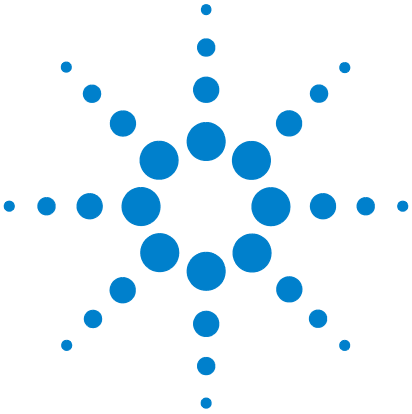

Agilent
OBSAI Protocol Tester

User's Guide

Agilent Technologies

Notices

Printing HIstory

Agilent Technologies, Inc. can issue revisions between the product releases to reflect the latest and correct information in the guide. Agilent Technologies, Inc. also reserves its right to not issue a new edition of the guide for every system release.

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Indicates that antistatic precautions should be taken.

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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.

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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.

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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

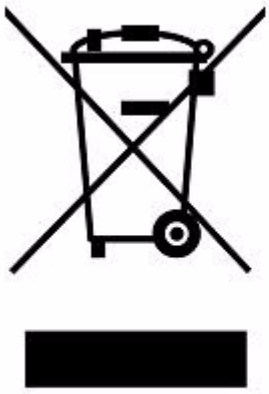
Do not operate the instrument in the presence of flammable gases or fumes.

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



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.

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About this document

Purpose

This document provides the information of Open Base Station Architecture Initiative (OBSAI) protocol tester.Every OBSAI system specification is in accordance with the Open Base Station Architecture Initiative rules and procedures.

Scope

The document defines the overall architecture and the interfaces involved in it. This provides a more detailed specifications and implementation of OBSAI protocol tester. OBSAI protocol tester has two interfaces: GUI and API. This document covers only the GUI aspect of the OBSAI protocol tester. For information on API, please refer to the online help.

Audience

The document defines the overall architecture and the interfaces involved in it.The intended audience of this document are Research and Development (R&D) professionals,trained personnels, integration and verification teams. Also, the production might be interested of using the OBSAI protocol tester.

Contents

1 Introduction

This chapter introduces you to the Open Base Station Architecture Initiative (OBSAI) protocol tester. It gives an overall information about the system. It includes, architecture information, scope and accessing and exiting of OBSAI protocol tester.

About OBSAI Protocol Tester

Agilent OBSAI protocol tester is an advanced verification system that allows you to generate and capture data traffic simultaneously. This physical layer data which you capture, you can view and analyze to identify problems. You can also find their root cause and troubleshoot them. This makes OBSAI protocol tester a very effective tool to control as well as speed up the testing.

A brief list of features of OBSAI is given below:

- Enables to verify traffic between Baseband Module (BBM) and Radio Frequency Module (RFM).
- Provides multiple active links.
- Enables flexibility to configure complete frames
- Enables multiple error insertion points to test designs in faulty conditions.
- Enables in quick analysis with the use of trigger conditions.
- Generates and captures data traffic which includes error insertion and detection simultaneously.
- Enables to perform root cause and performance analysis.
- The OBSAI protocol tester is compliant to Reference Point 3 specification (RP3) version 4.0, and Reference Point 1 specification (RP1) version 2.0.
- Provides a stable and reliable system in order to execute verification without debugging the test equipment.
- The test equipment supports the following OBSAI interfaces RP1, RP3 and RP3-01 (optical).

OBSAI Architecture Overview

The OBSAI family of specifications provides the architecture, function descriptions and minimum requirements for the integration of a set of common modules into a Base Transceiver Station (BTS). As a minimum, the BTS has the capability to be configured from a set of common modules in order to support more than one current or future wireless network access standards. Internal interfaces between BTS functional blocks designated as Reference Point 1 (RP1), Reference Point 3 (RP3).

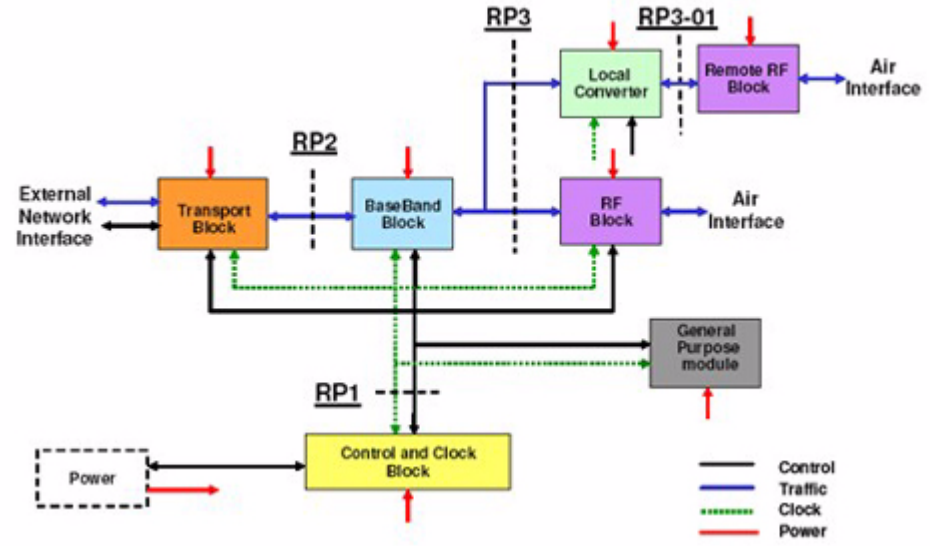


Figure 1 OBSAI Architecture

In Figure 1, each block represents a logical separation of BTS functions in protocol processing. A block represents a logical grouping of a set of functions and attributes. A block may consist of one or more modules, each of which represents a physical implementation of a subset of the block functions.

Reference Point Functions

Reference Points are the connectivities between RF and Baseband modules of a base station:

- Reference Point 1(RP1)
- Reference Point 3(RP3)

Reference Point 1(RP1)

RP1 interchanges control, performance, status, alarm and data provision between the Control and Clock Block and other BTS blocks with the protocol specified in the OBSAI RP1 specification. RP1 also defines an open, standardized interface for exchange of clock and synchronization signals that meet the timing, frequency stability, phase noise and jitter constraints of supported air interfaces. The interface employs a common clock rate for generation of system clock signals for all blocks and modules within each block.

Reference Point 3(RP3)

RP3 interchanges, formatted air interface user and signalling data user between the BaseBand Block and the Remote RF Block.

Scope of OBSAI Tester

The scope of OBSAI protocol tester is to test and debug the RP3 and RP3-01 interfaces for HW and ASIC designs used in R&D. Presently, it only tests the functionality till the link layer. It is used to verify that the OBSAI interfaces of the products are working according to OBSAI standard specification. These designs requires the following:

- Transmitting RP3 and RP3-01 data to the Device Under Test (DUT). It includes, good data and error frames.
- Receiving and analyzing RP3 and RP3-01 data from the DUT. It includes frame structure checking, and uploading the data to a computer for post processing
- Sending and receiving of control messages

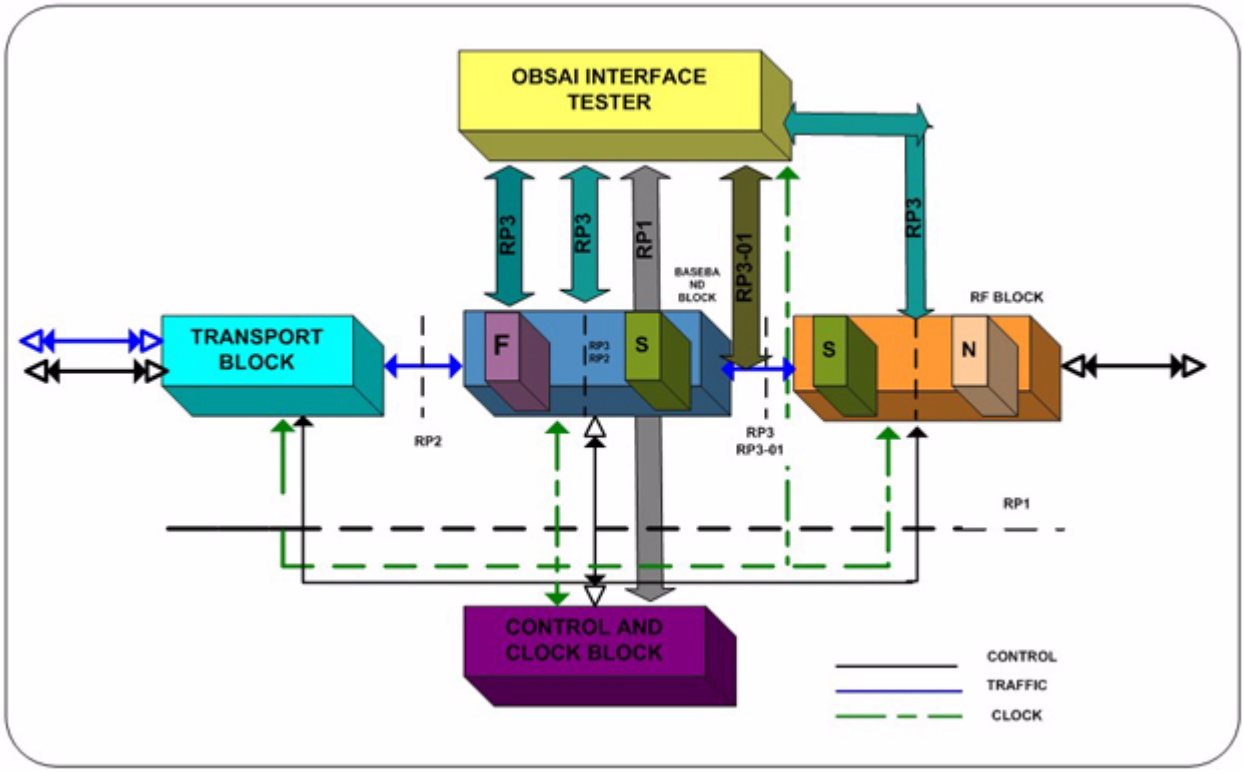


Figure 2 Scope of OBSAI Protocol Tester

Baseband Emulation to Validate RF Module

OBSAI protocol tester is emulating the RF module. In case of missing Clock and Control module, it provides the RP1 synchronization interface.

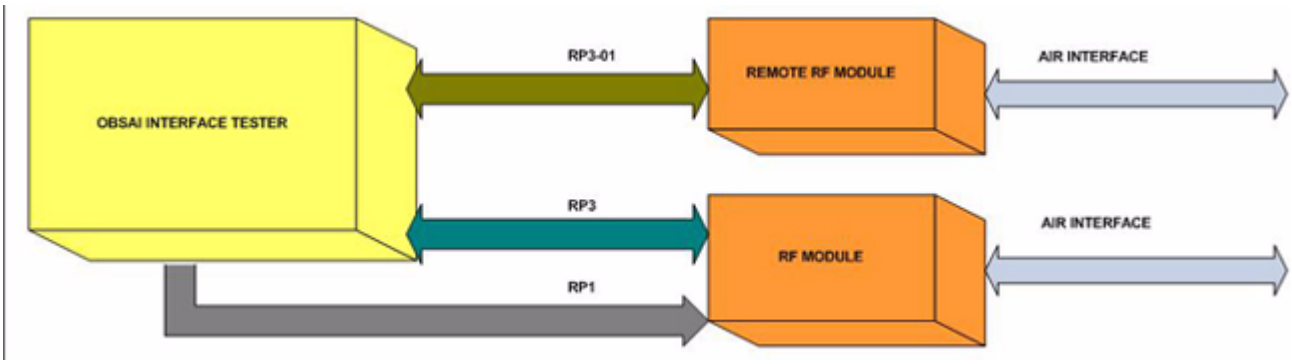


Figure 3 RF Module Testing

RF Emulation to Validate the Baseband Module

OBSAI protocol tester is emulating the Baseband module. In case of missing Clock and Control module, it provides the RP1 synchronization interface.

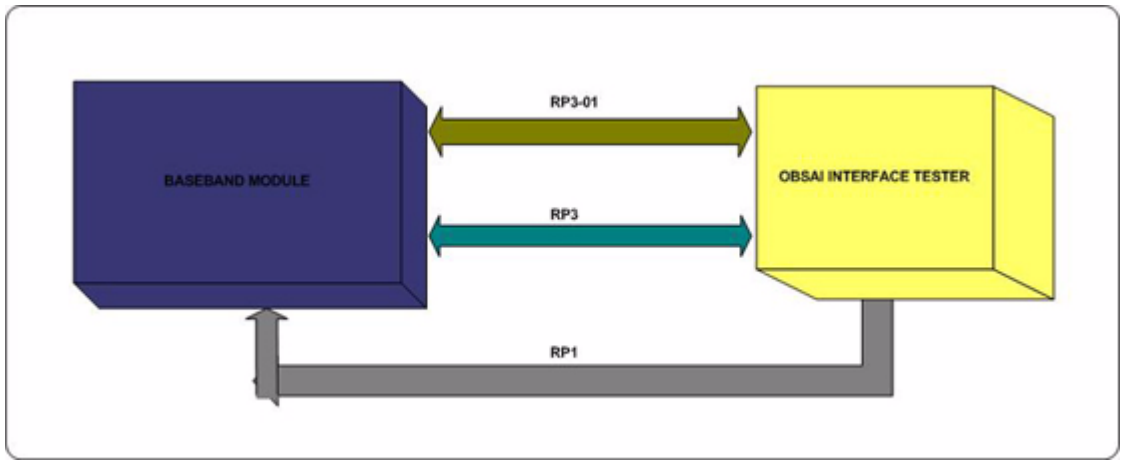


Figure 4 Baseband Module Testing

System Testing

OBSAI protocol tester provides traffic on RP3 and RP3-01 interface between RF module and Baseband module. As an interconnect:

- Dedicates connector board between edge connectors of modules
- Probe interface e.g. retainer

In case of missing Clock and Control module, it provides the RP1 synchronization interface.

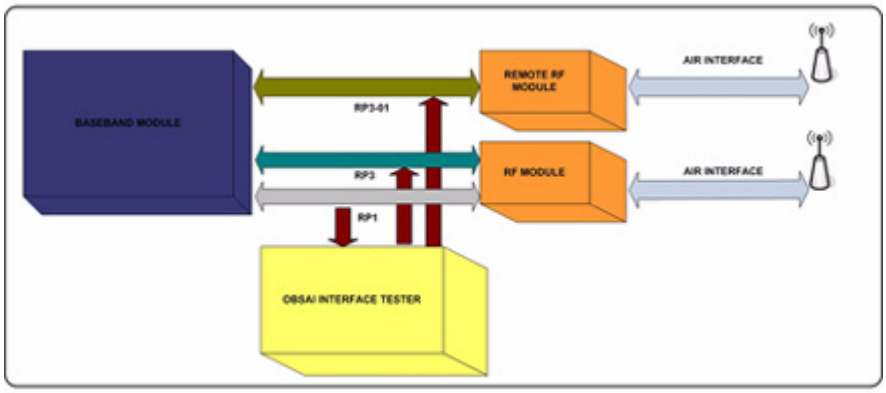


Figure 5 System Testing

In conclusion, OBSAI protocol tester is data link tester for RP3, RP3-01, RP1, and eth interface. It can also emulate Baseband, RF module, Remote RF module, and/or Control and Clock module (CCM).

Session Concept

Communication between the controller PC and the serial I/O modules is based on the concepts of sessions. A session is a representation of the instrument components involved in a test:

- The control software running on the controller PC
- The serial I/O module involved in the test

The following figure indicates the components involved in a session. It also indicates how more than one client can log onto one session.

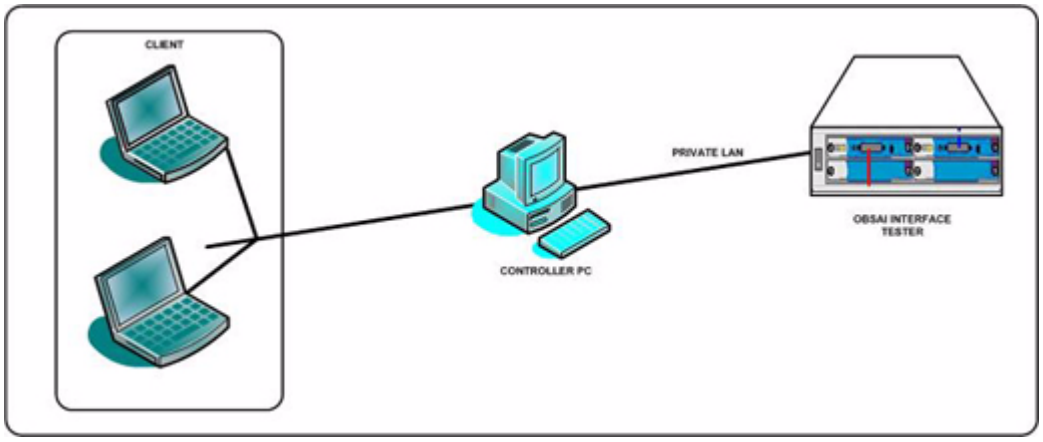


Figure 6 Session Concept

To use a session, it is necessary to:

- **Start and configure the session**: This is when you establishes communication between the client and the control PC.
- **End the session**: This is when you quit using a session and the last one using the session, you are prompted as to whether the session should be ended. Ending a session clears the Serial I/O Module, allowing it to be used for a new session.

All accesses to the test system must go over the session. The session is not locked, but concurrent access to one session is possible.

Using a Session at Several Computers

If a session is up and running, you can use it from multiple instances of the user interface (for example, from different clients) or from tcl scripts. This is helpful if you want to set up a test system directly at the controller PC and then run a series of tests from your PC.

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

To connect to a current session in the user interface, you need to note the session number and then select this session when the software starts.

Accessing and Exiting Protocol Exerciser for OBSAI

This chapter introduces you the method of accessing the Protocol Exerciser for OBSAI protocol tester application. And the various GUI components of the Protocol Exerciser for OBSAI application.

Accessing Protocol Exerciser

Before you get started with Protocol Exerciser for OBSAI, you need to know how to access it. Accessing Protocol Exerciser for OBSAI requires you to specify whether you want to connect to a new or an existing session, and the name of the server where you want to start the session.

If a new session is requested, the following occurs:

1. You can add a serial I/O module and its port to the session.
2. The serial I/O module downloads the necessary FPGA and embedded software from the control PC.

To specify all required inputs, Protocol Exerciser provides two dialog boxes: Select type of session and Port Selection to use.

The Select type of session opens up as shown in Figure 7.

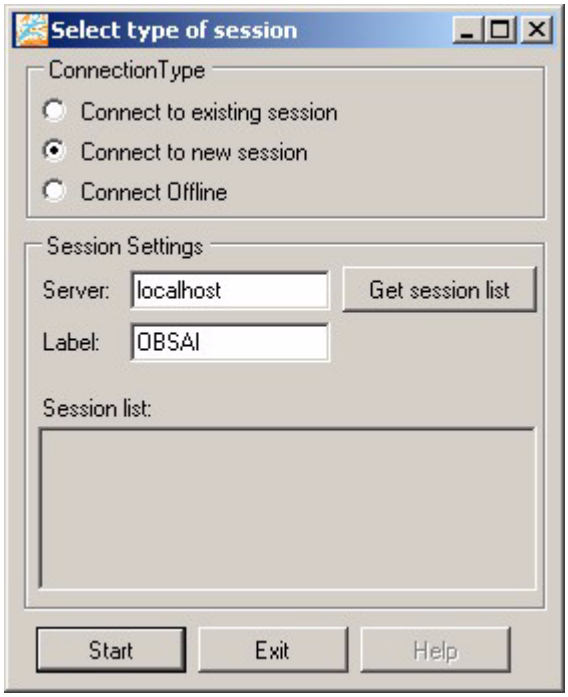


Figure 7 Select type of session screen

Table 1 briefly describes the **components of the Select type of session dialog box**.

Table 1 Components of the Select type of session dialog box.

Component	Description
Connect to existing session	Select **Connect to existing session** if you want to use an existing session of Protocol Exerciser for OBSAI on a known server.
Connect to new session	Select **Connect to new session** if you want to create a new Protocol Exerciser for OBSAI session on a known server.
Connect Offline	Select **Connect Offline** if you want to work in off-line mode. Working in off-line mode does not connect you to the hardware.
Server	Specifies the name or IP address of the server, where you want to start a new or join an existing Protocol Exerciser session. Its default value is **localhost**. Also, this text field is disabled if you have selected the **Connect Offline** option.
Label	Provide a **label** to the connecting session, if desired
Session list	Displays a list of sessions existing on the server you specified in the **Server** text field.
Start	Click **Start** to log on to the Protocol Exerciser for OBSAI application
Exit	Click **Exit** to close the dialog box without starting the Protocol Exerciser application.
Help	Click **Help** to display the online help

The Port Selection screen opens up as shown in Figure 8.

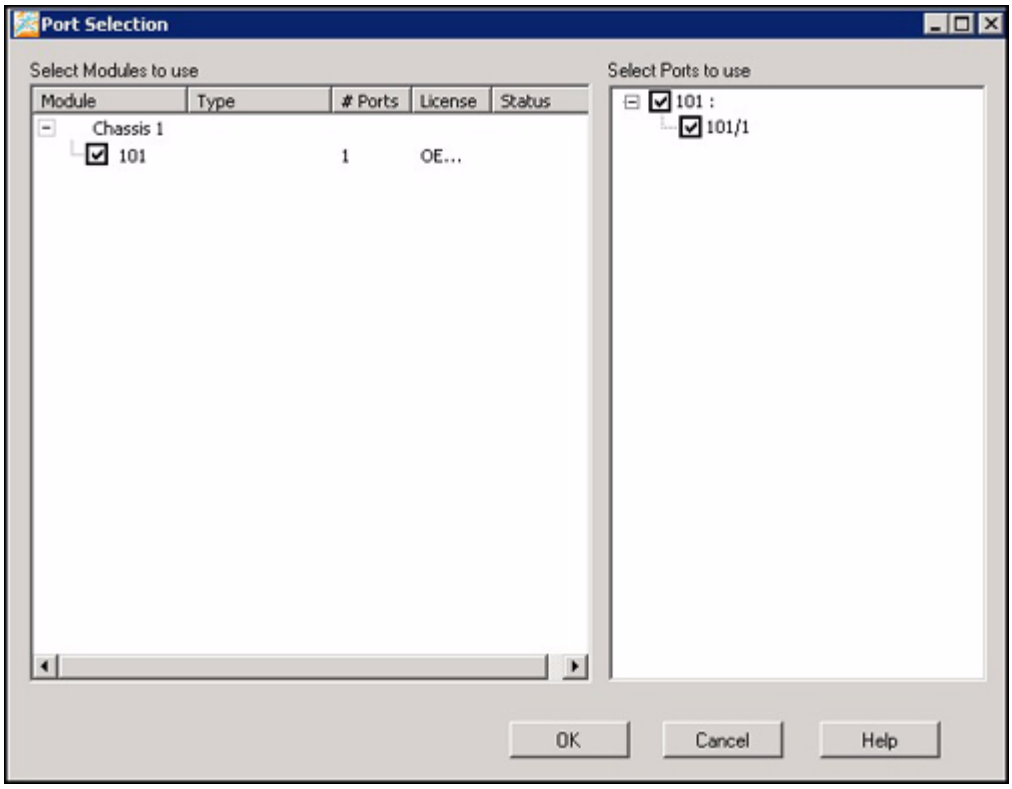


Figure 8 Port Selection screen

Table 2 briefly describes the components of the Port Selection screen.

