# Exalt Plus

*Excalibur Analysis*
*Laboratory Tools*

*Quick Start Guide*

**EXCALIBUR**
**EXCALIBUR SYSTEMS**

# Table of Contents

# Starting *Exalt Plus*

To start *Exalt Plus*, select **Start | All Programs | Excalibur | Exalt | Exalt** from the Windows Taskbar. The *Exalt Plus* Main Screen is displayed.



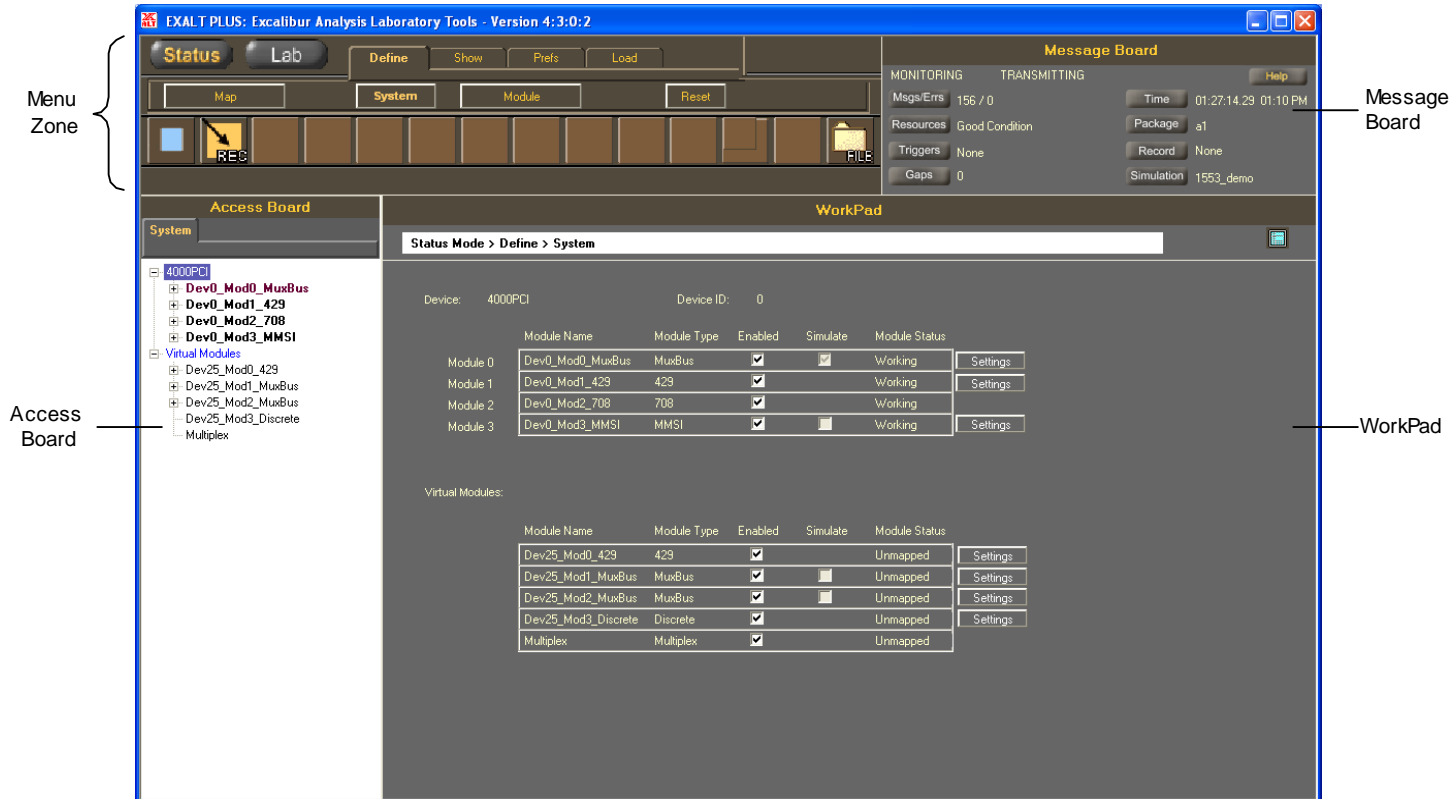**Figure 1**   *Exalt Plus* **Main Screen**

| | • | For Exalt Plus *installation instruction, refer to the* Exalt Plus User's Guide. |
| --- | --- | --- |
| | • | *The areas of the Main Screen can be resized by dragging the lines in between the areas.* |

*Exalt Plus* has two main modes: **Status Mode** and **Lab Mode**. You can switch between modes by clicking on one of the mode buttons at the top-left of the main screen. Each mode has a set of tabs and subtabs. *Exalt Plus* features are activated by clicking on a mode button, a tab, and a subtab, or by clicking an icon on the toolbar below the subtabs.

## Verifying that Your Excalibur Board is Installed Properly

When you start *Exalt Plus* for the first time, the **Status Mode | Define | System** screen is displayed (see **Figure 1**). *Exalt Plus* automatically detects the carrier boards and modules on your system and displays them on the **WorkPad** area of the **Status Mode | Define | System** screen. Check that it says **Working** next to each module. If not, make sure your carrier board is installed properly. For more information, see the `readme.pdf` file on the root folder of the *Exalt Plus CD* and the *Excalibur Installation CD* that came with your carrier board.

## Verifying that *Exalt Plus* is Detecting Traffic on the Bus

To Verify that *Exalt Plus* is Detecting Traffic on the Bus:

1. Make sure that the Excalibur carrier board is connected to a bus on which communication is currently being transmitted.

   When your board is not connected to a bus, you can still monitor data by using **simulation** to transmit data over the bus. When using simulation to transmit data from 1553 and MMSI modules, you can immediately monitor that data in *Exalt Plus* due to the Internal Concurrent Monitor built into these modules. For H009, 429 and Discrete modules, a loopback cable is required to monitor the data that you are transmitting. For information on simulation, see **Simulating Bus Messages** on page 23.

2. In the **Menu Zone** of *Exalt Plus* (see **Figure 1**), select **Status Mode | Show tab | System subtab**.
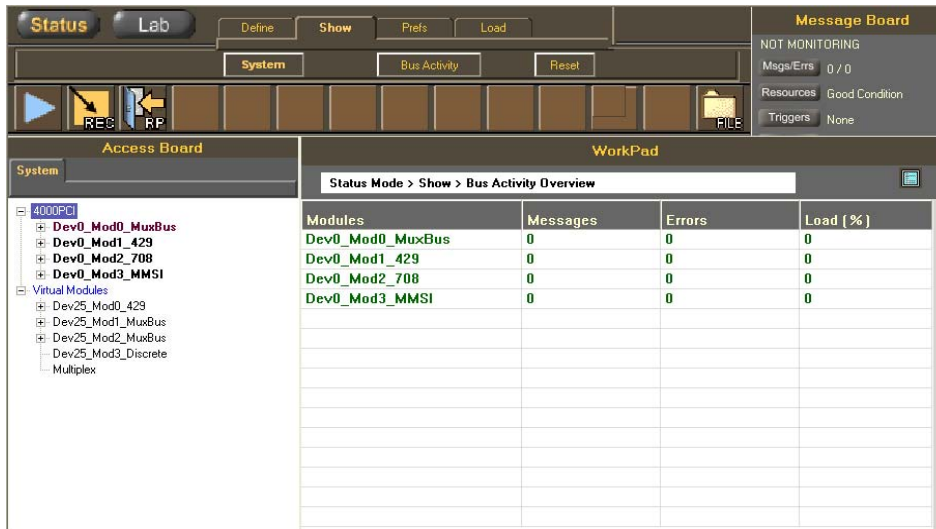


