wyle

Telemetry and Data Systems

CHAPTER 10 RECORDER

USER GUIDE 2.8p2

501-281000-001 A24

This page intentionally left mostly blank.

NOTICE

This document and all subject matter disclosed herein are proprietary items to which Wyle Telemetry and Data Systems retains the exclusive rights.

The information in this document has been carefully checked and is believed to be entirely reliable. While all reasonable efforts to ensure accuracy have been taken in the preparation of this manual, Wyle Telemetry and Data Systems assumes no responsibility resulting from omissions or errors in this manual or from the use of information contained herein.

Wyle Telemetry and Data Systems products and the information supplied in this document are subject to change without notice. Products may be changed to improve reliability, performance, function, or design.

Wyle Telemetry and Data Systems does not assume any liability arising out of the application or use of any product or circuit described herein; nor does Wyle Telemetry and Data Systems convey any license under its patent rights or the rights of others.

Inquiries should be addressed to:

Wyle
Telemetry and Data Systems
Publications Department
44417 Pecan Court
California, Maryland 20619

This page intentionally left mostly blank.

Welcome

You now have access to what we believe is the most versatile, capable, and easy to use ground based IRIG 106 Chapter 10 Recorder on the market. This product was designed first and foremost to meet the demanding needs of the high paced data acquisition laboratory environment.

Some of the features that make the **IMUX G2** stand out include:

- Intuitive Graphical User Interface (GUI) that gets you going right out of the box.
- Individual channel reconfiguration on the fly with no impact to other channels or current operations.
- Quick Global reconfiguration based on standard TMATS files.
- Multiple simultaneous recording to local and Network Attached Storage (NAS) devices.
- Network accessible control and monitoring.
- Channel-specific lag adjustments to account for known fixed data link delays.
- Real-time creation and recording of virtual PCM best data streams using Wyle's Best Data Engine (BDE) technology.
- Real-time links to OMEGA-SERV, allowing immediate integrated local or remote processing of recorded data using Wyle's Powered-by-OMEGA (PBO) technology.
- Embedded links to other high-end data processing tools such as the OMEGA Data Environment (ODE).

At Wyle Telemetry and Data Systems, we are committed to helping our customers by providing tools that give end users easy access to their collected mission critical data. We include input from telemetry users throughout the design phase of our products to make sure we add in the features that make your job easier. If you see something that you think needs to be changed, we want to hear from you.

Any time you have questions or concerns, please send an e-mail to us at G2@wyle.com or give us a call at 301-863-1661.

Tim Gatton
Product Line Manager
Wyle
Telemetry and Data Systems

This page intentionally left mostly blank.

Table of Contents

This page intentionally left mostly blank.

Introduction

What Is IMUX G2?

IMUX G2 is a ground/laboratory data recorder/reproducer that creates and ingests data files compliant with the IRIG 106 Chapter 10 Digital On-Board Recorder Standard. The **IMUX G2** Graphical User Interface (GUI) is designed for easy hands-on use in a laboratory environment, yet the underlying and well documented TCP/IP command set allows full remote computer control across a network connection.

Whether using the TCP/IP command set or the GUI described by this manual, a user has all the flexibility necessary to control all aspects of **IMUX G2** recording and reproducing. The interface allows a user to configure all input and output channels, manage multiple media and target locations, create different record lists for simultaneously recording different data sets to different locations, play back Chapter 10 compliant files, and select individual or multiple segments for simultaneous playback.

The **IMUX G2** GUI automatically interacts with the **IMUX G2** Controller software, which is responsible for managing the operations of the **IMUX G2** Chapter 10 Recorder. Because of this, the GUI, or any remote connection, can be shut down and the Recorder will continue to operate. When a remote connection or the GUI is reopened, it receives updated status from the controller and is able to present that information to the user.

IMUX G2 hardware can be configured in a myriad of ways with up to 256 input channels and 256 output channels. This manual includes details and examples that may not apply to your purchased hardware configuration. We are constantly developing new input/output modules to better meet your needs. If you notice that a particular channel type is not listed and have a need for it, contact the factory and we can discuss when it will be available.

What Is In the Manual?

The manual has the following main sections.

- **Getting Started** describes the basics of the **IMUX G2** GUI and provides some one-page Quick Start guides to help you start recording and playing back data right out of the box.

- **The Interface Explained** provides details on the purpose and use of each of the main windows as well as the Menu Bar, the Toolbars, and the Status Tray. Each section starts with covering the general operation of each higher level item and then dives into the details to give you everything you need to know to take advantage of the little features that make **IMUX G2** so versatile.

- **Menu Details** provides any remaining details for all of the menu items. In some cases, the menu items are just another way to do something that has already been covered in detail elsewhere. For those items the details will be limited. However, there are some things that are only available from the Menu Bar, and this section will provide all the details necessary to understand how to take advantage of those features.

- **Appendices** include Definitions, Frequently Asked Questions, and a Cross Reference table that covers Icons, Accelerator Keys, and Hot Keys.

How to Use the Manual

Depending on the level of experience you have, you may wish to use the manual in the following ways.

- As a new user, read the *Getting Started* section to get a good idea about what the **IMUX G2** can do and to learn how to perform the basic operations. When you understand the basics, refer to the remaining sections to read more about specific features.

- When comfortable with the basic operation, review the section titled *The Interface Explained*, which covers the details of the main windows and how you can use the features to your advantage.

- To understand how to set up and configure the system level aspects of the **IMUX G2**, read the *Menu Details* section

- Use the *Appendices* as quick look-up tables for the information covered in this manual.

Getting Help From Within the Program

The ultimate source of help is this manual, which is available from within the **IMUX G2** GUI by selecting *Help > Help* from the Menu Bar or by pressing **F1** while in the application.

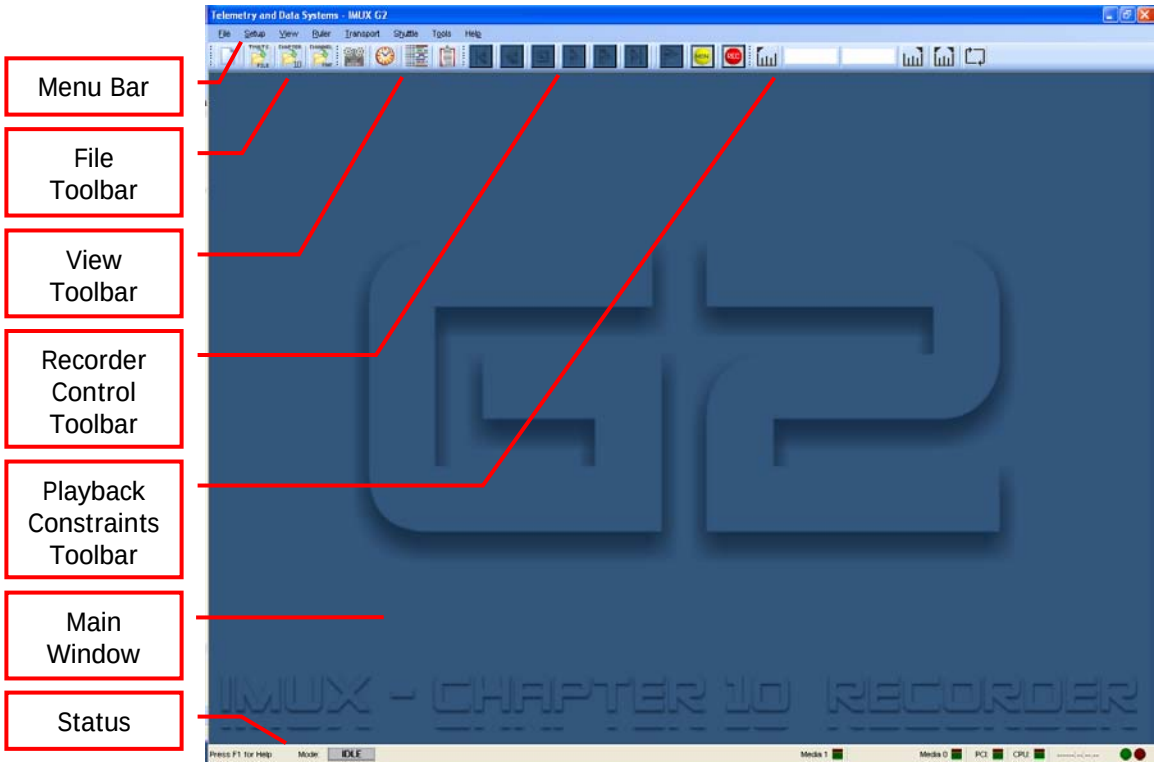
Using Training Mode

The **IMUX G2** GUI can operate in a training mode that does not require the installation of hardware. It is not possible to record or play back data while operating within the training mode. Nor is it possible to use the Snapshot Viewers. However, in all other ways, the interface will operate just as if it were processing data.

Getting Started

Starting the Program

The first time the **IMUX G2** GUI is started, none of the display windows are activated. In subsequent starts, the windows will be displayed just as they were when the application last closed.



Opening the Primary Display Windows

The four primary displays can each be started in one of two ways:

To view the **Recorder Transport Control** display, select *View > Recorder Controls* from the menu, or select the **Recorder Transport Control** icon on the toolbar.

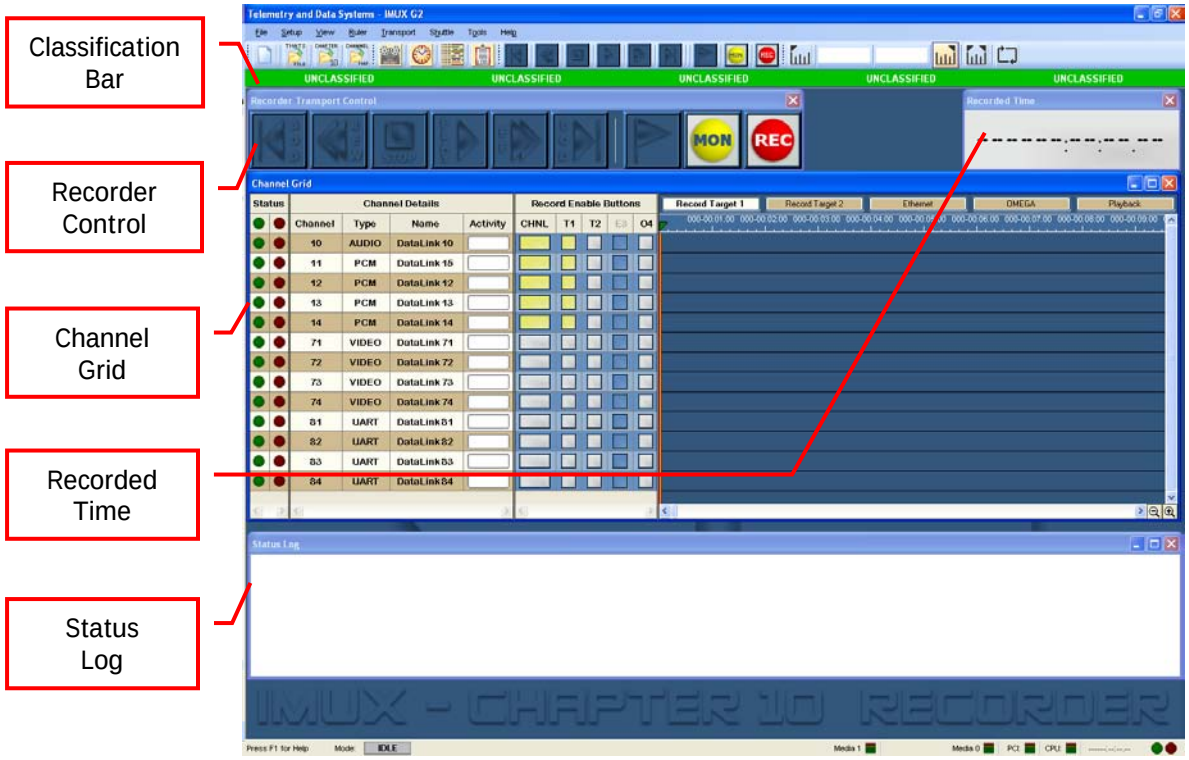
To view the **Recorded Time** display, select *View > Recorded Time* from the menu, or select the **Recorded Time** icon on the toolbar.