Table 2 Components of the Port Selection screen

Component	Description
Module	Provides a list of attached modules.
Type	Provides the type of port of each module.
# Ports	Displays the number of ports of each module.
Licence	Displays the licence details of each module.
Status	Displays the current state of the module, e.g., ready, rebooting, or in use by session.
Select Ports to use	Displays a check box list of ports of the modules. Here, select a port to start a new session.
OK	Click **OK** to start an instance of Protocol Exerciser for OBSAI on the selected port.
Cancel	Click **Cancel** to close the Port Selection dialog box without selecting any port.
Help	Click **Help** to display the online help

To start an session from a client:

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

The **Select type of session** appears.

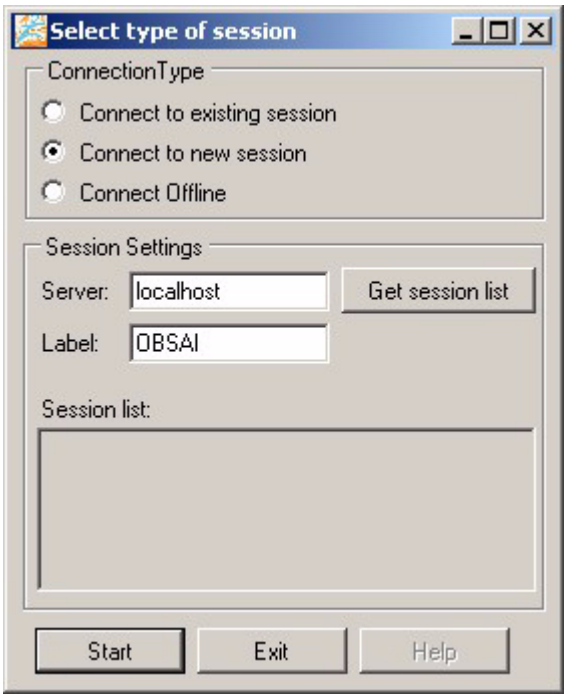


Figure 9 Select type of session screen

2 Do one of the following:

- **a** Click **Connect to existing session** to use an existing session.
- **b** Click **Connect to new session** to start a new session.
- **c** Click **Connect Offline** to access Protocol Exerciser without connecting to the hardware.

3 Type in the name or IP address of the server, where you want to start a new or join an existing session, in the **Server** text field.

4 If you are trying to use an existing Protocol Exerciser session, do the following:

- **a** Click **session list**. A list of sessions currently running on the server specified in the Server text field is displayed in Session list.
- **b** Select the required session from Session list.
- **c** Click **Start**. The main Protocol Exerciser for OBSAI window appears.

5 If you are trying to create a new Protocol Exerciser for OBSAI session, do the following:

a Enter the network name of the controller PC in the **Server** text field. So, that it can communicate with the controller PC.

b Provide a **label** to the connecting session, if desired.

c Click **Start**. The Port Selection dialog box appears.

d Select a module name from the **Select Modules to use** pane.

e Select a port check box of the module from the **Select Ports to use** pane.

f Click **OK**. The main Protocol Exerciser window appears.

NOTE You can also connect to the OBSAI session, on clicking  from the Logic Analyzer GUI.

Exiting Protocol Exerciser for OBSAI

You can exit from the Protocol Exerciser application by closing the current sessions and the Protocol Exerciser for OBSAI window.

To exit Protocol Exerciser for OBSAI:

1 Click **File > Exit**.

The **Closing Session** dialog box appears. (Figure 10).

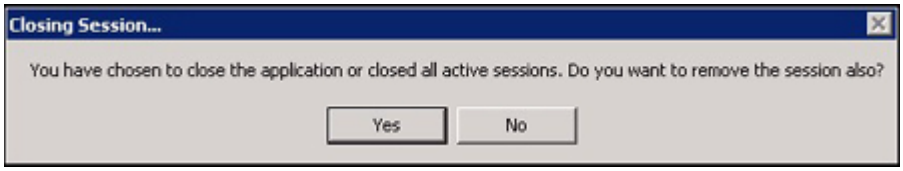


Figure 10 Closing Session dialog box

2 Do one of the following:

a Click **Yes**. This closes the Protocol Exerciser for OBSAI window and also removes the associated session.

b Click **No**. This closes the Protocol Exerciser window without removing its associated session.

2 Getting Started

The Protocol Exerciser for OBSAI allows you to generate and respond to all types of OBSAI transactions. In addition, it allows you to create various OBSAI protocol variations and violations.

Another key feature is the ability to insert errors and test the behavior of device in response to these errors. Errors can be generated and inserted on the physical and data link. It is used to debug a device.

About Protocol Exerciser Components

Protocol Exerciser provides various components, that can be accessed.

Figure 11 displays the Protocol Exerciser application screen with its main components.

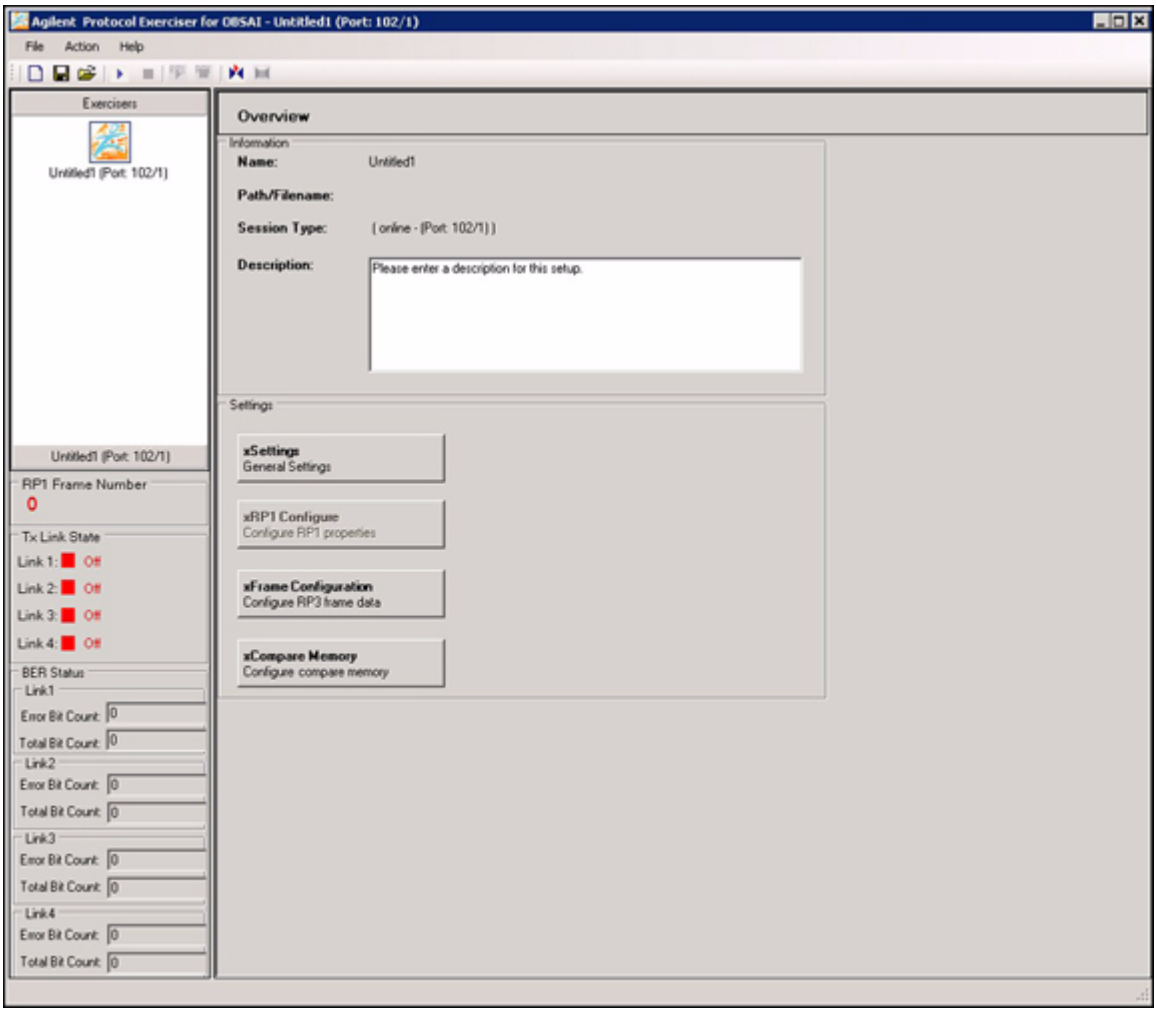


Figure 11 Protocol Exerciser Application screen

This section covers the following topics:

- Using the Menu Bar
- Using the Toolbar
- Using the Panes

Using the Menu Bar

The Menu Bar is one way to access the functionality of the application. In Protocol Exerciser, menu bar provides the following menus:

- File menu
- Edit menu
- View menu
- Action menu
- Help menu

File menu

Table 3 briefly describes the File menu commands.

Table 3 File Menu Commands

Menu commands	Description
New	Displays the Port Selection screen to select a new port.
Open	Displays the Open dialog box, that enables you to open the saved configuration file.
Save	Displays the Save dialog box that enables you to save the configuration file. If you are saving it for the first time, then this menu command saves the information at the default location. Otherwise, this menu command saves it on the last saved location.
Save As	Displays the Save As dialog box that enables you to specify the desired location to save the file.
Close	Closes the selected session.
Exit	Closes the Protocol Exerciser application.

Action menu

Table 4 briefly describes the Action menu commands.

Table 4 Action Menu Commands

Menu commands	Descriptions
Run	Starts sending RP3/RP3-01 frames.
Stop	Stops sending frames.
Run RP1	Starts sending RP1 syncburst information.

Table 4 Action Menu Commands

Menu commands	Descriptions
Stop RP1	Stops sending RP1 syncburst information.
Start Memory Compare	Starts comparison of incoming RP3/RP3-01 frame with the configured compare memory frames.
Stop Memory Compare	Stops comparison of incoming RP3/RP3-01 frame.

Help Menu

Table 5 briefly describes the Help menu commands.

Table 5 Help Menu Commands

Menu commands	Descriptions
Online Help	Displays the online help for Protocol Exerciser.
Version Information	Displays the version information of the Protocol Exerciser application.
About	Displays information about the OBSAI Link Interface Tester platform.

Using the Toolbar

Toolbar provides a quick access to the features of the Protocol Exerciser application.

Table 6 specifies the names of all toolbar icons.

Table 6 Toolbar icons

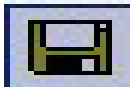
Icon	Name
	New
	Save
	Open

Table 6 Toolbar icons

Icon	Name
	Start RP3/RP3-01 Transmission.
	Stop RP3/RP3-01 Transmission.
	Run RP1 Transmission.
	Stop RP1 Transmission.
	Start Memory Compare.
	Stop Memory Compare.

Using the Panes

Protocol Exerciser provides the following panes:

- Navigation
- Hardware Status

Navigation

The Navigation pane further provides the following panes:

- **Exerciser**: This pane enables you to navigate between multiple setup files.
- **<Setup_Filename>**: Setup_Filename refers to the name of the setup file. This Overview pane provides options to use Protocol Exerciser for your test application.

  Click **<Setup_Filename>** under **Exerciser** to view the **Overview** screen on the right pane (Figure 11).

  Table 7 briefly describes the Overview screen.

Table 7 Overview Screen

Component	Description
Name	Provide the desired name of the setup.
Pathname/Filename	Provides the pathname or filename of the setup where it is saved.
Session Type	Informs the current type of session. For e.g.: Existing session, new session, or Offline.
Description	Provide description of the setup, if desired.
x Settings General Settings	Click to display the General Settings screen.
x RP1 Configure Configure RP1 properties	Click to display the RP1 Configuration screen.
x Frame Configuration Configure RP3 frame data	Click to display the RP3 Frame Setup screen.
x Compare Memory Configure Compare Memory	Click to display the Compare Memory screen.

Hardware Status

The Hardware Status pane has the following tabs:

- RP1 Frame Number: This displays the RP1 frame number.
- TxLink Status: This tab provides the status information of the link width, link state.
- BER Status: This tab provides the status information of the bit error ratio for each link.

General Settings

Tx Settings

It defines the transmit side of the RP3 interface. For Base Station Extension Test module, there are four number of electrical links supported. And for Base Station Link Test Module, there is only one optical link and one electrical link.

To display the General Settings screen:

- Click **xSettings** General Settings tab provided in the **Settings** group.

  The **General Settings** screen appears (Figure 12).

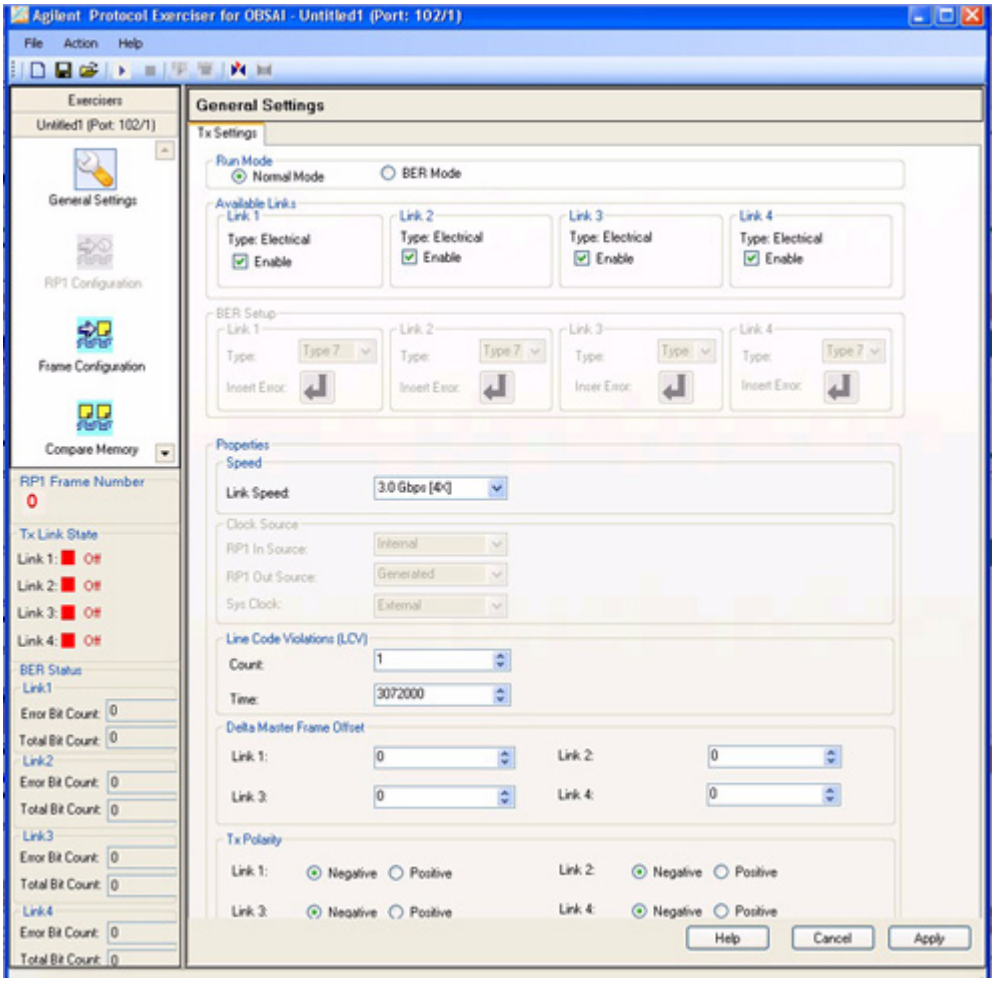


Figure 12 General Settings screen

Table 8 briefly describes the **General Settings** screen.

Table 8 General Settings screen

Component	Description
Run Mode	The **Run Mode** section provides the following components: • **Normal Mode**: The pattern of settings that runs by default. • **BER Mode**: The pattern of settings that runs in Bit Error Ratio.
Available Links	The following are the available links: • **Link 1 to Link 4**: These links may be either electrical or optical. Base Station Link Test Module has two links, electrical and optical. Base Station Extension Test module has four electrical links. • **BER Setup**: The transmitter operates with Bit error ratio of better than 1*10-15 in the presence of input signal.There are four links to enable more than one bit error. Select the desired Pseudo Random Binary Sequence (PRSBS) type to continue. The links gets enabled when the BER mode is selected.

Table 8 General Settings screen

Component	Description
Properties	• **Speed**: The speed of the link can be either 0.7 Gbps [1X], 1.5 Gbps [2X], 3.0 Gbps [4X]. • **Clock Source**: RP1 Insource can be either External, Internal, or RP3-01. It can be either Generated,or RP3-01 for RP1 Outsource. And the Sys Clock can be External, Internal or RP3-01. • **Line Code Violations**: Physical layer, the 8b10b decoder, detects invalid line codes from the incoming serial bit stream. Each Line Code Violation (LCV) erroneously received byte is indicated to data link layer.It also transmits K30.7 character to the link when data layer link indicates that the byte to be transmitted contains an error. • **Delta Master Frame Offset**: Offset values of delta can be configured for each link before enabling the Tx. These values are specified in 4 byte clock ticks. • **Polarity**: Select the Polarity of the links as positive or negative.

RP1 Configuration

The Exerciser is capable of acting as a CCM which can transmit sync burst, and it can extract the RP1 information either from the RP3-01 interface or the RP1 interface. Sync burst is checked for correct CRC and expected frame type. Further, it extracts the frame number and compares it with the range of framenumber that can be stored in trigger storage. This RP1 configuration is not enabled in case of Base Station Extension Test Module.

An interleaved sequence of frame bursts can be defined of upto four different burst that transmits repetitively.

To configure RP1:

- Click **RP1 configuration** icon under **<Setup_Filename>**.

  The **RP1 Configuration** screen opens up as shown in the Figure 13.

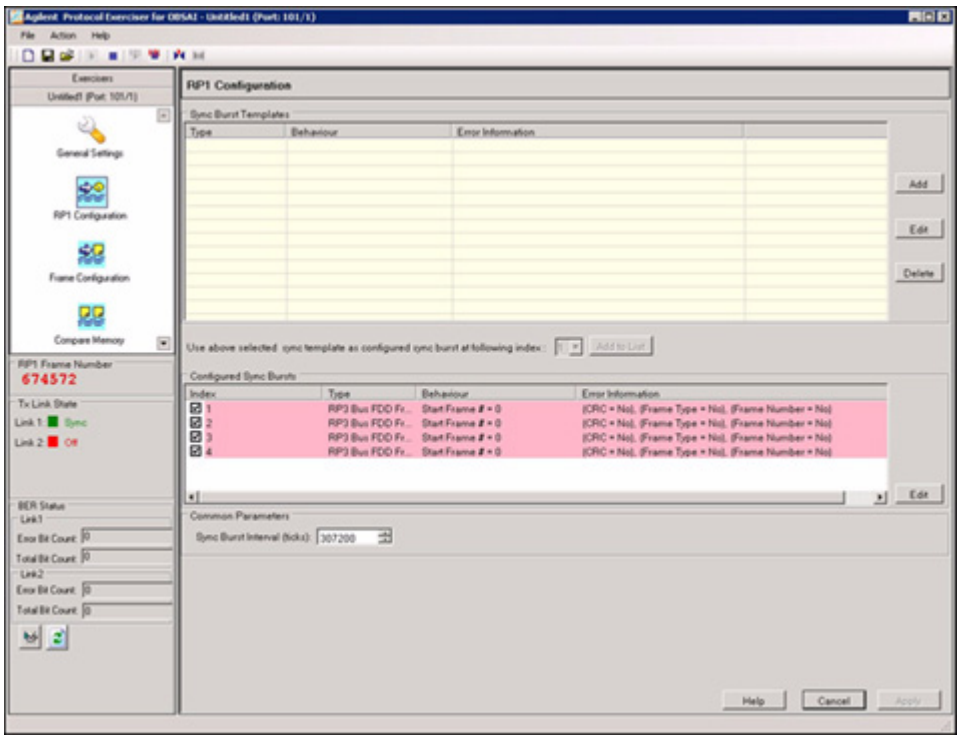


Figure 13 RP1 Configuration screen

Table 13 briefly describes the **RP1 Configuration** screen.

Table 9 RP1 Configuration screen

Component	Description
Sync Burst Templates	It includes: • **Type**: The expected type of frame used in RP1. • **Behaviour**: To specify the RP1 behaviour. For example: Startframenumber. • **Error Information**: It consists of the incorrect Cyclic Redundancy Check (CRC), unexpected type of frame and incorrect frame number
Configured Sync Bursts	It includes: • **Index**: It determines the index number. • **Type**: The expected type of frame used in RP1. • **Behavior**: To specify the RP1 behaviour. For example: Startframenumber. • **Error Information**: It consists of the incorrect Cyclic Redundancy Check (CRC), unexpected type of frame and incorrect frame number
Common parameters	It includes: • **Sync Burst Interval**: It transmits the RP1 frames. This property is common for all the frame type indexes. Time between the burst is in ticks

Sync Configuration Editor

The steps to edit a configured sync burst are as follows:

1 Select the **sync burst** that needs to be updated and click the check box to enable.

2 Click **Edit**.

The Sync Configuration Editor screen appears (Figure 14).

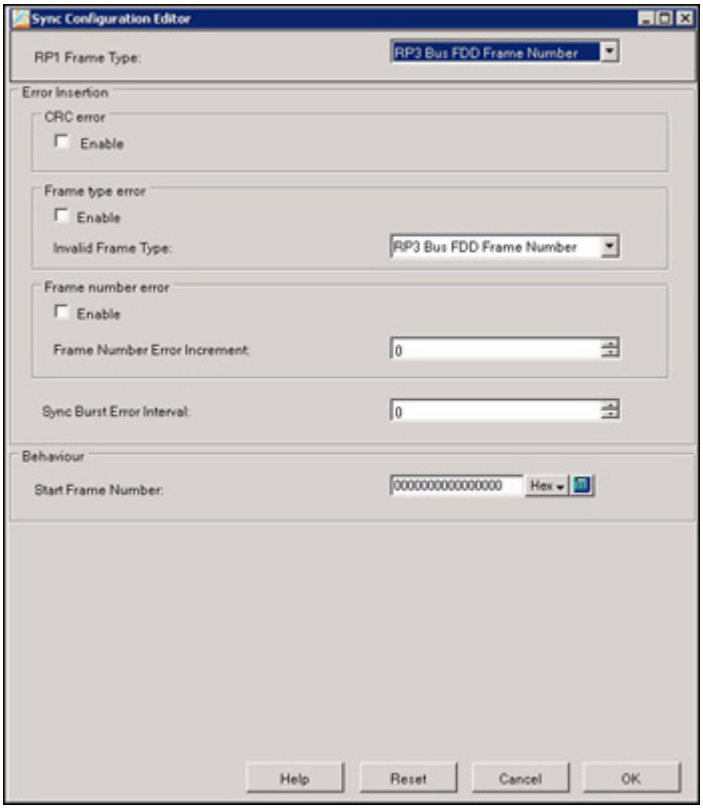


Figure 14 Sync Configuration Editor screen

Table 10 briefly describes the **Sync Configuration Editor** screen

Table 10 Sync Configuration Editor Screen

Component	Description
RP1 Frame Type	Types of RP1 frames.
CRC Error	Enable to insert an incorrect CRC. Sync burst checks for incorrect CRC in case no trigger occurs.
Frame type error	Enable to set RP1 Frame type to be sent in case of error.
Frame number error	Enable the value to be used to increment the RP1 frame number, in case of error. Frame number is an 64 bit unsigned integer value that is incremented automatically by 1 with every frame.