**Figure 2    Status Mode | Show | System Screen**

3. Click the **Start** icon to start monitoring bus communications. The number of messages that *Exalt Plus* has monitored is displayed in the **Messages** column of the **WorkPad**.
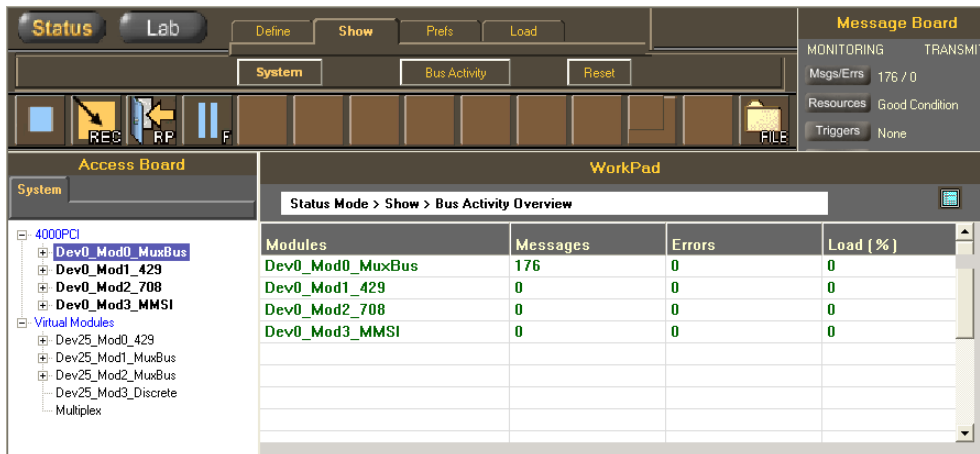


**Figure 3    Monitoring Bus Activity**

4. Select **Lab Mode | Analyze tab** to view the raw data being transmitted over the bus. The **Lab Mode | Analyze** screen is displayed. The data is displayed in the **WorkPad** in hexadecimal format.
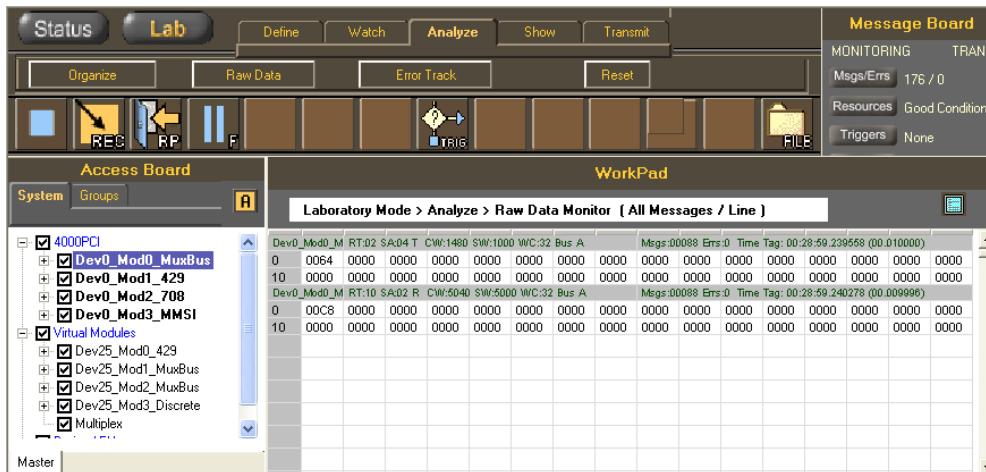


**Figure 4     Lab Mode | Analyze Screen**

# Recording and Replaying Data

To record bus transmission data:

1. Click the **Record** icon  and select **Record checked items**. The **Save As** dialog box is displayed.
2. Type a name for the file.
3. Click **Save**. *Exalt Plus* starts recording bus transmission data. The data is saved in a Replay file (`*.rpf`).
4. Click the **Record** icon again to stop recording.

To replay recorded data:

1. Click the **Replay** icon . The **Load** dialog box is displayed.
2. Select a file and click **OK**. The Replay file is loaded and a new row of icons appears in the **Menu Zone**.

3. Click the **Start** icon  to start the Replay file. The data is displayed in the **WorkPad**.

4. Click the **Stop** icon to stop playing the Replay file.

5. Click the **Exit Replay Mode** icon to return to real-time monitoring.

# Displaying the Data in a User-friendly Format

The next step is to define data units to allow you to display data in a more user-friendly format. *Exalt Plus* data units are called Engineering Units (EUs). An EU is set of bits within a message that represents a specific measured item. For example, an EU can represent the engine temperature or the altitude. EUs are defined in **Lab Mode**, on the **System tab** of the **Access Board**.

## 1553, MMSI and H009 Configuration

For 1553, MMSI and H009, you must first define a Message Type, then you can define one or more EUs under the Message Type. You can specify which bits to use within the message for each EU.

To configure a 1553, MMSI or H009 module:

1. Select **Lab Mode**.
2. In the **System tab** of the **Access Board**, expand a carrier board, a module, an RT, then an SA (or PU and CF for H009).
3. Right-click a message direction (**Rcv** or **Tx**), and select **Add Message Type**. The **Define Message Type** dialog box appears.
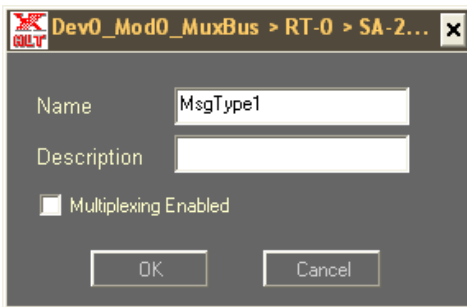


**Figure 5    Define Message Type Dialog Box**

4. Complete the fields, as described in the following table.

| Field Name | Description |
|---|---|
| Name | Name of the Message Type. |
| Description | *[Optional]* Description of the EU. |
| Multiplexing Enabled | *[Optional]* Select this checkbox to enable multiplexing. For information on multiplexing, refer to the *Exalt Plus User's Guide*. |

5. Click **OK**. The Message Type is displayed in the **Access Board**.
6. In the **System tab** of the **Access Board**, right-click a Message Type, and select **Add EU**. The **Define EU** dialog box appears.

**Figure 6    Define EU Dialog Box**

7. Complete the fields, as described in the following table. For additional information, refer to the *Exalt Plus User's Guide*.

| Field Name | Description |
|---|---|
| Name | Name of the EU. Each EU within a Message Type must have a unique name. |
| Description | *[Optional]* Description of the EU. |
| Type | Value type. Available options are: Integer, Unsigned, Sign & magnitude, BCD (Binary Coded Decimal), Floating Point IEEE, String, Discrete 1 Bit, and Discrete 2 Bit. |
| Word | This field determines in which word of the message the EU begins (0–31 or 1–32). An EU can span two words. |
| Bit | This field determines in which bit of the word, the EU begins (0–15). |
| Length | Length of the EU in bits. The available lengths vary depending on the selection in the **Type** field. |
| Radix | Numeric base value. Available options are: decimal, hex, binary, octal. |
| Scale | *[Optional]* Raw data is multiplied by this number before displaying the EU value. |
| Offset | *[Optional]* This number is added to the raw data before displaying the EU value. |
| Base Unit | *[Optional]* Unit of the raw data, for example, Feet. |
| Display Unit | *[Optional]* Unit for display purposes, for example, Meters. |
| Value/Discrete | Whether the data is a value or a discrete. A discrete is a name for a value or range of values. To configure discrete ranges, click **Discrete**. Available options are: Value and Discrete. |
| Primary Visual | Default graph type for this EU. |
| **Display Range** | |
| Low | Lowest value to display on graphs. |
| High | Highest value to display on graphs. |

| Field Name | Description |
|---|---|
| **Alarm** | |
| Low | *[Optional]* Low value for alarm. |
| High | *[Optional]* High value for alarm. |
| Type | *[Optional]* This field determines whether the alarm values are within the Low and High values, or outside of these values. Available options are: Within Limits and Out of Limits. |

8.  To define discretes for value range, click **Discretes**. For more information, refer to the *Exalt Plus User's Guide*.

