intended for indoor use in an installation category II, pollution degree 2 environment. It is designed to operate at a maximum relative humidity of 95% and at altitudes of up to 2000 meters.

Refer to the specifications tables for the ac mains voltage requirements and ambient operating temperature range.

Before Applying Power

Verify that all safety precautions are taken. The power cable inlet of the instrument serves as a device to disconnect from the mains in case of hazard. The instrument must be positioned so that the operator can easily access the power cable inlet. When the instrument is rack mounted the rack must be provided with an easily accessible mains switch.

Ground the Instrument

To minimize shock hazard, the instrument chassis and cover must be connected to an electrical protective earth ground. The instrument must be connected to the ac power mains through a grounded power cable, with the ground wire firmly connected to an electrical ground (safety ground) at the power outlet. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury.

Do Not Operate in an Explosive Atmosphere


Do not operate the instrument in the presence of flammable gases or fumes.

Do Not Remove the Instrument Cover

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made only by qualified personnel.

Instruments that appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.

Environmental Information

	<p>This product complies with the WEEE Directive (2002/96/EC) marking requirements. The affixed label indicates that you must not discard this electrical/ electronic product in domestic household waste.</p> <p><i>Product Category: With reference to the equipment types in the WEEE Directive Annex I, this product is classed as a "Monitoring and Control instrumentation" product.</i></p> <p>Do not dispose in domestic household waste.</p> <p>To return unwanted products, contact your local Agilent office, or see www.agilent.com/environment/product/ for more information.</p>
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Exerciser for DigRF—At a Glance

Agilent Exerciser for DigRF is an advanced testing application that equips you with serial stimulus capabilities required for DigRF v3 or v4 based IC evaluation and characterization. This single application combines stimulus and capture capabilities to generate configurable control and data traffic, and observe the response from the Device Under Test (DUT). It allows you to work in the domain (Digital or RF) of your choice to quickly characterize the DUT's digital and wireless behavior.

N5343A Exerciser Card

Agilent System Protocol Tester provides the N5343A exerciser card for DigRF, which supports DigRF v3 and v4 bus specifications, speeds up to 3 Gb/s with single or multi-lane configuration, and integrates stimulus and capture capabilities on a single card.

While setting up the hardware for DigRF exerciser, this card connects to a DUT using the N5443A DUT cable.

The following figure shows the exerciser setup.

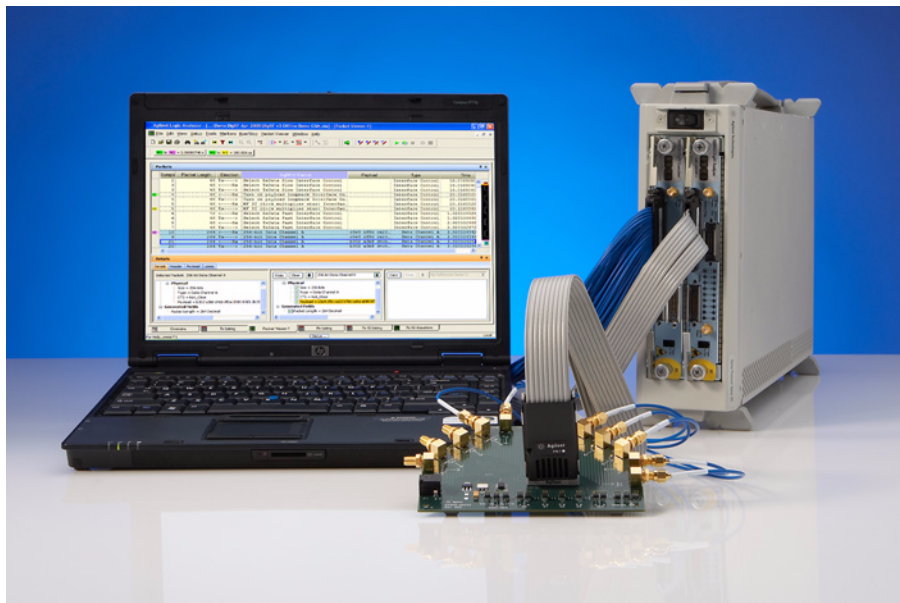


Figure 1 N5343A Exerciser Card Setup

Features of Exerciser

A brief list of the features of Exerciser for DigRF is given below:

- Provides digital stimulus for DigRF v3 or v4 based RF-IC and BB-IC.
- Smart stimulus with protocol state machine emulation.
- Customize header, payload, and frame sequence generation.
- Converts raw IQ and control information to DigRF v3 and v4 compliant packets.

See • ["In This Guide"](#) on page 7

In This Guide

For an overview and list of features, see: ["Exerciser for DigRF—At a Glance"](#) on page 5

This guide describes the graphical user interface (GUI) of the Agilent N5343A exerciser card for DigRF. It contains these chapters:

- [Chapter 1](#), "Starting and Exiting the Exerciser GUI," starting on page 11
- [Chapter 2](#), "Quick GUI Overview," starting on page 19
- [Chapter 3](#), "General Settings," starting on page 27
- [Chapter 4](#), "Frame Configuration," starting on page 41
- [Chapter 5](#), "BER Functions," starting on page 63
- [Chapter 6](#), "Status Functions," starting on page 67
- "Glossary" on page 75

For a printable version of this guide, see: [↗ "Agilent N5343A Exerciser for DigRF User's Guide"](#).

See Also

Protocol Exerciser has a application programming interface (API) in addition to the graphical user interface (GUI). For information on the API, please refer to:

- *"DigRF v4 API Reference" (in the online help)*

To understand the exerciser hardware, please refer to:

- *"Agilent DigRF v4 Protocol Tester Installation Guide" (in the online help)*
- *"Agilent DigRF v4 Protocol Tester Hardware Reference Guide" (in the online help)*

For additional information on the Agilent N5343A exerciser for DigRF, you can also refer to:

- *"Agilent RDX Test Solutions for DigRF v3 and v4 Data Sheet"*

You can also access this data sheet by visiting the ["http://www.agilent.com/find/digrf"](http://www.agilent.com/find/digrf) web page, then exploring the MIPI DigRF v4 Test link under Related Products.

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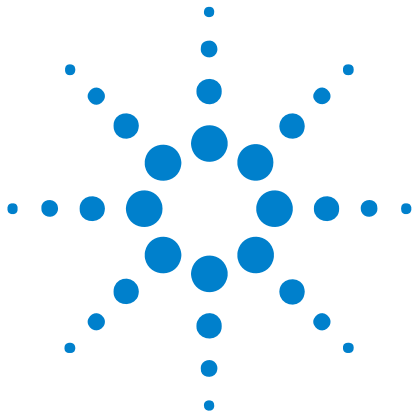
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This chapter introduces you to Exerciser for DigRF and provides information on starting and exiting the Exerciser GUI.



Understanding Exerciser Sessions

In the context of exerciser, a session represents the components, such as Controller PC connected with the exerciser card which in turn communicates with the device under test (DUT). A session forms the basis of communication between the Controller PC and DUT.

In exerciser, there are two types of sessions:

- **Online**— In online session, you generate real-time DigRF traffic to exercise.

Starting an online session establishes communication between the Controller PC and exerciser cards, and also initializes the necessary firmware. Therefore, before you start an online session, ensure that an exerciser card is connected with the Controller PC.

Ending an online session relinquishes the hardware resources of exerciser, thus enabling them to be used for a new session.

- **Offline**— In offline session, you do not need to connect the Controller PC with any hardware.

You generally start an offline session when you do not have an established connection with any external hardware device, but you want to create configuration specifications to be used later when an online session is established.

Some options in offline session are disabled due to their dependency on the connected hardware.

Exerciser does not enable you to lock a session (online or offline). Therefore, it is possible for multiple exerciser instances to concurrently access a single session.

NOTE

The controller PC does not protect against meaningless, or even conflicting requests. Therefore, it is recommended that only one user should own a particular session at a time.

Starting the Exerciser GUI

Starting the exerciser for DigRF requires you to specify whether you want to connect to a new or an existing session, name of the session, and the name of the server where you want to start the session. Accessing exerciser also requires you to specify the port to use if you are trying to connect to a new session.

To start the exerciser GUI:

- 1 On the Windows task bar, click **Start>Programs>Agilent System Protocol Tester>Exerciser for DigRFv4**.

The “[Select type of session dialog box](#)” on page 14 appears.

- 2 Do one of the following:
 - a Click **Connect to existing session** to use an existing exerciser session.
 - b Click **Connect to new session** to start a new exerciser session.
- 3 Type the name or IP address of the server, where you want to start a new or join an existing exerciser session, in the **Server** text field.
- 4 If you are trying to use an existing exerciser session, do the following:
 - a Select **Connect to existing session**.
 - b Click **Get session list**. A list of sessions, which are currently running on the server specified in the Server text field, is displayed in Session list.
 - c Select the required session from **Session list**.
 - d Click **Start**. The main exerciser window appears.
- 5 If you are trying to create a new exerciser session, do the following:
 - a Select **Connect to new session**.
 - b Click **Start**.

The “[Port Selection dialog box](#)” on page 15 appears.

- c Select a module check box from the **Module** column.
 - d Select an appropriate option from the **Type** drop-down list.
 - e Click **OK**. The main exerciser window appears.
- 6 If you are trying to create an offline session, do the following:
 - a Select **Offline mode**.
 - b Click **Start**. The main exerciser window appears.

Select type of session dialog box

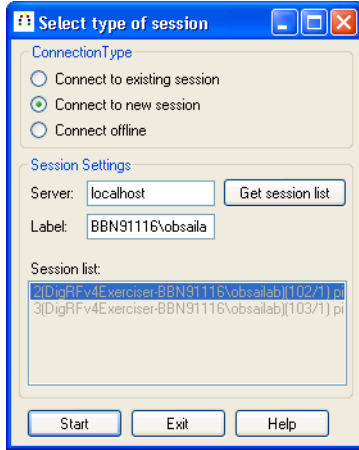


Figure 2 Select type of session dialog

The following table briefly describes the components of the Select type of connection dialog box.

Table 1 Components of the Select type of connection dialog box

Component	Description
Connect to existing session	Select Connect to existing session if you want to use an existing session of exerciser on a known server. The existing session can be either initiated using API or another GUI since multiple GUIs can share the same session.
Connect to new session	Select Connect to new session if you want to create a new exerciser session on a known server.
Connect offline	Select Connect offline if you want to access the exerciser GUI without connecting to the hardware.
Server	Specifies the name or IP address of the server, where you want to start a new or join an existing exerciser session.
Get session list	Click Get session list to retrieve a list of existing exerciser sessions from the server you specified in the Server text field. This button works only if you have selected the Connect to existing session option.
Label	Specifies the name of the session. By default, it takes the user name that you use to log on to your computer.
Session list	Displays a list of sessions existing on the server you specified in the Server text field.
Start	Click Start to start a new exerciser instance.

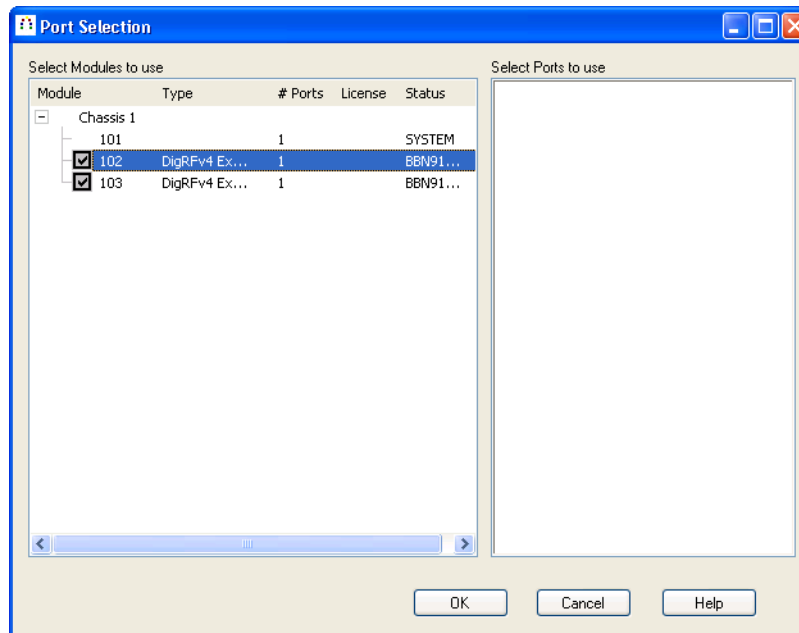
Table 1 Components of the Select type of connection dialog box (continued)

Component	Description
Exit	Click Exit to close the dialog box without starting the exerciser application.
Help	Click Help to display the online help.

Port Selection dialog box

The following figure displays the Port Selection dialog box.

The Port Selection dialog box appears only when you are trying to create a new session, and shows a list of ready to be used (as well as already in use) exerciser modules. Here, select an exerciser module that is not in use.

**Figure 3** Port Selection dialog box

The following table briefly describes the components of the Port Selection dialog box.

Table 2 Components of the Port Selection dialog box

Component	Description
Module	The Module column provides a list of modules in the form of check boxes. These check boxes are organized under the expandable list of chassis to which they belong. Here, select a module on which you want to start a new session. A module, which is already associated with a session, appears disabled.
Type	The Type column lists the type of the hardware module connected with the system.
# Ports	The # Ports column displays the number of ports available for each module.
License	The License column displays the license details of each module.
Status	The Status column displays a status message, Rebooting, which indicates that the exerciser module is restarting.
Select Ports to use	Select the port to use from the Select Ports to use list box.
OK	Click OK to start an exerciser instance on the selected port. Clicking OK may start the new exerciser instance after a few seconds delay. This is because it first downloads the appropriate software for the new instance.
Cancel	Click Cancel to close the Port Selection dialog box without selecting any port.
Help	Click Help to display online help.

Exiting the Exerciser GUI

To exit from exerciser:

1 Click **File>Exit**.

The "Changes not applied!" message box appears if you had not applied all the changes made to exerciser.

2 Do one of the following:

- Click **Yes** to apply all the unapplied changes before closing the exerciser window.
- Click **No** to close the exerciser window without applying the unapplied changes.
- Click **Cancel** to quit the message box and return to exerciser.

Clicking Yes or No displays a message box that prompts to save the settings of the current session in a file.

3 Do one of the following:

- Click **Yes** to save the exerciser settings before exiting.
- Click **No** to close the exerciser window without saving its settings.
- Click **Cancel** to quit the message box and return to the exerciser window.

Completing this message box displays the Closing Session message box.

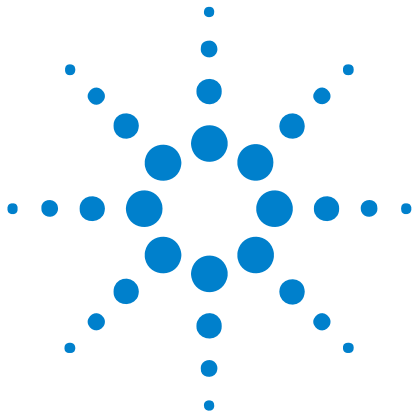
4 Do one of the following:

- Click **Yes** to remove the associated session before closing the exerciser window.
- Click **No** to close the exerciser window without removing its associated session.