To view the **Channel Grid** display, select *View > Channel Grid* from the menu, or select the **Channel Grid** icon on the toolbar.

To view the **Status Log** display, select *View > Status Log* from the menu, or select the **Status Log** icon on the toolbar.

When the four windows have been opened to their default locations, the screen will look something like the picture below.

The only expected differences should be in the number and types of channels shown in the Channel Grid and the size of the media available.



Quick Start 1: A Simple Record and Playback Session

Recording a session using the default values is as easy as hitting one button. Do the factory default settings match what you really want to record? Probably not, but that is easy enough to change. We'll give you those details later. For now we'll assume you like the defaults and are ready to go.

To start a Record Session using the current channel and system configuration, simply select the **Record** button on the Recorder Control window or the toolbar. Data will be recorded for each enabled channel to each enabled target.

As data is recorded, Recorded Time will start to update, and Data Segments will be drawn in the right-hand portion of the Channel Grid, also known as the Data Grid. Disable and enable a particular channel by selecting its **CHNL, T1,** or **T2** buttons. The Data Segment for that channel will stop growing when the channel is disabled and a new Data Segment will start when the channel is enabled.

Note regarding Record Enable button color:

When a button is...	Then...
Blue	It is disabled and cannot be selected.
Gray	It has not been selected, but can be selected.
Orange	It has been selected from within the GUI, but the Controller has not yet completed processing the request.
Yellow	It has been selected, but the channel or media target is not currently able to record data due to the setting of some other companion button or the mode of the Recorder.
Green	It has been selected and is able to process incoming data.

To stop the current Record session, select the **Stop** button on the Recorder Control window or the toolbar. All data segments will be closed, time will stop updating, and the system will return to the Idle mode.

To play back data from the just recorded session, select the **Play** button on the Recorder Control window or the toolbar. Data channels are automatically mapped to play back using the same channel number on which they were recorded. Playback will proceed to the end of the data file, stop, and return to the Idle mode.

That's it. You've just recorded and played back a session on an **IMUX G2** Chapter 10 Recorder.

Quick Start 2: Playback a Previously Recorded Session

Practically, it is not that often that you need to play back the session that was just recorded. More likely than not, you will need to play back a session that was recorded some time in the past. This Quick Start steps you through loading a Chapter 10 data file, mapping recorded channels to available output channels, and playing back the data.

To open a Chapter 10 data file, select the **Open Chapter 10** button on the toolbar or select *File > Open Chapter 10 Data File*. Use the window that pops up to browse to and select the desired Chapter 10 file.

Once a file has been loaded, the **Data Grid** portion of the Channel Grid window will automatically set its focus on the **Playback** tab.

In addition, the **Record Enable Buttons** segment of the Channel Grid will change to display **Channel Mapping** information.

The channels that were recorded will be mapped into the available hardware playback channels in an iterative fashion.

- First, a mapping will be made if there is a match between any recorded and available hardware playback channel numbers that have the same data type.
- Second, of the remaining unassigned channels, the first channel listed in the TMATS header records will be assigned to the first available hardware playback channel of the same type.

In addition, it is possible to use the drop-down lists to select which recorded data channel will be assigned to each available hardware playback channel.

It is acceptable to have the same recorded channel assigned to multiple playback channels.

It is acceptable to leave a playback channel unassigned. In that case, no data will play back on that channel.

Each drop-down list will be limited to the recorded channels that are the same type as the available hardware playback channel.

To move to the beginning of the recorded data, simply select the **BOD** button on the Recorder Control window or the toolbar or select *File > Transport > Beginning of Data*.

To play back data from the previously recorded session, simply select the **Play** button on the Recorder Control window or the toolbar. Playback will proceed to the end of the data file, stop, and return to the Idle mode.

That's it. You've just played back a Chapter 10 file on an **IMUX G2** Chapter 10 Recorder.

Quick Start 3: Configuring a Channel

When the application begins, all channels are configured based on the content of the default TMATS file. It is possible to load a new configuration by opening another TMATS file.

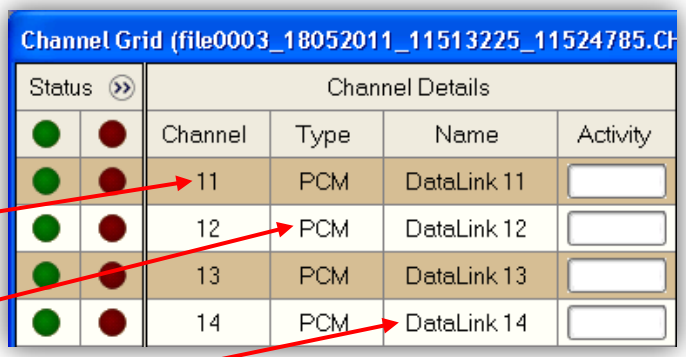
To open a TMATS file, simply select the **Open TMATS File** button on the toolbar or select *File > Open TMATS Setup*. Use the window that pops up to browse to and select the desired TMATS file.

It is also possible to make changes to the channels from within the **IMUX G2** GUI. In order to do this, the Channel Grid window must be open.

To change the channel name, select **Channel Name** and type in the new name. The new text will only be saved when you hit **<Enter>**. Leaving the field in any other manner will result in the changes being discarded.

To open the Channel Setup screen for a particular channel, click on either of two places on the **Channel Details** portion of the Channel Grid: the Channel Number or the Channel Type.

- The Channel Number
- The Channel Type
- The Channel Name



Selecting the **Channel Number** or the **Channel Type** will bring up the Channel Setup screen. Depending on the channel type, the Channel Setup screen will look a little different. However, all screens will have an **OK** and a **Cancel** button.

Hitting **OK** will commit the changes for that particular channel including any changes made to any setup sub-windows for that channel, and close the setup window.

Hitting **Cancel** will discard any changes made on that setup window and to any setup sub-window for that channel and close the setup window.

Note: If a session has just been recorded, and a user opens the setup window for any channel, makes changes, and selects **OK**, then the session that was just recorded will no longer be available from the **Record Target** tabs in the Data Grid. To play the session back, it will be necessary to open the data file and play it back from the **Playback** tab of the Data Grid.

That's it. You've just configured the channels on an **IMUX G2** Chapter 10 Recorder.

Quick Start 4: Selecting Media and Targets

To understand how and where **IMUX G2** data files are stored, it is necessary to first understand the concept of **Media** and **Targets.**

A **Media** is a physical device with a drive letter that is accessible to the **IMUX G2** Recorder. It can be either a local or remote media as long as it has a drive letter associated with it.

A **Target** is a directory on a media. It is possible to have multiple Targets point to different or even the same directories on the same Media.

Data files will be stored in the Target directory of the selected media using the Chapter 10 file naming convention.

Selecting Media

To view or make changes to the current Media settings, select *Setup > Media Bandwidth*.

Use the drop-down options to select from the available media drive letters.

Select **OK** to confirm the changes or **Cancel** to discard the changes.

Selecting Targets

To view or make changes to the current Target settings, select *Setup > Targets*

Use the drop-down options to select from the media locations assigned in the previous step.

For each Target, type in a path for recording, or browse to a preexisting path.

Leaving the Target path blank will result in the target being disabled.

Enter "****" to record to the root directory of the selected media.

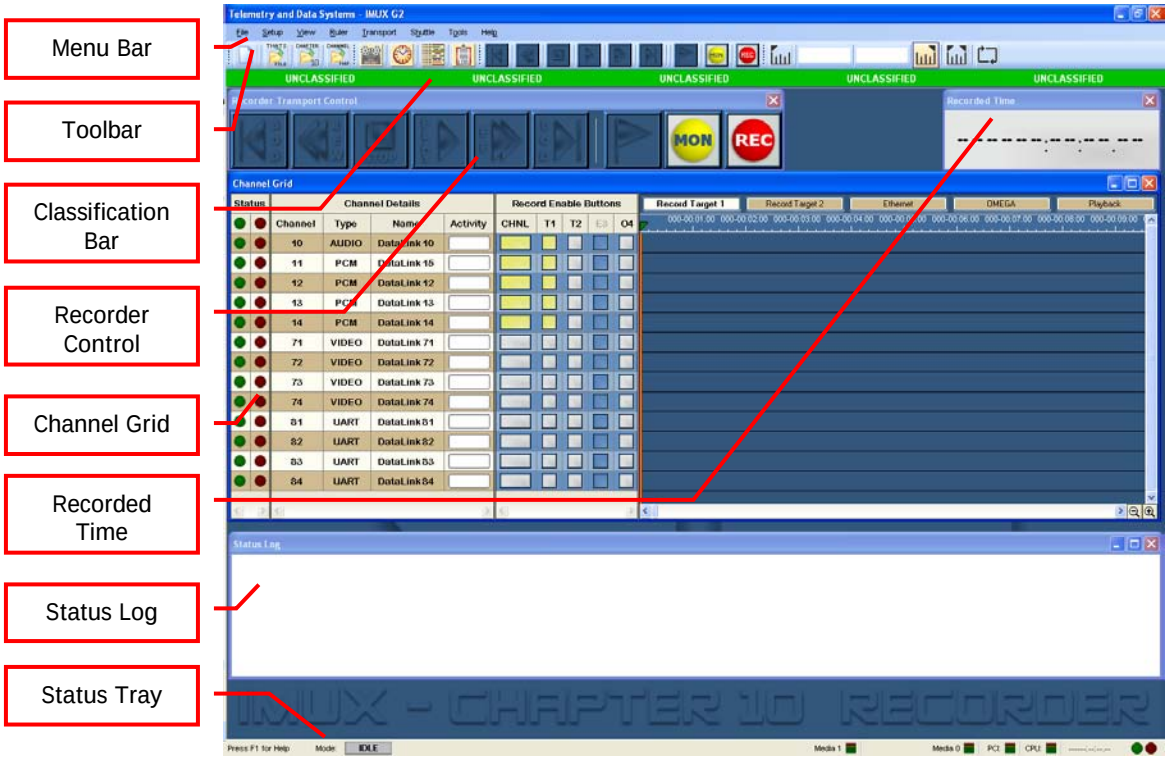
Select **OK** to confirm the changes or **Cancel** to discard the changes.