9.  Click **OK**. The EU is created.

10. Select **Lab Mode | Watch tab**.

11. Click the **Start** icon  to start monitoring bus communications. The values of the defined EUs are displayed in the **WorkPad**.

## ARINC 429 Configuration

For ARINC 429 modules, EUs are created under labels.

To configure an ARINC 429 module:

1. Select **Lab Mode**.
2. In the **System tab** of the **Access Board**, expand a carrier board and a module.
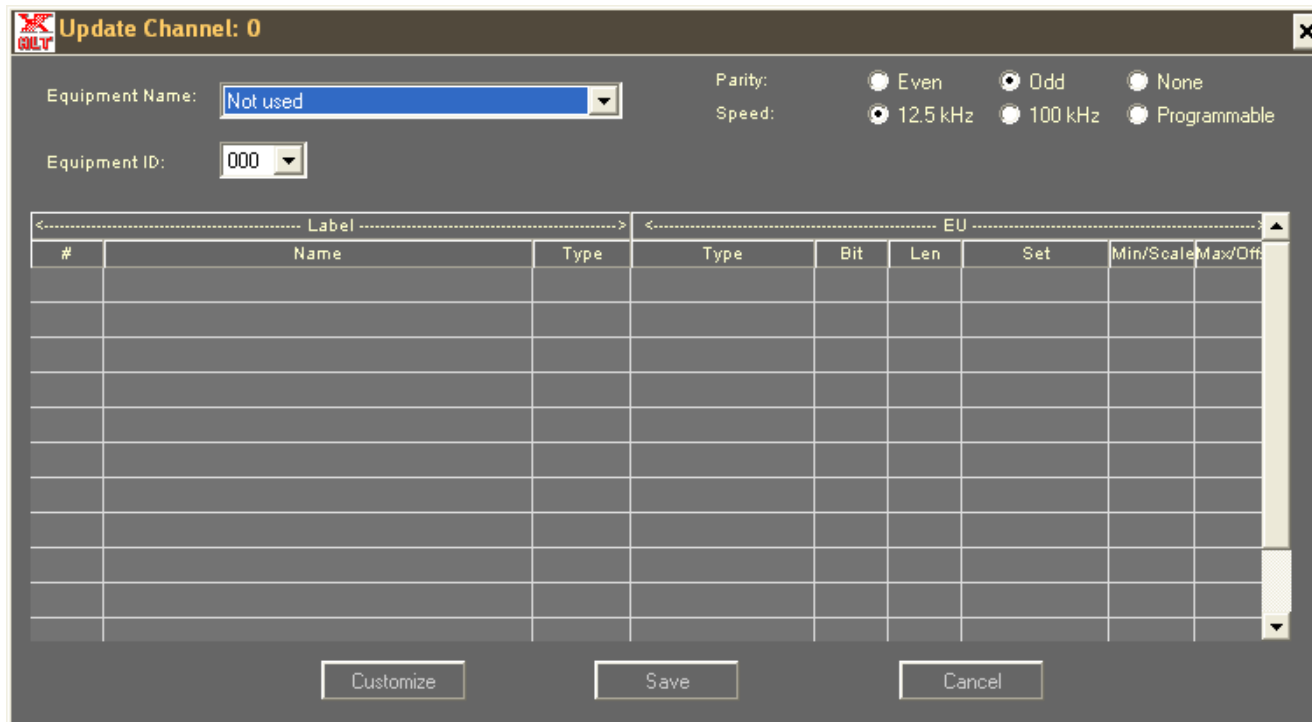3. Right-click a channel and select **Update Channel**. The **Update Channel** dialog box appears.



**Figure 7    Update Channel Dialog Box**

4. Complete the fields, as described in the following table. For additional information, refer to the *Exalt Plus User's Guide*.

| Field Name | Description |
| --- | --- |
| Equipment Name | Name of the channel. Each equipment name contains a set of labels. Each label contains one or more EUs. When you first run *Exalt Plus*, all the equipment names in the list are **Spec**. That is, they are predefined according to ARINC 429 specifications. |
| Equipment ID | ID number of the equipment name. The equipment ID is selected automatically based on the equipment name. |
| Parity | Available options are: Even, Odd and None |
| Speed | Speed of communication. Available options are: 12.5 kHz, 100 kHz, Programmable. |

5. Click **Save**. The equipment name is added the **Access Board**.

6. Select **Lab Mode | Watch tab**.

7. Click the **Start** icon ▶ to start monitoring bus communications. The values of the defined EUs are displayed in the **WorkPad**.

## ARINC 708 Configuration

For ARINC 708 modules, each of the two channels has a Message Type. The ARINC 708 Specification Word bits are designated as EUs under the Message Type.

### To add or modify an ARINC 708 EU:

1. Select **Lab Mode**.

2. In the **System tab** of the **Access Board**, expand a carrier board, a module, a channel, then a Message Type.

3.  Do of the following:
    a.  To add an EU, right-click a Message Type, and select **Add EU**.
    b.  To modify an existing EU, right-click an EU, and select **Update**. The **Define EU** dialog box appears.



**Figure 8    Define EU Dialog Box**

4.  Complete the fields, as described in **1553, MMSI and H009 Configuration**. See page 10.
5.  To define discretes for value range, click **Discretes**. For more information, refer to the *Exalt Plus User's Guide*.
6.  Click **OK**. The EU is added/modified.
7.  Select **Lab Mode | Watch tab**.
8.  Click the **Start** icon ▶ to start monitoring bus communications. The values of the defined EUs are displayed in the **WorkPad**.
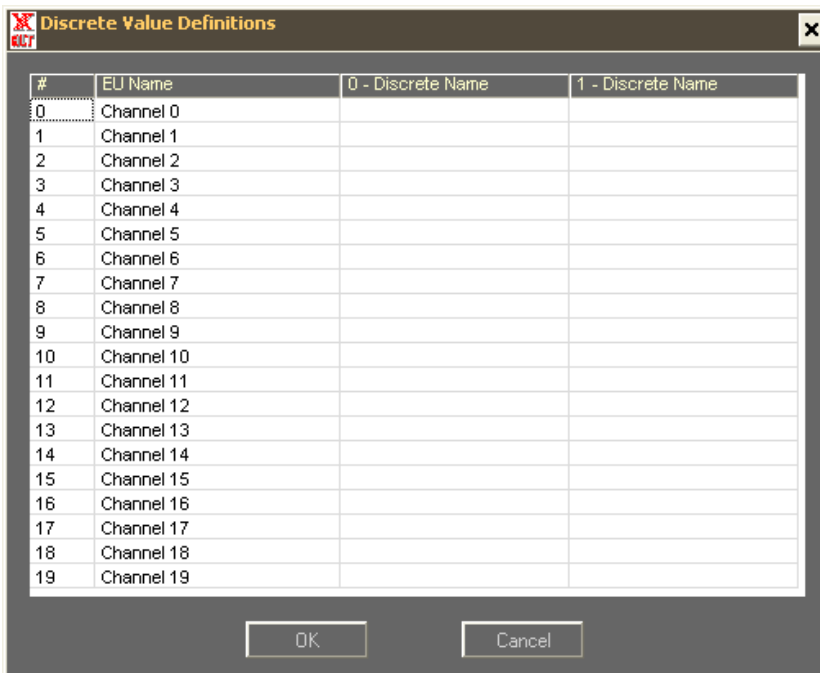
## Discrete Configuration

For Discrete modules, each channel is an EU.