NOTE

Closing a session automatically makes all the GUI interfaces that are connected to it inaccessible.

1 Starting and Exiting the Exerciser GUI



2 Quick GUI Overview

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This chapter briefly introduces you to the main screen components of the exerciser GUI.



Exerciser Window

The following figure displays the exerciser application window with its main components.

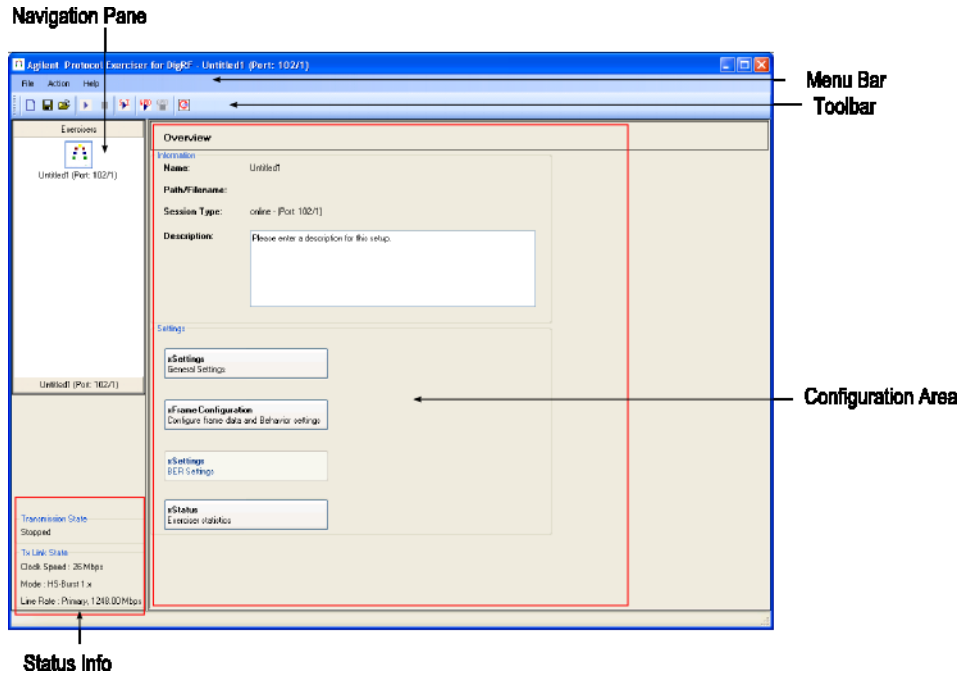


Figure 4 Exerciser window

The main components of the exerciser window are briefly described below:

- **Menu Bar** and **Toolbar**— They provide easy and quick access to the features of the exerciser application.
- **Configuration Area**— It shows you the existing settings and allows you to specify the new settings for the exerciser function currently selected in the Navigation pane.
- **Panes**— They help you to navigate through various functions of exerciser.
- **Status Info**— It displays the current transmission state and transmission link state of the exerciser instance.

The transmission state shows one of the following messages:

- **Ready**— This message signifies that exerciser setup is up and ready for use.
- **Running**— This message signifies that exerciser is running, that is, sending frames.

- **Stopped**– This message signifies that exerciser has stopped sending frames.

The transmission link state shows speed mode (Sys Burst, HS Burst 1.x, or HS Burst 2.x) and line rate (Primary or Secondary) for DigRF v4, and shows link speed (Slow, Medium, and High) and measured clock speed (19.2 MHz, 26 MHz, and 38.4 MHz) for DigRF v3.

In addition to these components, the exerciser window shows the Overview screen, which has the Information and Settings sections.

- The Information section shows the filename and path of the current exerciser setup file, provides the current session information (online/offline and port number). The Information section also displays as well as allows you to specify the description for the current exerciser setup file.
- The Settings section provides quick access to the exerciser functions.

Menu Bar

In Exerciser for DigRF, menu bar provides the following menus:

- "File menu" on page 22
- "Action menu" on page 22
- "Help menu" on page 23

File menu

The following table provides a brief description of the File menu commands.

Table 3 File menu commands

Menu command	Description
New	Displays the Port Selection dialog box that enables you to modify the port settings of the current exerciser GUI instance.
Open	Displays the Open dialog box that enables you to open the exerciser setup file (*.dxs).
Save Save As	Display the Save As dialog box that enables you to save the exerciser settings in a *.dxs file. The Save As dialog box is displayed only when you are trying to create a new exerciser setup (*.dxs) file.
Close	Closes the currently active exerciser setup file.
Exit	Closes the exerciser application.

Action menu

The following table provides a brief description of the Action menu commands.

Table 4 Action menu commands

Menu command	Description
Run	Starts sending frames.
Stop	Stops sending frames.
Send Immediate	Writes frames to the immediate transmit memory.
Start GPIO	Starts sending the GPIO data.
Stop GPIO	Stops sending the GPIO data.
Reload CRI	Reloads CRI.

Help menu

The following table provides a brief description of the Help menu commands.

Table 5 Help menu commands

Menu command	Description
Online Help	Displays online help for exerciser.
Version Information	Displays the Version Information message box with the current version information.
About	Displays the information about the System Protocol Tester system.

Toolbar










Toolbar provides a quick access to the features of the exerciser application.



Figure 5 Toolbar

The following table specifies the names of all toolbar icons.

Table 6 Toolbar icons

Icon	Name
	New
	Open
	Save
	Run
	Stop
	Send Immediate
	Start GPIO
	Stop GPIO
	Reload CRI

Panes

Exerciser for DigRF provides a Navigation pane, which helps you to quickly access its functions.

The Navigation pane further provides the following panes:

- **Exercisers**— This pane enables you to navigate between the multiple exerciser setup files.

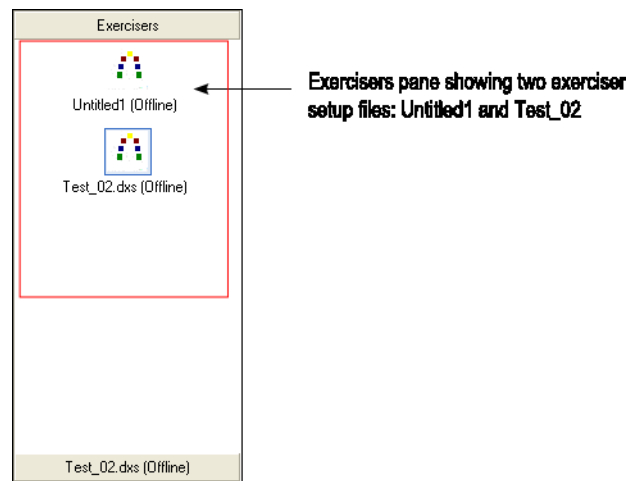


Figure 6 Navigation pane - Exercisers

The above figure is showing the two setup files: Untitled1 and Test_02. Out of these files, Untitled1 is the exerciser setup file available by default. Test_02, on the other hand, is a user-defined exerciser setup file, which you can create by saving the exerciser settings using the **Save** or **Save As** menu command.

- **<Setup_Filename>**— This pane provides functions to use exerciser for your test application.

2 Quick GUI Overview

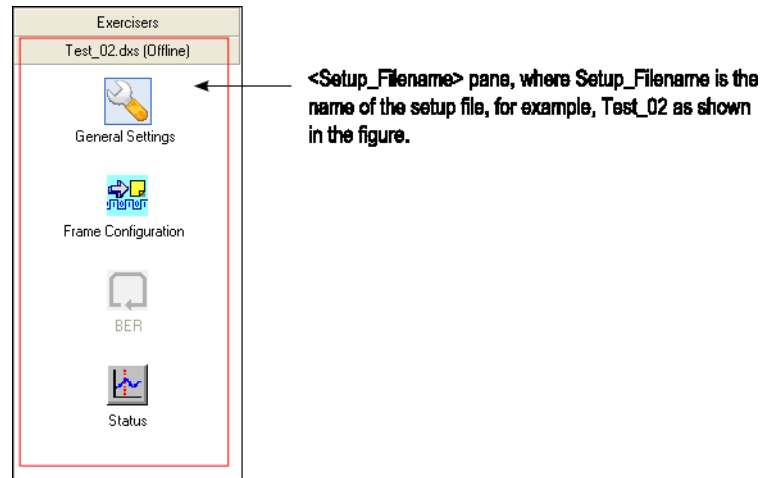
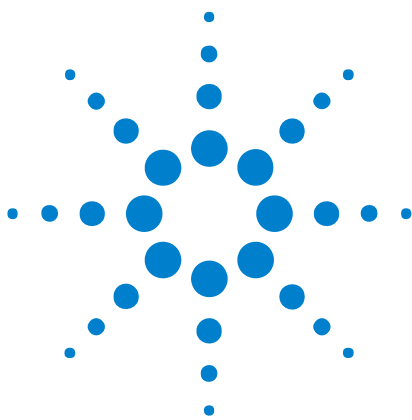


Figure 7 Navigation pane - <Setup_Filename>

Here, Setup_Filename refers to the name of the setup file, for example Test_02.



3 General Settings

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This chapter provides information on the General Settings function of the exerciser application and also provides instructions on creating a DigRF link.

The General Settings function provides these tabs:

- **Link** tab – enables you to specify the necessary link settings for creating a DigRF (v3 or v4) link, as well as test the bit error ratio of the device under test.
- **Transmission** tab – allows you to specify transmission settings for DigRF v3 or v4.
- **Trigger** tab – lets you identify a pattern in the transmission that will cause a pulse on the Trigger Out line.

To access the General Settings function:

- Click **General Settings** in the Navigation pane.



Creating a DigRF v4 Link

Like DigRF v3, creating a DigRF v4 link requires you to specify link settings in the Link tab as well as in the Transmission tab.

To create a DigRF v4 link:

- 1 Do the following in the Link Selection section:
 - a Select **Normal** to specify the mode.
 - b Select **DigRF v4** to specify the protocol.

This displays the components that are required to create a DigRF v4 link.

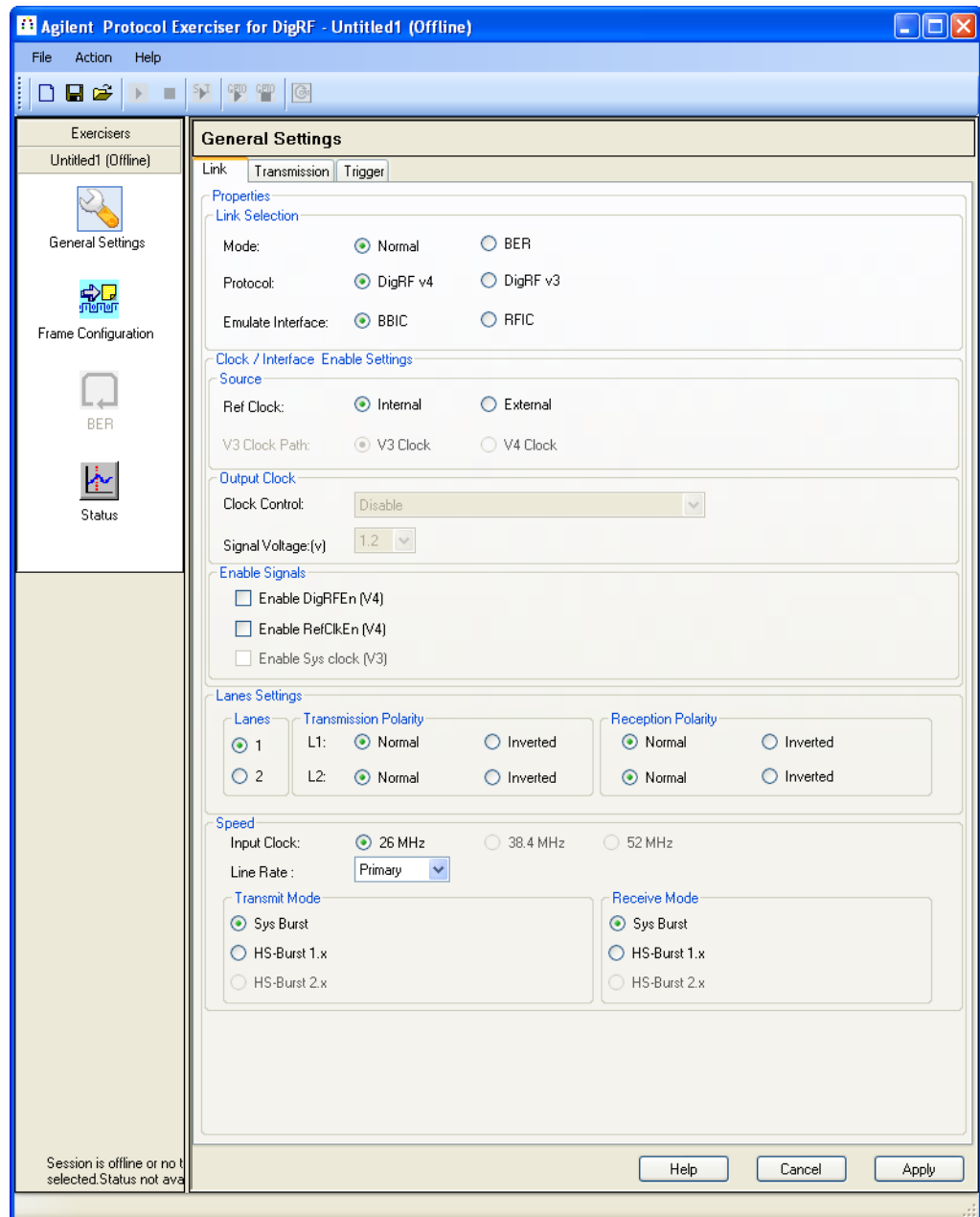


Figure 8 General Settings, Link tab for DigRF v4

- c Select **BBIC** or **RFIC** to emulate exerciser as BBIC or RFIC.
- 2 Select one of the following options to specify the reference clock source:
 - **Internal** – Select if you want to use exerciser card's on-board oscillator clock as source.

- **External** – Select if you want to use some external clock source, such as DUT clock source, for exerciser.
- 3 Specify to enable or disable the output clock and its signal voltage.

To do this:

- a Select one of the following options from the Clock Control drop-down list:
- Disable
 - Enable always
 - Enable only if REFCLK_EN_IN input signal is active

This drop-down list is not available if you have selected to emulate exerciser as BBIC.

- b Select **1.2** or **1.8** from the Signal Voltage drop-down list to specify the desired signal voltage for the output clock.

This drop-down list is not available if you have selected **Disable** in the Clock Control drop-down list.

- 4 Specify to enable the DigRF interface and/or reference clock (from BB to RF) by selecting **Enable DigRFEn** and/or **Enable RefClkEn** in the Enable Signals section.
- 5 Specify lanes settings in the Lanes Settings section.

To do this:

- a Select **1** or **2** in the Lanes section to specify the desired lane count for Tx.
- b Set the transmission and reception polarity of exerciser to **Normal** or **Inverted** for Lane 1 and Lane 2.