Table 10 Sync Configuration Editor Screen

Component	Description
Sync Burst Error Interval	Count of sync burst after which errored RP1 is to be sent.
Start Frame Number	Specify the start frame number for RP1. This number will be incremented by 1 on each sync burst, if no error.

3 Click **OK**.

The steps to add or delete a configured sync bursts are as follows:

1 Click **Add.**

The **Sync Configuration Editor** screen opens up. For details, refer Figure 14. The added sync burst appears under **Sync Burst Templates.**

2 Click **Delete** to remove a Configured Sync Burst from the screen.

Frame Configuration

Frame configuration is used to configure transmit side frames into the FGPA. The frames are encoded which is in the application format and program it into the FPGA buffers in the FPGA format.

It consists of two panes:

- RP3 Frame Setup
- Configuration

To configure frames:

1 Click **Frame configuration** icon under **<Setup_Filename>**.

The **RP3 Frame Setup** screen appears (Figure 15).

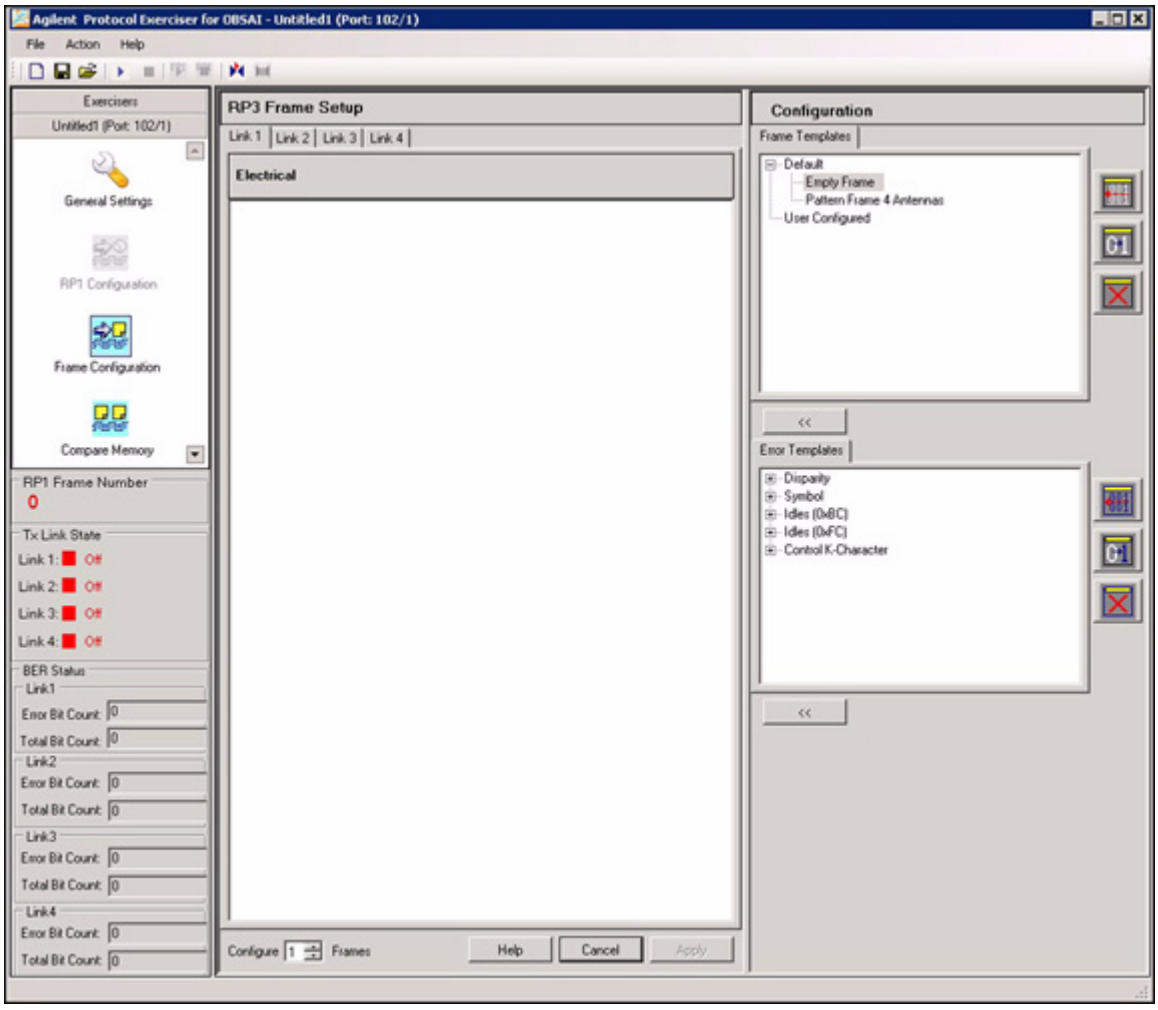


Figure 15 RP3 Frame Setup screen

RP3 Frame Setup

It consists of four electrical links for Base Station Extension Test module and two links for Base Station Link Test module, one electrical and one optical. You can configure frames between 0 to 15, wherein 0 is by default. If there is no frames to be send, then transmit empty messages.

Configuration

The configuration pane consists of:

- Frame Templates
- Error Templates

Frame Templates

It includes **Default** like **Empty frames** and **Pattern frames 4 antennas**.

User Configured

The steps to configure a frame are as follows:

1 Select **User Configured**.

2 Click 

.

The Frame Configuration screen appears.(Figure 16).

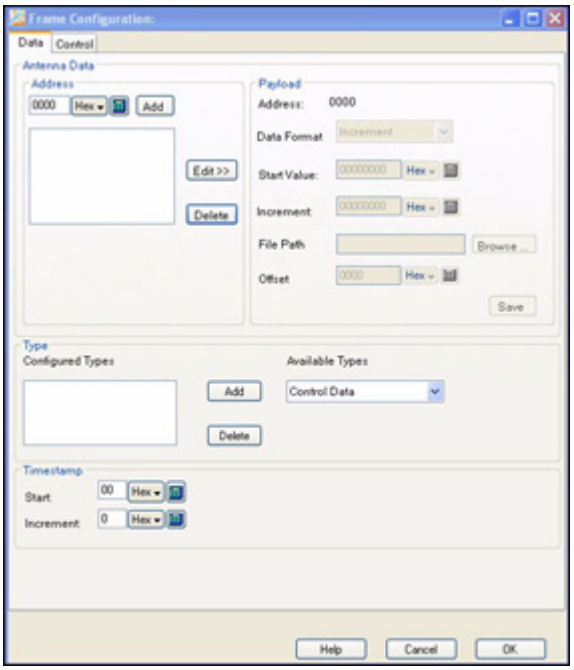


Figure 16 Frame Configuration Data screen

3 Click **Data**.

This allows you to provide the **Antenna Data**.

a **Address** field: The **Address** controls the routing of each message. In downlink direction, from baseband to RF, all message transfers are point to point, and the address identifies the target node.

Address '00000000xxxxx', where 'x' stands for either '0' or '1' bit, is reserved for initial booting of the bus network. Thus, node address '00000000' is used only as default boot up address. It cannot be assigned permanently to any node.

Address 1FFFh is reserved for the empty message. Therefore, physical layer deletes all received messages with an all-ones address. However, addresses 1FE0h-1FFEh can be used, that is FFh node address is valid.

b **Payload** field: The **Payload** represents the content of the message with the type field. It defines the details of the selected address of the Antenna Data. The

payload size is fixed at 16 bytes. It is the responsibility of the application layer to map data to the payload.

c **Types** field: Application layer is responsible for defining the type of the message. The **Type** field identifies the content of the payload data.

d **Timestamp** field: The timestamp field relates the payload data to a specific time instant.

4 Click **Control**.

This allows you to provide the **Header Data** as shown in the Figure 17.

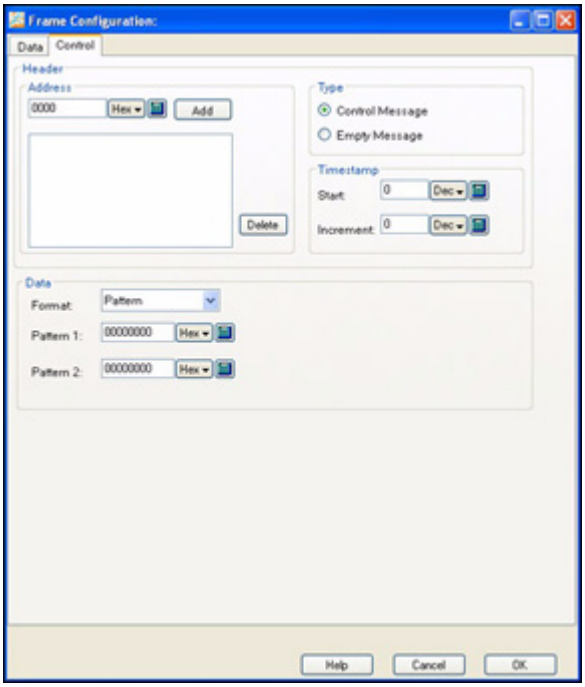


Figure 17 Frame Configuration Control screen

a Click **Add** to specify a address in the **Address** field.

b Select **Type** as **Control Message** or **Empty Message**.

c Specify a **Start** value and a **Increment** value, if desired in the **Timestamp** field.

d Select the **Data** format as **Pattern** or **Increment.**

e Click **Ok**.

Table 11 briefly describes the frame template icons.

Table 11 Frame Template icons

Icons	Descriptions
	On clicking, the **Frame Configuration** screen pops up, wherein the frames needs to be configured by providing the **Data** and **Control** information.
	On clicking, it edits or updates the configured frames.
	Deletes the selected configured frames.

Error Templates

An error can be generated by configuring the error bits in the user message structure. It consists of the following:

a **Disparity Error**: For generating disparity error on nth byte of message.

b **Symbol Error**: For generating symbol error on nth byte of message.

c **Idles BC**: It represents the misplaced message delimiter

d **Idles FC**: It represents the misplaced frame delimiter.

e **Control K- character**: It represents the control symbol error.

Table 12 briefly describes the error template icons.

Table 12 Error Template icons

Icon	Description
	Changes the behaviour of a particular error by selecting an error template from the template tree.
	Edits the selected error from the error template.
	Deletes the selected error.

Behaviour Template:

Select the desired error to change the behaviour such as message number and byte number. It consists of two panes that is **Location Parameters** and **Repeat Parameters**.

1 Select the check box to **Insert disparity error at delimiter.**

2 Select the desired **Message Group Number** under **Location Parameters.**

3 Select the **Message Number** at desired **location**.

4 Select the **Byte Number** at desired **location.**

5 **Quick Select/Deselect** the following:

- Click **Header** to select or deselect the first 3 (for e.g.: 0,1,2) **Byte Number**.
- Click **Payload** to select or deselect the remaining 16 bytes.

6 Specify **Repeat Interval** and the **Repeat Count** to repeat the error after the specified message group as shown in the Figure 18.

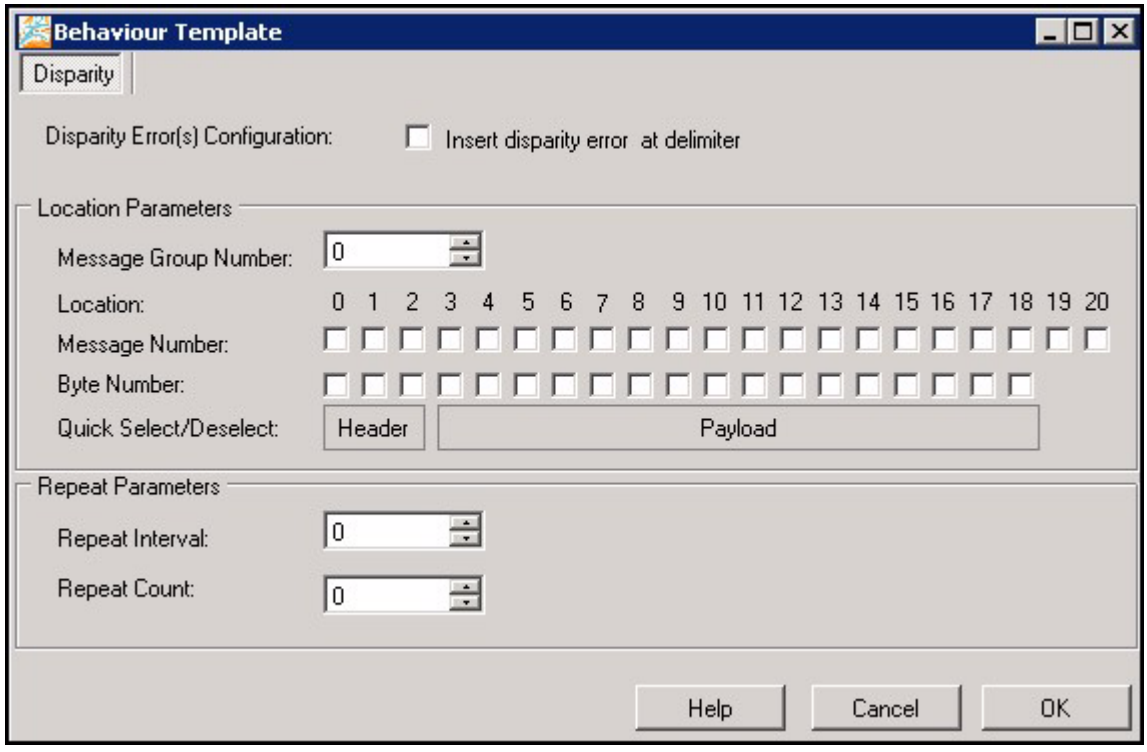


Figure 18 Behaviour Template

Compare Memory

The start comparison is determined by a defined frame number derived from RP1 sync interface. It can be initiated in two ways:

- Frame numbers through RP1: When the frame number is detected, comparison starts and compares first incoming frame with the first reference frame, second incoming frame with the second reference frame and so on. After the last reference frame used, it automatically continuous with the first reference frame. The incoming frames are compared to the reference frames saved in memory check on several kinds of error conditions.
- Manually: The comparison can be started manually through the toolbar.

To start Compare Memory:

- Click **Compare Memory** icon under **<Setup_Filename>**.

  The Compare Memory screen opens up as shown in the Figure 19.

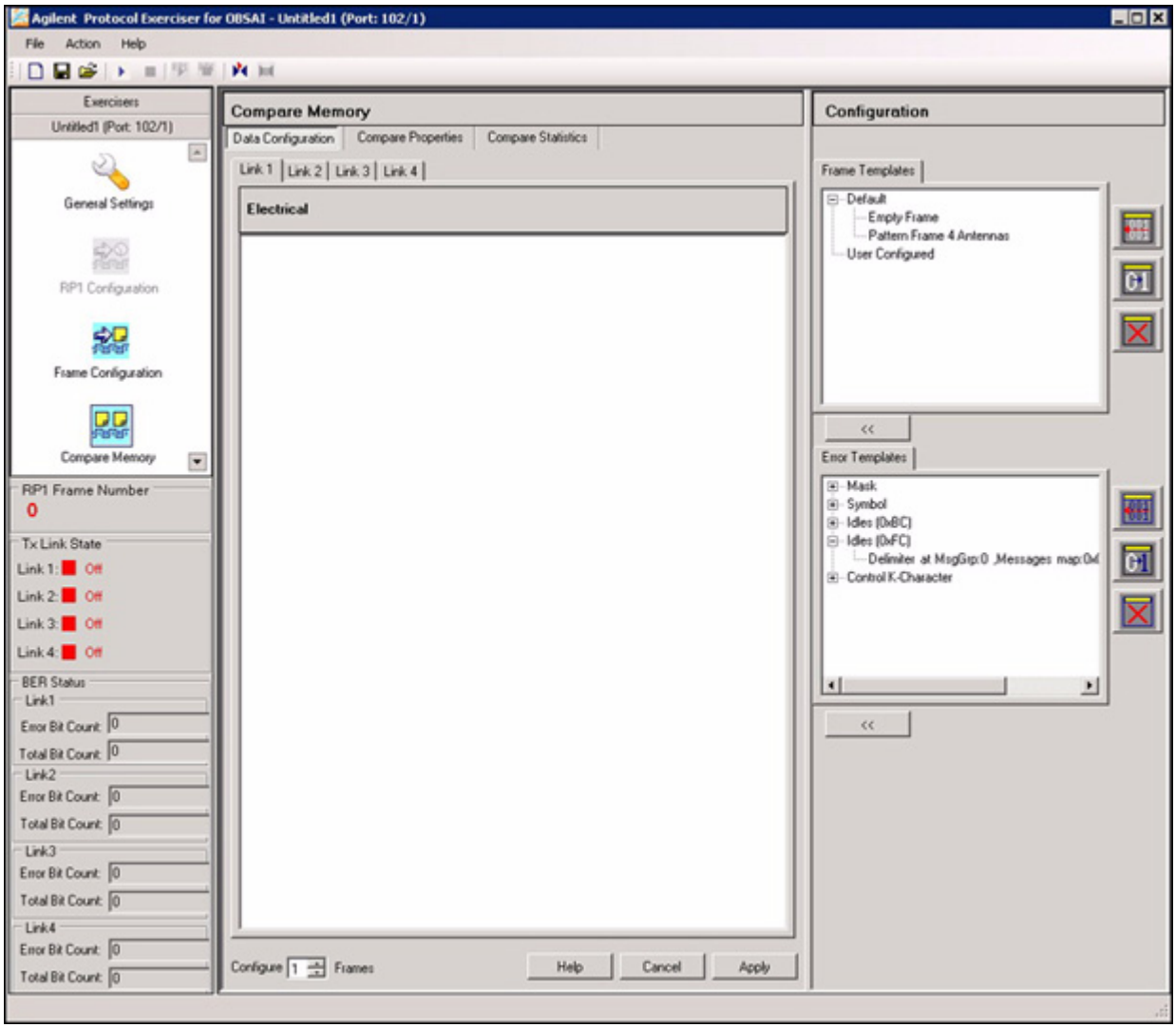


Figure 19 Compare Memory screen

Data Configuration

You can configure the frames to be compared on the links as desired. You can also insert errors or mask certain bytes from comparison as desired.

To configure data:

- Click **Data Configuration**.

  The **Data Configuration** screen opens up. Refer Figure 19.

For details, refer Configuration 39.

Compare Properties

It includes the start and stop compare parameters on RP1 frame type and frame number.

The **Compare Properties** screen opens up as shown in the Figure 20.

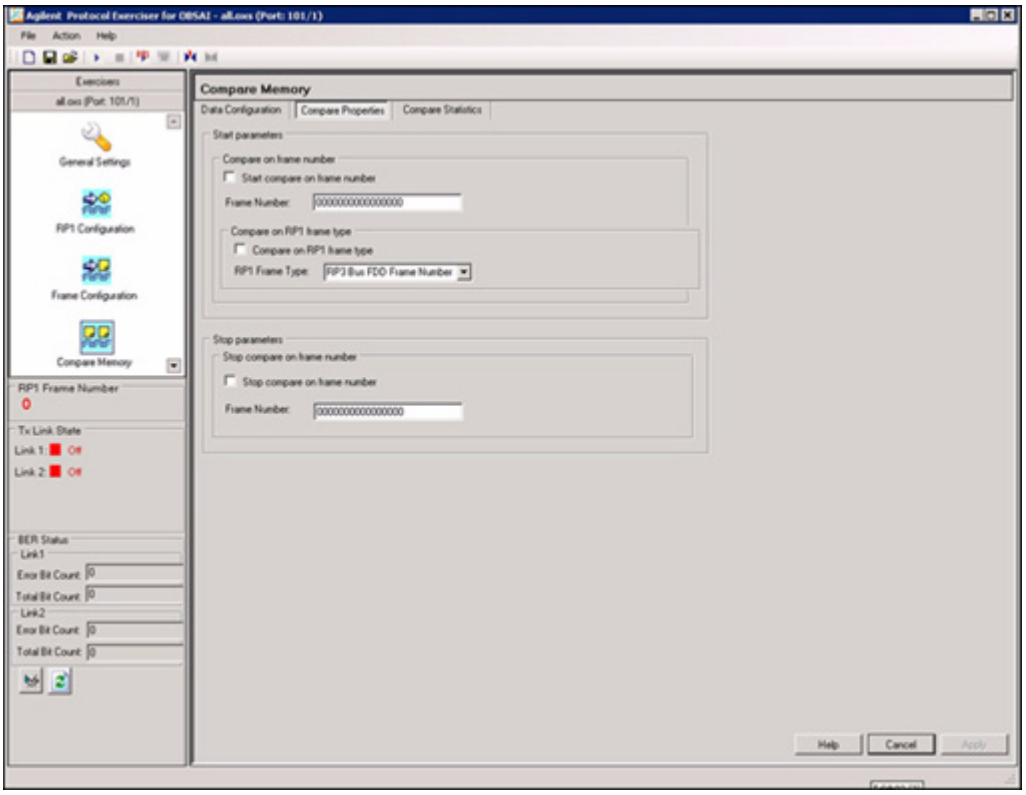


Figure 20 Compare Properties screen

Compare Statistics

It details the mismatch of the Byte Error Count and Bit Error Count of a particular RP1 frame number for each link. This occurs due to the change in the data or frames received with respect to the data or frames configured.

The Compare Statistics screen opens up as shown in the Figure 13.