To configure a Discrete module:

1. Select **Lab Mode**.
2. In the **System** or **Groups tab** of the **Access Board**, expand a carrier board and a module.
3. Right-click **Discrete Message** and select **Update discrete channels**. The **Discrete Value Definitions** dialog box is displayed.



**Figure 9     Discrete Value Definitions Dialog Box**
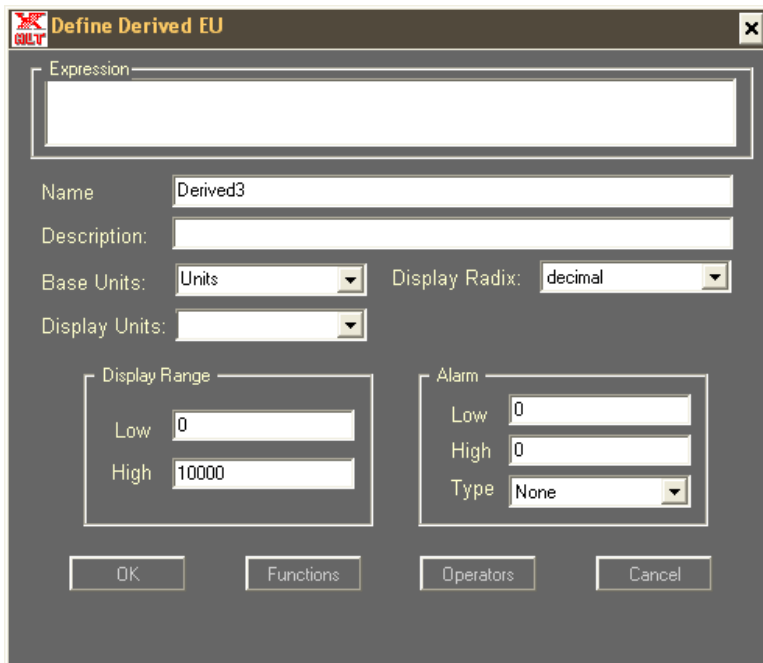
4. For each discrete channel that you want to name, type a name for the channel and its values.
5. Click **OK**. The discrete channels are configured.
6. Select **Lab Mode | Watch tab**.

7. Click the **Start** icon ▶ to start monitoring bus communications. The values of the defined EUs are displayed in the **WorkPad**.

## Creating Derived EUs

A derived EU is an EU that is derived from a function of two or more EUs, or one EU augmented by a function.

To create a derived EU:

1. Select **Lab Mode | Watch tab | Derived EU subtab**. The **Define Derived EU** dialog box is displayed.

**Figure 10   Define Derived EU Dialog Box**

2. Expand the items on the **Access Board** until the desired EUs are displayed.

3.  Complete the fields, as described in the following table. For additional information, refer to the *Exalt Plus User's Guide*.

| Field Name | Description |
| --- | --- |
| Expression | Drag one or more EUs to the Expression box. Click **Functions** and **Operators** to add functions and operators to the expression. |
| Name | Name of the derived EU. |
| Description | *[Optional]* Description of the derived EU. |
| Base Units | *[Optional]* Unit of the raw data, for example, Feet. |
| Display Units | *[Optional]* Unit for display purposes, for example, Meters. |
| Display Radix | Numeric base value. Available options are: decimal, hex, binary, octal. |
| **Display Range** | |
| Low | Lowest value to display on graphs. |
| High | Highest value to display on graphs. |
| **Alarm** | |
| Low | *[Optional]* Low value for alarm. |
| High | *[Optional]* High value for alarm. |
| Type | *[Optional]* This field determines whether the alarm values are within the Low and High values, or outside of these values. Available options are: Within Limits and Out of Limits. |

4.  Click **OK**. The derived EU is added at the bottom of the **Access Board**.

# Creating Graphs

> *The instruction in this section are for 1553 modules using Graphic Time Plot. Instructions for other modules and other graphs may vary.*

To create a graph:

1.  Select **Lab Mode | Watch tab**.

2.  In the **System** or **Groups tab** of the **Access Board**, expand a carrier board, a module, an RT, an SA, then a direction (Message Type). The list of configured EUs is displayed under the Message Type.

3.  Right-click an EU, and select **Graphic Time Plot**. The Graphic Time Plot is displayed.
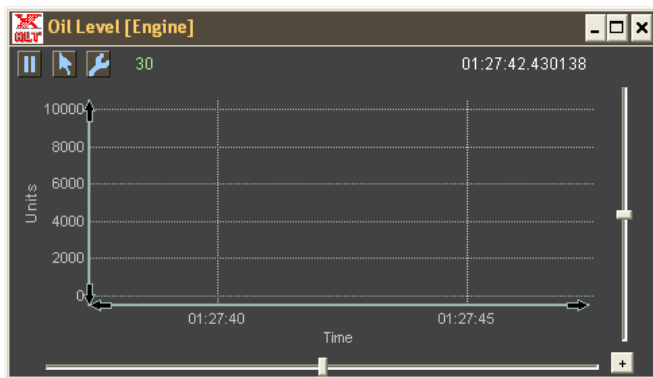


**Figure 11   Graphic Time Plot**

4.  Drag another EU from the **Access Board** onto the graph. Both EUs are displayed on the graph.

5.  Click the **Graph Parameters** icon . The **Graph Parameters** dialog box is displayed.
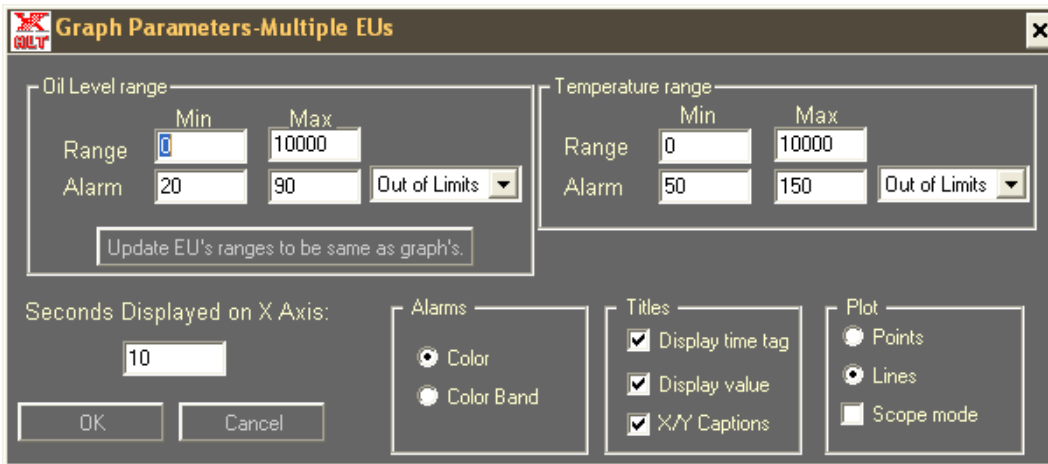
**Figure 12   Graph Parameters Dialog Box**

6. Complete the fields, as described in the following table.

| Field Name | Description |
| --- | --- |
| Range Min | Lowest value to display on this graph. |
| Range Max | Highest value to display on this graph. |
| Seconds Displayed on X Axis | Number of seconds to display on the graph. |
| **Alarms** | |
| Color | Line colors reflect whether the current value is within the alarm range. |
| Color Band | Color bands mark the alarm range. |

| Field Name | Description |
|---|---|
| **Titles** | |
| Display time tag | Display the Time tag at the top-right of the graph. |
| Display value | Display the current EU value at the top-left of the graph. |
| X/Y Captions | Display the names of the X and Y axes. |
| **Plot** | |
| Points | Plot graph using dots. |
| Lines | Plot graph using lines. |
| Scope mode | Display each graph screen overlapping the previous one, similar to an oscilloscope. |

7. To update the EU's range and alarm properties to match this graph's, click **Update EU's ranges to be same as graph's**.