- 6 Specify the speed transmission settings in the **Speed** section.

To do this:

- a Specify the desired input clock speed. At present, the default and only available input clock speed option is **26 MHz**.
- b Specify which line rate you want to use by selecting **Primary** or **Secondary** from the Line Rate drop-down list.
- c Specify the desired speed mode (**Sys Burst** or **HS-Burst 1.x**) to use for the transmitter in the Tx section.
- d Specify the desired speed mode (**Sys Burst** or **HS-Burst 1.x**) to use for the receiver in the Rx section.

- 7 Select the **Transmission** tab.

The following figure displays the Transmission tab for DigRF v4.

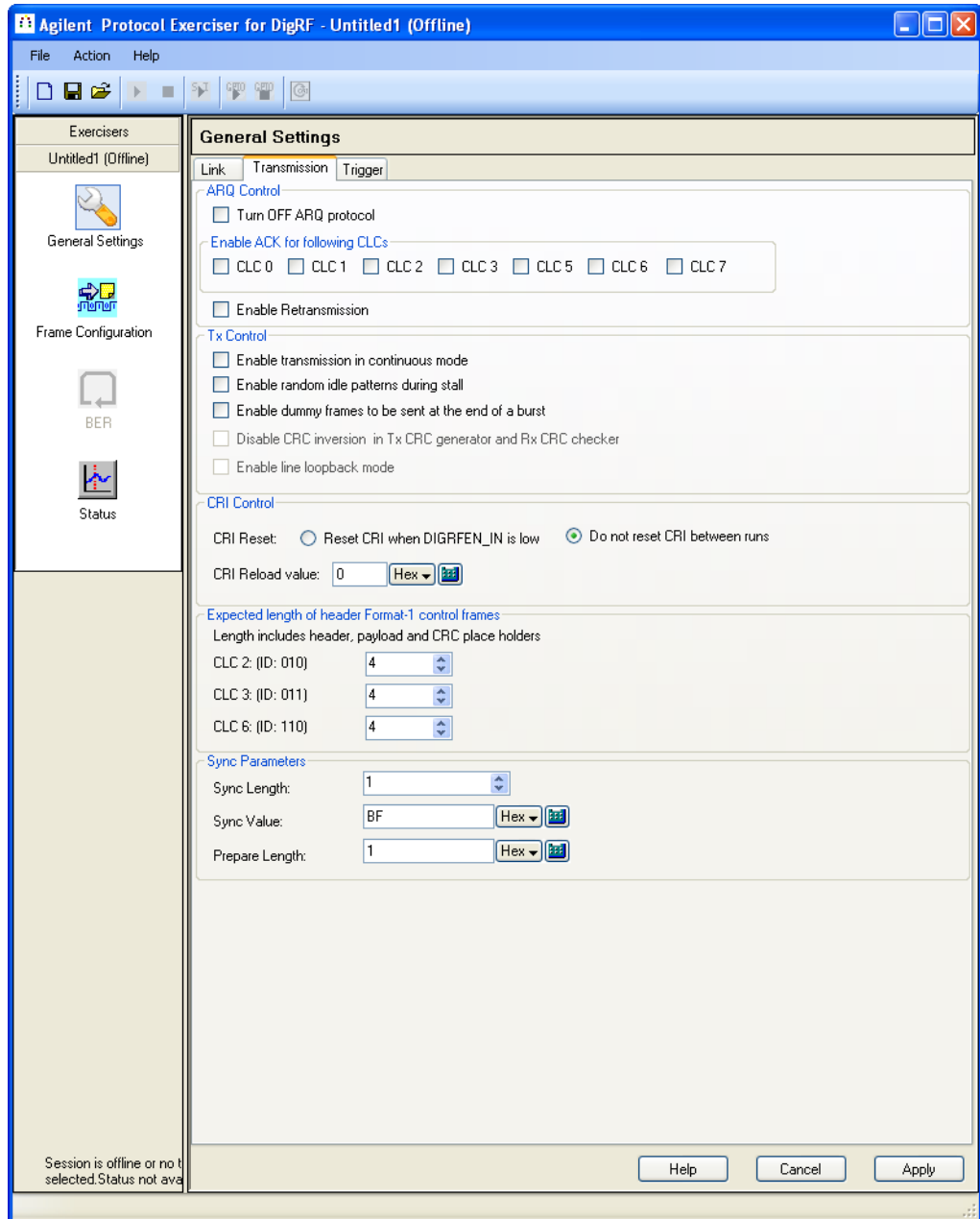


Figure 9 Transmission tab for DigRF v4

- Specify settings for the ARQ protocol in the ARQ Control section.

To do this:

- a Select **Turn OFF ARQ protocol** if you want to disable the ACK/NAK transmission.

This check box option works only in HS mode.

- b Specify to enable ACK/NAK for desired control logical channels by selecting desired CLCs (**CLC 0, CLC 1, CLC 2, CLC 3, CLC 5, CLC 6, and CLC 7**) in the Enable ACK for the following CLCs section.
- 9 Specify control settings for Tx in the **Tx Control** section.

For this, do the following:

- Select **Enable transmission in continuous mode** if you want to enable the transmission in continuous mode.
 - Select **Enable random idle patterns during stall** if you want to send random idle patterns when exerciser is in the stall mode.
 - Select **Enable dummy frames to be sent at the end of a burst** if you want to send dummy frames at the end the burst.
- 10 Specify how you want to control the cyclic running index in the CRI Control section.

To do this:

- a Select **Reset CRI when DIGRFEN_IN is low** if you want to reset CRI when the DigRF Enable Input line is low.
 - b Select **Do not reset CRI between runs** to avoid running CRI between multiple runs. In this case, if CRI was seven when you stopped a run, then it will start from eight (and will not reset to zero) when you initiate another run.
 - c Type the reload value of CRI in the **CRI Reload value** text box.
- 11 Specify the length of header Format 1 control frames in **CLC 2, CLC 3, and CLC 6**.
 - 12 Specify the synchronization parameters in the Sync Parameters section.

To do this:

- a Type the length of the synchronization pattern in the **Sync Length** text box. Here, you can specify a value ranging from 1 to 5 SI (Symbol Interval).
 - b Type the value for the synchronization pattern in the **Sync Value** text box.
 - c Type the length of the PREPARE period in the **Prepare Length** text box.
- 13 Click **Apply**.

This completes creating a DigRF v4 link.

Creating a DigRF v3 Link

Creating a DigRF v3 link requires you to specify link settings in the Link tab as well as in the Transmission tab.

To create a DigRF v3 link:

- 1 Do the following in the Link Selection section:
 - Select **Normal** to specify the mode.
 - Select **DigRF v3** to specify the protocol.

This displays the components that are required to create a DigRF v3 link.

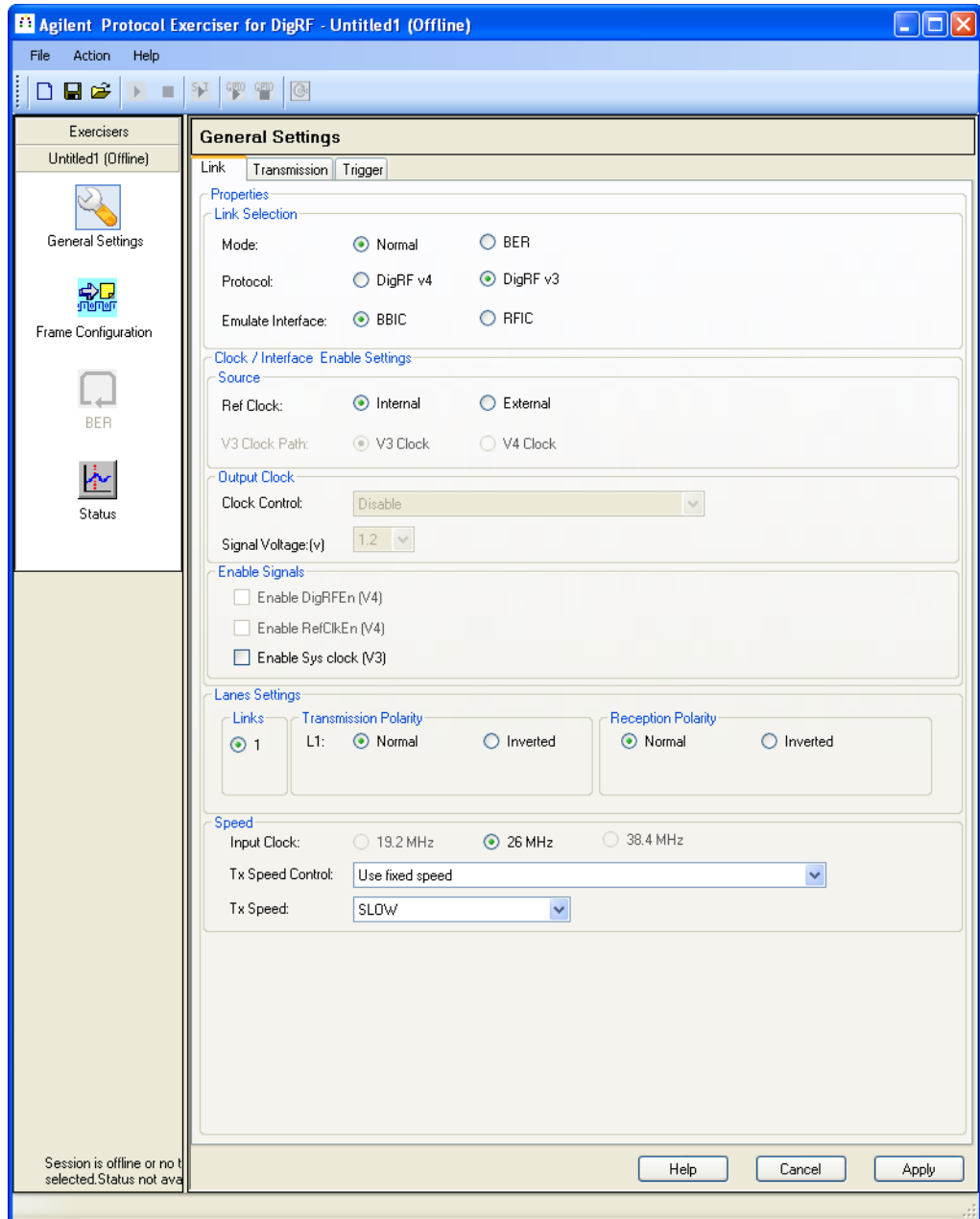


Figure 10 Link tab for DigRF v3

- Select **BBIC** or **RFIC** to emulate exerciser as BBIC or RFIC.
- 2 Select one of the following options to specify the reference clock source:
- **Internal** – Select if you want to use exerciser card's on-board oscillator clock as source.

- **External** – Select if you want to use some external clock source, such as DUT clock source, for exerciser.
- 3 Specify which clock to use, **V3 Clock** or **V4 Clock**, for the V3 clock path.
 - 4 Specify to enable or disable the output clock and its signal voltage.

To do this:

- a Select one of the following options from the Clock Control drop-down list:

- Disable
- Enable always
- Enable only if REFCLK_EN_IN input signal is active

This drop-down list is not available if you have selected to emulate exerciser as BBIC.

- b Select one of the following options from the Signal Voltage drop-down list to specify the desired signal voltage for the output clock:

- 1.2
- 1.8

This drop-down list is not available if you have selected **Disable** in the Clock Enable drop-down list.

- 5 Select **Enable Sys clock** to send system clock enable signal from BBIC to RFIC.
- 6 Set the transmission and reception polarity of the exerciser to **Normal** or **Inverted** for Lane 1 in the Lanes Settings section.
- 7 Specify the speed transmission settings in the Speed section.

To do this:

- a Specify the desired input clock speed. At present, the default and only available input clock speed option is **26 MHz**.
- b Specify to control the speed of transmission by selecting one of the following options from the Tx Speed Control drop-down list:

- Use fixed speed
- Transmitter speed is determined by received Tx speed change messages
- Transmitter speed is determined by received Rx speed change messages
- Remote loop (Rx pin connected to Tx pin)

NOTE

For this release, only **Use fixed speed** option is available for use. Other options will be available in the future release.

- c Specify the speed of transmission by selecting one of the following options from the Tx Speed drop-down list:

- SLOW
- MEDIUM
- HIGH

These options are available only when you have selected the **Use fixed speed** option in the Tx Speed Control drop-down list.

NOTE

For this release, only **SLOW** option is available for use. Other options will be available in the future release.

- 8 Select the **Transmission** tab.

The following figure displays the Transmission tab for DigRF v3.

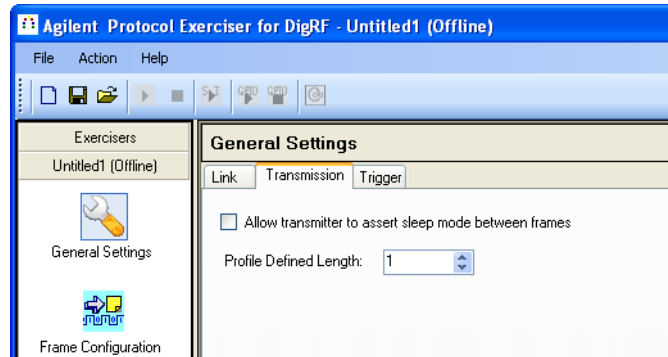


Figure 11 Transmission tab for DigRF v3

- 9 Select the **Allow transmitter to assert sleep mode between frames** check box to allow transmitter to assert sleep mode between frames.

- 10 Click **Apply**.

This completes creating a DigRF v3 link

Configuring Exerciser to BER Mode

Configuring exerciser to BER mode requires you to specify settings, such as input clock, line rate, mode, and polarity of the transmission.

To configure exerciser to BER mode:

- 1 Select **BER** in the Mode section.

This disables the components that are not required for configuring exerciser to BER mode.