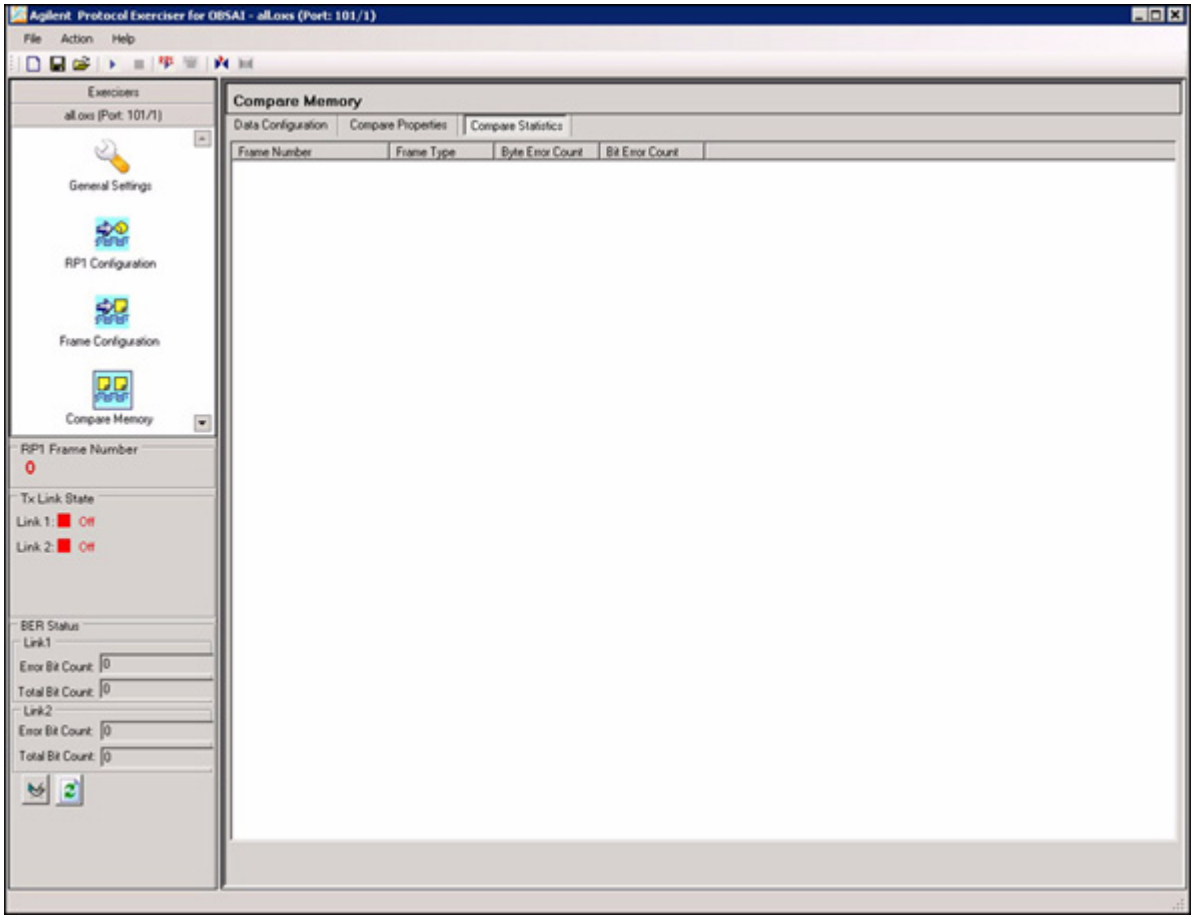


Figure 21 Compare Statistics screen

Table 13 briefly describes the **Compare Statistics** screen.

Table 13 Compare Statistics screen

Component	Descriptions
Frame Number	Displays the frame number of RP1.
Frame Type	Displays the type of frame
Byte Error Count	Displays the mismatched byte for a particular frame.
Bit Error Count	Displays the mismatched bit for a particular frame.

3
Emulating as Baseband Module

Base Station Link Test module is an extension of the Base Station Extension Test module protocol specifically designed for data transfer between a BTS and one or more Remote RF units (RRU). Base Station Link Test module is equivalent to the Base Station Extension Test module protocol except for the fact that different physical layer technologies, suitable for supporting data transmission over long distances, are applied. In order to minimize the number of connections to RRUs, RP1 data is mapped into RP3 messages. RP1 data includes ethernet and frame clock bursts.

Basically, Base Station Link Test module stands for an Base Station Extension Test module protocol where RP1 data is transferred in RP3 messages, between LCs and RRUs.

General Settings

The steps to set the general settings are as follows:

1 Select the **Normal Mode** as **Run Mode.**

2 Select **Optical** link as **Enable** under **Available Link**.

3 Select the **Link speed** as **3.0 Gbps [4x]** under **Properties**.

4 Select **RP1 In Source** as **Internal**.

5 Select **RP1 Out Source** as **Generated.**

6 Select **Sys Clock** as **Internal**.

7 Click **Apply**.

This applies the changes you made to set the general settings as shown in the Figure 22.

NOTE The Count and Time of Line Code Violations and the Delta Master Frame Offset remains as default.

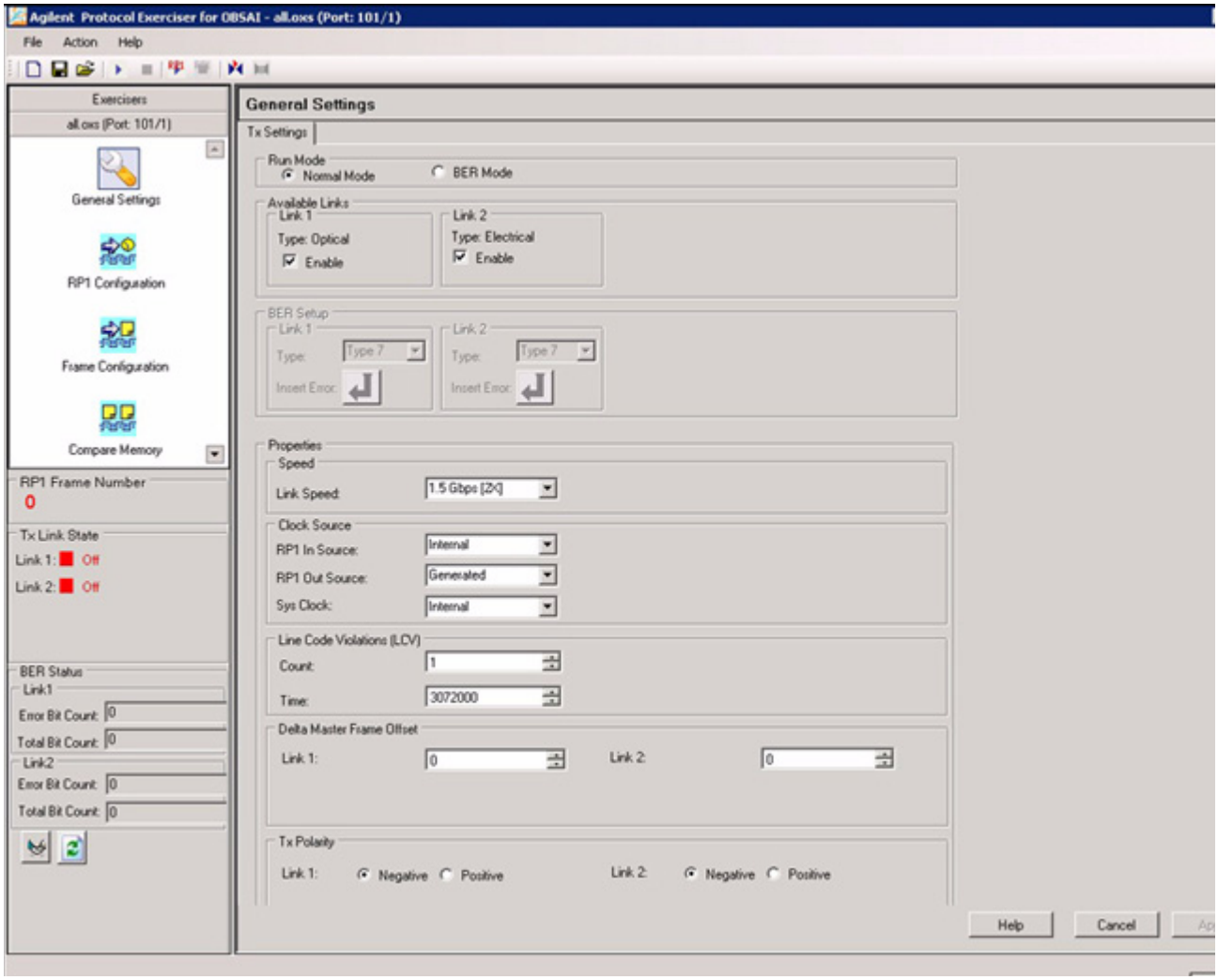


Figure 22 General Settings screen

RP1 Configuration

The Control and Clock Module (CCM) provides frametiming information for each air interface standard, independently, via periodic synchronization bursts.

The steps to configure RP1 are as follows:

1 Click **RP1 Configuration** icon.

The **RP1 configuration** screen appears (Figure 23).

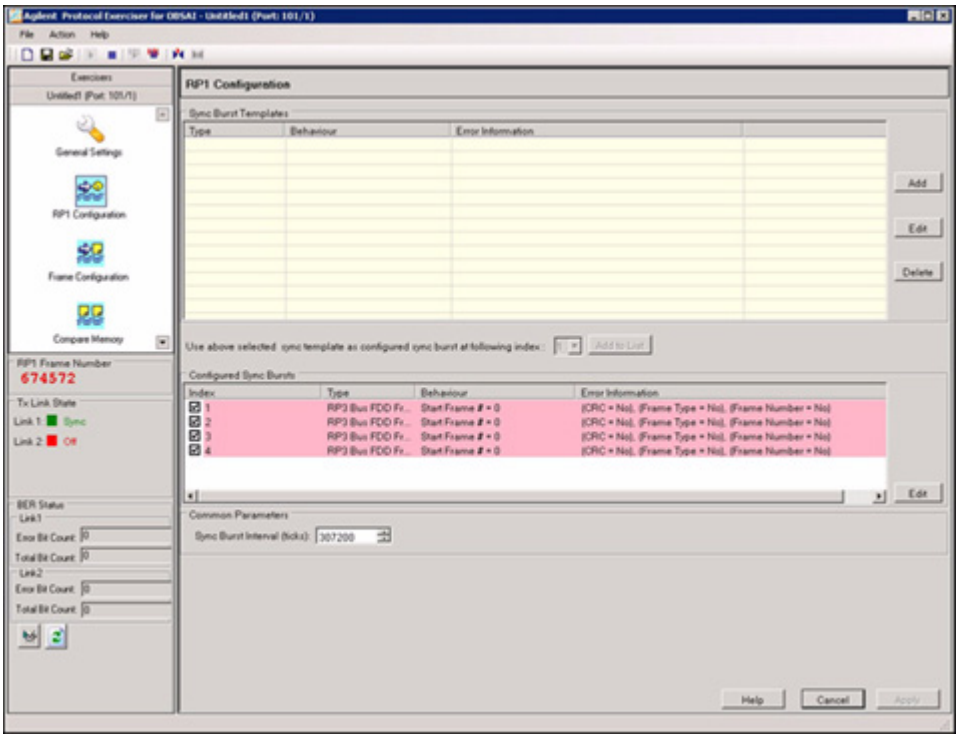


Figure 23 RP1 Configuration screen

2 Click **Add** under **Sync Burst Templates** to configure a RP1 data sync burst.

The **Sync Configuration Editor** dialog box appears (Figure 24).

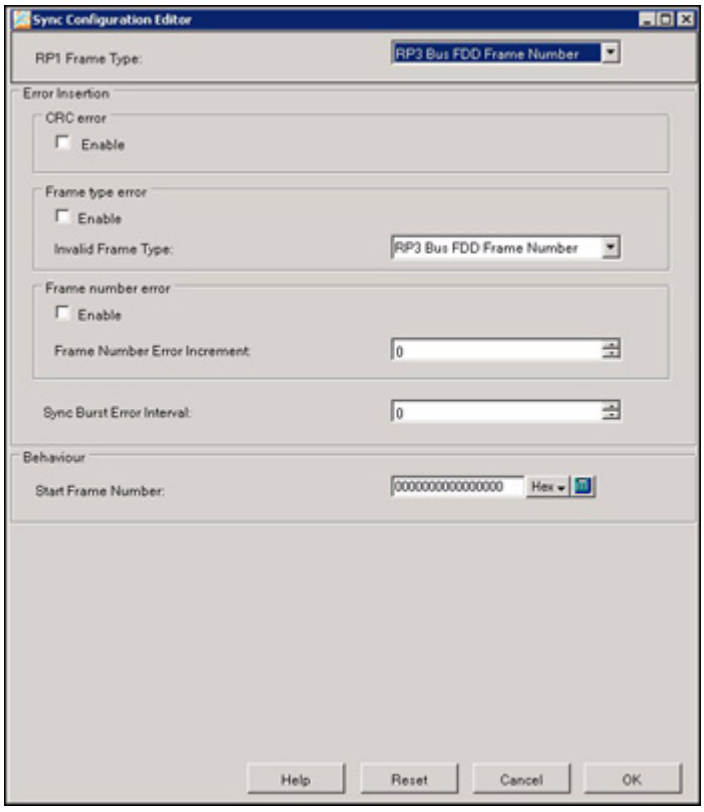


Figure 24 Sync Configuration Editor screen

3 Select the **RP1 frame type** as **RP3 Bus FDD Frame Number.**

4 Enable the errors, if desired to insert an error.

For Example: Enable the **Frame type error** and select **RP3 Bus FDD Frame Number** as an **Invalid Frame type**.

5 Select a specific sync burst to send errored RP1 frame repeatedly after every specified sync burst.

For Example: Specify the **Sync Burst Error Interval** as 1.

6 Insert **Start Frame Number** under **Behaviour**.

7 Click **OK**.

The configured Sync Bursts appears.

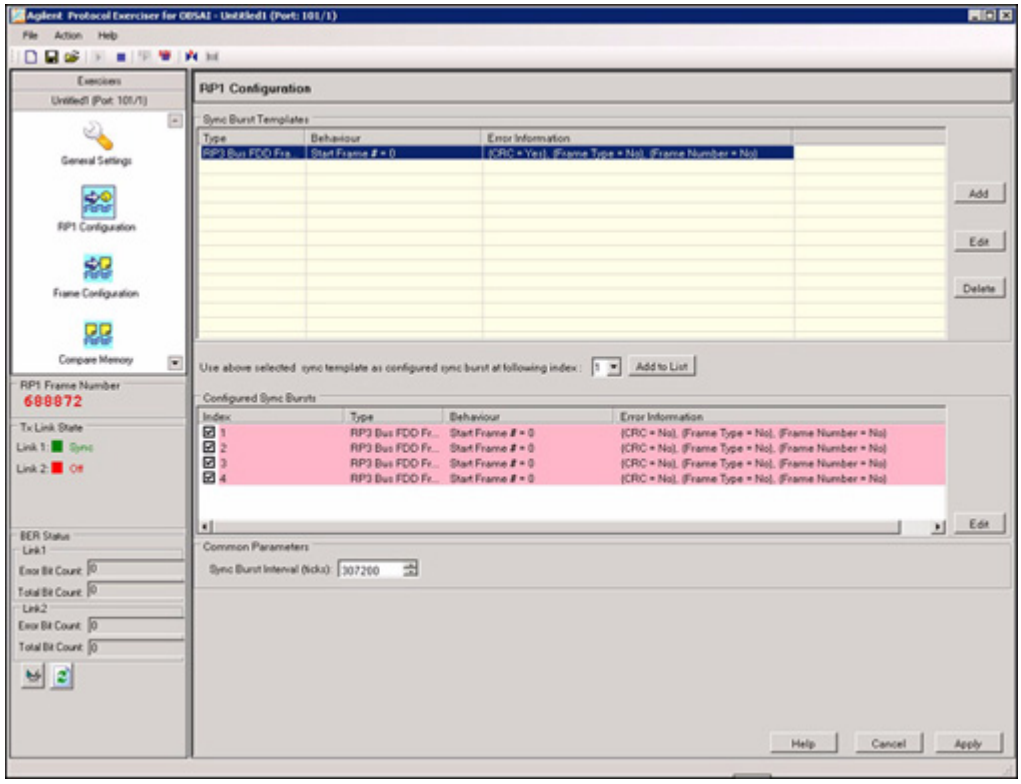


Figure 25 Configured Sync Burst

You can also replace the above sync template as configured sync burst

8 Select the **Sync Burst template**.

9 Select a specific index of Configured Sync Bursts to use as above selected sync burst template.

For Example: **Use above selected synctemplate as configured sync burst at following index** as 1.

This overwrites the above selected sync burst template with the selected index of configured sync burst, if desired.

10 Specify the Sync Burst Interval (ticks) as 327200 by default.

11 Click **Apply.**

This applies the changes you made to set the RP1 configuration.

Frame Configuration

The Steps to configure the frame are as follows:

1 Select the required link on which the frames needs to be configured.

2 Drag and drop a **Frame Template** from the frame template on the desired link.

For Example **Link 1**.

3 Select the **Empty Frame** under Configured Frame 0 Errors.

4 Right click the **Empty Frame** as shown in the Figure 26**.**

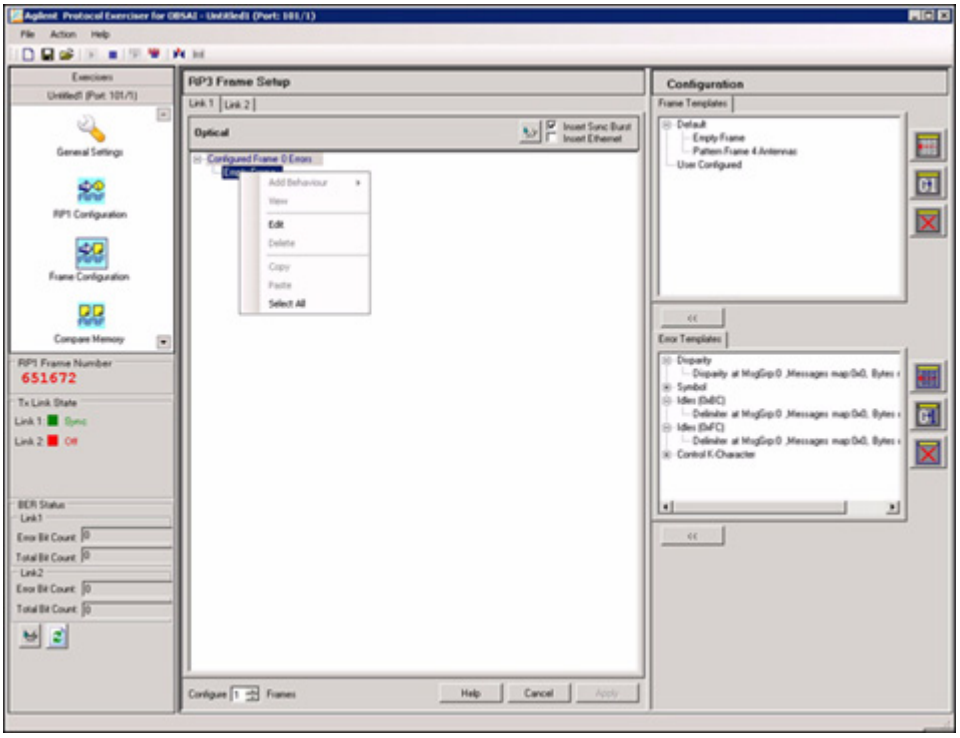


Figure 26 RP3 Frame Setup

5 Select **Edit**.

The **Frame Configuration** screen appears (Figure 27).

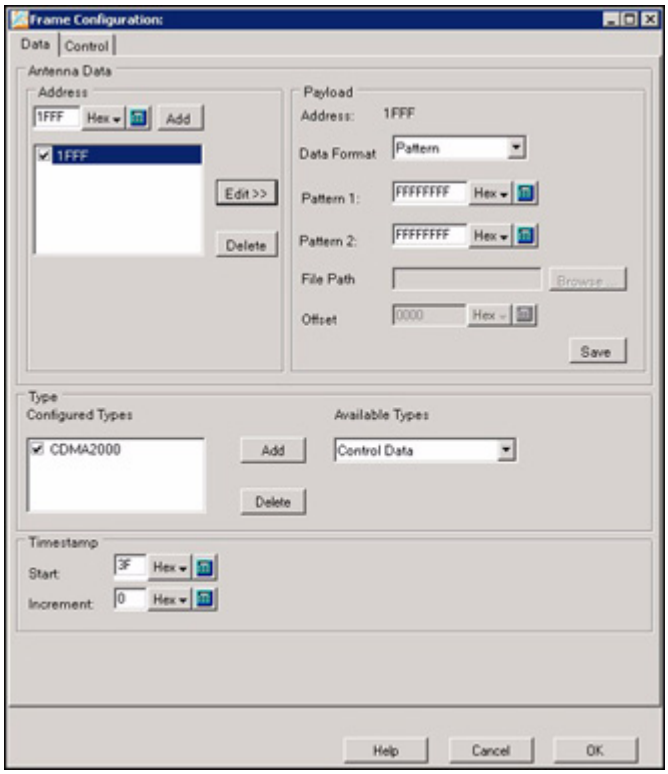


Figure 27 Frame Configuration Data screen

6 Click **Data**.

- **a** Click **Add** to specify an **Address** in the **Address** field
- **b** Select and click the check box of added **Address** to enable.
- **c** Insert the required information in the **Payload** field as desired.
- **d** Click **Save** to save the changes to be applied in the **Payload** field.
- **e** Click Add to configure type in the **Type** field.
- **f** Select and click the check box of added **Type** to enable.
- **g** Click **OK**.

7 Click **Control**.

The Control screen of Frame Configuration appears (Figure 28).

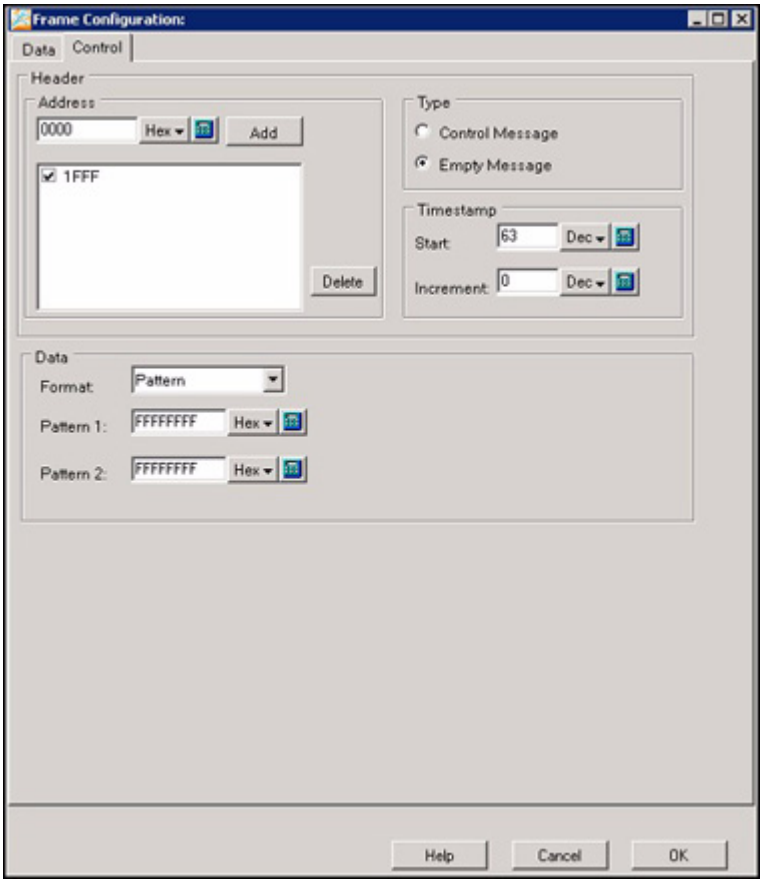


Figure 28 Frame Configuration Control screen

8 Click **Add** to specify a address in the **Address** field.

9 Select and click the check box of added **Address** to enable.

10 Select **Type** as **Control Message** or **Empty Message**.

11 Specify a **Start** value and a **Increment** value, if desired in the **Timestamp** field.

12 Select **Format** of **Data** as **Pattern** or **Increment.**

13 Click **Ok**.

Ethernet/Syncburst Configuration

The Ethernet/Sync burst Configuration is enabled only for Base Station Link Test module. It is used to send both the ethernet and sync burst simultaneously through this module.