That's it. You've just selected the storage location for your next Chapter 10 file recorded on an **IMUX G2** Chapter 10 Recorder.

The Interface Explained

The Application Window

The **IMUX G2** Graphical User Interface is built to take advantage of windowed application standards that are familiar to just about everyone. When the application is started, it consumes the entire screen and will look something like the picture below. We'll get into the details of each portion of the screen in the sections that follow.



What you will find is that many of the things you can do within the GUI can be done in multiple ways. In order to find a quick summary of all of the shortcuts, be sure to check out Appendix 3 – Icons, Accelerators, and Hot Keys.

For now, let's explain the different elements of the GUI.

The Menu Bar

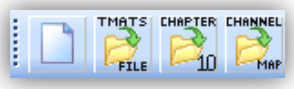
The Menu Bar is there to give the user a list-based way of getting to a feature or performing a task. A few things can only be done from the Menu Bar, such as saving of setup files, changing the system configuration, and viewing the Help features. Just about everything else can be easily done using the toolbars or the sub-windows in the application.

For a detailed description of what is available via the Menu Bar, check out the Menu Details section of this manual

The Toolbars

There are four main Toolsets on the **IMUX G2** GUI toolbar. All of the functions accessible here are also accessible through the Menu Bar.

File Toolbar



The File toolbar has four main icons that allow you to quickly open and load configuration and data files. The table below lists the title, the icon, any short cut keys, and a description of what the button will do.

Title	Icon	Accelerator	Hot Keys	Task
New		Alt, F, N	Ctrl + N	Clear all current record and playback activity and return to same state as if the application was just started.
Open TMATS Setup		Alt, F, O	Ctrl + O	Open a TMATS file that will be used to configure the Record channels.
Open Chapter 10 Data File				Open a prerecorded data set and display the data on the **Playback** tab of the Channel Grid. When selected, the Channel Grid, if open, will make the **Playback** tab the active Data Grid.
Open Channel Map				Open a Channel Map file that assigns particular channel numbers from the current selected playback file to the current available hardware channels.

View Toolbar

The View toolbar has four main icons that allow you to quickly open and close the primary application sub-windows. The table below lists the title, the icon, any short cut keys, and a description of what the button will do.

Title	Icon	Accelerator	Hot Keys	Task
Recorder Control		Alt, V, R		Toggle the display of the Recorder Control window.
Recorded Time		Alt, V, T		Toggle the display of the Recorded Time window
Channel Grid		Alt, V, G		Toggle the display of the Channel Grid
Status Log		Alt, V, L		Toggle the display of the Status Log

When a particular sub-window is being displayed, its related icon is shown with a tan background. This can be seen in the Recorder Control icon on the toolbar of the screen shot at the top of this section. In addition to the icon changing background color when it is activated, the related item on the View menu will have a checkmark displayed next to it.

Recorder Transport Control Toolbar

The Recorder Transport Control toolbar has small icons that can be used for controlling the Record and Playback functions of the **IMUX G2**. Because they are on the toolbar, they are always visible in the application, giving constant status of the state of the Recorder. The table below lists the title, the icon, any short cut keys and a description of what the button will do.

Title	Icon	Accelerator	Hot Keys	Task
Beginning of Data		Alt, T, B		Set the Time Marker to the Beginning of Data location.
Rewind		Alt, T, W		Set the Time Marker to a position that is one major tick mark's worth of time prior to the current position.
Stop		Alt, T, S	Ctrl + Q	Stop the current record or playback activity.
Play		Alt, T, P	Ctrl + P	Playback from the current position.
Fast Forward		Alt, T, F		Set the Time Marker to a position that is one major tick mark's worth of time after the current position.
End of Data		Alt, T, E		Set the Time Marker to the End of Data location.
Event		Alt, T, V	Ctrl + V	Insert an event marker during record. Event markers will be stored in the Chapter 10 data file as Event Marker packets in accordance with the Chapter 10 specification.
Monitor Data		Alt, T, M	Ctrl + M	Clear the display and start monitoring the data that is available for recording.
Record Data		Alt, T, R	Ctrl + R	Clear the display and start recording to a new Chapter 10 file.

* In the table above, an icon is not shown in Monitor Data mode because going into that mode is accomplished by right clicking on the Record Data icon.

Each icon has four background colors that indicate how that icon can be used while the **IMUX G2** is in its current mode of operation.

- A *blue* background shows that an icon is disabled and cannot be selected.
- A *silver* background shows that an icon can be selected.

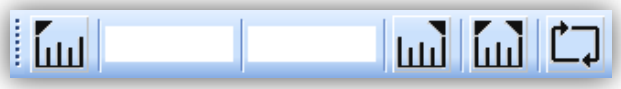
- An *orange* background shows that an icon has been selected and recognized by the GUI but not yet processed by the **IMUX G2** hardware control software.

- A *green* background shows that an icon has been selected, and the hardware is actively in the specified mode. This is generally only seen when in Monitor, Record, or Playback modes.

If the **IMUX G2** is in playback mode, and BOD, REW, FF, or EOD are selected, playback will stop and the marker will move to the specified position.

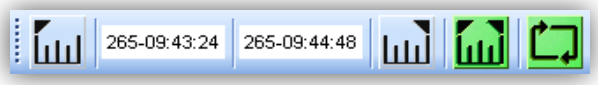
The icons on the Recorder Transport Control toolbar are kept in sync with the buttons in the larger Recorder Transport Control window and the selections found on the Transport menu. Making a selection in one place will cause all three locations to be updated.

Playback Constraints (Shuttle) Toolbar

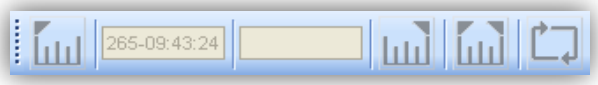


The Playback Constraints (Shuttle) toolbar has icons that can be used for constraining the boundaries over which the **IMUX G2** will play data back from a recorded session. The table below lists the title, the icon, any short cut keys, and a description of what the button will do.

When Use Constraints or Shuttle Playback are enabled, the background of the icon changes to green and the related item on the Shuttle menu will have a checkmark displayed next to it.

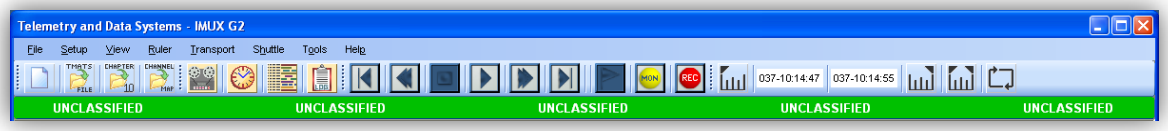


When the **IMUX G2** is in Record or Playback mode, it is not possible to make any changes to this toolbar. The foregrounds of each icon will be grayed out.



Title	Icon	Accelerator	Hot Keys	Task
Set Left Marker		Alt, H, L	Ctrl+Left	Set the left marker to the current Time Marker position. The box to the right of the icon will display the selected time.
Set Right Marker		Alt, H, R	Ctrl+Right	Set the right marker to the current Time Marker position. The box to the left of the icon will display the selected time.
Use Constraints		Alt, H, U	Ctrl + U	Toggle between using and not using the constraints during playback. When constraints are selected, the IMUX G2 will play back only the data that is found between the Left Marker and the Right Marker. If the Current Time Marker is at a position to the left of the Left Marker, playback will start from the current location and constraints will be applied once the Current Time Marker progresses past the Left Marker. If the Current Time Marker is to the right of the Right Marker, playback will start at the Left Marker.
Shuttle Playback Enabled		Alt, H, E	Ctrl + E	Toggle between continuous replay of the selected data segment or not. When Shuttle Playback is enabled, after the IMUX G2 has reached the end of the specified playback period, data playback will restart at the beginning of the specified playback period. Shuttle Playback can be enabled whether or not Constraints are being used.

The Classification Bar



The Classification Bar, when enabled, shows the currently selected classification. There is one exception. If the Playback Data Grid is being displayed and a file has been loaded for playback, the Classification Bar will show the classification level of the previously recorded session. If a session has been recorded and a Record Data Grid is being shown for that data, changing the classification will cause the data segments to be erased and the data to no longer be accessible from the Record Data Grids.

To toggle the display, select View *> Classification*

To change the classification, select *Setup > Set Classification > (selection)*

The Status Tray

The Status Tray provides system level status information when the **IMUX G2** is in Record or Playback mode. Details are reported for the current mode, the selected media, the PCI bus utilization, CPU utilization, and time information.

System Mode Information

The **Mode** display indicates the current mode of the recorder. The table below provides details on how this indicator operates.

Mode	Icon	State
Idle	IDLE	Steady
Monitor	MONITOR / MONITOR	Flashing
Record	RECORD / RECORD	Flashing

Mode	Icon	State
Play		Flashing

System Status Information

The **Media X** segments display status information for the particular predefined media.

- Amount of space currently available on the media
- % of the media space that is currently remaining
- % of allocated Media Bandwidth being used by **IMUX G2**

For example: **Media 1: 198GB (83%) 15%** means that **Media 1** currently has **198** gigabytes of space available on it, which equates to **83%** of the total media capacity, and currently the **IMUX G2** is transferring to that media at **15%** of its allocated rate. See the details elsewhere in this document for setting Media Bandwidth.

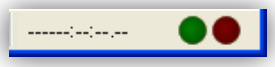
The **PCI** display shows % of allocated PCI bandwidth being used by the **IMUX G2**. See the details elsewhere in this document for setting the allocated PCI Maximum Bandwidth.

The **CPU** display shows the % of total CPU utilization for the entire system.

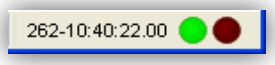
Time Channel Status Information

The two elements on the right-hand side of the **Status** Tray are related to recorded time.

When the system is idle, the display will look like this:



While in Record/Monitor mode, the display may look something like this:

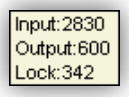


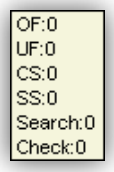
- The numeric value will show the current actual or freewheeling IRIG time of the IRIG Time Input channel.
- The LED displays will show whether or not the input is in lock with an IRIG Time Source.
    - A green LED indicates that the time channel is in lock.
    - A red LED indicates that the time channel is out of lock.

While in Playback mode,

- The time display will show the current time being reproduced.
- A green LED indicates that the circuit was in lock when it was recorded.

Position the cursor over the IRIG Time Input Channel LEDs to bring up Tool Tip windows that display channel status information. All status information for these LEDs is cumulative in nature.

IRIG Time Input Channel Green Status LED Details		
Display	**Status**	**Meaning**
	Input	The total number of time packets received from the hardware while in Record/Monitor mode.
	Output	The total number of time packets sent to the hardware while in Playback mode.
	Lock	The total number of times the GUI requested status from the Controller and the status was reported as being in IRIG Lock. Since the GUI updates approximately 7 times per second, this number will increase much more rapidly than the total packet count numbers.