3 General Settings

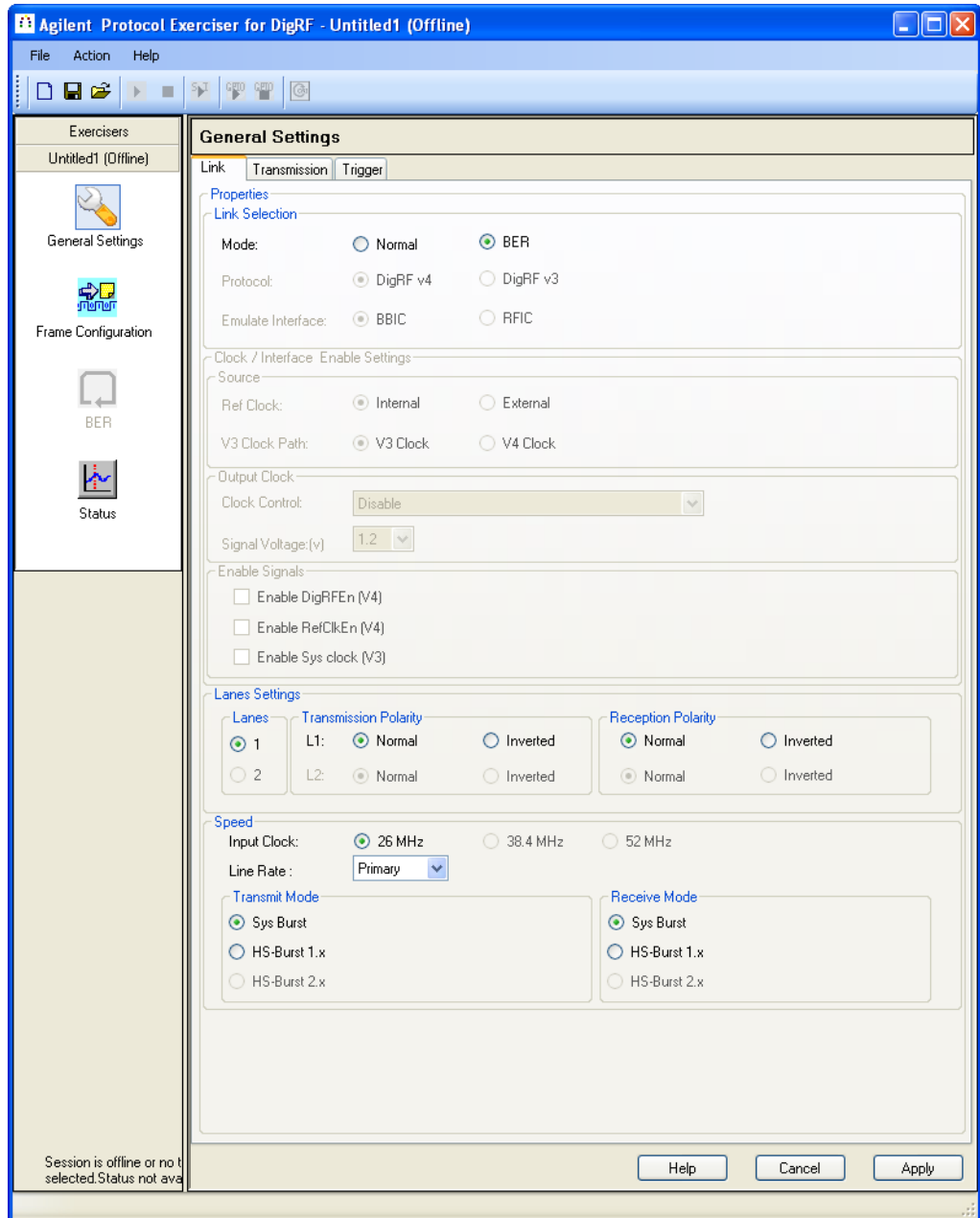


Figure 12 Link tab for BER

- 2 Set the transmission and reception polarity of exerciser to **Normal** or **Inverted** for Lane 1 in the Lanes Settings section.
- 3 Specify the speed transmission settings in the **Speed** section.

To do this:

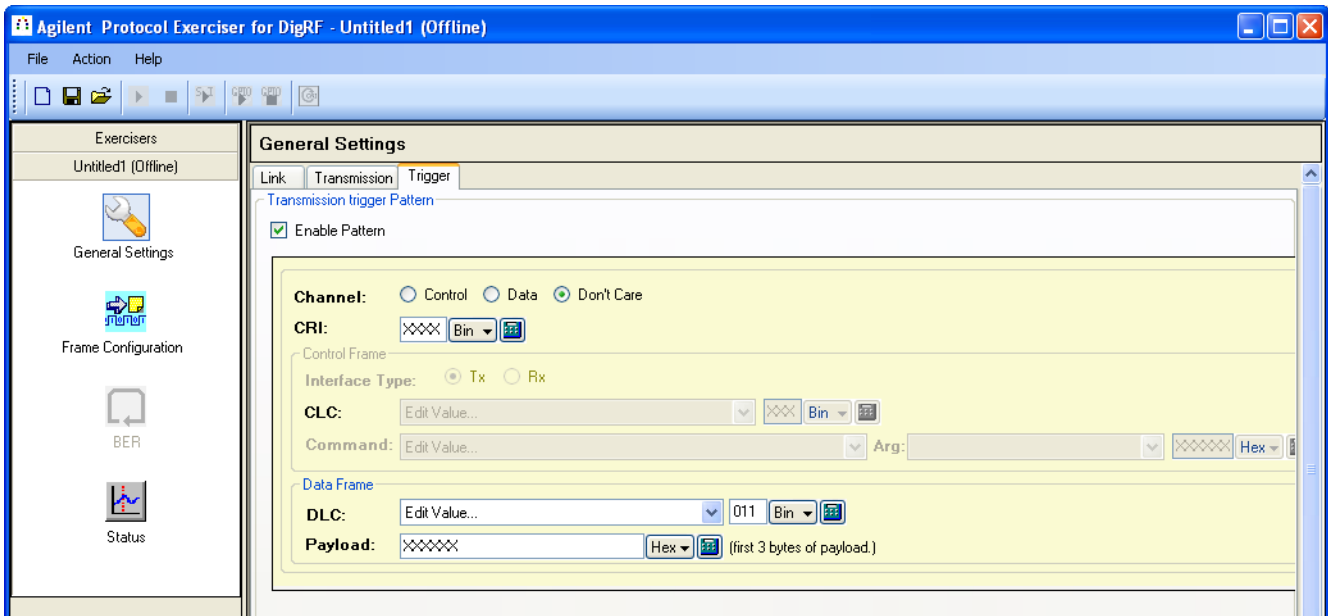
- a Specify the desired input clock speed. At present, the default and only available input clock speed option is **26 MHz**.
 - b Specify which line rate you want to use by selecting **Primary** or **Secondary** from the Line Rate drop-down list.
 - c Specify the desired speed mode (**Sys Burst** or **HS-Burst 1.x**) to use for the transmitter in the Tx section.
 - d Specify the desired speed mode (**Sys Burst** or **HS-Burst 1.x**) to use for the receiver in the Rx section.
- 4** Click **Apply**.

This completes configuring exerciser to BER mode, and also makes the BER function in the Navigation pane available for use.

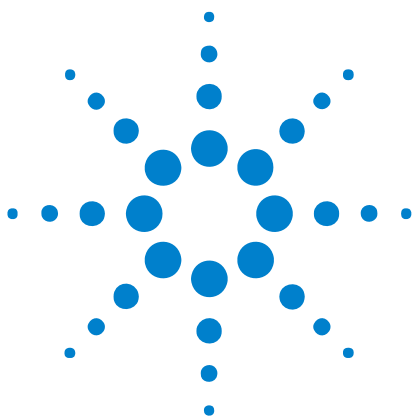
Pulsing Trigger Out on Transmission Pattern

In General Settings, the Trigger tab lets you identify a pattern in the transmission that will cause a pulse on the Trigger Out line.

- 1 In General Settings, select the **Trigger** tab.
- 2 Check **Enable Pattern**.



- 3 Select the type of channel:
 - **Control**
 - **Data**
 - **Don't Care**
- 4 Enter the CRI (Cyclic Running Index) value.
- 5 If you chose the Control channel type, select the **Control Frame** options:
 - **Interface Type** – transmit (Tx) or receive (Rx).
 - **CLC** – type of Control Logical Channel.
 - **Command** – command sent on channel.
 - **Arg** – command argument selection (if available).
- 6 If you chose the Data channel type, select:
 - **DLC** – type of Data Logical Channel.
 - **Payload** – first three bytes of the data frame's payload.
- 7 Click **Apply**.



4 Frame Configuration

Traffic Template	43
Frame Templates	44
Traffic Flow Graph	52

This chapter provides information on the Frame Configuration function of the exerciser GUI, which allows you to send DigRF frames, and edit them, before sending them to the link partner.

Once you have created a DigRF link between exerciser and DUT, you can start sending DigRF frames to the link partner. In Exerciser for DigRF, you can specify the settings to send DigRF frames to a link partner using the Frame Configuration function.

To access the Frame Configuration function:

- Click **Frame Configuration** in the Navigation pane.

The following screen appears.



4 Frame Configuration

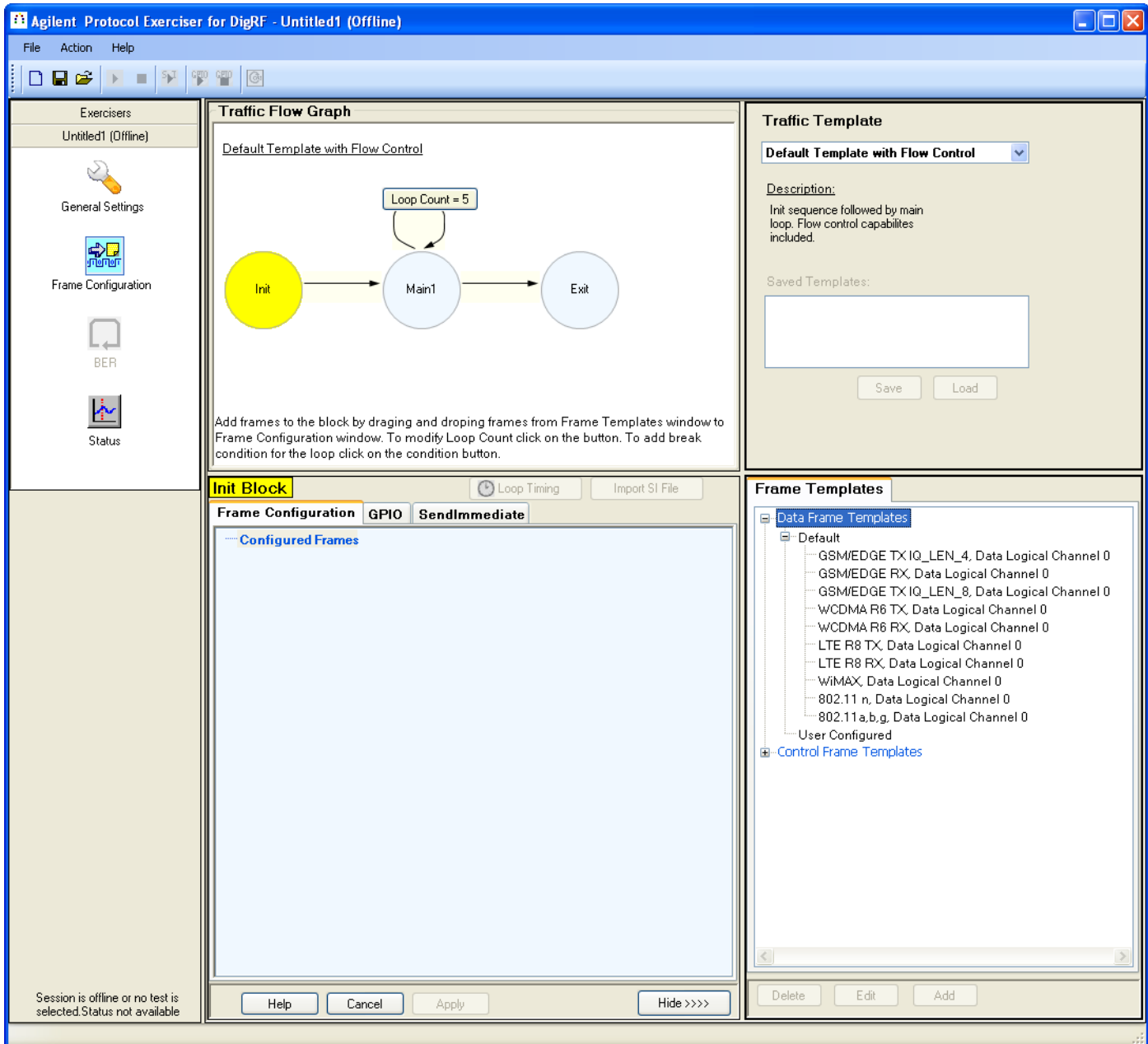


Figure 13 Frame Configuration

Frame Configuration provides various components, **Traffic Template**, **Frame Template**, and **Traffic Flow Graph**, which allow you to configure frames and assign them to a template with flow control before sending them to the link partner.

Traffic Template

The Traffic Template pane provides a drop-down list with the following options:

- Default Template with Flow Control
- Template with Conditional Flow Control

Each of these options defines a template that you can use to specify the flow control for frames.

Selecting any one of these options offers a traffic flow graph, in the Traffic Flow Graph section, which you can use as is or modify as desired.

The following figure shows the graphs that appear in the Traffic Flow Graph section on selecting these options.

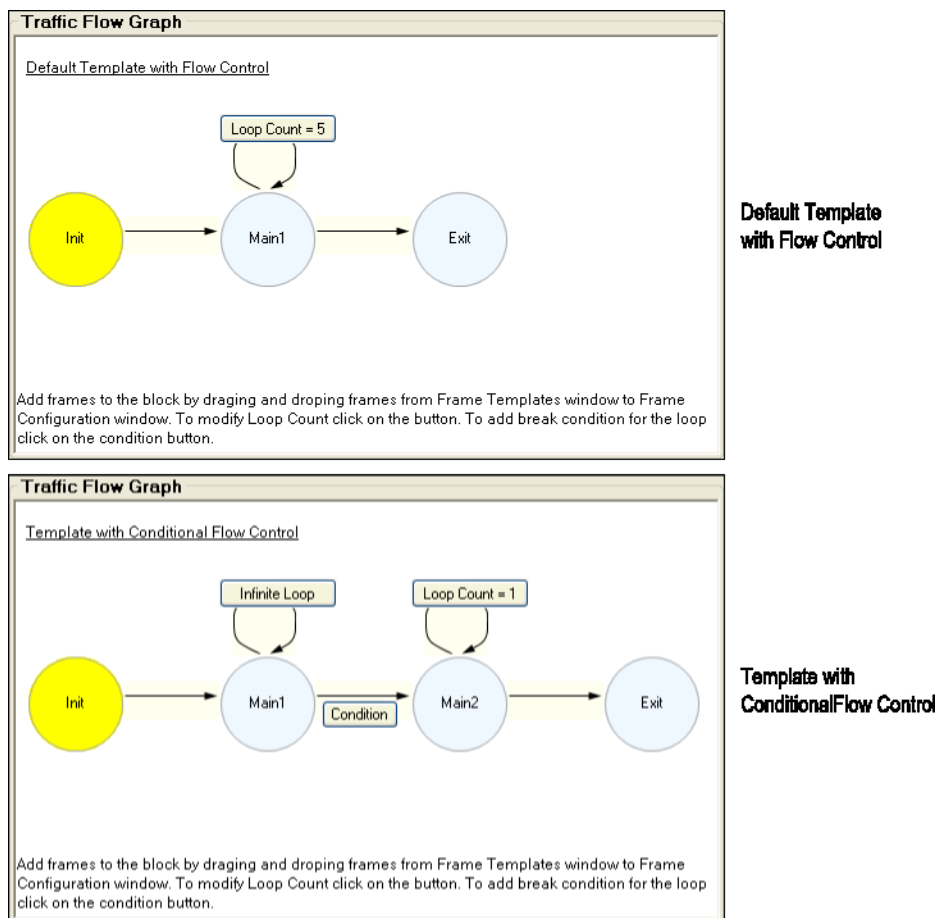


Figure 14 Traffic flow graphs

Frame Templates

The Frame Templates pane provides templates for various types of DigRF frames, which you can select to send them to the link partner. In this pane, all frame templates are organized between the following two categories:

- Data Frame Templates (for data frames)
- Control Frame Templates (for control frames).