The steps to insert a sync burst in the RP3 Frame setup link are as follows:

1 Select the check box of **Insert Sync Burst** as shown in the Figure 29.

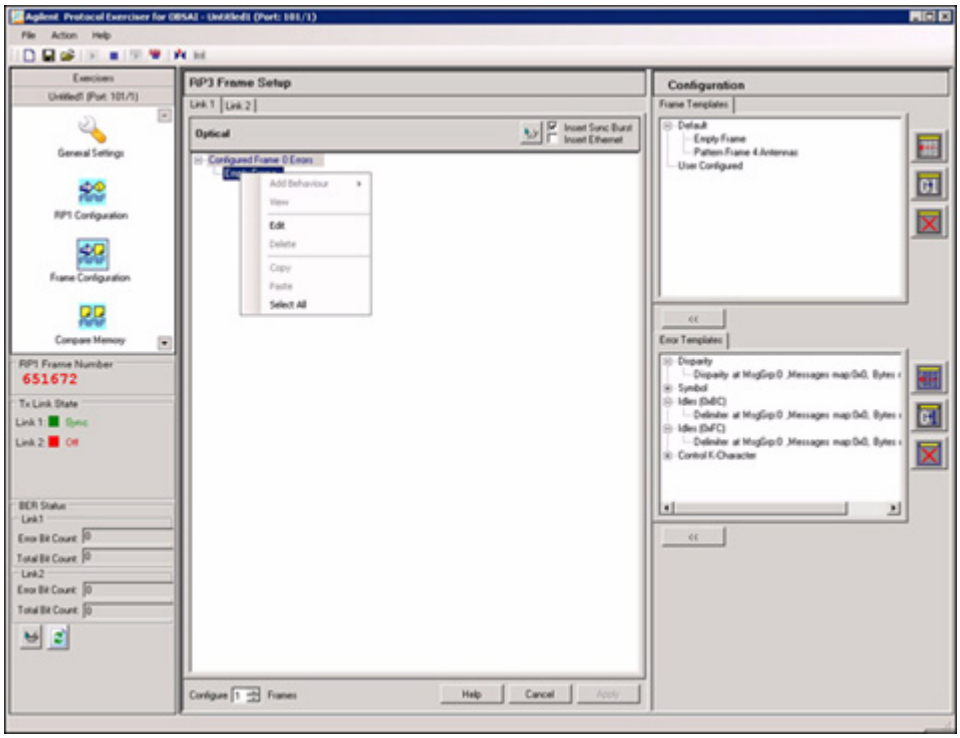


Figure 29 Insert Sync Burst

2 Click **Ethernet/Syncburst Configuration** icon to insert a sync burst**.**

The **Ethernet/Syncburst Configuration screen** opens up as shown in the Figure 30.

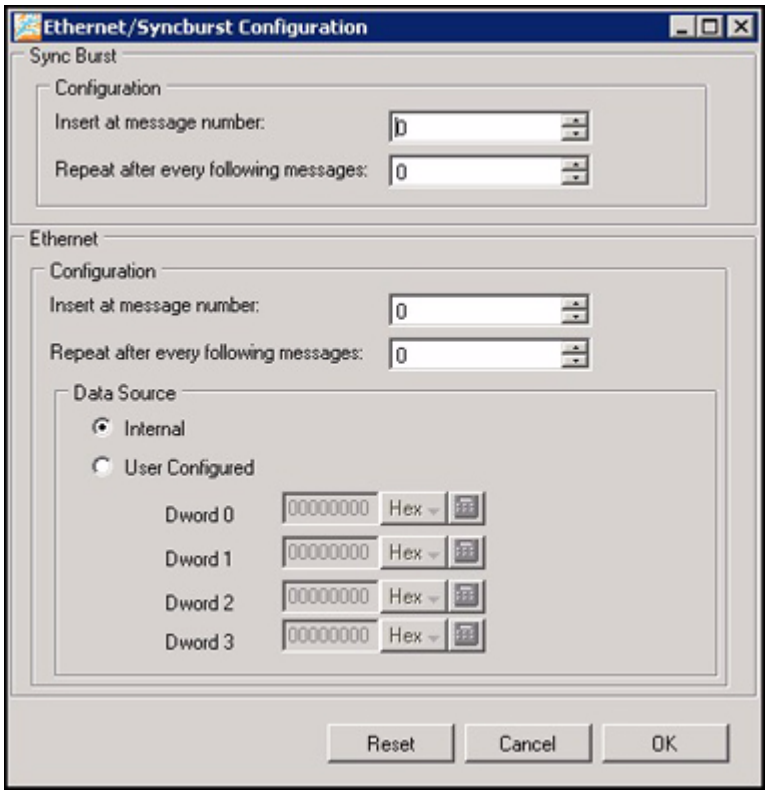


Figure 30 Ethernet/Syncburst Configuration

3 Insert the message number to configure the Sync Burst**.**

For Example: **Insert at message number** as 2.

4 Select a count to repeat the Sync Burst after the specified message number.

For Example: **Repeat after every following message** as 1.

5 Select **Data Source** as **Internal** or **User Configured,** if an Ethernet configuration needs to be insert**.**

6 Click **Ok**.

Error Insertion

The steps to insert an error in the configured frames are as follows:

1 Select the desired error under the Error Template.

For Example: **Disparity Error.**

2 Click **Behavior Template** icon to insert the error in the location and repeat parameters.

The **Behaviour Template** screen appears (Figure 31).

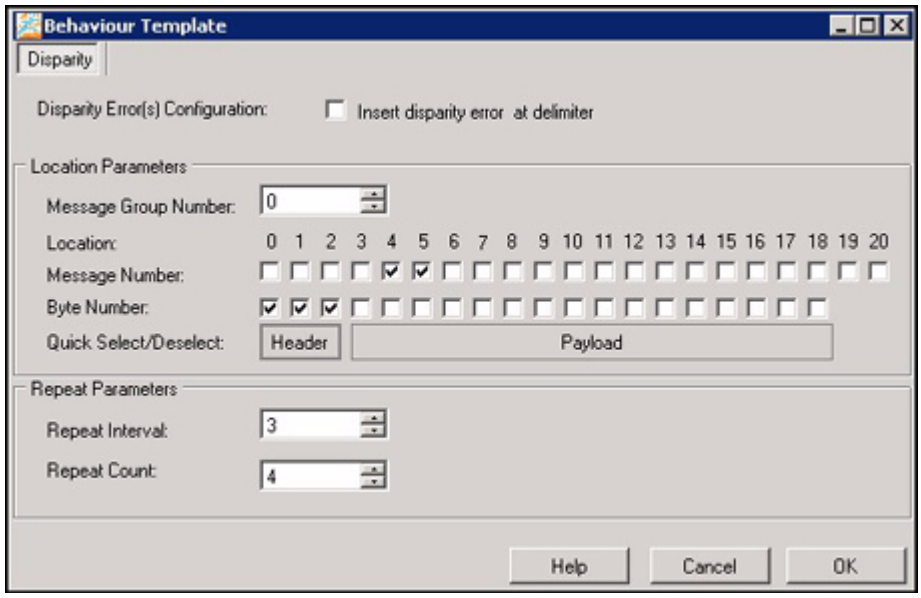


Figure 31 Behaviour Template screen

3 Select the check box to **Insert disparity error at delimiter** for message group or frames.

4 Select a desired **Message Group Number.**

5 Select the required check box for **Message Number** and **Byte Number.**

6 Click **Header** of **Quick Select/Deselect** to select or clear all the header bytes number.

7 Click **Payload** of **Quick Select/Deselect** to select or clear all the payload bytes number.

8 Select a count to repeat the error after every specified message group.

For Example: **Repeat Interval** as 3.

9 Select the number of times to repeat the error.

For Example: **Repeat Count** as 4.

10 Click **Ok**.

11 You can also select a specific count of number frames to be configured.

For Example: **Configure frames** from as **1.** Where 0 is considered as the first frame number.

12 Click **Apply** on the **RP3 Frame Setup** pane.

Compare Memory

Data Configuration

The steps to Data Configuration on the compare memory are as follows:

1 Click **Data Configuration** tab as shown in the Figure 32.

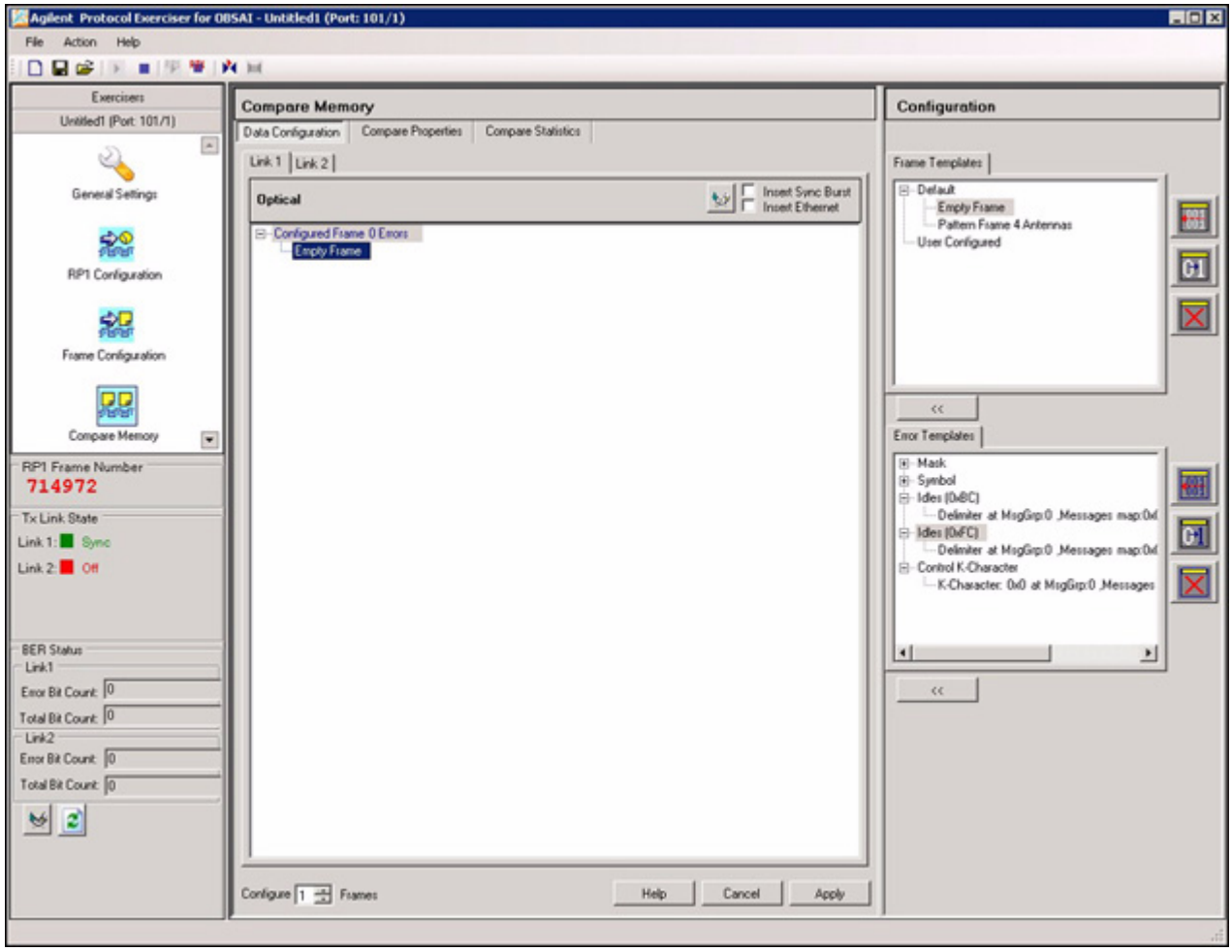


Figure 32 Data Configuration screen

2 Click the desired link to configure the data on the frames.

For Example: **Link 1.**

3 Drag and drop an frame template.

4 Edit the address of the frame as required.

For Example: Select **1FFF** and edit the address by changing a bit in the pattern 2 from **FFFFFFFF** H to **FFFFFFFE** H. This changes the pattern of the frame as shown in the Figure 33.

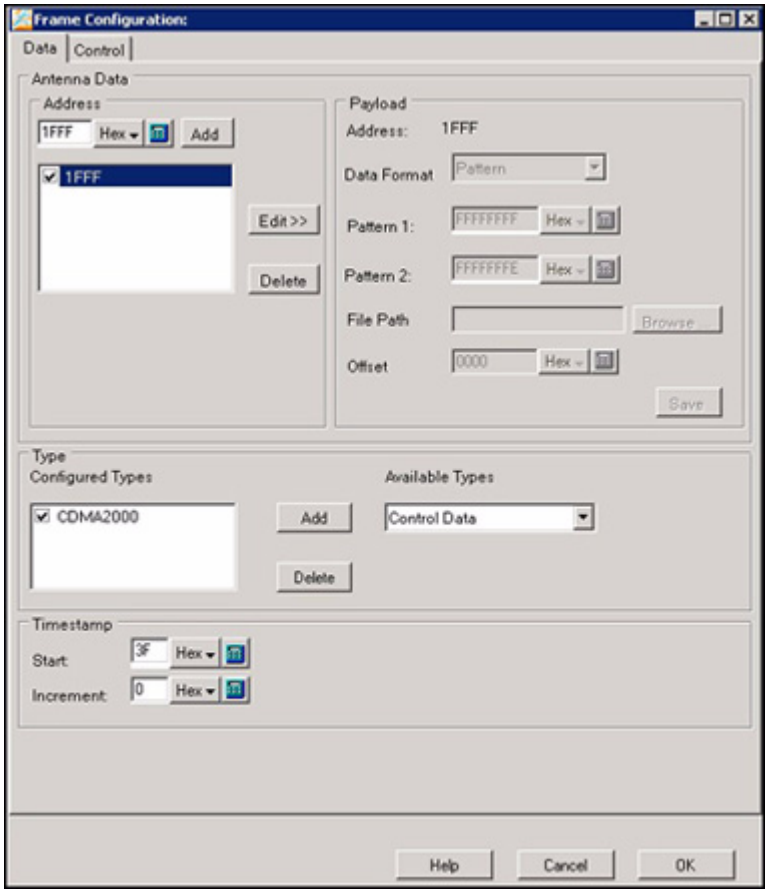


Figure 33 Frame Configuration Data screen

5 Click **Save**.

6 Click **OK**.

7 Insert the error in the frames as desired from the error templates.

8 You can also select a specific count of number frames to be configured.

For Example: **Configure frames** from as **1.** Where 0 is considered as the first frame number.

9 Click **Apply**.

This applies the changes you made to set the Data configuration of compare memory.

Compare Properties

It includes the start and stop compare parameters on RP1 frame.

1 Click **Compare on RP1 frame type** checkbox under **Start parameters** and select the required frame type as **RP1FrameType** as shown in the Figure 34.

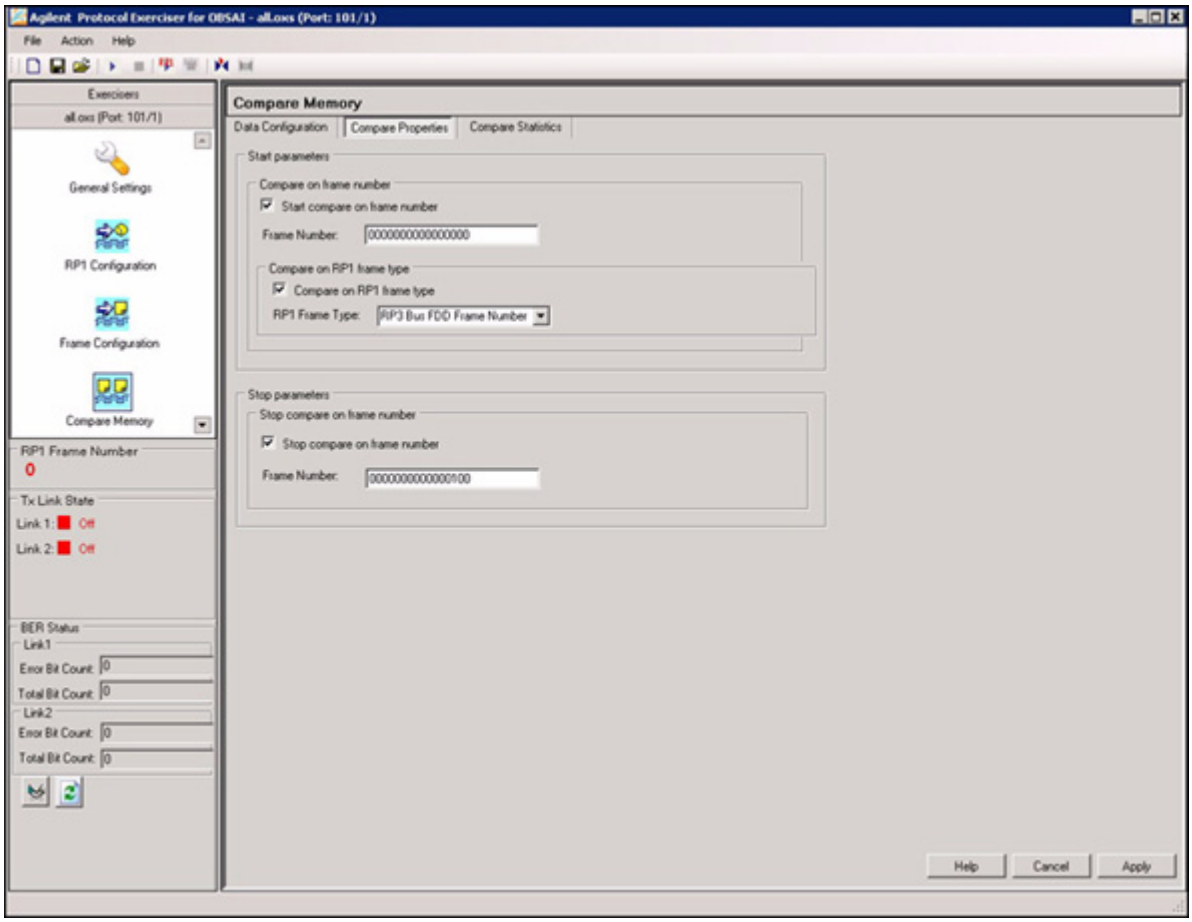


Figure 34 Compare Properties screen

2 Click **Start compare on RP1 Frame Number** checkbox.

3 Insert a specific frame number in the **RP1FrameNumber** field, to start the compare on the RP1 frame.

For Example: 0.

4 Click **Stop compare on RP1 Frame Number** checkbox under **Stop Parameters.**

5 Insert a specific frame number in the **RP1FrameNumber** field, to stop the compare on the RP1 frame.

For Example: 100.

6 Click **Start Compare Memory** icon from the toolbar.

You can view the compare statistics, once the compare memory automatically stops.

NOTE You need to click **Stop Compare Memory** icon from the tool bar, if no specific frame type or frame number is selected.

Compare Statistics

It details the mismatch of the Byte Error Count and Bit Error Count of RP1 frame number for a particular RP1 frame number in each link.

1 Click **Compare Statistics** to view the mismatch details as shown in the Figure 35.

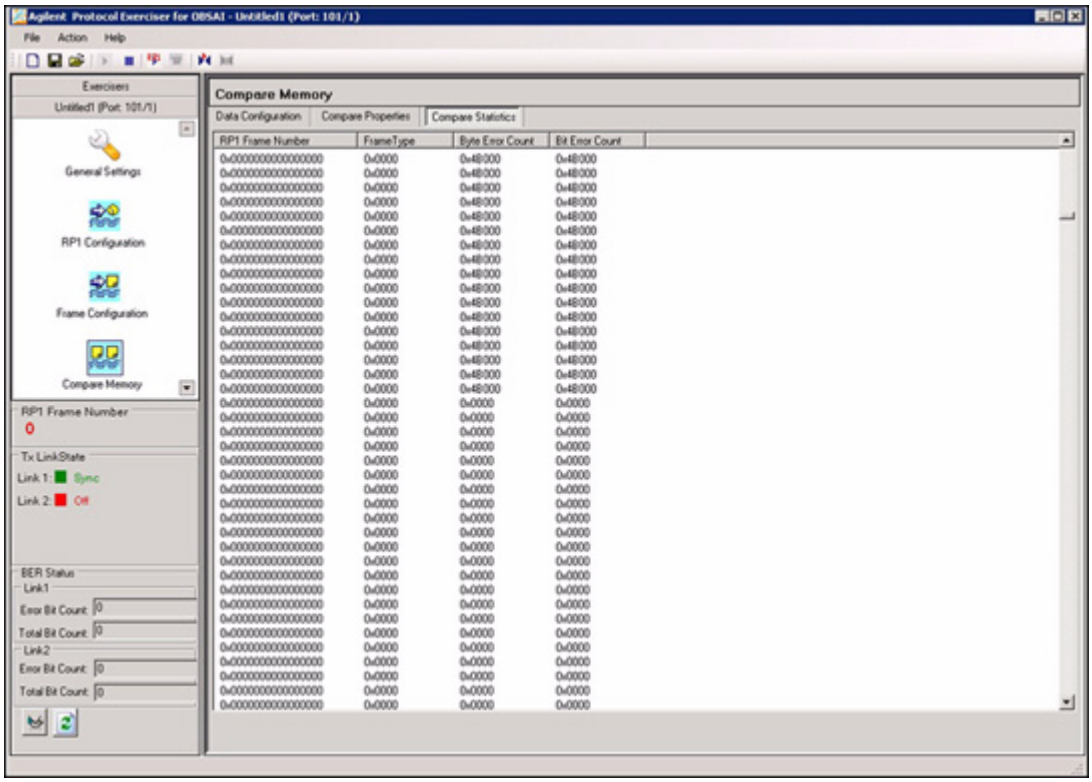


Figure 35 Compare Statistics screen

Rx Side

Rx side defines the receive side of RP3/RP3-01 interface to receive the incoming frames. Each link is synchronized individually before the transfer of data. The state Frame_Sync is the normal operational mode with frame structure detected and messages received.

1 **Enable** the **Optical Link**.