IRIG Time Input Channel Red Status LED Details		
Display	**Status**	**Meaning**
	OF	Overflow – While in Record/Monitor mode, the total number of times the hardware provided data faster than software was able to process it and data was dropped in order to catch up.
	UF	Underflow – While in Playback mode, the total number of times the software was not able to provide data quickly enough for it to be properly reconstructed by the hardware.
	CS	Checksum – While in Record/Monitor mode, the total number of times the controller evaluated the packet received from the hardware and found a checksum error. While in Playback mode, the total number of times the hardware evaluated the packet received from the software and found a checksum error.
	SS	SoftSync – While in Playback mode, the total number of times the hardware was not able to find the sync pattern at the expected start of the next Chapter 10 data packet.
	Search	The total number of times the GUI requested status from the Controller and the status was reported as being in IRIG Search. Since the GUI updates approximately 7 times per second, this number will increase much more rapidly than the total packet count numbers.
	Check	The total number of times the GUI requested status from the Controller and the status was reported as being in IRIG Check. IRIG Check condition occurs when the channel has found the IRIG Sync pattern and is currently evaluating the data to determine whether or not it truly is in sync. Since the GUI updates approximately 7 times per second, this number will increase much more rapidly than the total packet count numbers.

Although the IMUX G2 Recorder uses IRIG-A/B/G day format during recording, it is able to play back other time packet formats with the following restrictions:

- Real Time Clock time data packets are played out as an IRIG-B time signal, and the packets are decimated when necessary to one per second
- Month, Day, Year format packets are converted to day only format packets prior to playback

The Main Window

Recorder Transport Controls

The Recorder Transport Controls are simply bigger, easier to see versions of the icons on the Recorder Transport Controls toolbar. Rather than repeat the details here, we'll simply provide a few screen shots of how the controls should look in different operational scenarios. Remember, any button clicks done here will cause the icons on the toolbar and the items on the Transport menu to be updated accordingly.

The screenshot below shows the **IMUX G2** in **Idle** mode.

The screenshot below shows the **IMUX G2** in **Monitor** mode. To enter Monitor mode using the Transport Controls, left click on the MON button.

The screenshot below shows the **IMUX G2** in **Record** mode. To enter Record mode using the Transport Controls, left click on the REC button. It is not possible to go back into Monitor mode from Record mode.

The screenshot below shows the **IMUX G2** in **Record** mode in a situation where the **Stop** button on the GUI has been selected, but the command has not yet been processed by the **IMUX G2** hardware control software.

The screenshot below shows the **IMUX G2** in **Playback** mode.

Recorded Time

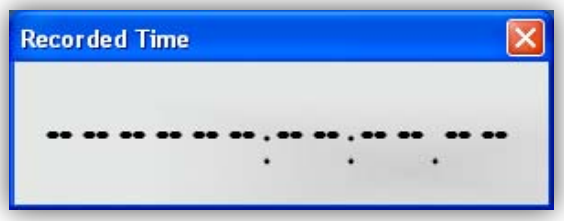
When the system is in Record mode, the Recorded Time display will show the time currently being recorded.

If the background is *green*, it means that the Recorder is in lock with an external time source.

If the background is *gray*, it means that the Recorder is not in lock with an external source and is freewheeling.

When the system is in Playback mode, the Recorded Time display will show the time that is currently being generated by the Time channel. The display is always green when generating Time data.

When the system is in neither Record nor Playback mode, the display background is *gray*, and the display is filled with dashes.

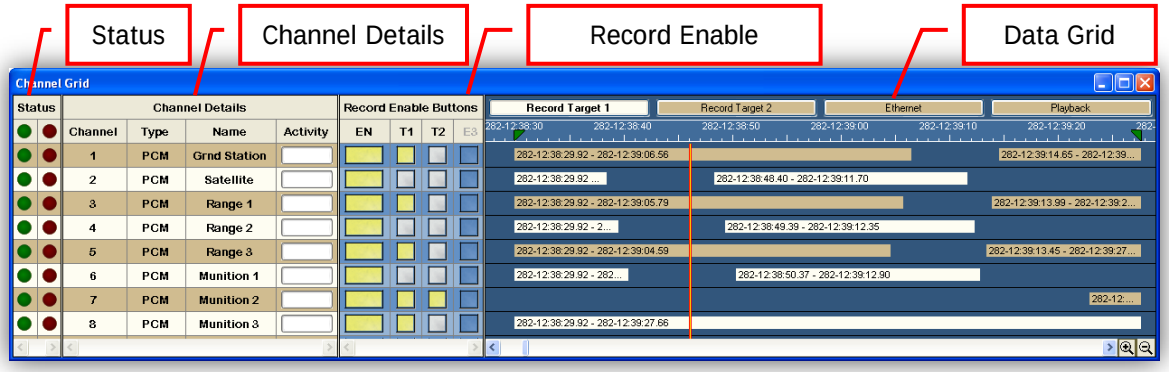


Channel Grid

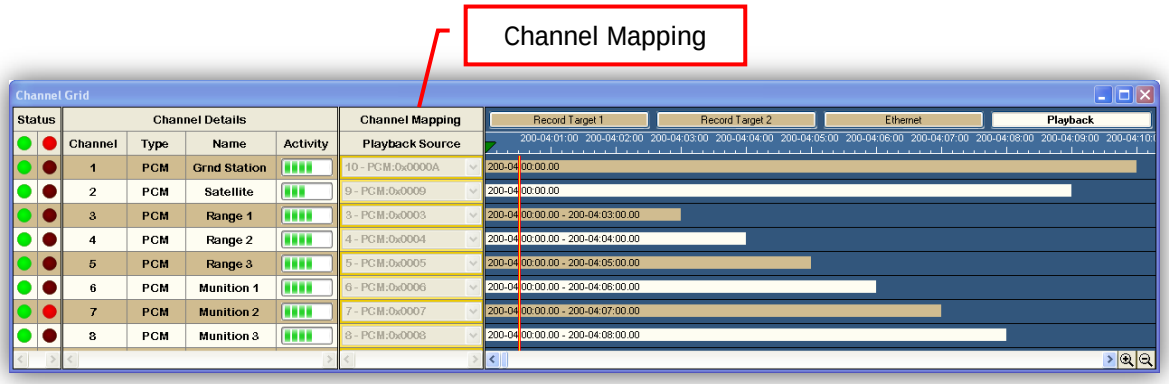
The Channel Grid is where all of the channel specific record and playback session configuration and monitoring tasks are done. It is broken up into five main sections, only four of which are viewable at any one time.

The five sections are: Status, Channel Details, Record Enable, Channel Mapping, and the Data Grid. Status, Channel Details, and the Data Grid are always available. What is displayed between the Channel Details and the Data Grid is a function of which tab is selected in the Data Grid.

The Record Enable Button window is displayed when the Data Grid is set to the **Record Target 1**, **Record Target 2**, **Ethernet** or optional **OMEGA** tab.



The Channel Mapping window is displayed when the Data Grid is set to the **Playback** tab.

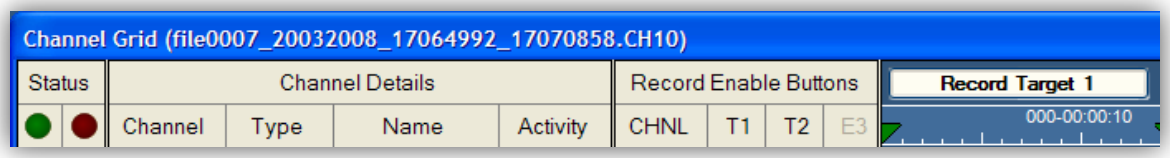


The number of channels that are displayed on the Channel Grid is a function of the number of channels installed and defined in the hardware configuration file. If channels are defined but not installed, the Channel Details will be grayed out.

Channel Grid Title Bar

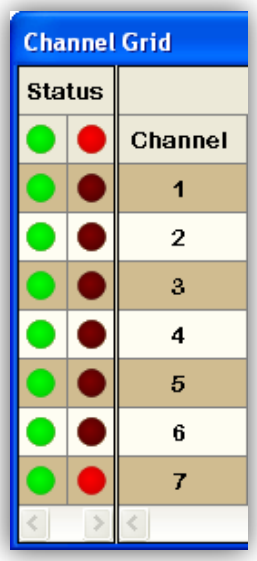
The Channel Grid Title Bar includes path information for the data being recorded or played back. The target information that is displayed depends on which Data Grid tab is selected. In Record mode, the Channel Grid will include the path details for the file that is being recorded.

When recording is terminated the complete file name for the file will be displayed.



Channel Status

The leftmost section of the Channel Grid displays Channel Status information. The top *red* and *green* LED displays are summary displays that show combined status for all channels in the system. If the *red* LED display is lit for any channel, the summary LED display will also be lit. If the *green* LED display is lit for all enabled channels, the summary LED display will also be lit.



A lit green LED display shows that some amount of data flowed between the hardware and software since the last update was made to the status.

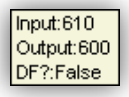
An unlit green LED display shows that there was no data flow.

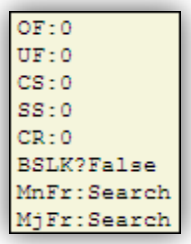
A lit red LED display shows that there was an error of some type since the last update was made to status.

An unlit red LED display shows that there was no error of any type.

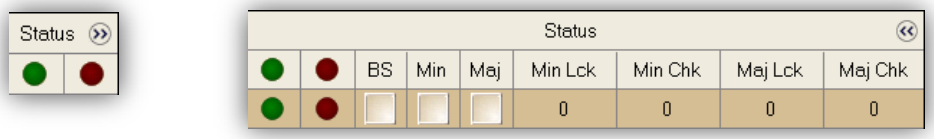
Channel Status is updated approximately 7 times per second.

Position the mouse cursor over either of the Channel Status LEDs to bring up Tool Tip windows that display channel status information. Updates to the status values are made approximately seven times per second.

Data Channel Green Status LED Details		
Display	**Status**	**Meaning**
	Input	The total number of data packets received from the hardware while in Record/Monitor mode.
	Output	The total number of data packets sent to the hardware while in Playback mode.
	DF?	Data Flow – "True" when there has been at least one data packet transferred in either direction between the hardware and the controller software since the last status update. Otherwise it is set to "False."

Data Channel Red Status LED Details		
Display	**Status**	**Meaning**
	OF	Overflow – While in Record/Monitor mode, the total number of times the hardware provided data faster than the software was able to process it and data was dropped in order to catch up.
	UF	Underflow – While in Playback mode, the total number of times the software was not able to provide data quickly enough for it to be properly reconstructed by the hardware.
	CS	Checksum – While in Record/Monitor mode, the total number of times the controller evaluated the packet received from the hardware and found a checksum error. While in Playback mode, the total number of times the hardware evaluated the packet received from the software and found a checksum error.
	SS	SoftSync – While in Playback mode, the total number of times the hardware was not able to find the sync pattern at the expected start of the next Chapter 10 data packet.
	BSLK?	Bit Sync Lock – While in Record/Monitor mode, for PCM channels with Bit Syncs enabled, the In-Lock status of the Bit Sync. True means the status is In-Lock. False means that status is NOT In-Lock. For PCM boards with a revision less than B60 the board does not provide the necessary details and the indicator will always show that the board is out of lock regardless of the true state of the Bit Sync.
	MnFr	Minor Frame Status – While in Record/Monitor mode, for PCM channels setup for Packed mode, this will show the minor frame status. Search means the frame sync pattern can not be found in the current data. Check means that the frame sync pattern has been found in the current data and that more instances are required to satisfy the Matches to Lock criteria. Lock means the Matches to Lock criteria have been satisfied and the frame sync pattern continues to be found in the data.
	MjFr	Major Frame Status – While in Record/Monitor mode, for PCM channels setup for Packed mode, this will show the major frame status. Search means a valid subframe counter value can not be found in the current data. Check means that the valid subframe counter has been found in the current data and that more properly incrementing/decrementing instances are required to satisfy the Matches to Lock criteria. Lock means the Matches to Lock criteria have been satisfied and properly incrementing/decrementing values continue to be found in the data.