These categories further have two more branches: Default and User Configured.

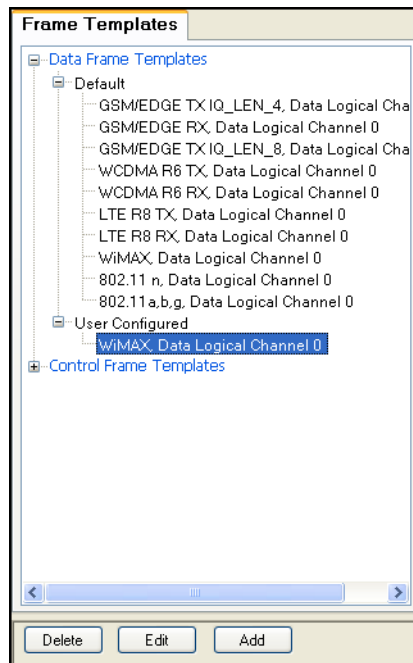


Figure 15 Frame Templates pane

The **Default** category lists frame templates that come with predefined settings. You cannot delete, edit, or add any frame template in this category. The **User Configured** category, on the other hand, allows you to add a new as well as delete/edit any existing frame template.

To delete a frame template from the User Configured category, select that frame template and then click **Delete**.

To edit a frame template, select that frame template and then click **Edit**. This displays the "Data Frame Editor dialog box" on page 45 or "Control Frame Editor dialog box" on page 48, depending on if you are trying to edit a data frame or a control frame. Here, you can edit the settings of the underlying frame template.

To add new frame template, click **Add**. This too displays the Data Frame Editor or Control Frame Editor dialog box, depending on if you are trying to edit a data frame or a control frame. Here, you can edit the settings of the new frame template. After specifying the settings for the new frame template, click **OK** to add the new frame template under the User Configured category.

Data Frame Editor dialog box

The following figure shows the Data Frame Editor dialog box.

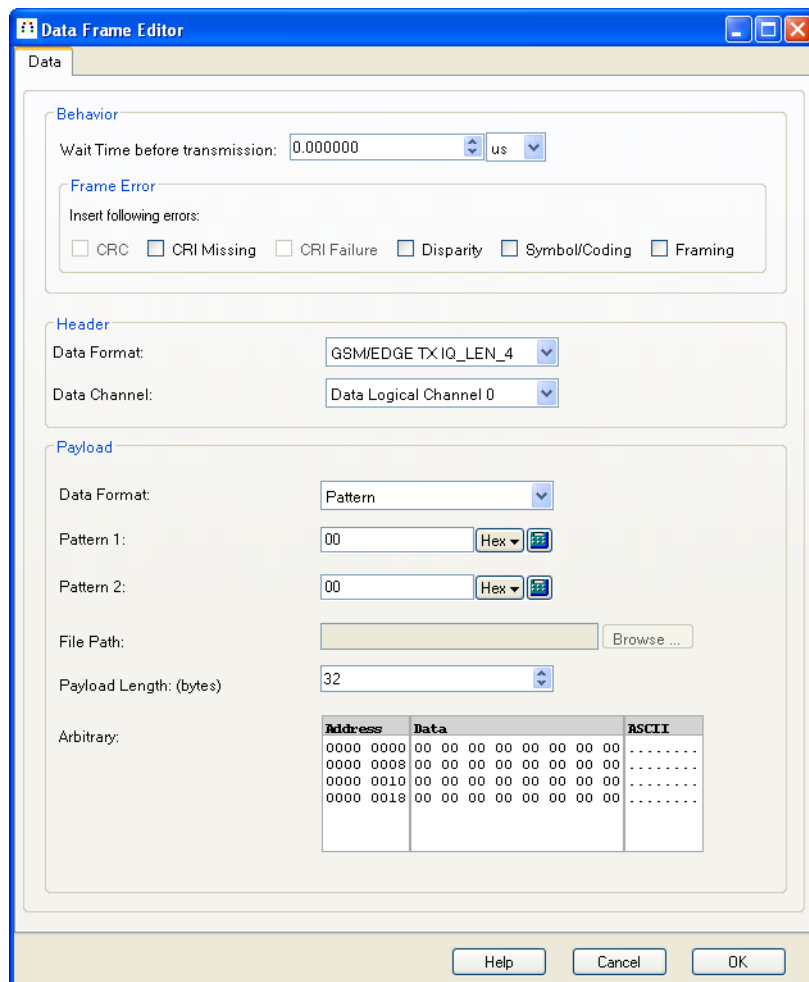


Figure 16 Data Frame Editor dialog box

The following table briefly describes the components of the Data Frame Editor dialog box.

Table 7 Components of the Data Frame Editor dialog box

Component	Description
Behavior	<p>The Behavior section provides the Wait Time before transmission text box, where you can specify the time for which the underlying frame waits for transmission after its prior frame has been transmitted. In this text box, you can specify a value ranging between 0 to 999 seconds. The drop-down list, right adjacent to the text box, provides the following options to specify the wait time before transmission:</p> <ul style="list-style-type: none"> • s (seconds) • ms (milliseconds) • us (microseconds) • ns (nanoseconds)
Header	<p>The Header section provides the following drop-down lists to allow you to specify the settings for the frame header:</p> <ul style="list-style-type: none"> • Data Format— The Data Format drop-down list provides the following options to specify the data format to use. <ul style="list-style-type: none"> • GSM/EDGE TX IQ_LEN_4 • GSM/EDGE RX • GSM/EDGE TX IQ_LEN_8 • WCDMA R6 TX • WCDMA R6 RX • LTE R8 TX • LTE R8 RX • WiMAX • 802.11 n • 802.11 a, b, g • Data Channel— The Data Channel drop-down list provides the following options to allow you to specify the data channel to use for the selected data format. <ul style="list-style-type: none"> • Data Logical Channel 0 • Data Logical Channel 1 • Data Logical Channel 2 • Data Logical Channel 3 • Data Logical Channel 4 • Data Logical Channel 5 • Data Logical Channel 6 • Sub Data Logical Channel

Table 7 Components of the Data Frame Editor dialog box (continued)

Component	Description
Payload	<p>The Payload section provides the following components to specify the payload of the frame:</p> <ul style="list-style-type: none"> • Data Format— The Data Format drop-down list provides the following options to specify how you want to fill the payload of the data frame: <ul style="list-style-type: none"> • Pattern— Select this option when you want to specify the payload with a particular data pattern. • Increment— Select this option when you want to specify the payload with incremental values. In this case, you initialize the payload with a start value, and then increments the value till it reaches to the end of the range. • File— Select this option when you want to specify the payload using the contents of a file. • Arbitrary— Select this option when you want specify the payload by manually specifying the arbitrary values. • Pattern 1 and Pattern 2 — The Pattern 1 and Pattern 2 text boxes are used in conjunction to specify a particular pattern to fill the payload. Here, you can specify a pattern in hexadecimal, binary, or decimal format. You can also use the calculator for input assistance. Clicking the calculator for input assistance displays the Input Assistant dialog box. Here, you can perform boolean operations over the hexadecimal, binary, and decimal values, and use the resulting value as the value for Pattern 1 and Pattern 2 text boxes. The Pattern 1 and Pattern 2 text boxes are displayed when you select the Pattern option in the Data Format drop-down list. • Start Value — The Start Value text box is used to specify the value to initialize the data frame payload. Here, you can specify a pattern in hexadecimal, binary, or decimal format. You can also use the calculator for input assistance. Clicking the calculator for input assistance displays the Input Assistant dialog box. Here, you can perform boolean operations over the hexadecimal, binary, and decimal values, and use the resulting value as the start value. This text box is displayed only when you select the Increment option in the Data Format drop-down list. • Increment — The Increment text box is used to specify the incremental value, which increments the value specified in the Start Value text box. Here, you can specify a pattern in hexadecimal, binary, or decimal format. You can also use the calculator for input assistance. Clicking the calculator for input assistance displays the Input Assistant dialog box. Here, you can perform boolean operations over the hexadecimal, binary, and decimal values, and use the resulting value as the incremental value. This text box is displayed only when you select the Increment option in the Data Format drop-down list.

Table 7 Components of the Data Frame Editor dialog box (continued)

Component	Description
Payload (cont'd)	<ul style="list-style-type: none"> • File Path — The File Path text box is used to specify the file (*. dpld) that you want to use to specify the payload. Here, you can directly type the path and name of the file in the text box; or you can browse it using the Browse command button. Note that the file that you specify here contains data in hex, where two digits correspond to one hex value. • Payload Length— The Payload Length text box shows the payload length (in bytes) of the frame you selected in the Data Format drop-down list of the Header section. Though, this payload length is as recommended in DigRF v4 specification, it is not rigid. You can change the payload length as desired. • Arbitrary — The Arbitrary section provides the Data column, where you can type in the payload contents. By default, the Data column contents are shown in the DWord aligned Hex View (little endian) format. To change it to other format, right-click in the Data column, and then select one of the following menu command: <ul style="list-style-type: none"> • DWord aligned Hex View (little endian) • DWord aligned Hex View (big endian) • Byte aligned Hex View • Nibble aligned Binary View The Arbitrary section is available only when you have selected the Arbitrary option in the Data Format drop-down list.
Help	Click Help to display online help.
Cancel	Click Cancel to close the Data Frame Editor dialog box without saving any changes.
OK	Click OK to close the Data Frame Editor dialog box and save the changes made to the frame template.

Control Frame Editor dialog box

The following figure shows the Control Frame Editor dialog box.

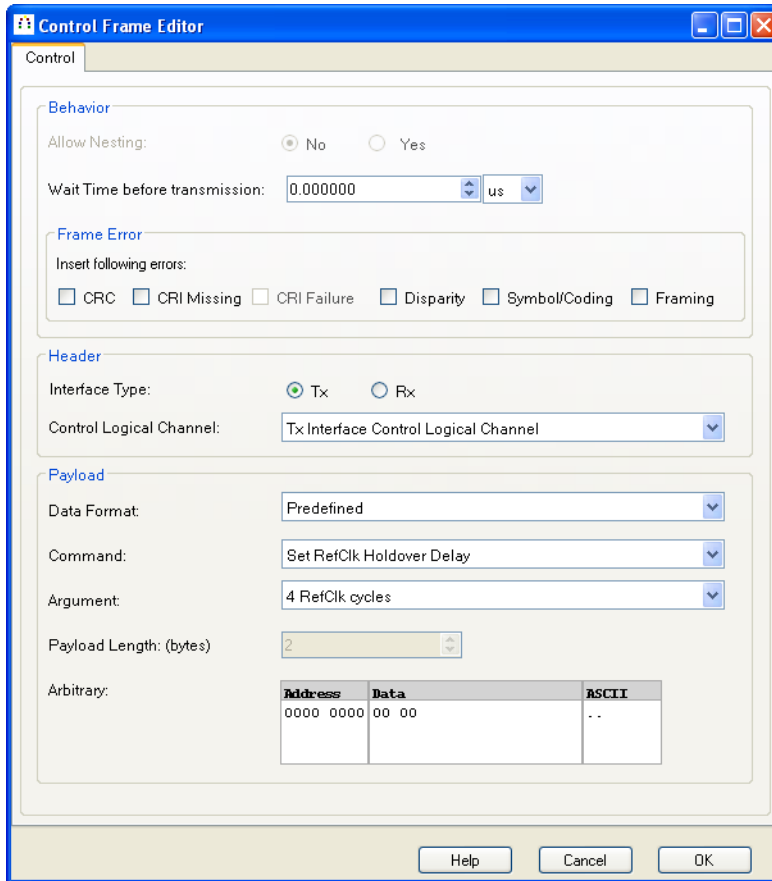


Figure 17 Control Frame Editor dialog box

The following table briefly describes the components of the Control Frame Editor dialog box.

Table 8 Components of the Control Frame Editor dialog box

Component	Description
Behavior	<p>The Behavior section provides the following components that allow you to specify the behavior of the control frame:</p> <ul style="list-style-type: none"> • Allow Nesting— Provides options (No and Yes) to nest the control frame inside an existing frame. • Wait Time before transmission— The Wait Time before transmission text box allows you to specify the time duration for which the underlying frame waits for transmission after its prior frame has been transmitted. In this text box, you can specify a value ranging between 0 to 999 seconds. The drop-down list, right adjacent to the text box, provides the following options to specify the time unit: <ul style="list-style-type: none"> • s (seconds) • ms (milliseconds) • us (microseconds) • ns (nanoseconds)
Header	<p>The Header section provides the Control Logical Channel drop-down list, from where you can select the desired Tx CLC.</p>
Payload	<p>The Payload section provides the following components to specify the payload contents of the frame:</p> <ul style="list-style-type: none"> • Data Format— The Data Format drop-down list provides the following options to specify how you want to specify the payload of the control frame: <ul style="list-style-type: none"> • Predefined— Select this option when you want to specify the payload using the control commands and arguments. • Arbitrary— Select this option when you want to fill the payload by manually specifying the arbitrary values. • Command— The Command drop-down list provides commands for the CLC you selected in the Control Logical Channel drop-down list. • Argument— The Argument drop-down list provides arguments for the command you selected in the Command drop-down list. • Payload Length— The Payload Length text box shows the payload length (in bytes) of the frame you selected in the Control Logical Channel drop-down list. Though, this payload length is as recommended in DigRF v4 specification, it is not rigid. You can change the payload length as desired. • Arbitrary — The Arbitrary section provides the Data column, where you can type in the payload contents. By default, the Data column contents are shown in the DWord aligned Hex View (little endian) format. To change it to other format, right-click in the Data column, and then select one of the following menu commands: <ul style="list-style-type: none"> • DWord aligned Hex View (little endian) • DWord aligned Hex View (big endian) • Byte aligned Hex View • Nibble aligned Binary View <p>The Arbitrary section is available only when you have selected the Arbitrary option in the Data Format drop-down list.</p>

Table 8 Components of the Control Frame Editor dialog box (continued)

Component	Description
Help	Click Help to display online help.
Cancel	Click Cancel to close the Control Frame Editor dialog box without saving any changes.
OK	Click OK to close the Control Frame Editor dialog box and save the changes made to the frame template.

Traffic Flow Graph

The Traffic Flow Graph section is where you define the flow of the traffic. This section is further divided into two more sections: Graph and Configuration.