8. Click **OK**. The settings are applied to the graph.

9. Click the **Start** icon ▶ in the **Menu Zone**. The graph data is displayed.
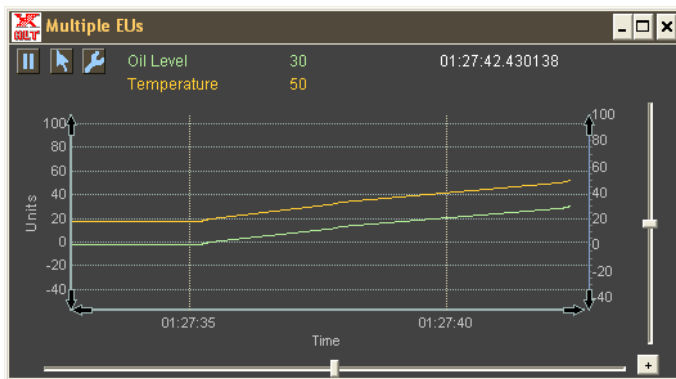


**Figure 13   Graphic Time Plot with Data**

10. To remove an EU from the graph, right-click an EU at the top of the graph and select **Delete from graph**.

11. Graphs are floating by default. That is, they are displayed on all tabs of the **WorkPad**. (The tabs appear at the bottom of the **WorkPad**.) To dock the graph to a new tabbed page, right-click the graph and select **Dock to new page**.

All graphs are saved with the *Exalt Plus* package file. For more information, see **Saving Your Exalt Plus Configuration** on page 37.

# Simulating Bus Messages

Simulation mode allows the avionics systems tester to transmit data over the bus.
- For 1553 and MMSI, this enables the tester to act as a Bus Controller and Concurrent Remote Terminal(s).
- For H009, this enables the tester to act as Peripheral Units and Control Fields.
- For 429, this enables the tester to act as a transmitter.
- For Discrete modules, this enables the tester to act as output (transmit) channel.

Simulation is configured on the **Transmit tab** in **Lab Mode**. The **Transmit tab** is displayed when at least one module or channel is designated for simulation. After a module or channel is designated for simulation, you can define the data to be transmitted over the bus. The set of data to be transmitted is called a **simulation scenario**. You can define and save several simulation scenarios. Each scenario is saved in a separate file (**`*.scn`**).

The process for configuring simulation varies depending on the module:

- For 1553, MMSI and H009 modules, see **1553, MMSI and H009 Simulation** on page 24.
- For ARINC 429 modules, see **ARINC 429 Simulation** on page 30.
- For Discrete modules, see **Discrete Simulation** on page 35.

# 1553, MMSI and H009 Simulation

To configure simulation for 1553, MMSI and H009 modules:

1. Select **Lab Mode**.

2. In the **System** or **Groups tab** of the **Access Board**, expand a carrier board.

3. Right-click a module, and select **Use this module for simulation**. The **Transmit tab** is added to the **Menu Zone**. The module name is displayed in **mauve** on the **Access Board** to indicate that it is being used for simulation.

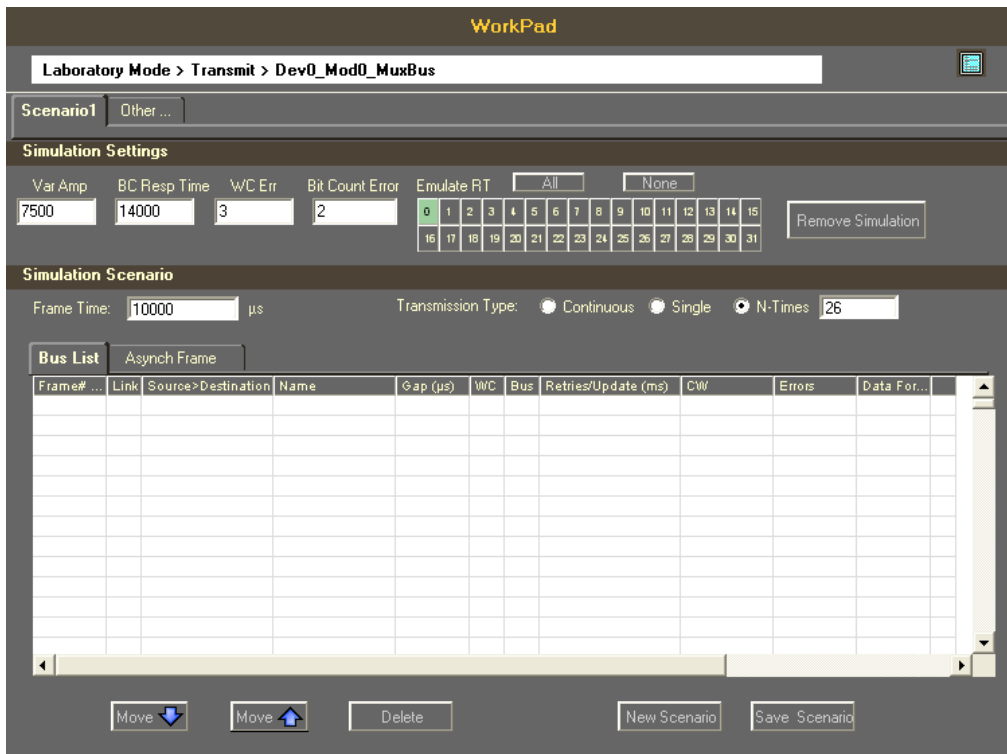4. Select the **Transmit tab**. The **Simulation Scenario** area is displayed in the **WorkPad**.