Channel Status Information



The Channel Status section of the Channel Grid can be expanded to display additional status information if the PCM boards in the system have been upgraded to provide expanded status (revision BM0 or higher). Use the » button on the right-hand side of the Status header to expand or collapse the Channel Status section. When expanded, lock status information will be displayed for each PCM channel.

Just to the right of the LEDs are lights for bit sync lock status, minor frame lock status and major frame lock status. The bit sync status will only be available for those channels that have a bit sync installed and enabled. The minor and major frame lock status will be available for channels configured to use Packed Mode Data on boards at revision BM0 or higher, and channels configured to use Throughput Data with the framing information setup on boards at revision BN0 or higher.

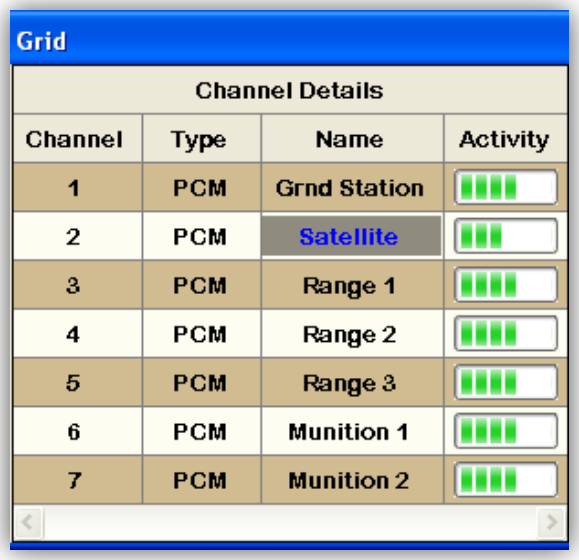
To the right of the lock status lights are counters that display the total number of minor frame lock, minor frame check, major frame lock and major frame check occurrences. Counts will be available for channels configured to use the Packed Mode Data on boards at revision BM0 or higher, and channels configured to use Throughput Data with the framing information setup on boards at revision BN0 or higher.

Updates to the lock status information are made approximately seven times per second. The lock status information is only available while in Record/Monitor mode.

Channel Details
The second section of the Channel Grid always contains the Channel Details. There are four columns in the Channel Details section.

The **Channel** column contains the channel number of the hardware device. This number is a reference to both the physical input channel and the associated physical output channel. These Channel Numbers cannot be changed from within the GUI. They are set up using an XML hardware configuration file.

The **Type** column references the type of channel that is installed. This is a function of the hardware installed in the **IMUX G2**. These display fields also serve as buttons used for bringing up the Channel Configuration windows.



To get to the Channel Configuration windows, click on the **Channel Number** or the **Channel Type**. It is possible to view the Channel Configuration windows while in the Record or Monitor mode, but it is not possible to make modifications.

The **Name** column refers to the Channel Name that will be used to describe the channel in the Chapter 10 file. The default value is automatically determined by concatenating the text “DataLink" and the channel number. This default name will be updated from the TMATS file if there is an associated record found in the file. It is also possible to change the name manually.

To change the name of the channel, click on the **Channel Name** and enter the desired text. The text change is saved when exiting the field. Hit the <**Esc**> key to cancel the changes. It is only possible to change the **Channel Name** when in Idle mode.

The **Activity** meter is a sample driven display that provides a quick look into the data content of a particular channel. The table below explains how the activity is determined.

Channel Type	Activity Density (Range 0-31)
1553	This value is modulus 32 of the number of 1553 packets received. It is reset to “0” if no packets are received for one second.
Analog	The number of bits set to “1” in the first 32-bit word of each packet.
Analog Audio	The value of first audio sample in the packet scaled from 0 to 32. The data is stored in two’s complement so no activity shows up as 50%.
429	This value is modulus 32 of the number of 429 packets received. It is reset to “0” if no packets are received for one second.
Ethernet	This value is modulus 32 of the number of Ethernet packets received. It is reset to “0” if no packets are received for one second.
PCM	The number of bits set to “1” in the first 32-bit word of each packet.
Serial-UART	The value of the first byte in the packet divided by 8.

Channel Type	Activity Density (Range 0-31)
Video	The value of the first 32 bit video word in the packet divided by 134217728

Snapshot Viewers

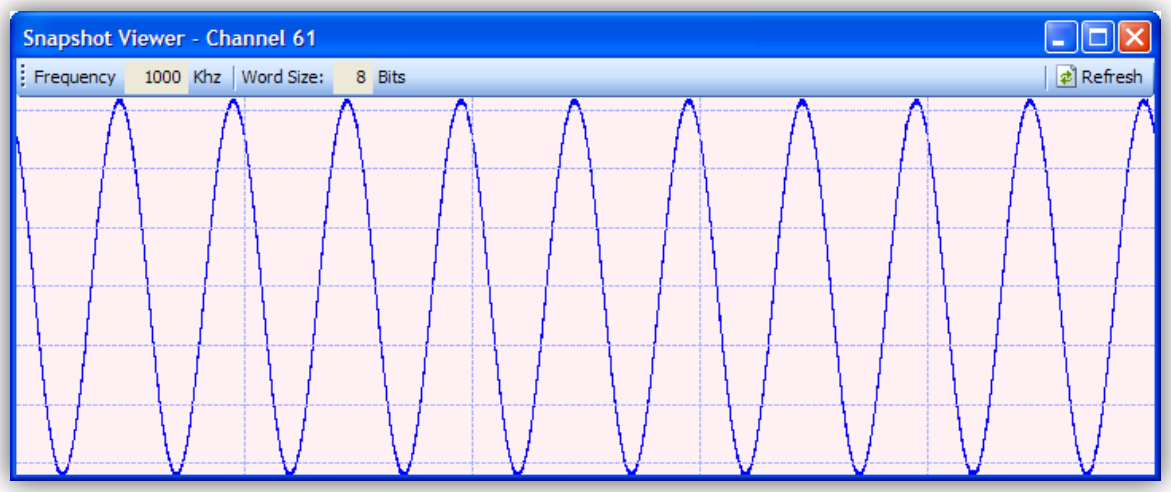
For some channel types, the **Activity** meters also serve as buttons to bring up a **Snapshot Viewer**. A Snapshot Viewer allows a user to capture a snippet of incoming data and display it on the screen. Because a Snapshot Viewer requires data, it can not be viewed while running in Simulation mode. Snapshot Viewers are available in Record, Monitor, and Playback modes.

Currently, Snapshot Viewers are available for Analog, Analog Audio, and PCM data.

Analog Snapshot Viewer

The **Analog Snapshot Viewer** collects and displays 100,000 samples of the selected channel without interrupting current data recording. The primary purpose of the Analog Snapshot Viewer is to provide the operator quick confirmation that the data is being properly received and interpreted by the channel.

To open an **Analog Snapshot Viewer**, click on the Activity Meter for the desired Analog channel.



Analog Snapshot Viewer Toolbar

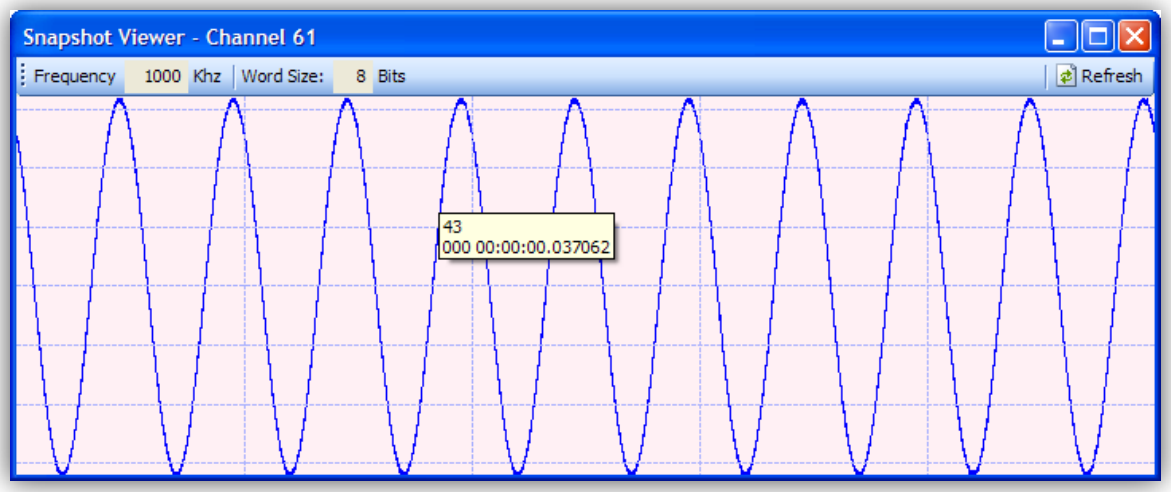
The Frequency and Word Size details that are displayed are informational only.

Select **Refresh** to collect another 100,000 samples of analog data.

Left click on the data to zoom in. Hold down the <**Ctrl**> key and left click on the data to zoom out.

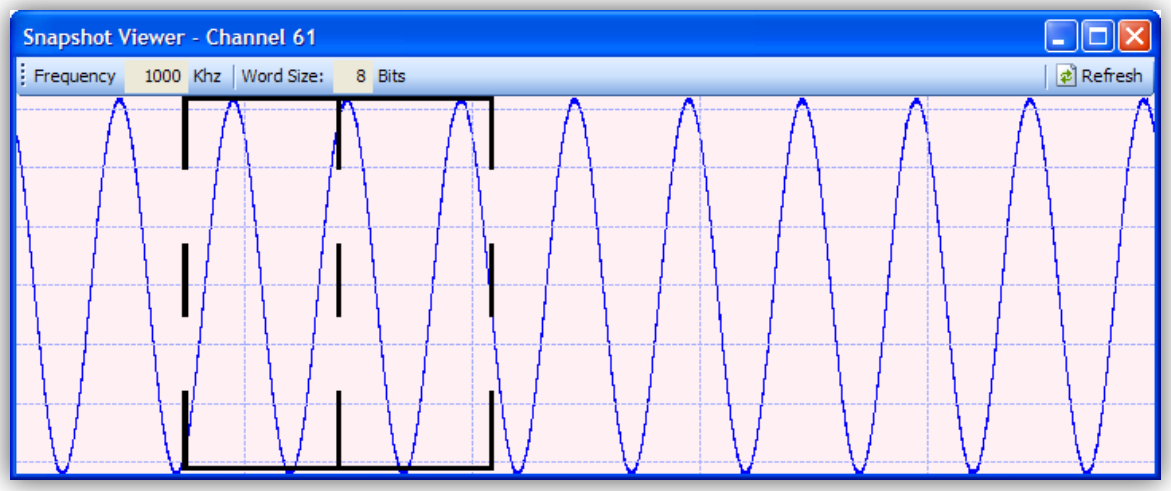
Analog Snapshot Controls

To zoom in, move the mouse cursor over the desired center point and left click.