2 Select **RP1 In Source** as **External/RP3-01** as shown in the Figure 36

3 Select **Sys Clock Source** as desired.

For Example: **Generated.**

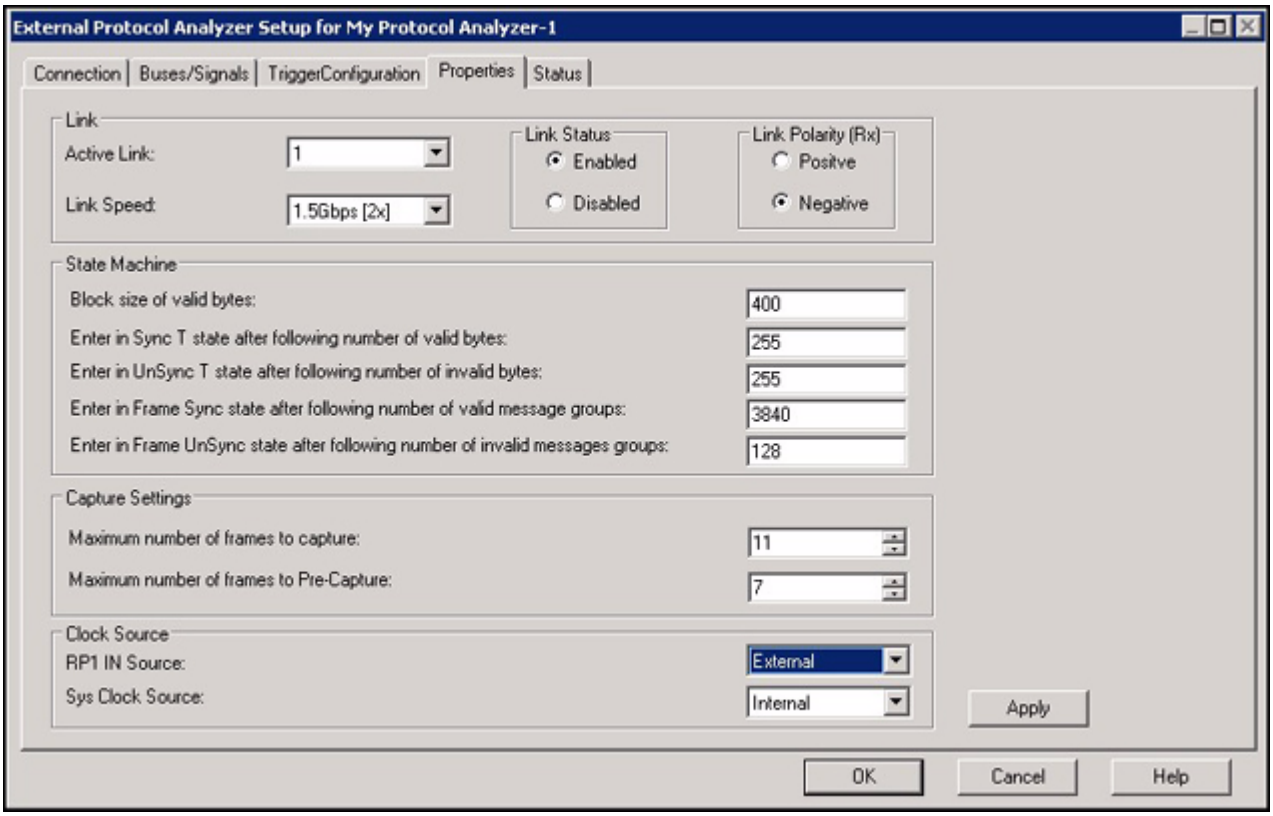


Figure 36 General Settings of Rx

4 Click **Apply.**

This applies the changes made to set the general settings for Rx.

4
Logic Analyzer for OBSAI

This chapter provides information regarding the Rx side of OBSAI protocol tester through the Logic Analyzer GUI. The logic analyzer captures and set triggers on the incoming frames, decodes the OBSAI frames and displays the captured frames.

Accessing Logic Analyzer for OBSAI

To start a session from the logic analyzer:

1 On the Windows task bar, click **Start > Programs >Agilent Logic Analyzer> Agilent Logic Analyzer.**

The **Offline Startup Options** screen opens up as shown in Figure 37.

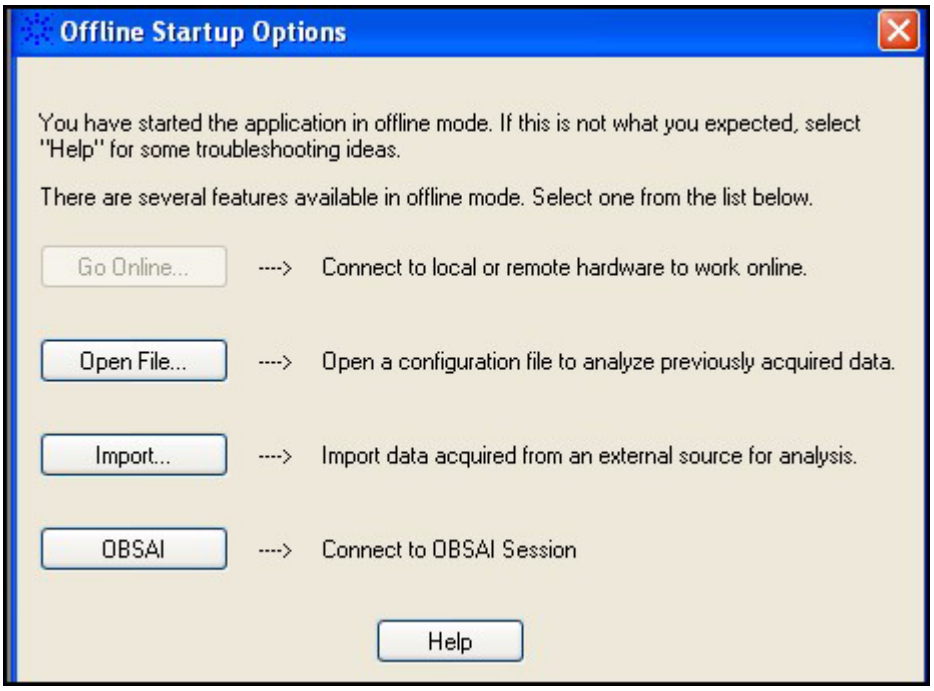


Figure 37 Offline Startup Options screen

2 Click **OBSAI** to connect to OBSAI session.

The **Agilent Logic Analyzer Overview** screen opens up as shown in the Figure 38.

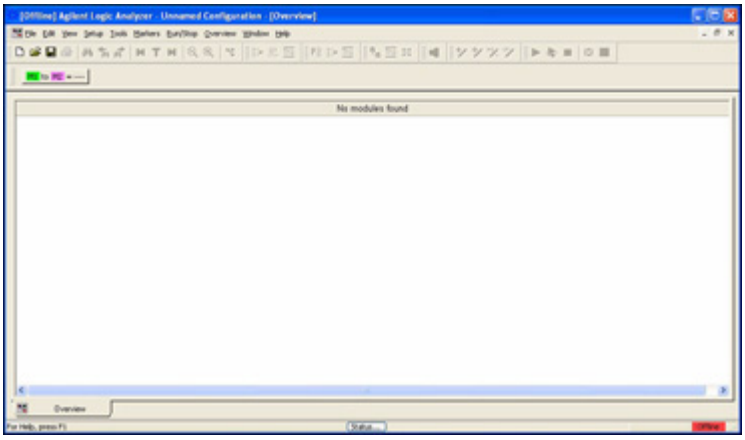


Figure 38 Agilent Logic Analyzer Overview screen

Adding OBSAI Protocol Analyzer Module

Connection

The OBSAI session can be in two ways:

- Creating a new session and attaching to it.
- Attaching to a pre-existing session.

Create New Session

The steps to create a new session are as follows:

1 Click **Add External Protocol Exerciser** from **Setup** menu command.

The **External Protocol Analyzer Setup for My Protocol Analyzer-1** screen opens up as shown in the Figure 39.

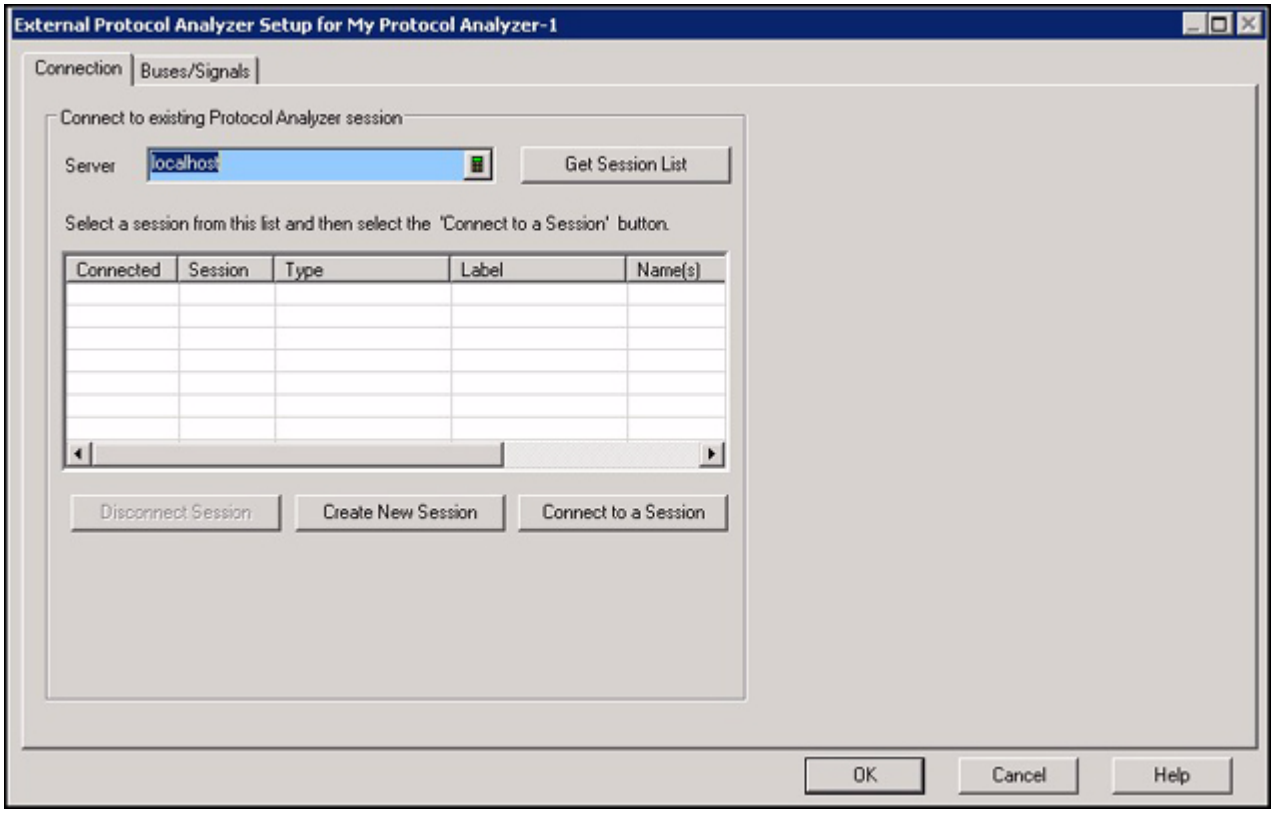


Figure 39 External Protocol Analyzer Setup screen

2 Click **Create New Session**.

The **Create New Session** dialog box opens up and the session appears as shown in the Figure 40.

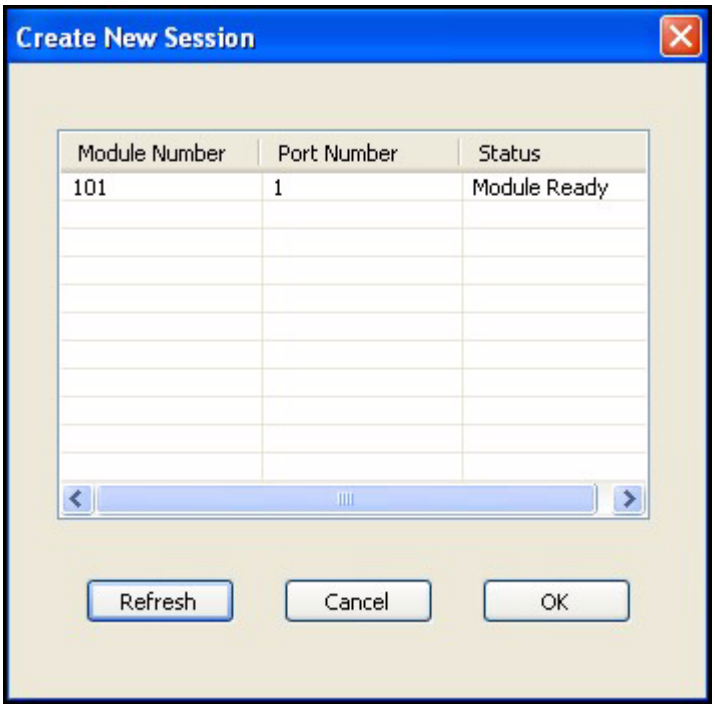


Figure 40 Create New Session dialog box

3 Select a module from the list of modules attached.

4 Click **OK**.

The selected module appears on the **Connection** screen.

5 Click **Refresh** to revive the module number, port number and the status of the modules.

6 Select a module from the list of modules attached from the **Connection** screen as shown in the Figure 41.

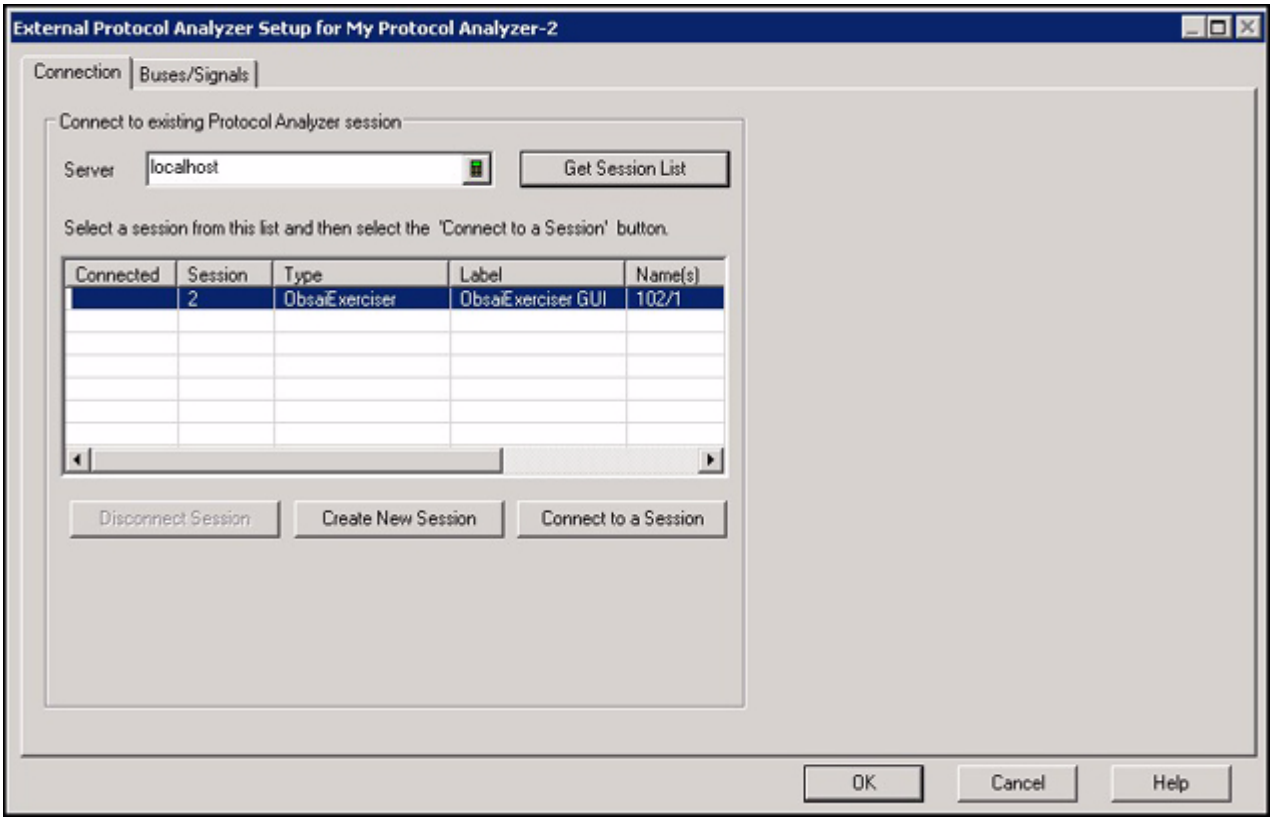


Figure 41 Connection screen

7 Click **Connect to a Session**.

The module gets connected as shown in the Figure 42.

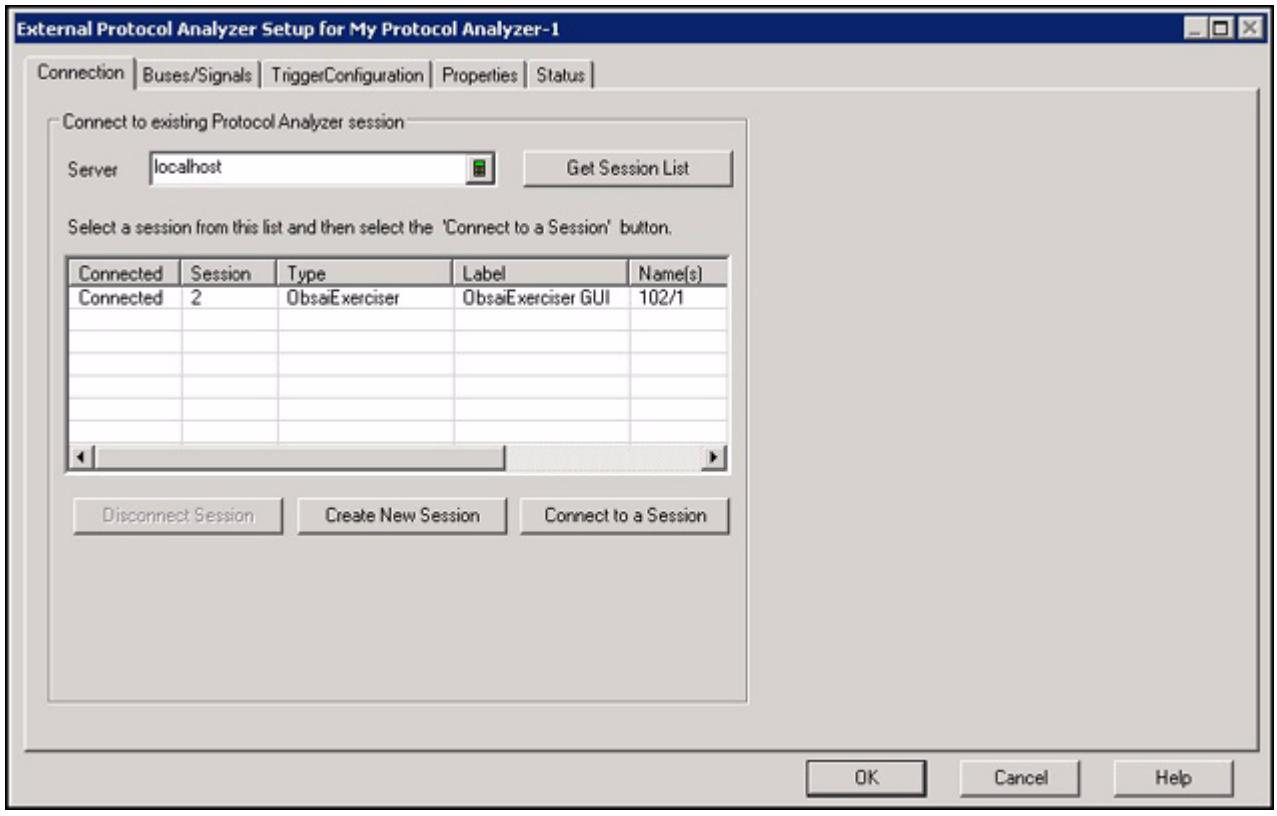


Figure 42 Session Connected screen

Attaching to Pre-existing Session

The steps to get a session list are as follows:

1 Click **Get Session List** to get the ObsaiExerciser session.

2 Select a module from the list of modules attached.

3 Click **Connect to a Session.**

The module gets connected as shown in the Figure 42.

4 Click **OK.**

NOTE Click **Disconnect Session** to detach from the existing connected session.

External Protocol Analyzer

The **My Protocol Analyzer** panel under modules column appears by default. You may change the name as desired. it consists of the following icons as shown in the Figure 43.

Figure 43 My Protocol Analyzer panel

Table 14 represents the icons of **My Protocol Analyzer** panel.

Table 14 My Protocol Analyzer Icons

Icon	Description
	Add tool/windows to add windows (For e.g. Packet Viewer to display captured OBSAI frames) and use the tools (For e.g. Packet Decoder to decode OBSAI frame).
	Connection Setup to connect to a session.
	Trigger Configuration to configure triggers on frames.
	Launch OBSAI Exerciser to connect the OBSAI exerciser to the session.

Trigger Configuration

A trigger is a combined set of conditions and their associated actions.

The steps to configure a trigger in the frames are as follows:

1 Click Trig in the **My Protocol Analyzer** panel.

The **External Protocol Analyzer Setup for My Protocol Analyzer** screen opens up with the selected **Trigger Configuration** tab as shown in the Figure 44.

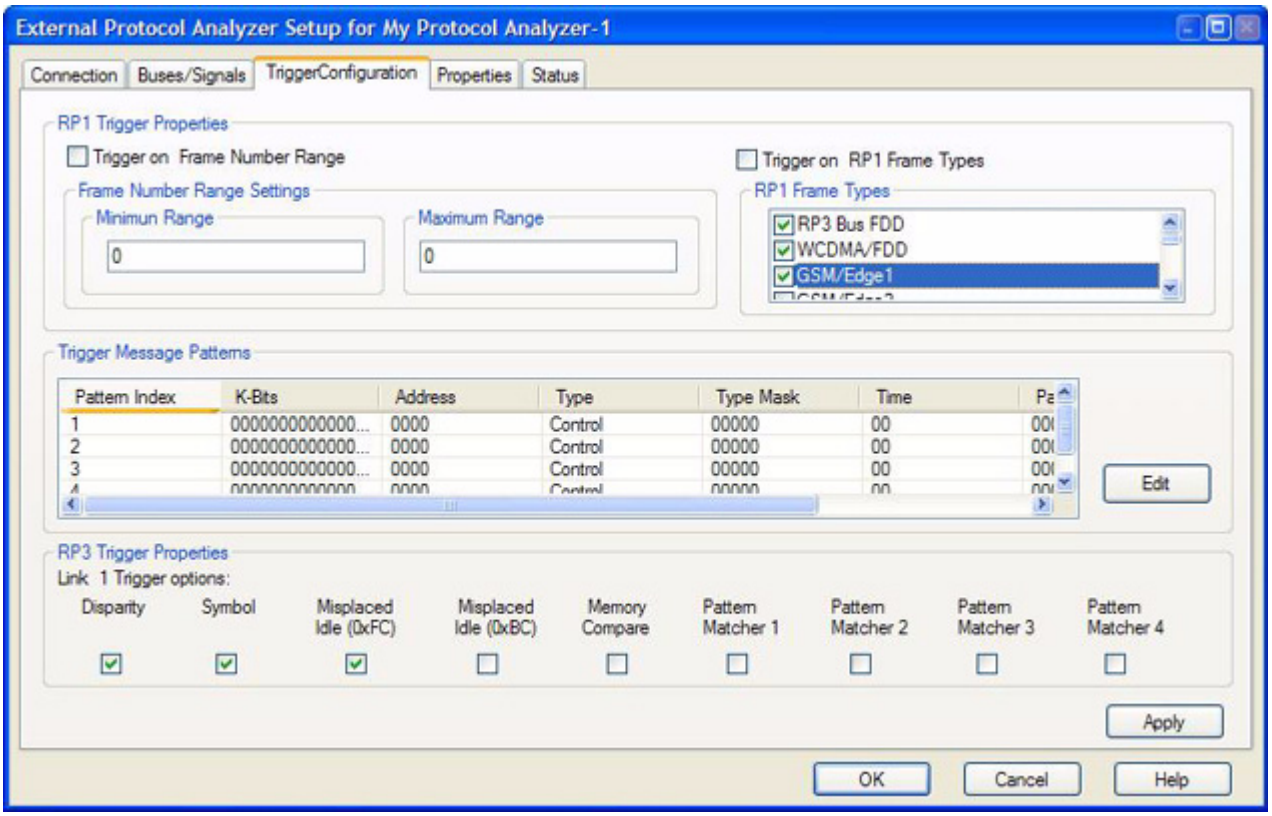


Figure 44 Trigger Configuration screen

Table 15 briefly describes the **Trigger Configuration** screen.