**Figure 14   Simulation Scenario Bus List**

5. Complete the fields, as described in the following table. For additional information, refer to the *Exalt Plus User's Guide*.

| Field Name | Description |
| --- | --- |
| **Scenario Settings** | |
| Var Amp | Set the variable amplitude. Available values are: 0–7,500 milliVolts/peak |
| BC Resp Time | Set the Bus Controller response time. Available values are: <br> For M4K1553PxII: 2000–32,000 nSec <br> For M4KMMSI: 2000–12,000 nSec |
| WC Err | Transmits a the wrong number of words (Word Count Error). Available values are: +3 to -3 |
| Bit Count Error | Transmits a Bit Count Error. This number of bits is added or subtracted from the usual 16 bits of a Command Word. Available values are: +3 to -3 |
| Emulate RT | To send messages to an RT that is not connected to the bus, create a virtual RT by clicking an RT number. Click **All** to emulate all RTs. Click **None** to remove emulation from all RTs. |
| **Simulation Scenario** | |
| Frame Time | Total amount of time in microseconds (µs) to send all messages in the simulation scenario. After this time period, the messages are resent (according to the amount of times configured in the **Transmission Type** field). This allows you to configure a gap time after sending all messages in the simulation scenario. The maximum value is 660,000,000 µs. <br><br> When using multiple frames within a simulation scenario, this value is the total amount of time in microseconds (µs) to send all messages within each frame. After this time period, the next frame is sent. This allows you to configure a gap time between frames. The maximum value per frame is 800,000 µs. |
| Transmission Type | Define how many times to transmit this simulation scenario. Available values are: Continuous, Single (once) and N-Times. |

6.  Add one or more messages to the scenario. Do one of the following:

    a.  To add a Quick Message to the simulation scenario, double-click a blank row in the bus list area. The **Define Quick Message** dialog box is displayed.
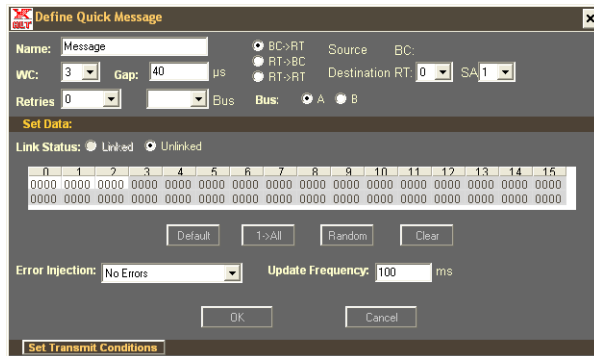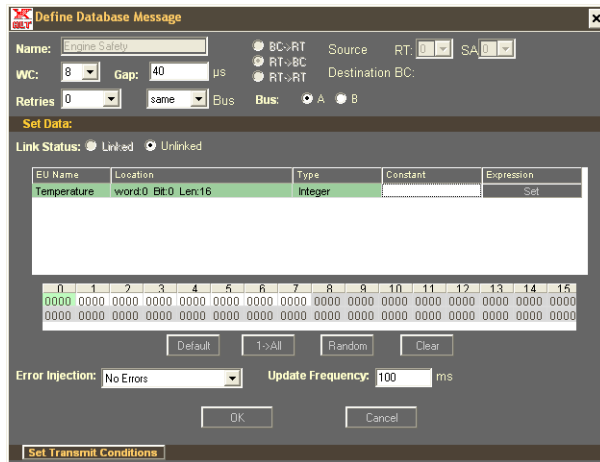


**Figure 15   Define Quick Message Dialog Box**

    b.  Complete the fields in the **Define Quick Message** dialog box. The fields in this dialog box are similar to the fields in the **Define Database Message** dialog box. For a description of the fields, see page 27.

    c.  Enter data values. Do one of the following:
        - Type a hexadecimal value in each cell of the Word table.
        - To insert default values, click **Default**.
        - To copy the data from the first cell to all other words (up to the number of words defined in the **WC** field), click **1 -> All**.
        - To insert random data, click **Random**.
        - To clear the values, click **Clear**.

    d.  *[Optional]* To configure transmit condition, click Set Transmit Conditions. For more information, refer to the *Exalt Plus User's Guide*.

    e.  Click **OK**. The Quick Message is added to the simulation scenario.

*or*

a. To add a Database Message to the simulation scenario, drag a Message Type from the **Access Board** to the bus list area of the simulation scenario. The **Database Message** dialog box is displayed.



**Figure 16   Define Database Message Dialog Box**

b. Complete the desired fields, as described in the following table. For more information, refer to the *Exalt Plus User's Guide*.

| Field Name | Description |
|---|---|
| Name | Name of the Quick Message. |
| WC | Number of 16-bit words to send in the message. Available values are: 1–32. |
| Retries | Number of times to resend the message in case of transmission error. |
| Gap | Intermessage gap time in microseconds (µs). The minimum gap time is 4 µs. |
| Bus | Select whether to send all retries on the same bus, or to alternate between buses. Available values are: same and alternate. |
| Bus A | Send messages on bus A. |
| Bus B | Send messages on bus B. |

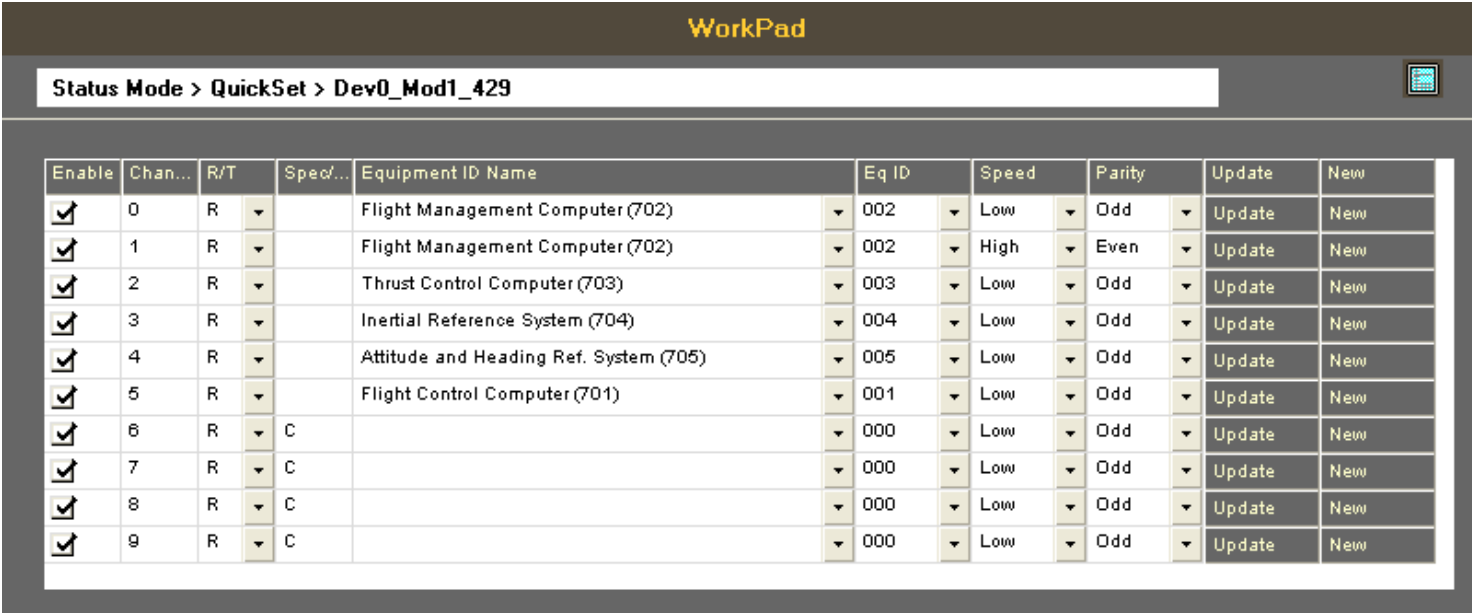| Field Name | Description |
| --- | --- |
| BC->RT | Send BC to RT message. |
| RT->BC | Send RT to BC message. |
| RT->RT | Send RT to RT message. |
| Destination RT | RT and SA number of the message destination. |
| **Set Data** | |
| Linked Status | Whether the message is linked to another message. When two messages are linked, there are sent twice, but only once instance is stored in memory. Changes to one linked message affect the other message. This is useful when you want to send the same message two or more times, but only store it once in memory. <br><br> Messages are linked by default when you drag a message from within the simulation scenario to a blank row in the scenario, or when you drag the same message two or more times from the **Access Board** to the simulation scenario. Available options are: Linked and Unlinked. |
| Error Injection | *[Optional]* Select the type of error to inject into the message: Available options are: No Errors, Non_Contiguous Words, Incorrect Word Count, Incorrect Bit Count, Incorrect Parity, Incorrect Sync. |
| Update Frequency | Frequency in milliseconds to increment the **timeval** value, when using the **timeval** function in an expression. |

c.  Enter data values. Do one of the following:
- For each EU, type a decimal value in the **Constant** column of the EU table, or type a hexadecimal value in the coresponding cells of the Word table.
- To insert default values, click **Default**.
- To copy the data from the first cell to all other words (up to the number of words defined in the **WC** field), click **1 -> All**.
- To insert random data, click **Random**.
- To clear the values, click **Clear**.