Position the cursor over a point to cause an information box to pop up and display the time of the event and the value.

To select a span of data, move the mouse cursor over the desired center point, click and hold the left mouse button, drag the cursor to the desired end point, and release. To zoom in on this selection, move the mouse cursor over the selection and left click.

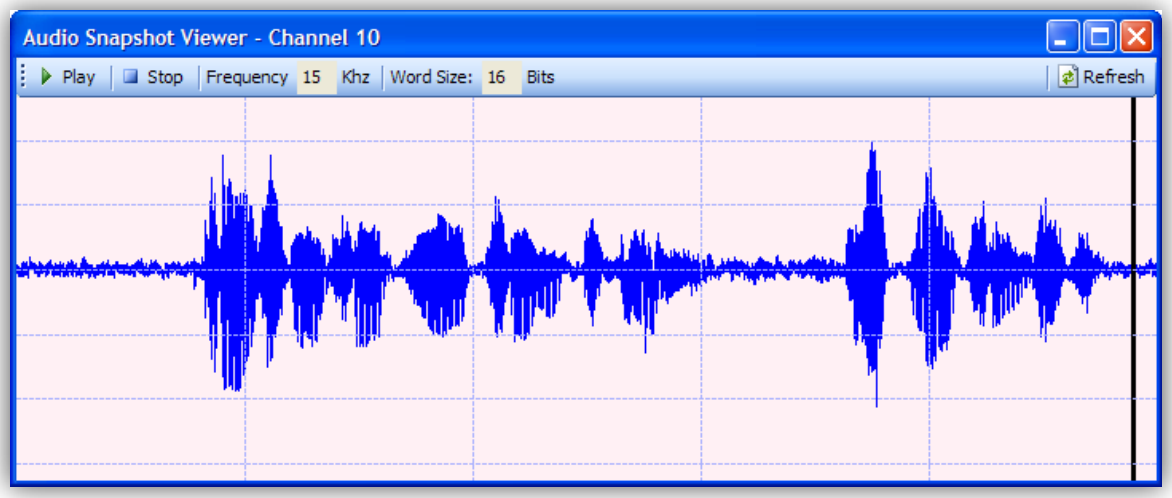


To zoom out, move the mouse cursor over the desired center point, hold down the <**Ctrl**> key and left click.

Analog Audio Snapshot Viewer

The **Analog Audio Snapshot Viewer** collects a snippet of audio data and allows the snippet to be played back through the system audio channels without interrupting current data recording. The primary purpose of the Analog Audio Snapshot Viewer is to provide the operator quick confirmation that the data is being properly received and interpreted by the channel.

To open an Analog Audio Snapshot Viewer, click on the Activity Meter for the desired Audio channel. The Snapshot Viewer will open and collect data for five seconds. When the data is collected, it will be displayed.



Audio Snapshot Viewer Toolbar

To play the snippet of captured Audio data, select **Play** on the Audio Snapshot Viewer toolbar.

To stop playing the snippet, select **Stop** on the Audio Snapshot Viewer toolbar.

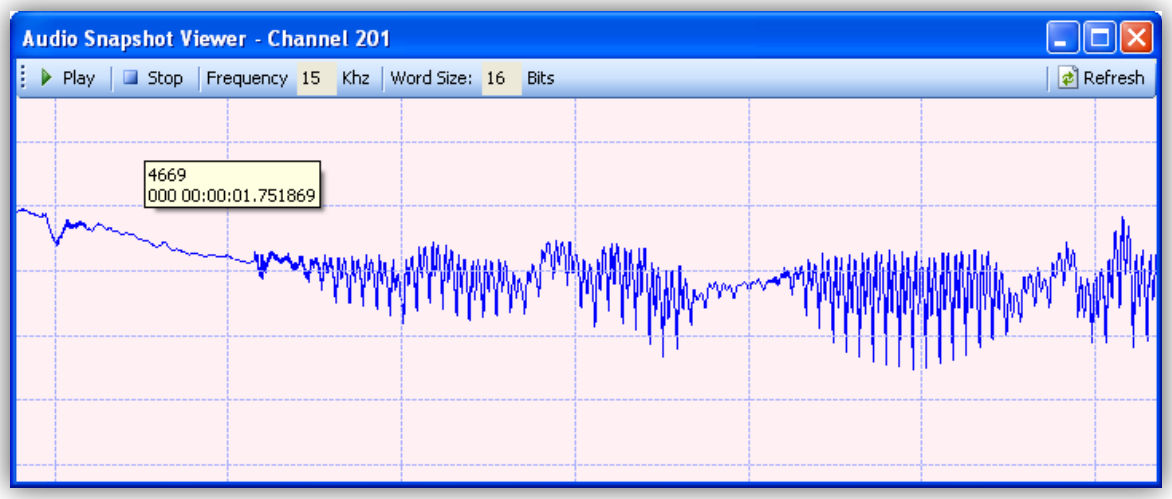
The Frequency and Word Size details that are displayed are informational only.

Select **Refresh** to collect another five seconds of audio data.

Left click on the data to zoom in. Hold down the <**Ctrl**> key and left click on the data to zoom out.

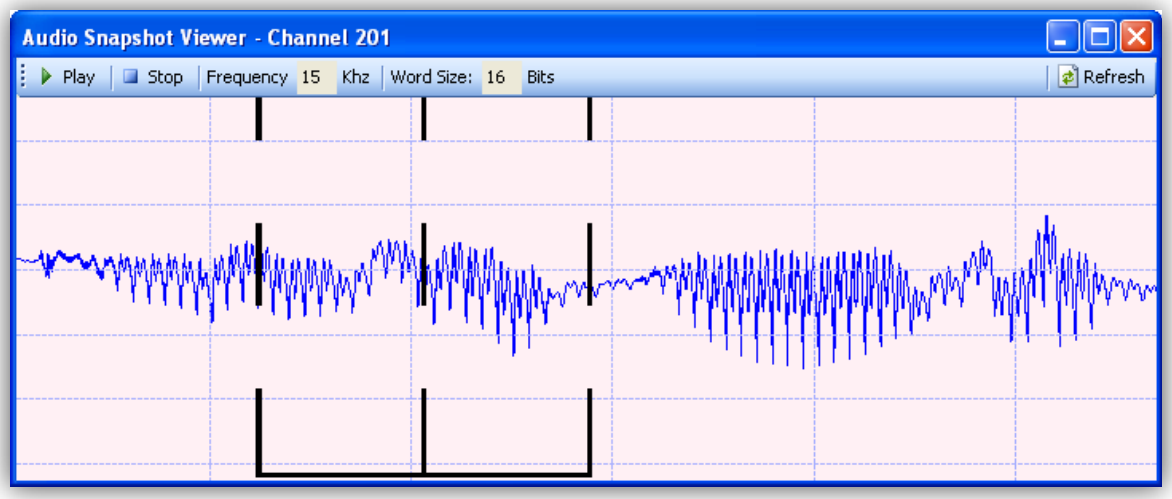
Audio Snapshot Controls

To zoom in, move the mouse cursor over the desired center point and left click.



Position the cursor over a point to cause an information box to pop up and display the time of the event and the value.

To select a span of data, move the mouse cursor over the desired center point, click and hold the left mouse button, drag the cursor to the desired end point, and release. To zoom in on this selection, move the mouse cursor over the selection and left click.

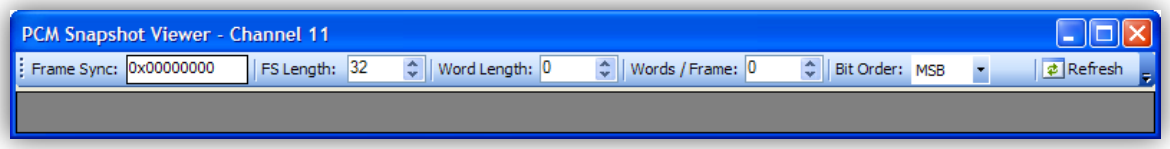


To zoom out, move the mouse cursor over the desired center point, hold down the <**Ctrl**> key and left click.

PCM Snapshot Viewer

The **PCM Snapshot Viewer** collects a snippet of PCM data and soft decommutates it for display on a grid. The primary purpose of the PCM Snapshot Viewer is to provide the operator quick confirmation that the data bits are being properly received and interpreted by the channel. The PCM Snapshot Viewer currently works with fixed word length/fixed frame length formats and is limited to 65,535 total words per frame. The PCM Snapshot Viewer can only be activated for a PCM channel that is configured in Throughput mode.

To open a **PCM Snapshot Viewer**, click on the Activity Meter for the desired PCM channel. The PCM Snapshot Viewer will open, and all fields will be blank. The first thing that must be done is to enter the PCM framing information on the toolbar. Each time the application is started all snapshot viewer history is lost. However, once the details have been filled in for a particular channel, the information will be retained as long as the G2 application is running.



The **Frame Sync** is entered in hexadecimal. A leading "0x" is allowable and will be ignored if included. Alphabetical characters can be entered in either upper or lower case. If the Frame Sync size is not an integer multiple of four (4) then the unused most significant bits of the left most hexadecimal character must be zero (0). For example, if the Frame Sync size is 33 bits, the leading character can be either zero (0) or one (1). If any other character is entered an error message will be posted asking the user to correct the frame geometry.

The **FS Length** is the Frame Sync length and specifies the number of bits in the Frame Sync field that are valid. If FS Length is set to zero (0) when the user enters a Frame Sync pattern, the FS Size will be automatically calculated using the assumption that all bits are valid. If FS Length has any other value that value will not be changed when the Frame Sync pattern is changed. Enter the value directly, or use the up arrow to increment or the down arrow to decrement the current value. The Frame Sync Length must be an integer multiple of the Word Length.

The **Word Length** is the number of bits in each standard data word. Enter the value directly, or use the up arrow to increment or the down arrow to decrement the current value.

The **Words/Frame** is the total number of standard data words in the frame. This number must include one word for the Frame Sync regardless of the size of the Frame Sync pattern. Enter the value in directly, or use the up arrow to increment or the down arrow to decrement the current value. A note to OMEGA users, OMEGA projects do not count the Frame Sync as one word regardless of size. If using setup information from OMEGA projects, be sure to adjust the Words/Frame to account for this difference.

The **Bit Order** identifies whether the bit order of the words is Most Significant Bit (MSB) first or Least Significant Bit (LSB) first. Use the drop-down box to select the correct value.

Current limitations for the PCM Snapshot Viewer are as follows...