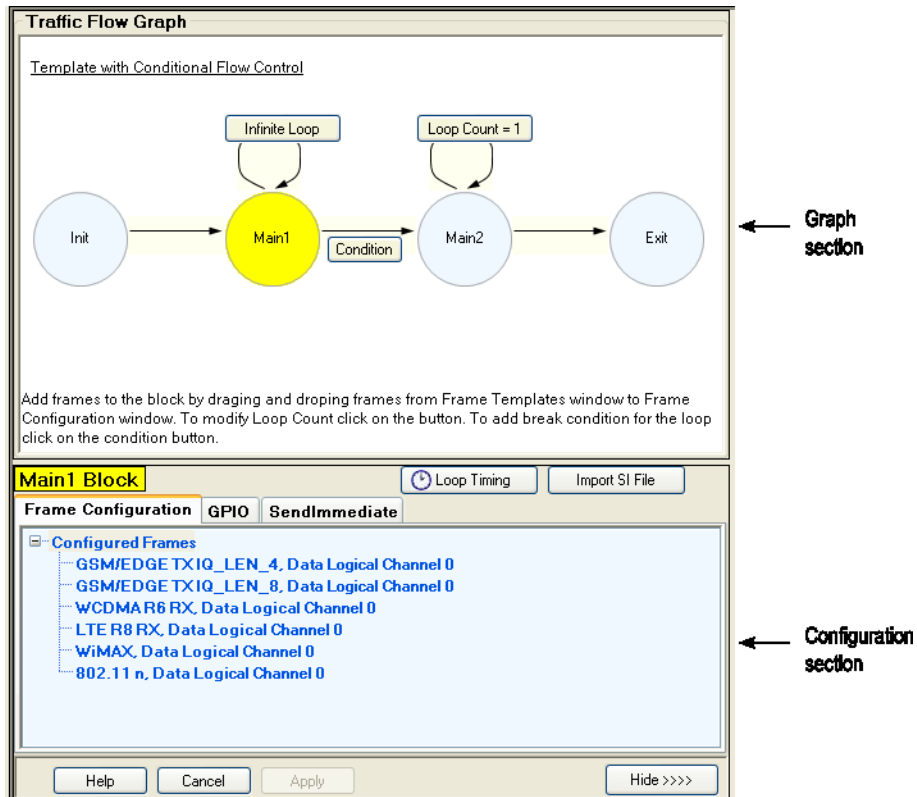


Figure 18 Traffic Flow Graph section

In this section, you will be:

- ["Understanding the Graph Section"](#) on page 52
- ["Understanding the Configuration Section"](#) on page 57

Understanding the Graph Section

As shown in the above figure, the Graph section depicts the flow of the traffic. The traffic flow graph shows three types of blocks (Init, Main, and Exit), two loop constructs (Infinite Loop and Loop Count), and a conditional construct to break the loop.

In this section, you will learn about:

- ["Init block"](#) on page 53

- "Main block" on page 53
- "Exit block" on page 56
- "Important point about blocks" on page 56

Init block

The Init block is intended to initialize resources before sending any data frame. For example, you can use the Init block to turn on the clock test mode before the transmission starts.

The Init block also provides the right-click menu with the following menu commands:

- **Add block after** – Select to display the following submenu commands:
 - **Unconditional Block** – Select to add an unconditional Main block after the Init block.
 - **Conditional Block** – Select to add a conditional Main block after the Init block.
- **Use as Control Block** – Select to specify using Init as a control block. If this menu command is not selected, then Init will be treated as a data block.
- **Transmit in Sys-Burst Mode** – Select to instruct exerciser to transmit frames of the Init block in sys-burst mode.

Main block

The Main block is intended to be used as a data block where you can add data frames for transmission. The Main block also provides the right-click menu with the following menu commands:

- **Add block before** – Select to display the following submenu commands:
 - **Unconditional Block** – Select to add a new unconditional Main block before the selected Main block.
 - **Conditional Block** – Select to add a new conditional Main block before the selected Main block.
- **Add block after** – Select to display the following submenu commands:
 - **Unconditional Block** – Select to add a new unconditional Main block after the selected Main block.
 - **Conditional Block** – Select to add a new conditional Main block after the selected Main block.
- **Add Condition** – Select to add a new conditional construct between the selected Main block and the next Main/Exit block.
- **Delete Condition** – Select to delete the conditional construct of the selected Main block. This menu command is available only when a conditional construct is already added to the Main block.

- **Delete Block** – Select to delete the selected Main block.

The Main block also has three more entities:

- "Loop" on page 54
- "Loop Timing" on page 54
- "Condition" on page 55

Loop The *loop* entity is used to iterate the transmission of the frames in the Main block. This entity is always present as a command button at the top of every Main block. Clicking this command button displays the Behavior Editor dialog box, where you can specify the loop count in the **Count** text box, or you can create an infinite loop by selecting the **Infinite** check box.

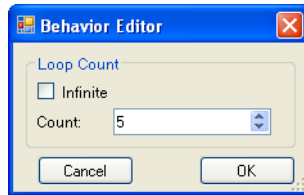


Figure 19 Behavior Editor dialog box

Loop Timing The *loop timing* entity is used to configure the loop time. This entity is available as the **Loop Timing** command button in the Configuration section. Clicking this command button displays the Loop Time Configuration dialog box.

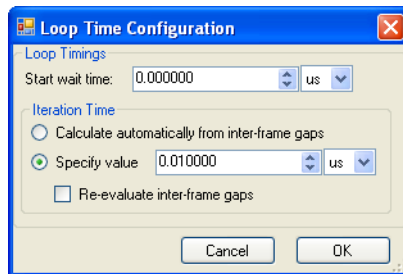


Figure 20 Loop Time Configuration dialog box

In the Loop Time Configuration dialog box, the **Start wait time** text box allows you to specify the time duration for which the underlying Main block should wait before starting its loop iteration. In this text box, you

can specify a value ranging between **0** to **999** seconds. The drop-down list, right adjacent to the text box, provides the options (**s**, **ms**, **us**, and **ns**) to specify the time unit.

The Iteration Time section provides the following options to automatically calculate the time for each loop iteration as well as to specify it manually:

- Calculate automatically from inter-frame gaps
- Specify value

In the Specify value text box, you can specify a value ranging between **0** to **999** seconds.

Condition The condition entity is used to specify the condition to break the loop. To add a condition, right-click the Main block and select **Add condition** from the right-click menu. This adds a Condition command button between the selected Main block and the next Main/Exit block. Click the Condition command button to display the Break Condition dialog box.

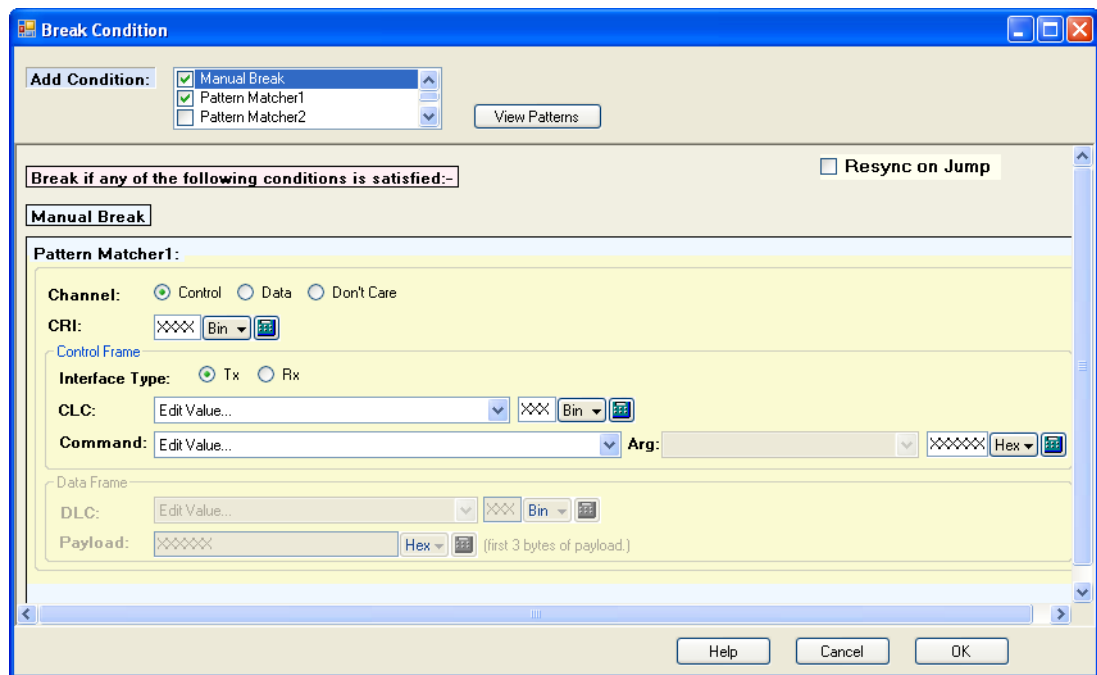


Figure 21 Break Condition dialog box

The Break Condition dialog box provides a **Add Condition** list box, from where you can select a Manual Break and eight pattern matchers. The above figure shows the Break Condition dialog box with **Manual Break** and **Pattern Matcher 1** conditions. If any of these two conditions is satisfied, the loop will break.

In the Pattern Matcher 1 section, you can specify if you want to apply condition to **Control** channel, **Data** Channel, or both (**Don't Care**). Accordingly, other components will be available to specify condition settings, such as type of interface (**Tx** or **Rx**), type of **CLC**, its **Command** and argument (**Arg**).

Once you have specified the pattern, you can view it in a window that appears when you click the **View Patterns** command button.

Pattern No.	Pattern	Mask	Blocks using this Pattern
0	00 00 00 00	FF FF FF FF	1
1	00 00 00 00	FF FF FF FF	
2	00 00 00 00	FF FF FF FF	
3	00 00 00 00	FF FF FF FF	
4	00 00 00 00	FF FF FF FF	
5	00 00 00 00	FF FF FF FF	
6	00 00 00 00	FF FF FF FF	
7	00 00 00 00	FF FF FF FF	

Figure 22 View Patterns

Exit block

The Exit block is intended to release resources, which you may have initialized in the Init block, after all Main blocks are executed. For example, you can use the Exit block to turn off the clock test mode that you turned on in the Init block.

The Init block also provides the right-click menu with the following command:

- **Add block before** – Select to display the following commands:
 - **Unconditional Block** – Select to add an unconditional Main block before the Exit block.
 - **Conditional Block** – Select to add a conditional Main block before the Exit block.
- **Use as Control Block** – Select to specify using Exit as a control block. If this command is not selected, then Exit will be treated as a data block.

Important point about blocks

The following are some important points about Init, Main, and Exit blocks:

- You can have maximum of eight blocks, Out of this, you can have:
 - Maximum of one Init block.
 - Maximum of six Main blocks.

- Maximum of one Exit block.

Understanding the Configuration Section

The Configuration section allows you to individually configure the blocks of the traffic flow graph. For this, it provides the following tabs:

- "Frame Configuration tab" on page 57
- "Send Immediate tab" on page 61
- "GPIO tab" on page 58

Frame Configuration tab

The Frame Configuration tab allows you to add the desired data and control frames to the selected block. For this, you need to drag the desired frame from the Frame Templates pane and drop it in the Frame Configuration tab.

In the Frame Configuration tab, all frames are arranged under the **Configured Frame** branch in the order you drop them. Once dropped, their placement cannot be changed. However, you can delete frames and add them again to change the order.

The Frame Configuration tab also provides the right-click menu with the following command:

- **View** – Select to display the Basic Frame Viewer window, which shows the details of the selected frame.

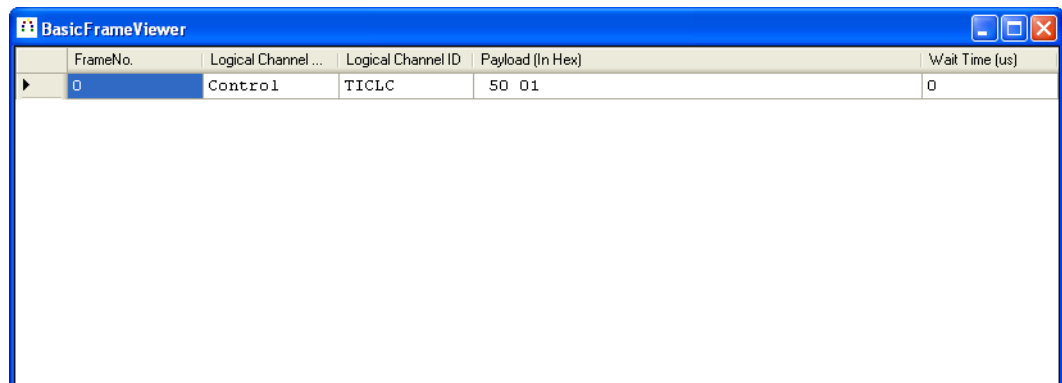


Figure 23 Basic Frame Viewer window

This command is available when you right-click on a single frame.

- **View All** – Select to display the Basic Frame Viewer window, which shows the details of the all frames in the Frame Configuration tab.

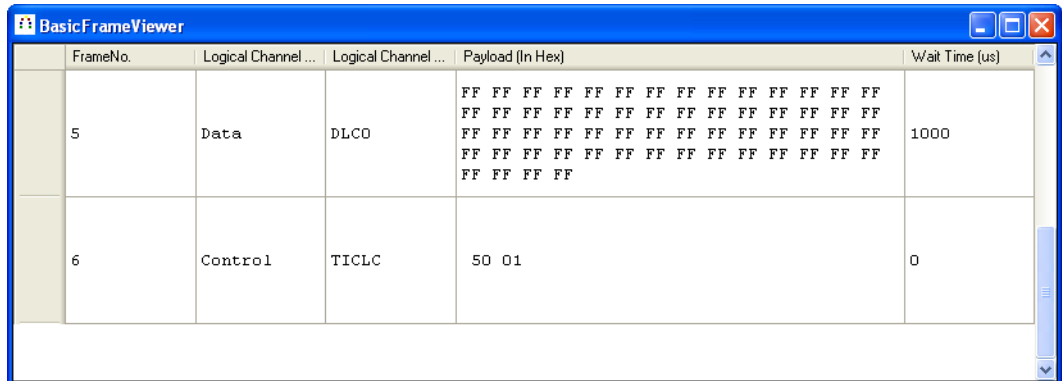


Figure 24 Basic Frame Viewer window

This command is available when you right-click the Configured Frame branch.

- **Edit** – Select to display the Data Frame Editor/Control Frame Editor, where you can edit the selected frame.
- **Delete** – Select to delete the selected frame.
- **Delete All** – Select to delete all frames from the Frame Configuration tab.

This command is available when you right-click the Configured Frame branch.

- **Copy** – Select to copy the selected frame.
- **Copy All** – Select to copy all frames in the Frame Configuration tab.

This command is available when you right-click the Configured Frame branch.

- **Paste** – Click to paste all copied frames.

GPIO tab

The GPIO tab allows you to configure the GPIO pins and data. For this, it further provides these tabs:

- "[Pin Configuration tab](#)" on page 58 – lets you specify the pins to use.
- "[Data Configuration tab](#)" on page 59 – lets you specify the data for the pins that you have selected to use.

Pin Configuration tab The following figure shows the Pin Configuration tab.