d. To use an expression instead of a constant value, click **Set** in the **Expression** column. An expression box is displayed in the dialog box. Do one of the following:
   - Type an expression in the expression box.
   - Drag one or more EUs from the **Access Board** to the expression box.
   - Click **Functions** and **Operators** to add functions and operators to the expression.

e. *[Optional]* To configure transmit condition, click Set Transmit Conditions. For more information, refer to the *Exalt Plus User's Guide*.

f. Click **OK**. The Database Message is added to the simulation scenario.

7. Click the **Start** icon ▶ to start transmitting and monitoring bus communications.

8. Select **Lab Mode | Watch tab** to view the transmitted data. For H009 modules, a loopback cable is required to view the transmitted data.

## ARINC 429 Simulation

To configure simulation for 429 channels:

1. Select **Status Mode | Define tab | System subtab**. The **Status Mode | Define | System** screen is displayed.
2. In the **Workpad**, click **Settings** next to the module. The **Status Mode | Quickset** screen is displayed.



**Figure 17   Status Mode | Quickset Screen**

3. For each channel you would like to use for simulation, click the arrow in the **R/T** column and select 'T'. The channel and module name are displayed in **mauve** on the **Access Board** to indicate that the channel is being used for simulation.
4. Select **Lab Mode | Transmit tab.**
5. In the **System** or **Groups tab** of the **Access Board**, expand a carrier board, a module, and select a channel configured for simulation.

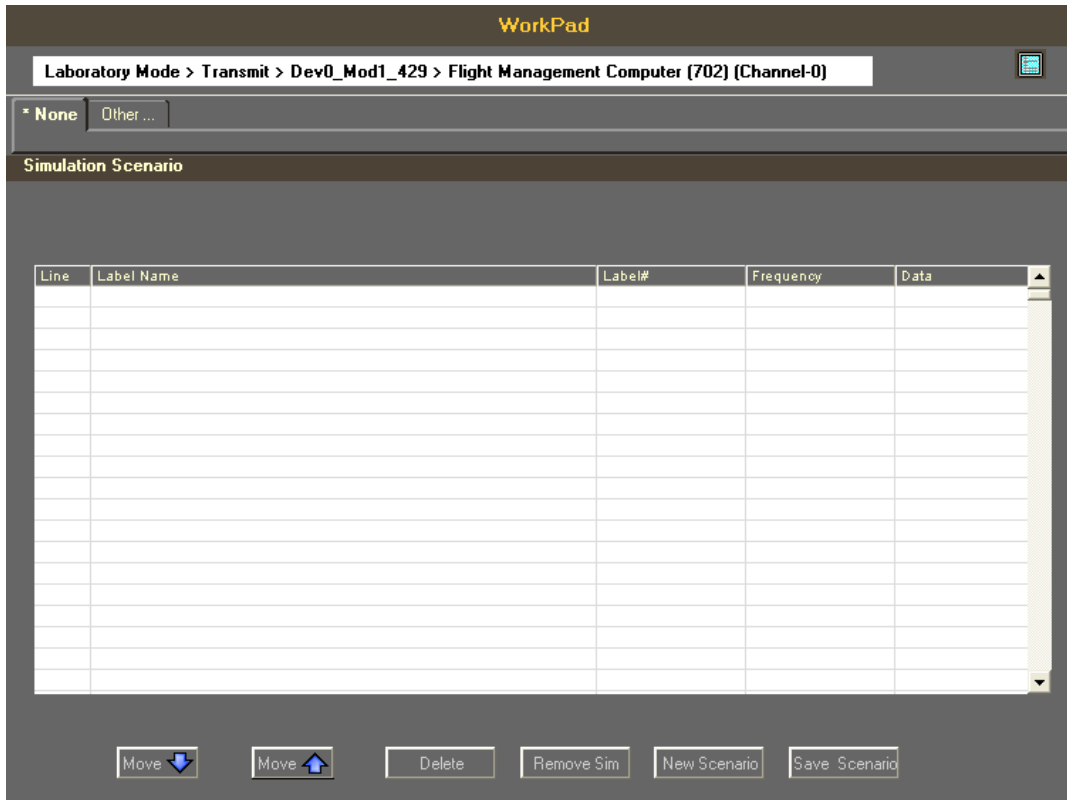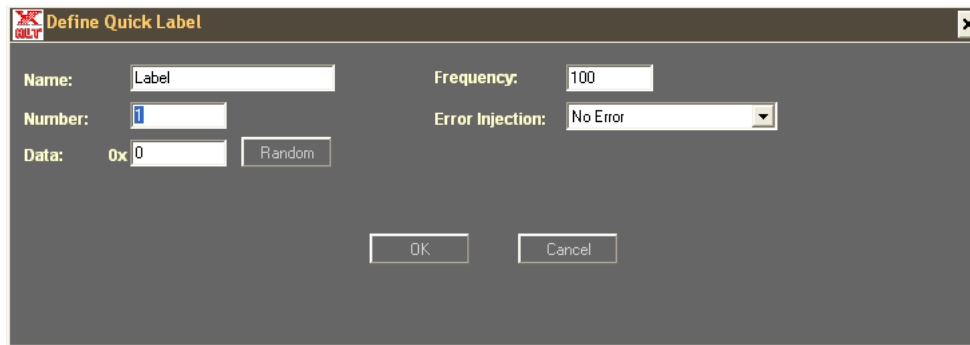6.  The **Simulation Scenario** area is displayed in the **WorkPad**.



**Figure 18   Simulation Scenario Label List**

7.  Add one or more messages to the scenario. Do one of the following:

    a.  To add a Quick Label (message) to the simulation scenario, double-click a blank row in the label list area. The **Define Quick Label** dialog box is displayed.



**Figure 19   Define Quick Label Dialog Box**

    b.  Complete the fields in the **Define Quick Label** dialog box. The fields in this dialog box are similar to the fields in the **Define Database Label** dialog box. For a description of the fields, see page 33.

    c.  Click **OK**. The Quick Label is added to the simulation scenario.