1. All words must be the same word length.
2. The Frame Sync size must be an integer multiple of the word length.

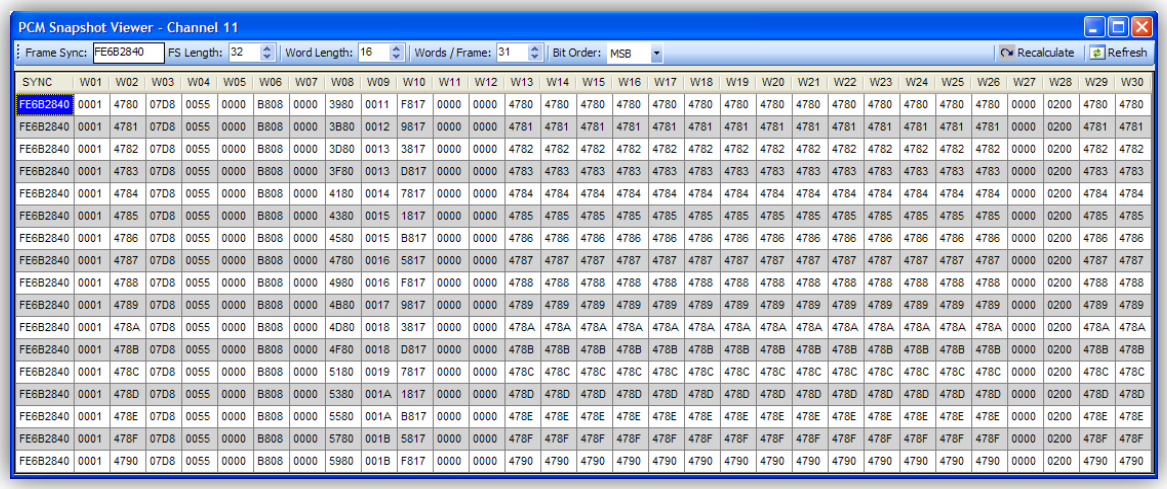
When all frame formatting information has been entered, select **Refresh** to gather and to soft decommutate fresh data. As data is being collected, the words “Waiting for Data” will be displayed in the data section.

If the PCM Snapshot Viewer is not able to find Frame Sync lock in the current data set, it will display the message “OUT OF LOCK” in the data section.

To decommutate the same set of data using a different frame format, make the desired modifications to the fields on the toolbar and select **Recalculate**.

To gather and evaluate new data using the same frame format, select **Refresh**.

Example of a populated PCM Snapshot Viewer:

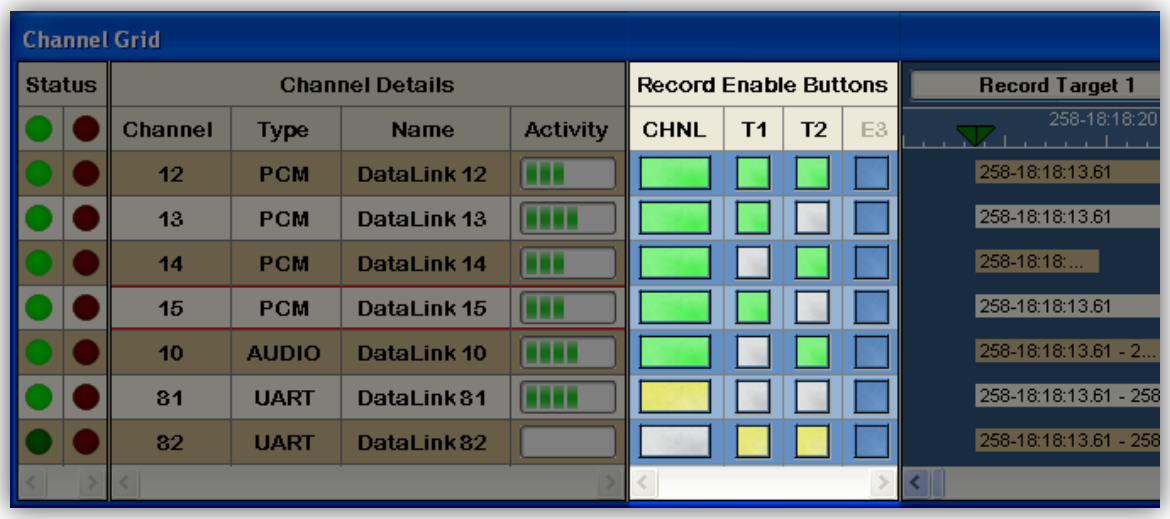


SYNC	W01	W02	W03	W04	W05	W06	W07	W08	W09	W10	W11	W12	W13	W14	W15	W16	W17	W18	W19	W20	W21	W22	W23	W24	W25	W26	W27	W28	W29	W30
FE6B2840	0001	4780	07D8	0055	0000	B808	0000	3980	0011	F817	0000	0000	4780	4780	4780	4780	4780	4780	4780	4780	4780	4780	4780	4780	4780	4780	0000	0200	4780	4780
FE6B2840	0001	4781	07D8	0055	0000	B808	0000	3B80	0012	9817	0000	0000	4781	4781	4781	4781	4781	4781	4781	4781	4781	4781	4781	4781	4781	4781	0000	0200	4781	4781
FE6B2840	0001	4782	07D8	0055	0000	B808	0000	3D80	0013	3817	0000	0000	4782	4782	4782	4782	4782	4782	4782	4782	4782	4782	4782	4782	4782	4782	0000	0200	4782	4782
FE6B2840	0001	4783	07D8	0055	0000	B808	0000	3F80	0013	D817	0000	0000	4783	4783	4783	4783	4783	4783	4783	4783	4783	4783	4783	4783	4783	4783	0000	0200	4783	4783
FE6B2840	0001	4784	07D8	0055	0000	B808	0000	4180	0014	7817	0000	0000	4784	4784	4784	4784	4784	4784	4784	4784	4784	4784	4784	4784	4784	4784	0000	0200	4784	4784
FE6B2840	0001	4785	07D8	0055	0000	B808	0000	4380	0015	1817	0000	0000	4785	4785	4785	4785	4785	4785	4785	4785	4785	4785	4785	4785	4785	4785	0000	0200	4785	4785
FE6B2840	0001	4786	07D8	0055	0000	B808	0000	4580	0015	B817	0000	0000	4786	4786	4786	4786	4786	4786	4786	4786	4786	4786	4786	4786	4786	4786	0000	0200	4786	4786
FE6B2840	0001	4787	07D8	0055	0000	B808	0000	4780	0016	5817	0000	0000	4787	4787	4787	4787	4787	4787	4787	4787	4787	4787	4787	4787	4787	4787	0000	0200	4787	4787
FE6B2840	0001	4788	07D8	0055	0000	B808	0000	4980	0016	F817	0000	0000	4788	4788	4788	4788	4788	4788	4788	4788	4788	4788	4788	4788	4788	4788	0000	0200	4788	4788
FE6B2840	0001	4789	07D8	0055	0000	B808	0000	4B80	0017	9817	0000	0000	4789	4789	4789	4789	4789	4789	4789	4789	4789	4789	4789	4789	4789	4789	0000	0200	4789	4789
FE6B2840	0001	478A	07D8	0055	0000	B808	0000	4D80	0018	3817	0000	0000	478A	478A	478A	478A	478A	478A	478A	478A	478A	478A	478A	478A	478A	478A	0000	0200	478A	478A
FE6B2840	0001	478B	07D8	0055	0000	B808	0000	4F80	0018	D817	0000	0000	478B	478B	478B	478B	478B	478B	478B	478B	478B	478B	478B	478B	478B	478B	0000	0200	478B	478B
FE6B2840	0001	478C	07D8	0055	0000	B808	0000	5180	0019	7817	0000	0000	478C	478C	478C	478C	478C	478C	478C	478C	478C	478C	478C	478C	478C	478C	0000	0200	478C	478C
FE6B2840	0001	478D	07D8	0055	0000	B808	0000	5380	001A	1817	0000	0000	478D	478D	478D	478D	478D	478D	478D	478D	478D	478D	478D	478D	478D	478D	0000	0200	478D	478D
FE6B2840	0001	478E	07D8	0055	0000	B808	0000	5580	001A	B817	0000	0000	478E	478E	478E	478E	478E	478E	478E	478E	478E	478E	478E	478E	478E	478E	0000	0200	478E	478E
FE6B2840	0001	478F	07D8	0055	0000	B808	0000	5780	001B	5817	0000	0000	478F	478F	478F	478F	478F	478F	478F	478F	478F	478F	478F	478F	478F	478F	0000	0200	478F	478F
FE6B2840	0001	4790	07D8	0055	0000	B808	0000	5980	001B	F817	0000	0000	4790	4790	4790	4790	4790	4790	4790	4790	4790	4790	4790	4790	4790	4790	0000	0200	4790	4790

Record Enable Buttons

The Record Enable Buttons window is displayed when the Data Grid is set to any tab other than the Playback tab. The number of columns in this section will vary based on the features installed in the recorder.

- **CHNL** is simply a channel enable button. This must be selected in order for channel data to be monitored or sent to <u>any</u> Target.
- **T1** and **T2** refer to Media Target 1 and Media Target 2. These must be selected in order for the channel to be included in the data stream in the location specified in the Target settings.
- **E#** refers to a UDP network data distribution feature. The "E" specifies the type of target. The "**#**" is an integer that specifies a unique numeric identifier for each target in the system. If there is no network interface hardware installed, the column will not appear.
- **O#** refers to a direct connection to OMEGA using the **Powered By OMEGA** feature. The "O" specifies the type of target. The "#" is an integer that specifies a unique numeric identifier for each target in the system. If PBO is installed on the system, an "O#" target will be available. If PBO is not installed on the system, there will be no column for an "O#" target.



Each button on the window can be one of four colors

- A *blue* background shows that an icon is disabled and cannot be selected.
- A *silver* background shows that an icon is not currently selected but can be.
- A *yellow* background shows that an icon has been selected, but because of another setting, no data will flow from the hardware to the software for storage on the selected Target.

- A *green* background shows that a channel has been enabled, the target has been selected, the hardware is actively in Record mode, and the channel is now able to pass data to the software.

In the screen shot above, note that the **CHNL** button of Channel 81 and the **T1** and **T2** buttons of Channel 82 are lit yellow.

- Channel 81: Because the channel is enabled but no Targets are selected, it can work in Monitor mode, but no data will be stored even if the unit is placed in Record mode.

- Channel 82: Because the channel is not enabled, even though Targets are selected, it will not work in Monitor mode and it will not contribute data to the data file even if the unit is placed in Record mode.

It is also possible to completely disable and re-enable all data being transmitted to a Target. Using the mouse cursor, Left Click on a Target's Column Header (**T1**, **T2**, **E3**, **O4**) to turn the target on or off.

When a Target is turned off the header text will remain bold, but all of the channel specific enable buttons will turn blue. When a Target is turned on, each channel specific enable button will return to its original state.

When a Media Target (T1 or T2) is turned off, it will close the current recording. When a Media Target (T1 or T2) is turned back on, it will start a completely new recording session to that target and the data grid for that Target will be reset.

If there is an error recording to one target it will not affect recording to the other targets. For example, consider the case where T1 is connected to a network drive and T2 is connected to a local drive. If the network connection to T1 is unplugged, T1 will fail, overflow, and eventually turn itself off. T2 will continue with no errors or dropouts.

Note that if two targets are sharing the same media, both targets may fail because of a common media issue.