Table 15 Trigger Configuration

Component	Description

RP1 Trigger Properties	• Enable the **Trigger on RP1 Frame Number Range**. The **RP1 Frame Number Range settings** consists of:
	  • **Minimum Range**: It's a 64 bits value.
	  • **Maximum Range**: It's a 64 bits value.
	• Enable the **Trigger on RP1 Frame Types**. Select a frame type of RP1 from **RP1 Frame Types**. One or more frame type can be selected.

Table 15 Trigger Configuration

Component	Description
Trigger Message Patterns	It consists of four message patterns. You can select multiple message pattern. Click **Edit**, to update the parameters accordingly. Select the desired parameter and update the remaining as DON'T CARE. For eg: Kbits, Address, Payload, etc. These can be used for more than one link.
RP3 Trigger Properties	Select trigger options to be used for the link. For eg: Disparity, Symbol, Memory compare, etc. If more than one option is selected. The trigger occurs at any of the selected options. It is a link based property.
Apply	Click **Apply** to apply the changes you made to set the trigger configurations.

Properties

The steps to set the properties of Rx link are as follows:

1 Click **Properties**.

The **Properties** screen opens up as shown in the Figure 45.

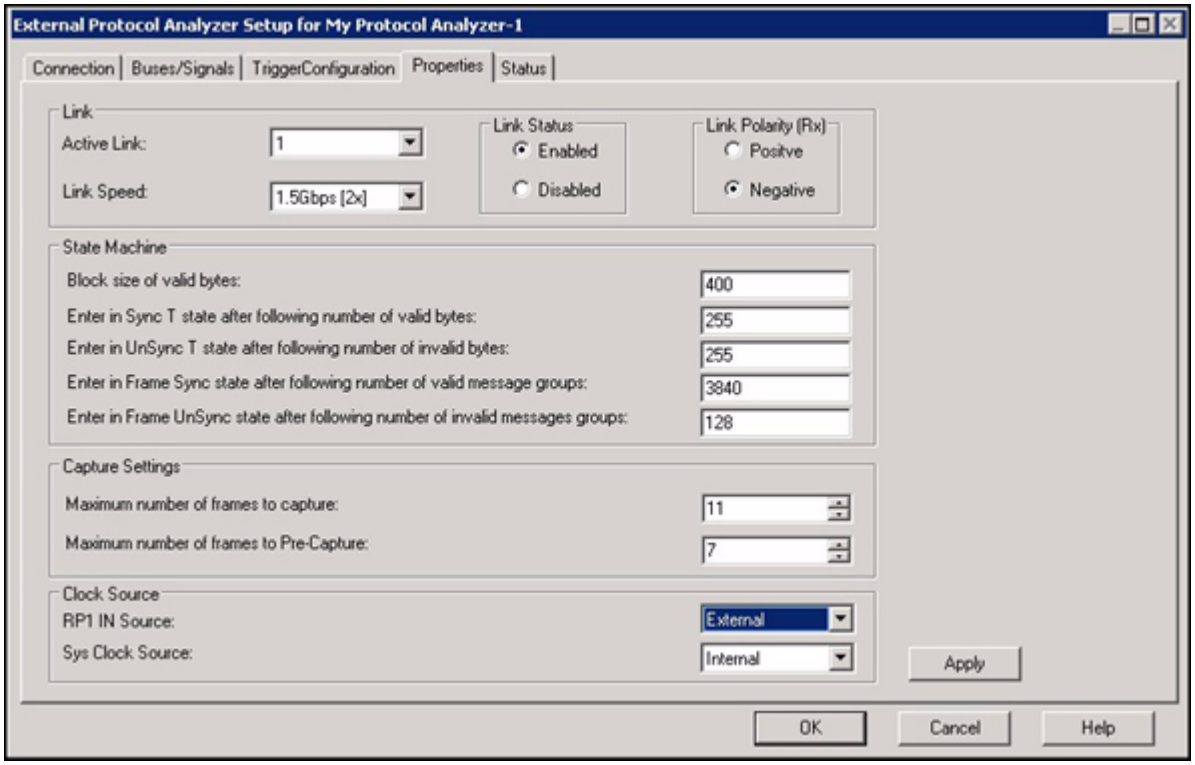


Figure 45 Properties screen

Table 16 briefly describes the **Properties** screen.

Table 16 Properties

Component	Description
Link	It includes four properties: • **Active Link**: The number of links available to enable. This is a link based property • **Link Speed**: The speed of the enabled link. This property is independent of the link, it applied for all links. This is applicable to more than one link • **Link Status**: It can be enabled or disabled.This is a link based property • **Link Polarity**: It can be positive or negative.This is a link based property

Table 16 Properties

Component	Description
State Machine	The parameters of state machine appears has the default values as shown in the Figure 45.This is a link based property
Capture Settings	It includes: • **Maximum number of frames to capture**: The number of frames captured after the trigger point is known as capture. • **Maximum number of frames to Pre-capture**: The number of frames captured before the trigger point is known as pre-capture. The maximum number of frames to pre-capture should be equal or less than the maximum number of frames to capture. The maximum number of frames to capture and precapture is 16. This is applicable to more than one link
RP1	The RP1 **Clock** is selected as **External**. It is enabled only for RP3-01 module for Rx side.This is applicable to more than one link.
Apply	Click **Apply** to apply the changes you made to set the properties.This is applicable to more than one link

Status

The steps to view the status of Rx link are as follows:

1 Click **Status**.

The **Status** screen appears as shown in the Figure 46.

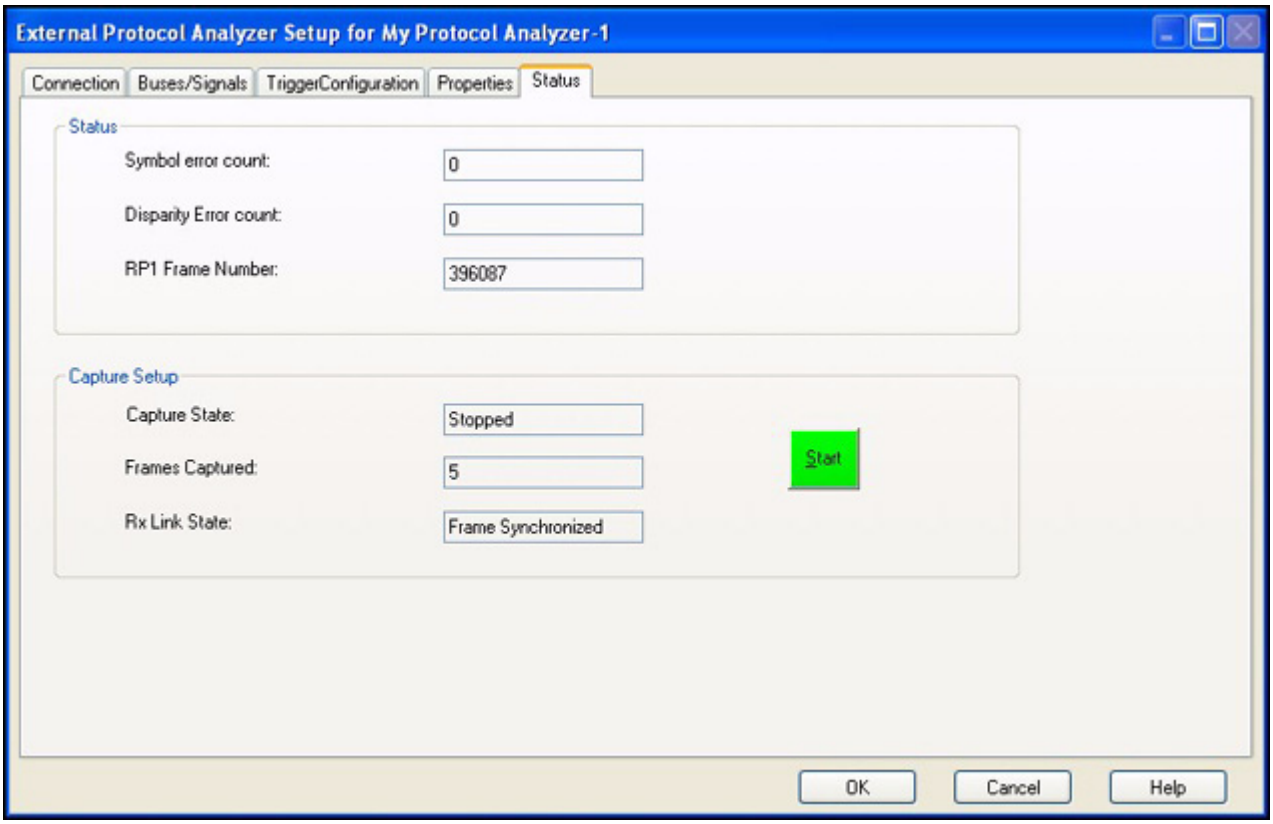


Figure 46 Status screen

Table 17 briefly describes the **Status** screen.

Table 17 Status

Component	Description
Status	It includes: • **Symbol error count**: Displays the count of symbol error. This is link based • **Disparity Error count**: Displays the count of disparity error. This is link based • **RP1 frame Number**: Displays the RP1 frame number. This is applicable to more than one link.

Table 17 Status

Component	Description
Capture Setup	It includes: • **Capture State**: The capture state can be running or stopped. This is applicable to more than one link • **Frames Captured**: The number of captured frames. This is applicable to more than one link • **Rx Link State**: The status of Rx link. This is link based
Start/Stop	Click **Start** to start capturing the frames. And the capturing of frames is automatically stopped in case of trigger. It can also be stopped manually.
OK	Click **OK** to the applied changes.
Cancel	Click **Cancel** to close the existing screen.
Help	Click **Help** to display the online help.

Packet Decoder

The steps to configure a packet decoder properties are as follows:

1 Click in the **My Protocol Analyzer** panel under modules column.

2 Select **New Tool** > **Packet Decoder** as shown in the Figure 47. The **Packet Decoder** panel appears under **Tools** column.

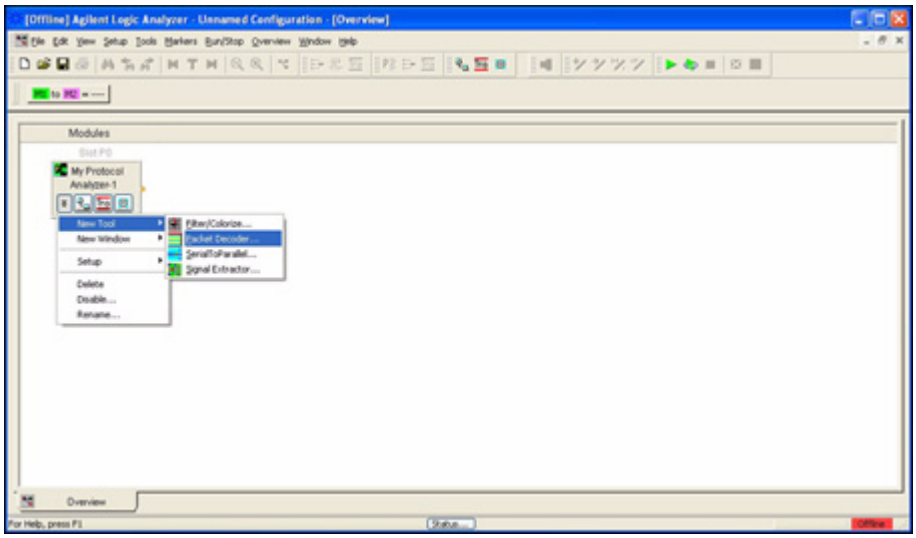


Figure 47 Packet Decoder

3 Click **Properties**.

The **Packet Decoder Properties** dialog box opens up as shown in the Figure 48.

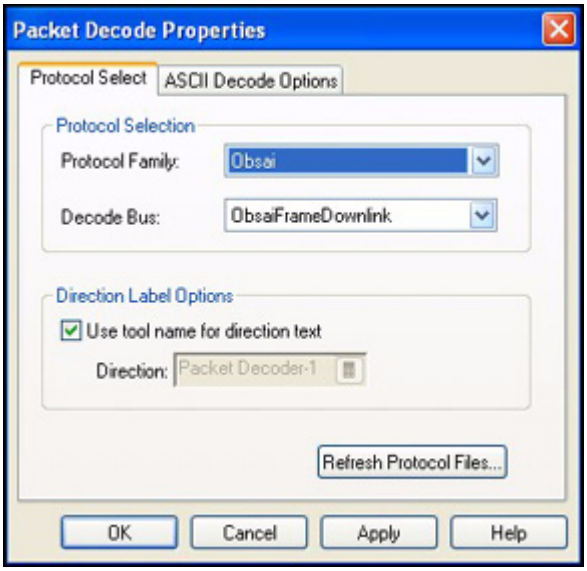


Figure 48 Packet Decode Properties dialog box

4 Select **OBSAI** as **Protocol family** under **Protocol Selection.**

5 Select **ObsaiFrameDownlink/Uplink** as **Decode Bus**.

6 Click **Apply**.

7 Click **OK**.

Packet Viewer

The steps to configure a packet viewer are as follows:

1 Click in the **Packet Decoder** panel under Tools column.

2 Select **New Window** > **Packet Viewer** as shown in the Figure 49.

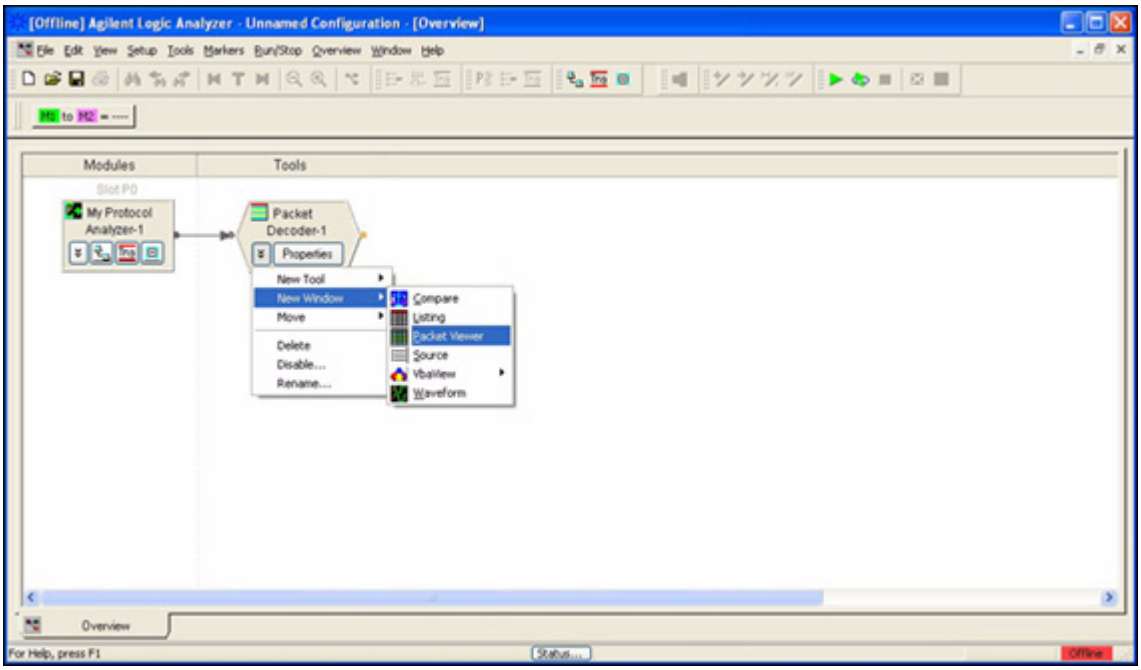


Figure 49 Packet Viewer

The **Packet Viewer** panel appears under **Windows** column as shown in the Figure 50.

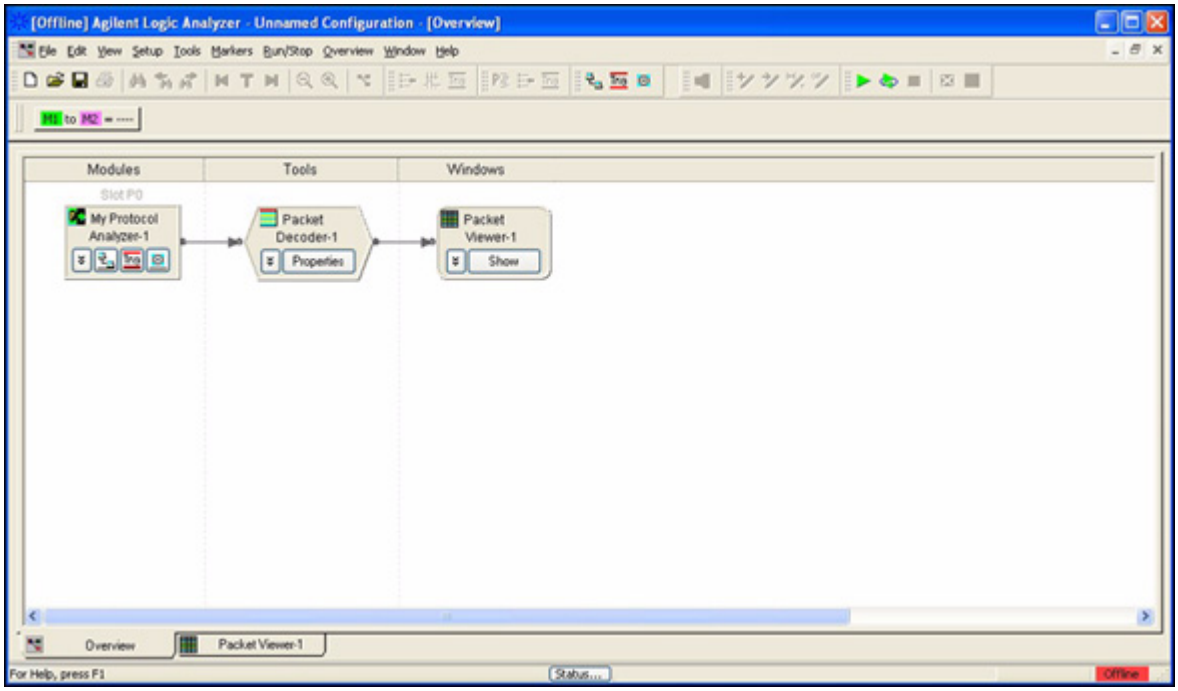


Figure 50 Packet Viewer Panel

3 Click **Show**.

The **Packet Viewer** screen opens up as shown in the Figure 51.

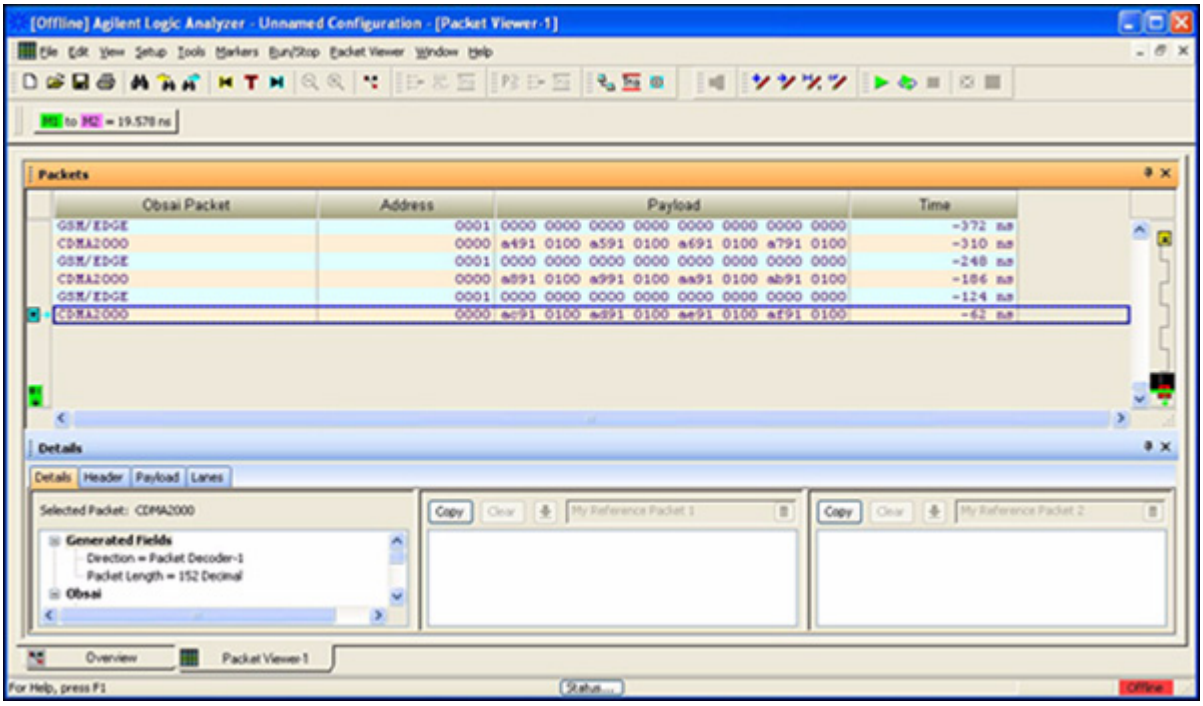


Figure 51 Packet Viewer screen

4 Click  to upload data to viewer.

The OBSAI packets with the details like its Address, payload information, time etc.

Adding a Column

The steps to add a column to view the desired information about OBSAI packets.

1 Right click the column heading. Select the desired option to insert a column before or after the selected column as shown in the Figure 52.