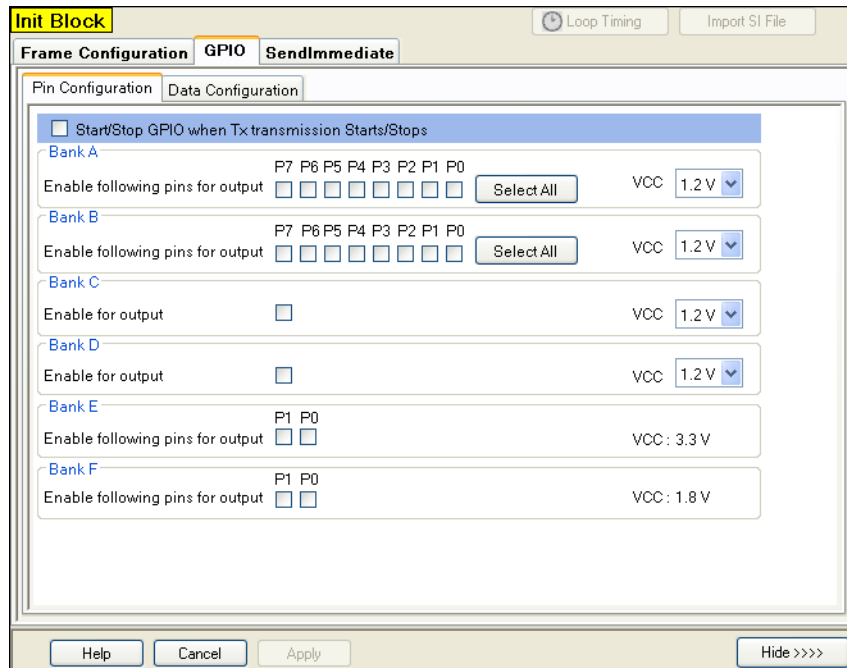


Figure 25 GPIO tab - Pin Configuration

In the Pin Configuration tab, you can instruct exerciser to start or stop GPIO when the Tx transmission starts or stops by selecting the **Start/Stop GPIO when Tx transmission Starts/Stops** check box.

The Pin Configuration tab also provides sections (Bank A, Bank B, Bank C, Bank D, Bank E, and Bank F), where you can specify the settings to configure the pins belonging to each bank.

Both bank A and B have eight pins each. Their respective sections (Bank A and Bank B) allow you to select pins individually, or you can select all of them by clicking Select All. Bank C and D also have eight pins each. However, their respective sections (Bank C and Bank D) allow you to select all eight pins by selecting the only provided check box. In each of these sections, you can also specify the voltage to use by selecting an option (1.2V, 1.8V, or 2.5V) from the VCC drop-down list.

Unlike other banks, E and F have only two pins each. Their respective sections (Bank E and Bank F) allow you to select pins individually, or you can select all of them by clicking Select All. However, these sections do not allow you to select the desired voltages. Instead, their respective voltage is provided by default (3.3V for Bank E and 1.8V for Bank F).

Data Configuration tab The following figure shows the Data Configuration tab.

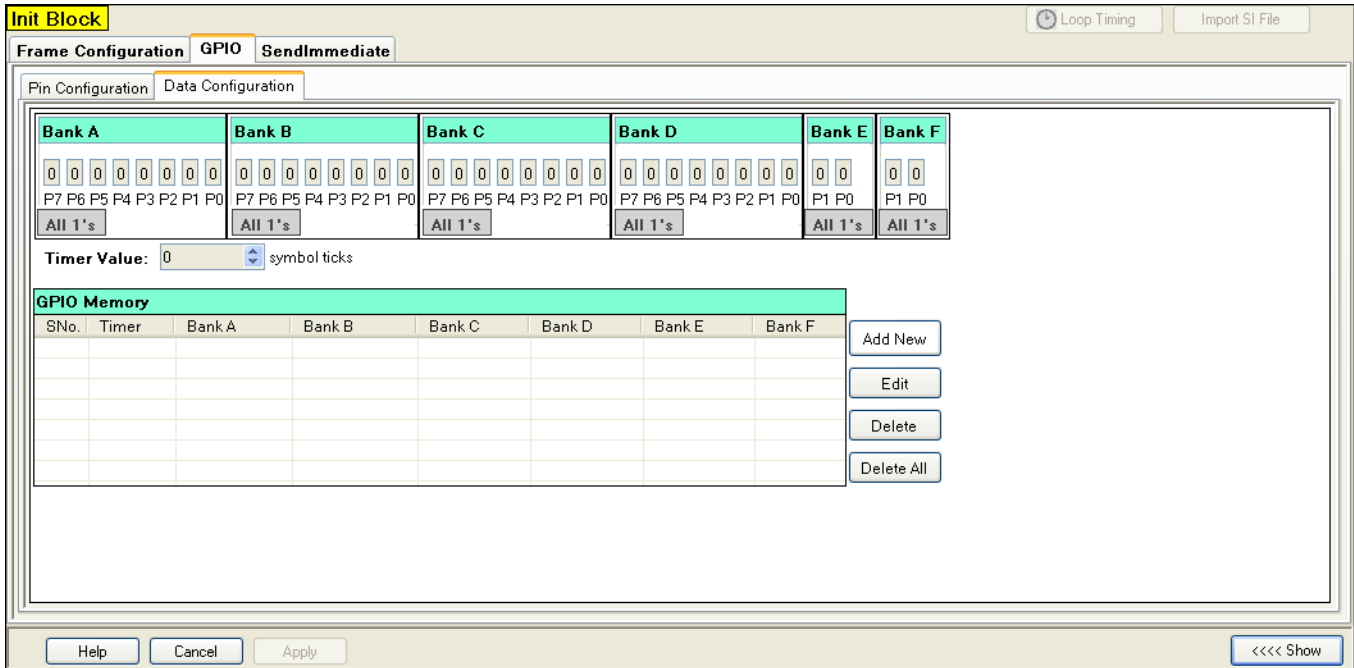


Figure 26 GPIIO tab - Data Configuration

In the Data Configuration tab, you configure the GPIIO memory. Here, you can specify 256 rows of GPIIO memory, and each row will have 36 bits of data (1 bit for each pin). To start configuring the GPIIO memory, click **Add New**. This enables all text boxes in sections ranging from Bank A to F, and replaces the Add New command button by the Add To List command button.

In the enabled text boxes of the bank sections, specify each pin's binary value directly in their respective text boxes, or click **All 1's** to fill all text boxes the section by 1s. Clicking **All 1's** also displays **All 0's**, which you can click to fill all text boxes the section by 0s.

Once you have specified the data for each pin, specify a timer value (in symbol ticks) in the **Timer Value** text box. The highest timer value that this text box can accept is of 24 bit. The value specified in this text box defines the duration for which each pin data will be available on the output signal.

Now, click **Add To List**. Doing this adds a new row filled with the timer value and the pin data in the GPIIO Memory section, and replaces the Add To List command button by the Add New command button.

Once you have added the GPIIO data, you can edit it by selecting the data row in the GPIIO Memory section and then clicking **Edit**. Clicking Edit display the selected pin data in the text boxes of their respective section where you can edit it and the timer value, as desired. Clicking Edit also

replaces the Add New/ Add To List command button Save. Once you are done editing the data, click Save to save it for future use. You can also delete an existing row by selecting it and then clicking Delete. To delete all existing rows, click Delete All.

Send Immediate tab

The Send Immediate tab allows you to add the desired data and control frames to immediate transmit memory. For this, you need to drag the desired frame from the Frame Templates pane and drop it in the Send Immediate tab.

In the Send Immediate tab, all frames are arranged under the **Configured Frame** branch in the order you drop them. Once dropped, their placement cannot be changed. However, you can delete frames and add them again to change the order.

The Send Immediate tab also provides the right-click menu with the following command:

- **Send** – Select to immediately send the selected frame.
- **View** – Select to display the Basic Frame Viewer window, which shows the details of the selected frame.

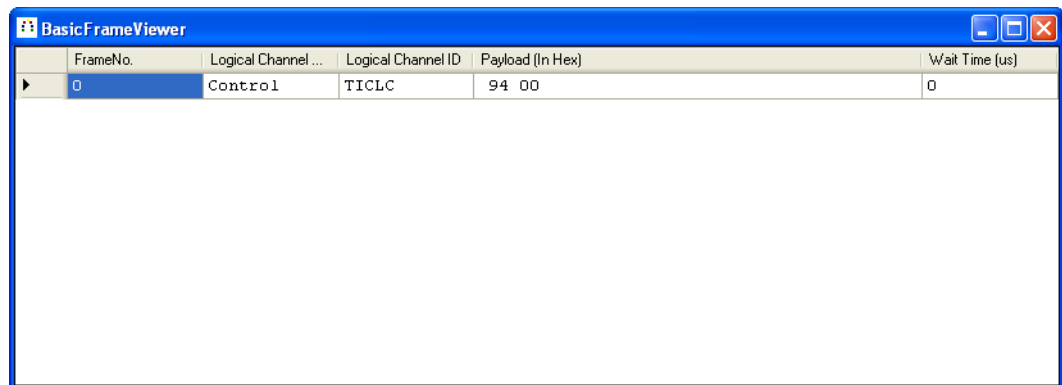
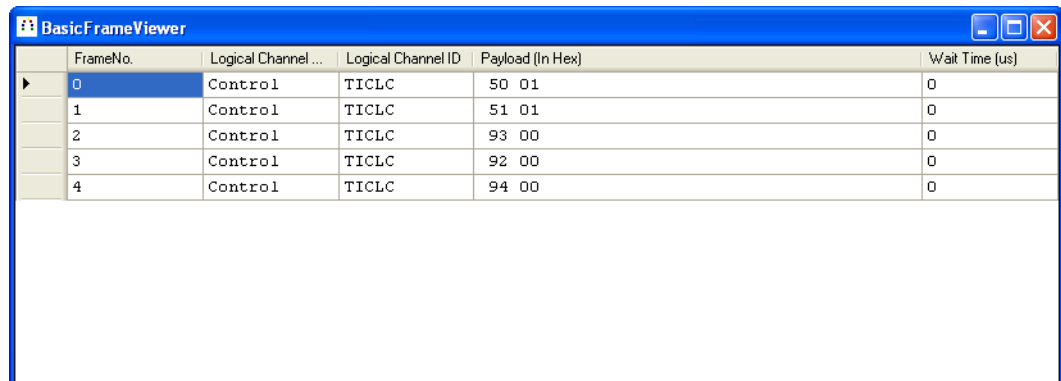


Figure 27 Basic Frame Viewer window

This command is available when you right-click on a single frame.

- **View All** – Select to display the Basic Frame Viewer window, which shows the details of the all frames in the Frame Configuration tab.



The screenshot shows a window titled "BasicFrameViewer" with a table containing the following data:

FrameNo.	Logical Channel ...	Logical Channel ID	Payload (In Hex)	Wait Time (us)
0	Control	TICLC	50 01	0
1	Control	TICLC	51 01	0
2	Control	TICLC	93 00	0
3	Control	TICLC	92 00	0
4	Control	TICLC	94 00	0

Figure 28 Basic Frame Viewer window

This command is available when you right-click the Configured Frame branch.

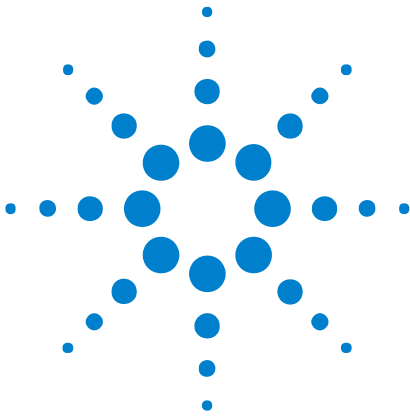
- **Edit** – Select to display the Data Frame Editor/Control Frame Editor, where you can edit the selected frame.
- **Delete** – Select to delete the selected frame.
- **Delete All** – Select to delete all frames from the Frame Configuration tab.

This command is available when you right-click the Configured Frame branch.

- **Copy** – Select to copy the selected frame.
- **Copy All** – Select to copy all frames in the Frame Configuration tab.

This command is available when you right-click the Configured Frame branch.

- **Paste** – Select to paste all copied frames.



5 BER Functions

This chapter provides information on the Status function of the Exerciser for DigRF application.

The BER (bit error rate) function in the exerciser application allows you to verify the link between the transmitter and receiver side of the exerciser card. Using this function, you can send bits to the receiver side of exerciser. The count of the total bits and error bits received by the receiver side of the exerciser card are shown in the BER screen.

To access the BER function:

- Click **BER** in the Navigation pane.

The following screen appears.

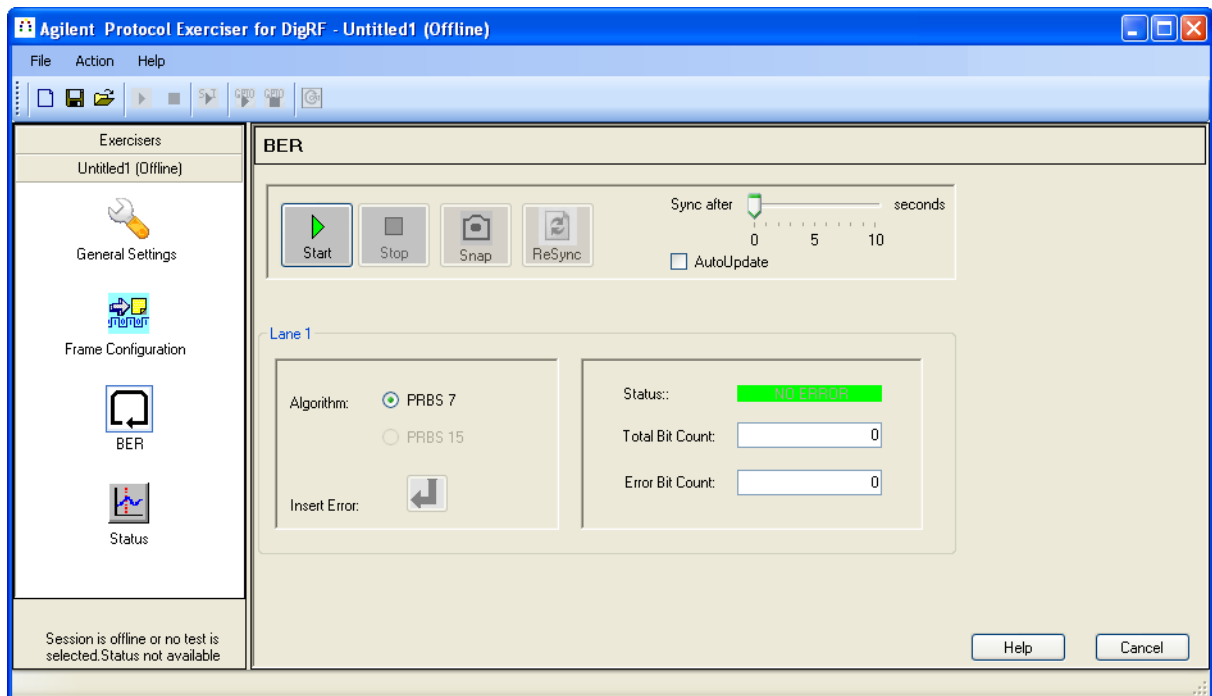


Figure 29 BER

The following table briefly describes the components of the Select type of connection dialog box.