*or*

a. To add a Database Label (message) to the simulation scenario, in the **System** or **Groups tab** of the **Access Board**, expand a channel, then a label. The configured EUs are displayed under the label.

b. Drag a label from the **Access Board** to the label list area of the simulation scenario. The **Define Database Label** dialog box is displayed.
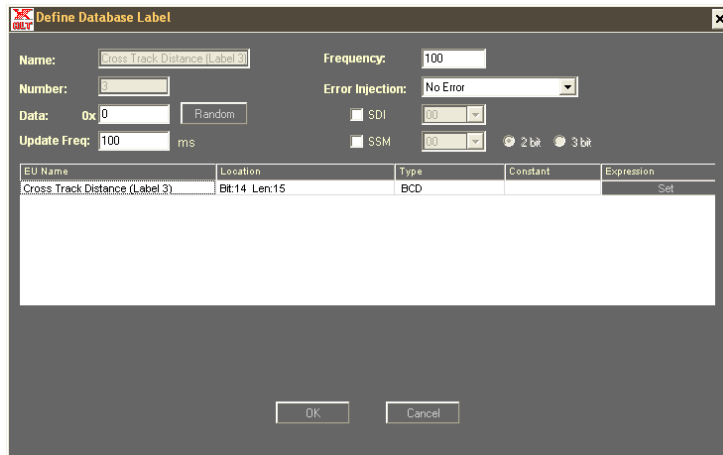


**Figure 20   Define Database Label Dialog Box**

c. Complete the fields, as described in the following table. For more information, refer to the *Exalt Plus User's Guide*.

| Field Name | Description |
| --- | --- |
| Name | Name of channel (equipment name). |
| Number | Equipment ID number. |
| Data | Displays the total value of the Database Label (message) in hexadecimal format. |
| Update Freq | Frequency in milliseconds to increment the **timeval** value, when using the **timeval** function in an expression. |
| Frequency | Frequency in milliseconds that the label is transmitted over the bus. |
| Error Injection | *[Optional]* Select the type of error to inject into the message: Available options are: No Error, Parity Error (in every word), Null bit error (in ARINC bit 2), Stretch bit error (in ARINC bit 2), Bit count high (33 bits transmitted), Bit count low (31 bits transmitted), Suppress parity (no parity). |

| Field Name | Description |
| --- | --- |
| SDI | To use a Source Destination Identifier, select the SDI checkbox, then select 00, 01, 10 or 11 from the drop-down box. |
| SSM | To use a Sign/Status Matrix, select the SSM checkbox, then either select 2 bit and select 00, 01, 10 or 11 from the drop-down box, or select 3 bit and select 000, 001, 010, 011, 100, 101, 110, 111 from the drop-down box. |

    d.   To use a constant value, type a decimal value for each EU in the **Constant** column.

    e.   To use an expression instead of a constant value, click **Set** in the **Expression** column. An expression box is displayed in the dialog box. Do one of the following:

- Type an expression in the expression box.
- Drag one or more EUs from the **Access Board** to the expression box.
- Click **Functions** and **Operators** to add functions and operators to the expression.

    f.   Click **OK**. The Database Label is added to the simulation scenario.

8.   Click the **Start** icon ▶ to start transmitting and monitoring bus communications.

9.   When a loopback cable is connected to the 429 module, you can view the transmitted data by selecting **Lab Mode | Watch tab**.

## Discrete Simulation

To configure simulation for Discrete channels:

1.  Select **Status Mode | Define tab | System subtab**. The **Status Mode | Define | System** screen is displayed.
2.  In the **Workpad**, click **Settings** next to the module. The **Status Mode | Quickset** screen is displayed.
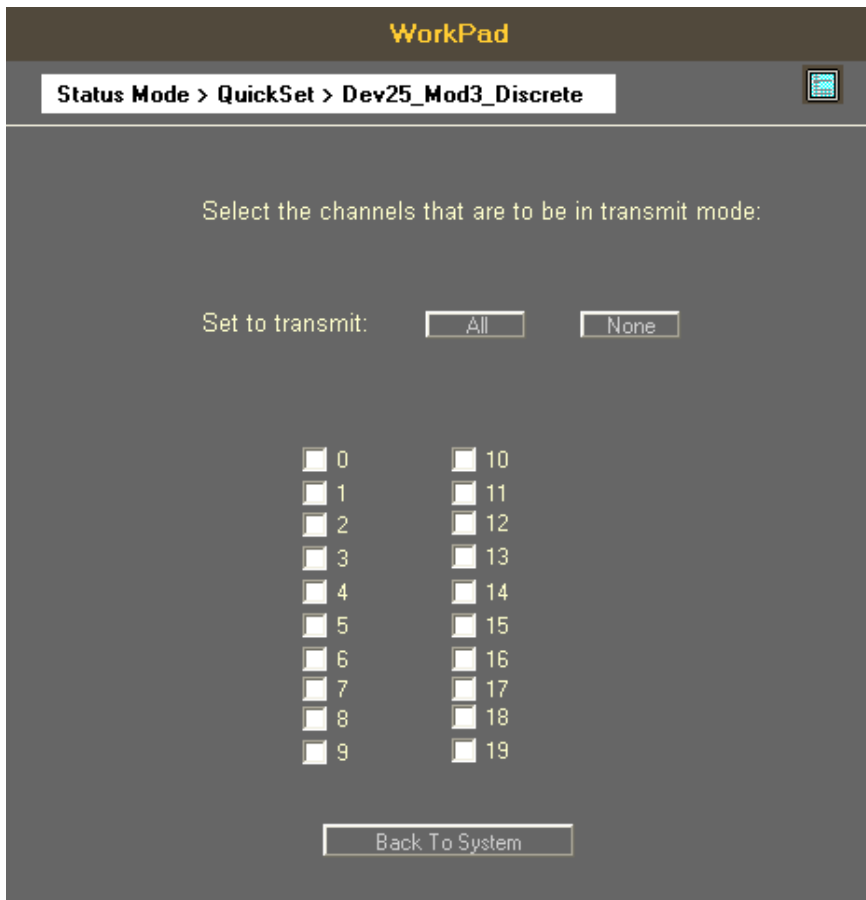


**Figure 21   Status Mode | Quickset Screen**

3.  Select the channels you would like to use for simulation.

4.  Select **Lab Mode | Transmit tab**.

5.  In the **System** or **Groups tab** of the **Access Board**, expand a carrier board and select a module.

6.  The **Simulation Scenario** area is displayed in the **WorkPad**.



**Figure 22   Discrete Module Simulation Scenario**

7. Expand the module and the Discrete Message. The channels configured for simulation are displayed in **red** and the module name is displayed in **mauve** on the **Access Board**.

8. To add an expression, right-click a simulation channel and select **Set channel function**. The **Channel Expression** dialog box is displayed.
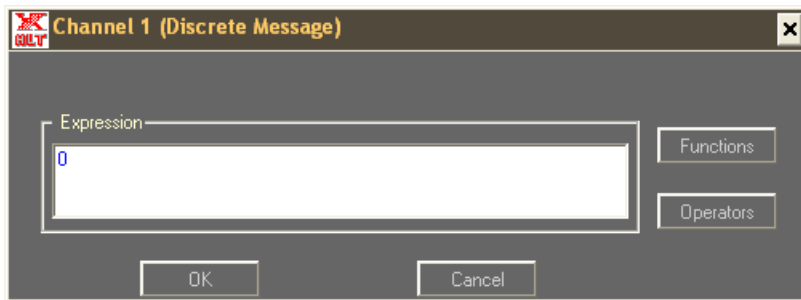


**Figure 23   Channel Expression Dialog Box**

9. Do one of the following:
    - Type an expression in the expression box.
    - Drag one or more Discrete channels from the **Access Board** to the expression box.
    - Click **Functions** and **Operators** to add functions and operators to the expression.

10. Click the **Start** icon ▶ to start transmitting and monitoring bus communications.

11. When a loopback cable is connected to the Discrete module, you can view the transmitted data by selecting **Lab Mode | Watch tab**.

# Saving Your *Exalt Plus* Configuration

When closing *Exalt Plus*, you are asked whether you want to save the package and then whether you want to save the scenario file. The package file (**\*.pak**) contains the entire configuration including all defined EUs and graphs. Simulation scenarios are saved in separate scenario files (**\*.scn**).

The most recently saved package and scenario files are automatically loaded when you restart *Exalt Plus*.

**Disclaimer**

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