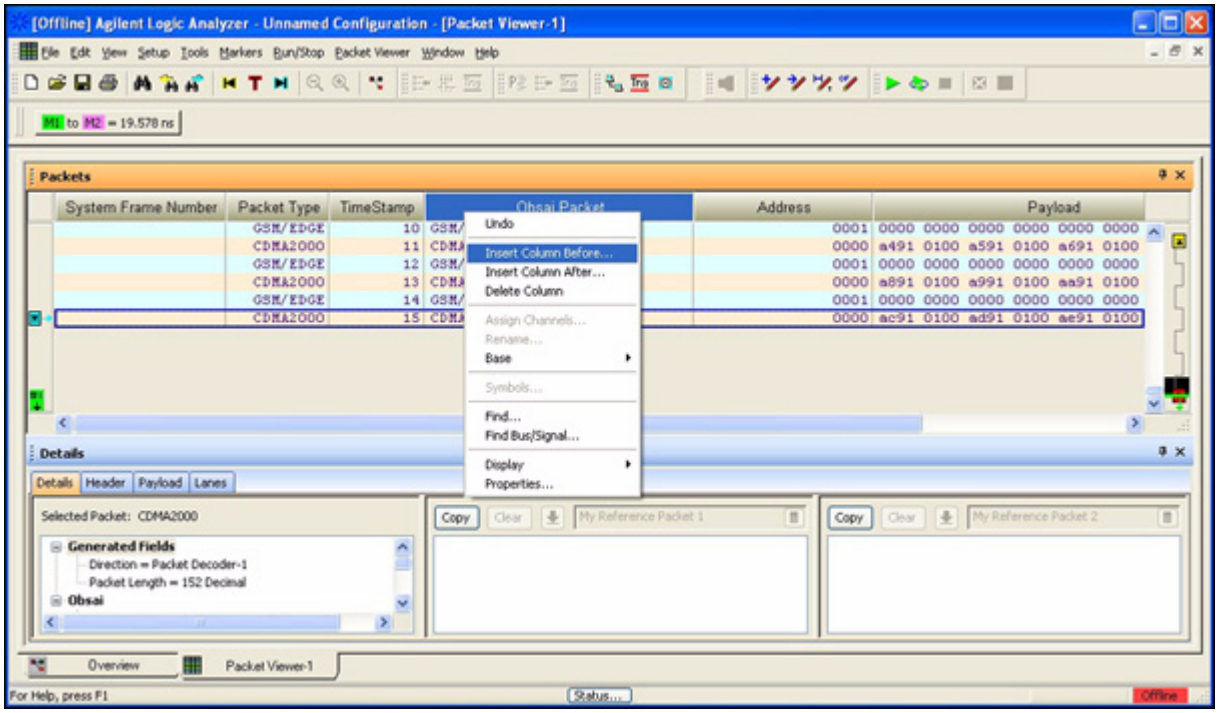


Figure 52 Insert Column screen

2 The list of column details that can be viewed opens up as shown in the Figure 53.

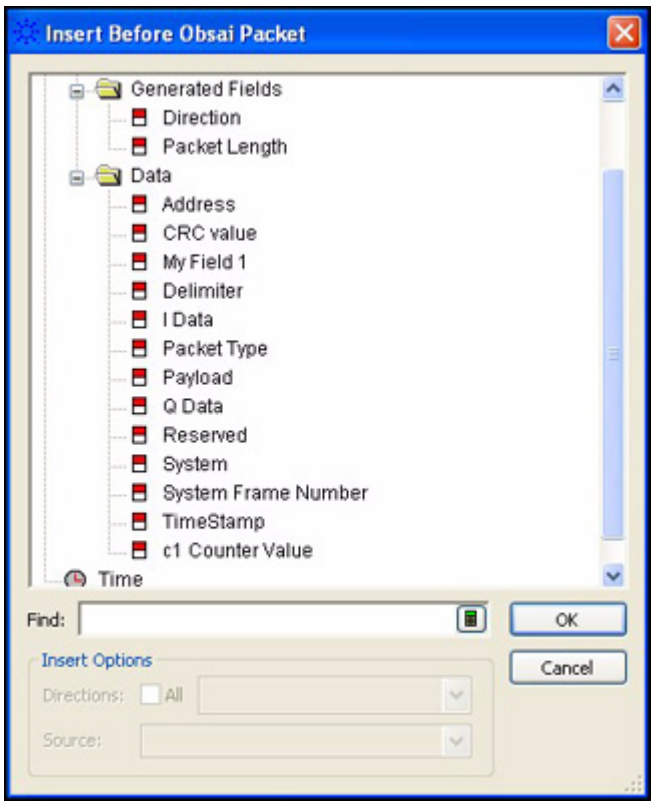


Figure 53 Insert Before dialog box

3 Click the desired information that needs to be viewed. This information appears as the column heading.

Setting a Marker

The steps to set a marker to the OBSAI packets are as follows:

1 Select the desired **OBSAI packet**.

2 Right click and goto **Place Marker** > **New Marker** as shown in the Figure 54.

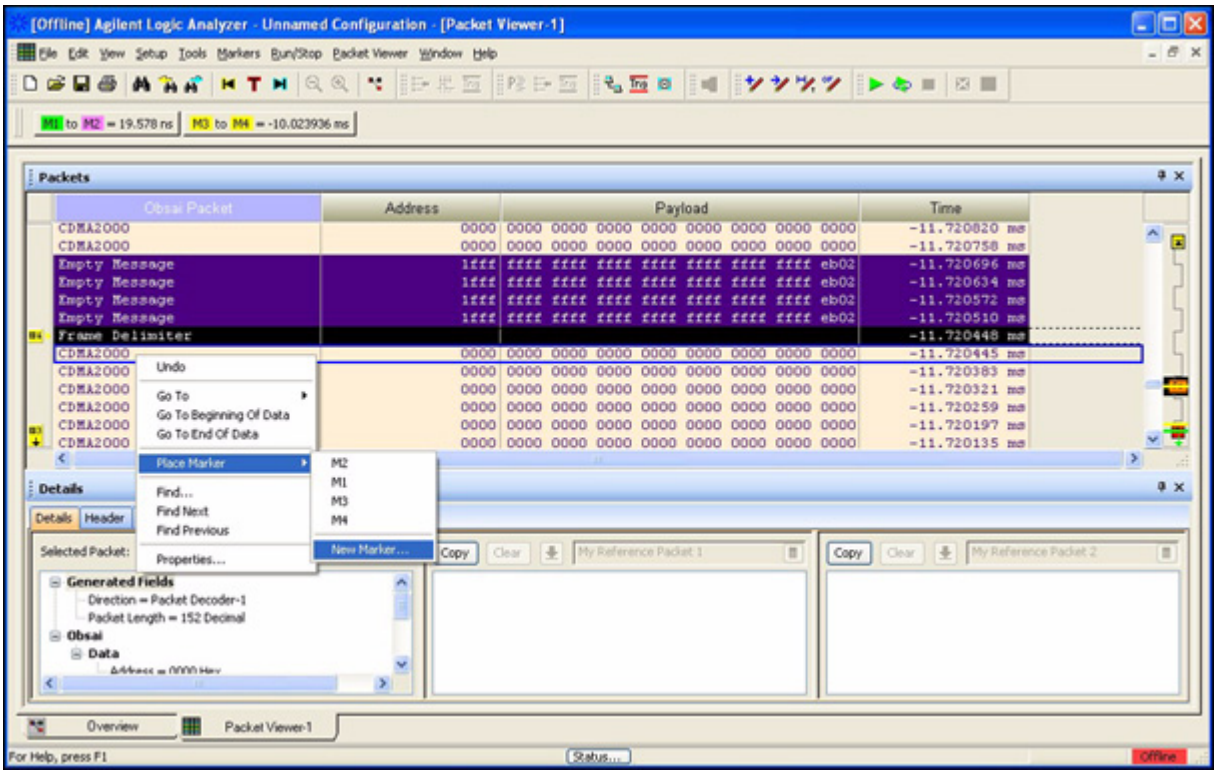


Figure 54 Place Marker

The New Marker dialog box opens up as shown in the Figure 55.

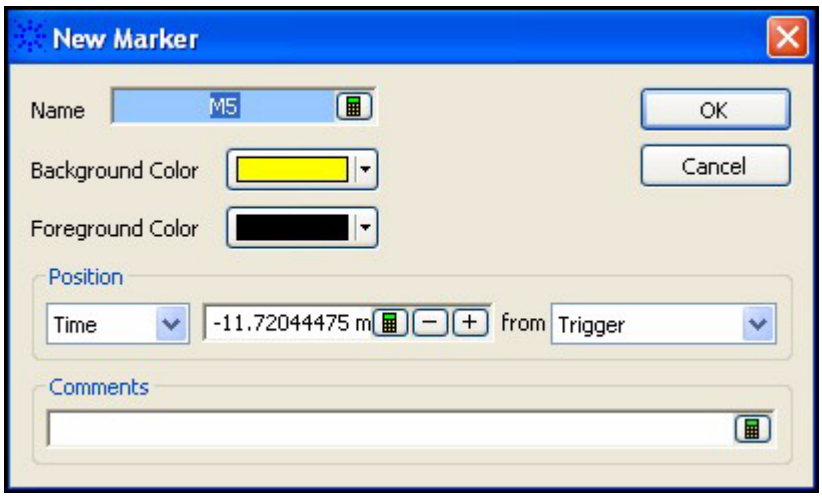


Figure 55 New Marker dialog box

3 Specify the required details in the **New Marker** dialog box.

4 Click **OK**.

The Marker is set to the OBSAI packet.

Time Interval Measurement

The steps to measure the time interval between two markers are as follows:

1 Right click on the measurement bar and select **New Time Interval Measurement** as shown in the Figure 56.

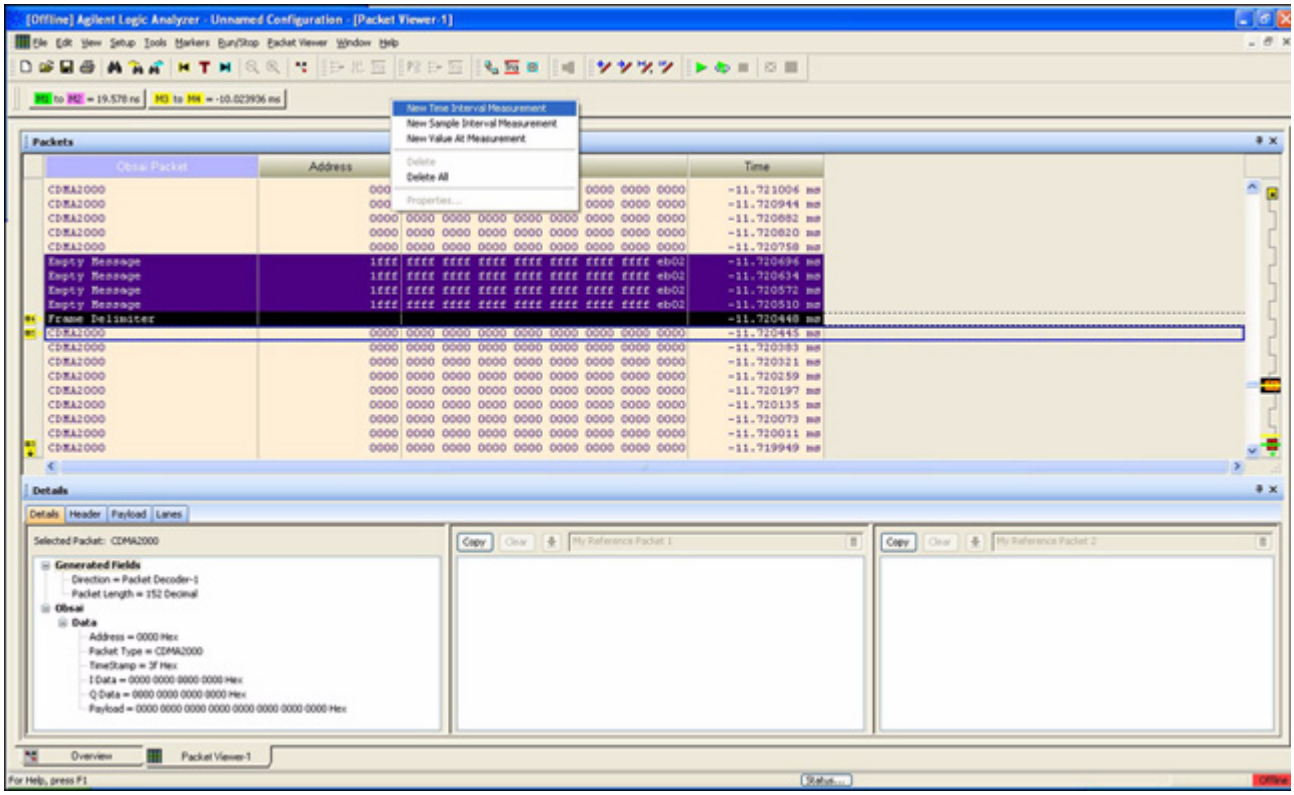


Figure 56 New Time Interval

The Time Interval dialog box opens up as shown in the Figure 57.

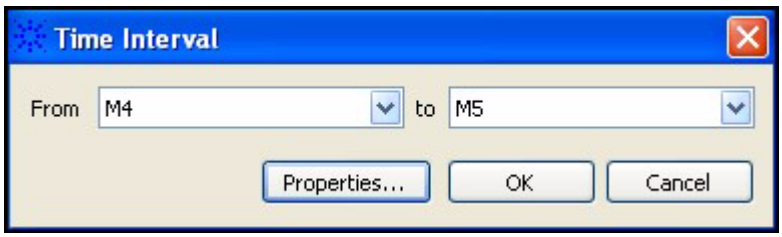


Figure 57 Time Interval dialog box

2 Specify the **From** and **to** markers to measure the time interval.

3 Click **OK.**

The time interval measurement appears on the measurement bar.

Table 18 briefly describes the icons available:

Table 18 Icons Descriptions

Icon	Description
	Displays the **New Marker** dialog box.
	Displays the **Marker** dialog box.
	Displays the **Time Interval** dialog box.
	Displays the **value to** screen.
	Displays the **Start point** of the captured frames.
	Displays the triggered frame.
	Displays the **End point** of the captured frames.

Searching OBSAI Data

- Click  to find Obsai Packets like Frame Delimiter, Tetra or Error Messages.
- Click  to find the previous Obsai data.
- Click  to find the next Obsai data.

The Find dialog box opens up as shown in the Figure 58.

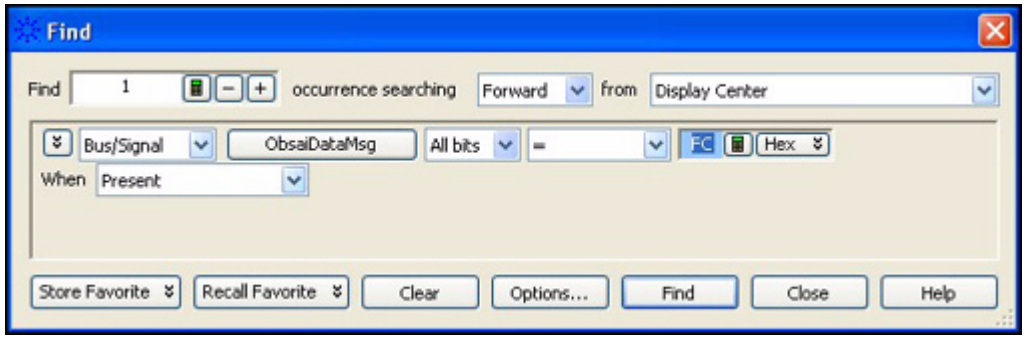


Figure 58 Find dialog box

To search a Frame Delimiter

1 Specify the number of frame delimiter to search in the **Find** field.

2 Select the **occurrence searching** as **Forward** or **Backward** and select the desired **From** location to search.

3 Select the **Bus/Signal** from the dropdown menu in the dialog box.

4 Select **All bits** as **ObsaiDataMsg.**

5 Select the obsai packet as **FC** with **And** option.

6 To search a frame delimiter in the payload, select **alyzer-3 Delimiter.**

7 Select **Rising Edge** as **alyzer-3 Delimiter** from the dropdown menu.

8 Click **Find**.

The following Figure 59 appears.

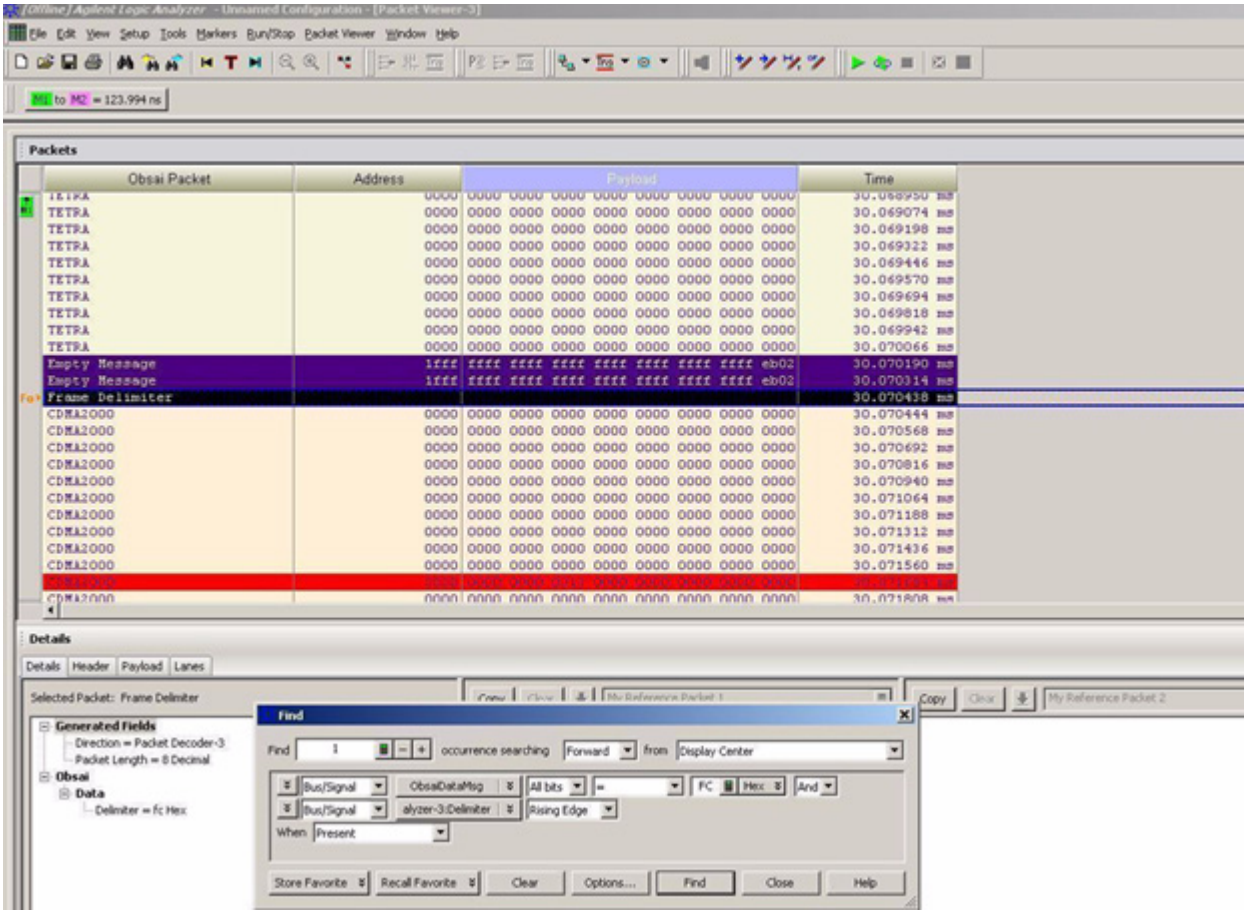


Figure 59 To search a Frame Delimiter

To Search a Tetra

1 Specify the number of tetra to search in the **Find** field.

1 Select the **occurrence searching** as **Forward** or **Backward** and select the desired **From** location to search.

2 Select the **Packet** from the dropdown menu in the dialog box.

3 Select the **Obsai Packet** as **Tetra**.

4 Click **Find**.

The following Figure 60 appears.

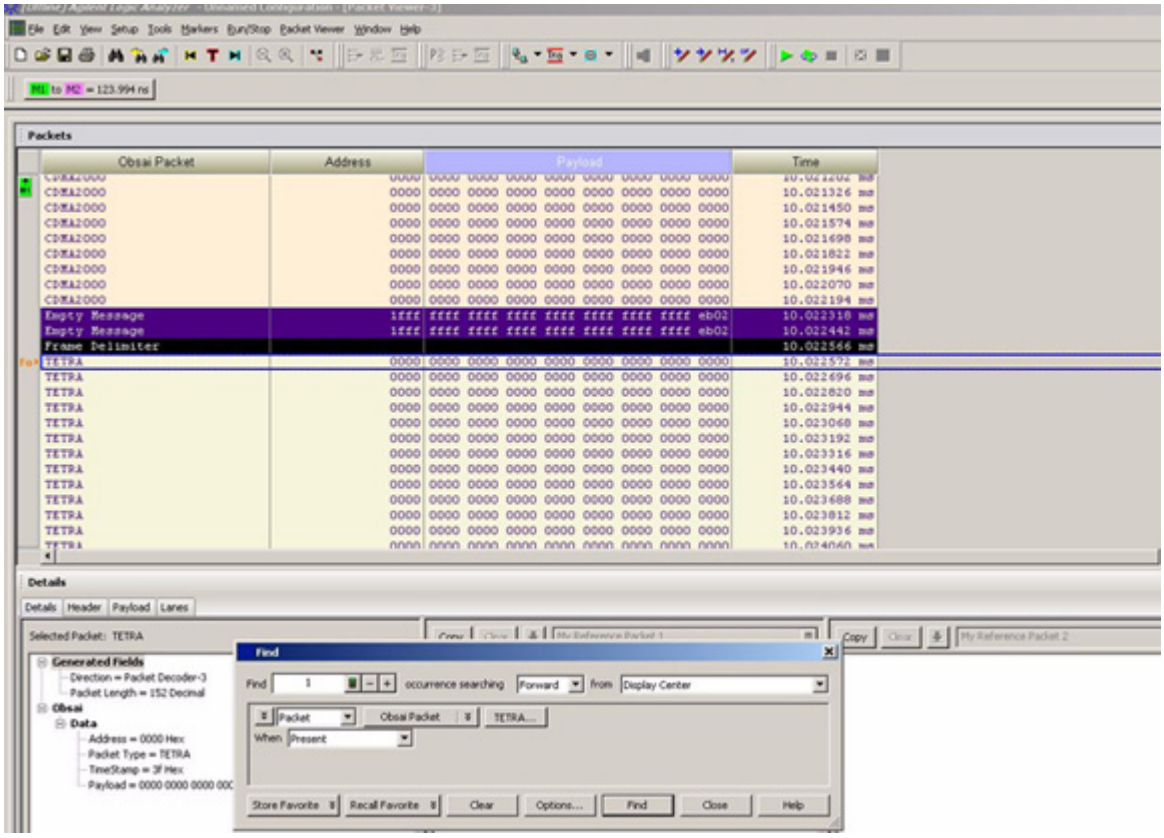


Figure 60 To search a Tetra

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