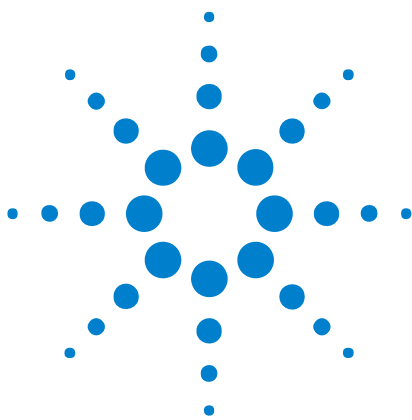
Table 9 Components of the BER screen

Component	Description
Start	Click Start to instruct the transmit side of the exerciser card to start sending bits to the receiver side of the exerciser card. Clicking Start also makes the following components, which are otherwise disabled, available for use: <ul style="list-style-type: none"> • Stop • Snap • ReSync • Insert Error
Stop	Click Stop to stop the transmit side of the exerciser card from sending bits to the receiver side of the exerciser card.
Snap	Click Snap to reflect the total number of bits and error bits, which are received by the receiver side of the exerciser card, in the Total Bit Count and Error Bit Count text boxes.
ReSync	Click ReSync to reset the transmit and receiver side of the exerciser card.
Sync After	The Sync After scroll bar enables you to specify after how many seconds (from 0 to 10) , you want to reset the transmit and receiver side of the exerciser card.
Auto Update	Select Auto Update to automatically updating the contents of the Total Bit Count and Error Bit Count text boxes. If Auto Update is not selected, then you have to click Snap whenever you want to update the total bits and error bits count in their respective text boxes.
Algorithm	The Algorithm section shows the algorithm used for bit transmission. At present, PRBS 7 is the default and only algorithm used for bit transmission.
Insert Error	Click Insert Error to insert an error bit in the transmission flowing from transmitter to receiver side of the exerciser card. Clicking Insert Error inserts an error bit in the transmission.
Status	The Status label shows one of the following two messages: NO ERROR ERROR OCCURRED
Total Bit Count	The Total Bit Count text box shows the total number of bits received. The contents of this text box are automatically updated if Auto Update is selected. Otherwise, you have to click Snap to update its contents.

Table 9 Components of the BER screen (continued)

Component	Description
Error Bit Count	The Error Bit Count text box shows the total number of error bits received. The contents of this text box are automatically updated if Auto Update is selected. Otherwise, you have to click Snap to update its contents.
Help	Click Help to display online help.

5 BER Functions



6 Status Functions

Errors Tab 68

Statistics Tab 70

GPIO Tab 72

This chapter provides information on the Status function of the Exerciser for DigRF application.

The Status function in the exerciser application shows the status of the protocol errors, hardware statistics, and GPIO status. In the Status function, this information is organized inside the following tabs.

- Errors
- Statistics
- GPIO

To access the Status function:

- Click **Status** in the Navigation pane.



Errors Tab

The Errors tab provides status messages, for example No Error or ERROR OCCURRED, on various DigRF protocol errors.

The following figure shows the Errors tab.

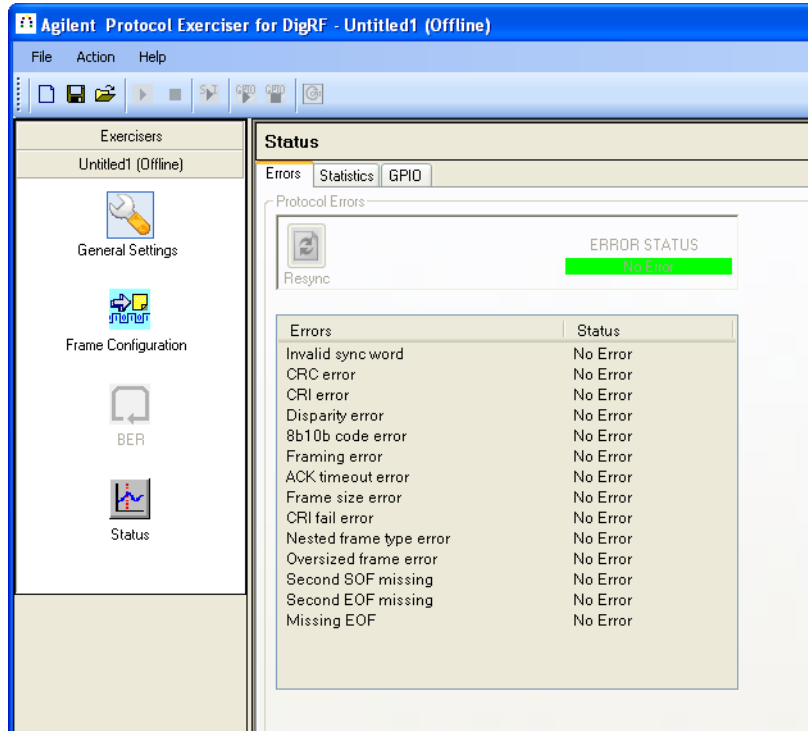


Figure 30 Errors tab

The following table briefly describes the components of the Errors tab.

Table 10 Components of the Errors tab

Component	Description
Resync	Click Resync to reset the count of all error bits.
ERROR STATUS	The ERROR STATUS label shows one of the following messages. <ul style="list-style-type: none"> • No Error: This message is displayed when not even no a single error has occurred in the transmission. • ERROR OCCURRED: This message is displayed even if a single error has occurred in the transmission.

Table 10 Components of the Errors tab (continued)

Component	Description
Errors	<p>The Errors column shows a list of following errors that you can insert using the Error Insertion function.</p> <ul style="list-style-type: none"> • Invalid sync word • CRC error • CRI error • Disparity error8b10b code error • Framing error • ACK timeout error • CRI fail error • Nested frame type error • Oversized frame error • Second SOF missing • Second EOF missing • Missing EOF
Status	<p>The Status column shows one of the following messages to reflect the status of its corresponding error listed in the Errors column.</p> <ul style="list-style-type: none"> • No Error • ERROR OCCURRED
Help	Click Help to display online help.

Statistics Tab

The Statistics tab provides the statistical information of the exerciser card, for example count of DLCs and CLCs sent and received.

The following figure shows the Statistics tab.

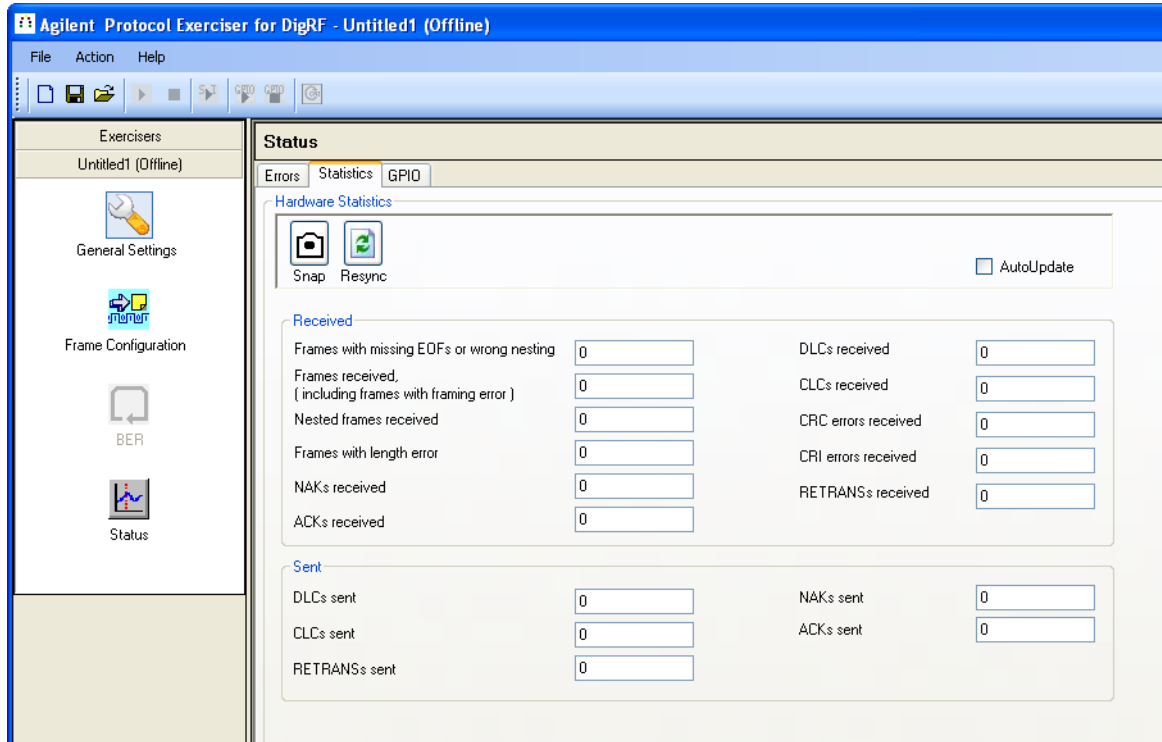


Figure 31 Statistics tab

The following table briefly describes the components of the Statistics tab.

Table 11 Components of the Statistics tab

Component	Description
Snap	Click Snap to refresh the current status of the hardware statistics.
ReSync	Click Resync to reset the count of all error bits.
Auto Update	Select Auto Update to automatically snap the hardware status after every 1 second. If Auto Update is not selected, then you have to click Snap whenever you want to update the status of the hardware statistics.

Table 11 Components of the Statistics tab (continued)

Component	Description
Frames with missing EOFs or wrong nesting	Displays the number of frames with missing EOFs or wrong nesting.
Frames received, (including frames with framing error)	Displays the number of received frames, including frames with framing error.
Nested frames received	Displays the number of nested frames received.
DLCs sent (for exerciser only)	Displays the number of DLCs sent by the exerciser.
CLCs sent (for exerciser only)	Displays the number of CLCs sent by the exerciser.
NAKs sent (for exerciser only)	Displays the number of NAKs sent by the exerciser.
ACKs sent (for exerciser only)	Displays the number of ACKs sent by the exerciser.
RETRANSs sent (for exerciser only)	Displays the number of RETRANSs sent by the exerciser.
DLCs received	Displays the number of DLCs received.
CLCs received	Displays the number of CLCs received.
CRC errors received	Displays the number of CRC errors received.
CRI errors received	Displays the number of CRI errors received.
NAKs received	Displays the number of NAKs received.
ACKs received	Displays the number of ACKs received.
RETRANS received	Displays the number of RETRANS received.
Frames with length error	Displays the number of frames with length error.
Help	Click Help to display online help.

GPIO Tab

The GPIO tab shows the output status of all the general-purpose input/output pins that you have selected in the Frame Configuration>GPIO>Pin Configuration tab.

The following figure shows the GPIO tab.

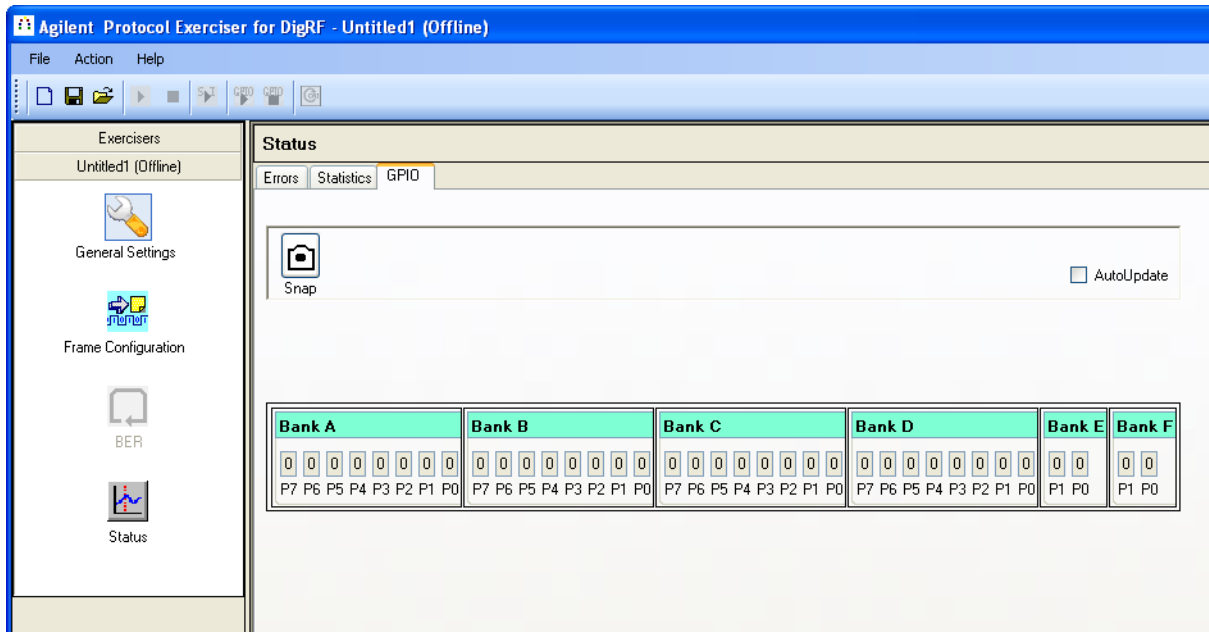


Figure 32 GPIO tab

The following table briefly describes the components of the GPIO tab.

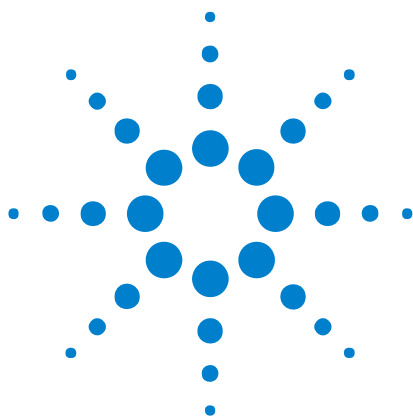
Table 12 Components of the GPIO tab

Component	Description
Snap	Click Snap to refresh the current status of the hardware.
Auto Update	Select Auto Update to automatically snap the hardware status after every 1 sec. If Auto Update is not selected, then you have to click Snap whenever you want to update the status of the hardware.
Bank A	Shows the most recent value (0 or 1) for Bank A pins.
Bank B	Shows the most recent value (0 or 1) for Bank B pins.
Bank C	Shows the most recent value (0 or 1) for Bank C pins.
Bank D	Shows the most recent value (0 or 1) for Bank D pins.

Table 12 Components of the GPIO tab (continued)

Component	Description
Bank E	Shows the most recent value (0 or 1) for Bank E pins.
Bank F	Shows the most recent value (0 or 1) for Bank F pins.
Help	Click Help to display online help.

6 Status Functions



Glossary

A

API Application programming interface.

B

BER Bit error rate.

C

CRI Cyclic Running Index.

D

DUT Device under test.

G

GPIO General-purpose input/output. Outputs can be used for things like the stimulus of proprietary interfaces. The N5343A exerciser module has 36 pins for general purpose input/output.

GUI Graphical user interface.



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