Channel Mapping

The Channel Mapping window is displayed when the Data Grid is set to the Playback tab. If an Ethernet Target has been defined, two columns will be displayed for each channel. If no Ethernet Target has been defined then there is only one column for each channel.

When a data file is loaded, the system will attempt to automatically route recorded source channels to a particular playback channel. Matches are made in the following priority.

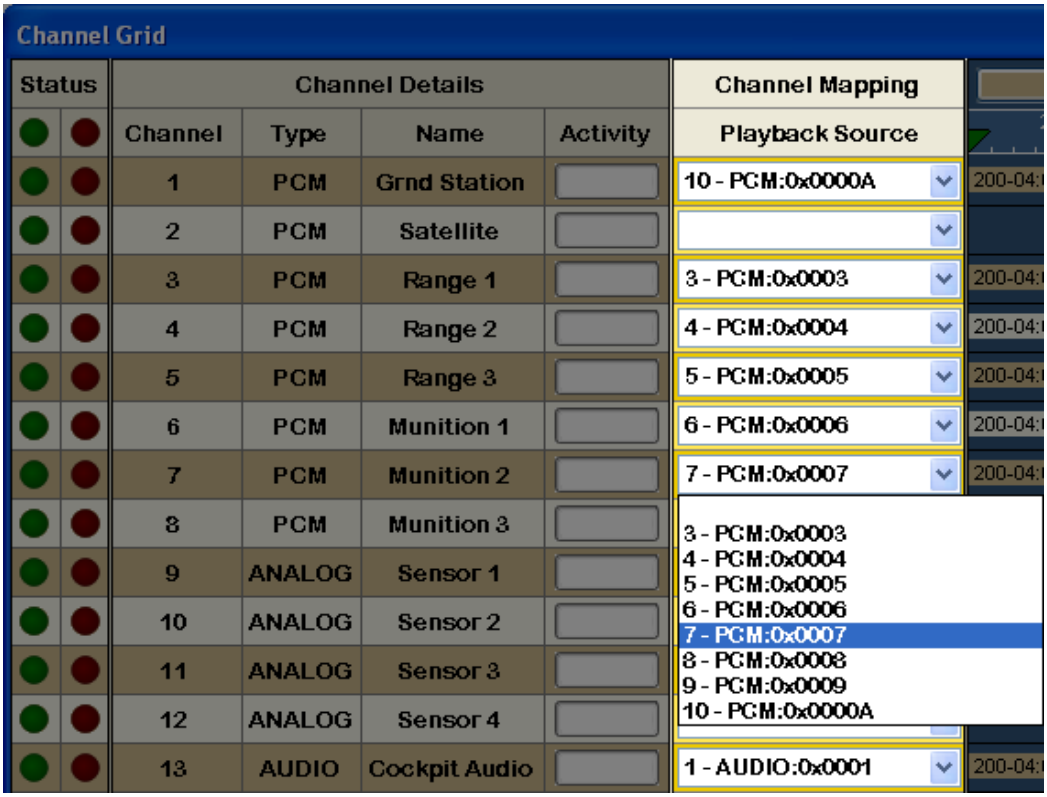
- One for one mapping based on identical channel number.
- Lowest remaining source channel to lowest remaining compatible playback channel.

Another method is to pick a particular source channel to recreate on a Playback channel. Source Channels will only show up in the drop-down menu for a Playback channel if they are a compatible type.

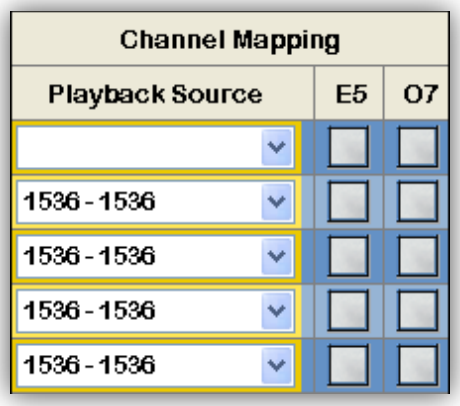
Select the combo box drop-down button to see the available channels. The channel descriptions in the drop-down box include a counter, followed by the source type, followed by the source channel number.

Select the blank line to prevent the channel from playing any source.

It is possible to have two playback channels assigned to playback the same recorded channel.



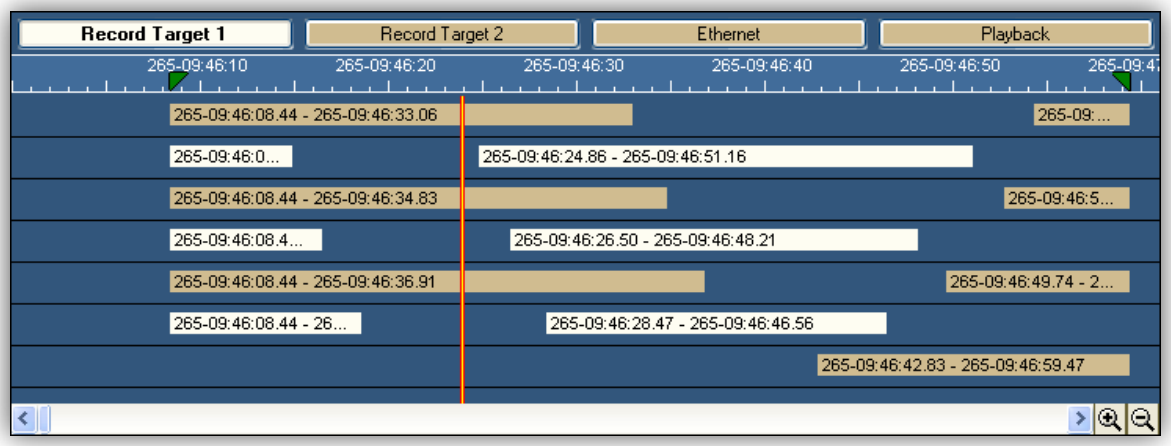
If an Ethernet Target has been defined and enabled, an additional channel mapping column is displayed next to the Playback Source column. It is identified as the letter “E” followed by a target ID, for example “E5”. By default, all mapped channels are disabled for Ethernet output and they must be specifically enabled. The one exception is the primary time channel, which is not displayed for mapping and will be output even if no other channels have been selected.



In cases where a single source channel is mapped to multiple output channels, if Ethernet output is enabled on any of the related channels, only one copy of the packets will be broadcast via UDP, regardless of how many of the Ethernet output enable buttons have been selected.

If PBO is installed on the system, an additional channel mapping column is displayed next to the Ethernet Target column. It is identified as the letter “O” followed by a target ID, for example “O7”. By default, all mapped channels are disabled for PBO output and they must be specifically enabled. The one exception is the primary time channel, which is not displayed for mapping and will be output even if no other channels have been selected

Data Grid



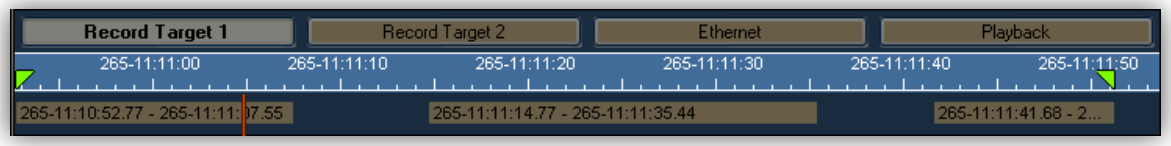
The Data Grid is a graphical representation of the record session over time. It allows easy viewing of which channels were enabled for which portion of the session. This allows the user to easily identify data segments of interest and choose which portions of a session to play back, validate, or analyze. Right clicking the mouse will bring up a menu that provides quick and easy access to the tools.

The number of tabs on the Data Grid is a function of the number of targets defined in system configuration file. There will always be a Playback tab. Tabs for Record Target 1, Record Target 2, Ethernet, and OMEGA will be displayed only if they are included in the system configuration. Each tab is managed independently, but only one tab is viewable at a time.

Record Target 1 shows the status of the current record session on Target 1 as defined on the setup pages. Likewise, Record Target 2 shows the status of the current record session on Target 2 as defined on the setup pages. The Ethernet tab will show record status to a TCP/IP client. The OMEGA tab will show record status of data sent to OMEGA SERV software via a Powered By OMEGA (PBO) connection.

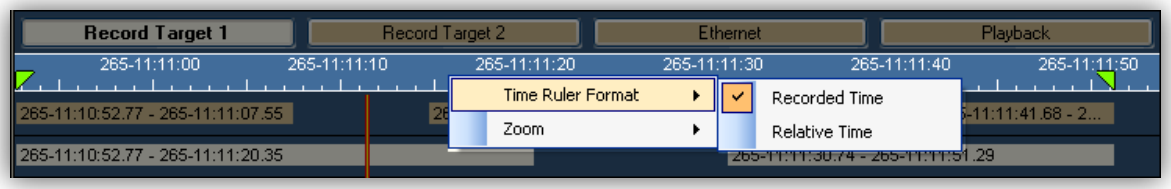
For all record tabs, immediately following a record session the display will retain the graphical representation of the session. It is possible to play back data from Media Target 1 and Media Target 2 for the last recorded session. However, if the application is closed, a new recording session is started, or the hardware is reconfigured, the display will be cleared. Once the display is cleared, it will be necessary to switch to the Playback tab and open the recorded Chapter 10 Data File in order to view and play back the recorded data.

Time Ruler



Under the tabs and above the data segments is a Time Ruler. Time is indicated at every major tick mark. Time can be shown as either Recorded or Relative time. To change the Time Ruler format from the Data Grid display, right click on the Time Ruler, select Time Ruler Format, and select the desired format.

The major tick marks on the Time Ruler are calculated based on the initial time value when recording started and are incremented assuming a linear extrapolation of time that is exactly one second per 10,000,000 ticks of the Chapter 10 Counter. In both Record and Playback modes, the initial value is based on the first recorded IRIG time value.



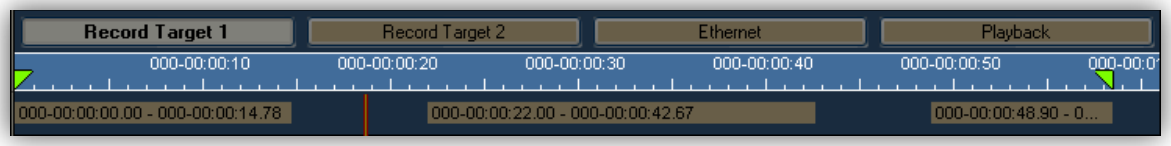
When Recorded Time is selected, the ruler will show the actual time information that was recorded. This works most of the time, but it can be a problem if there was an incorrect or unstable IRIG Time source. In these cases, it may be necessary to switch to Relative Time. In Relative Time mode, the left hand side of the display is considered to be day 000 – time 00:00:00. Major tick marks are then established based on the Chapter 10 counter regardless of any time information that was recorded.

Note: When displaying the Playback Data Grid, if the counter value for the last time packet is off by greater than 1% of a time period from the calculated Chapter 10 Counter value for that time; the display will automatically switch to Relative Time. For example...

Start time packet shows time 010-12:34:56:000 and counter value 10,000,000

Last time packet shows time 010-12:36:36:000 and counter value 1,010,200,000

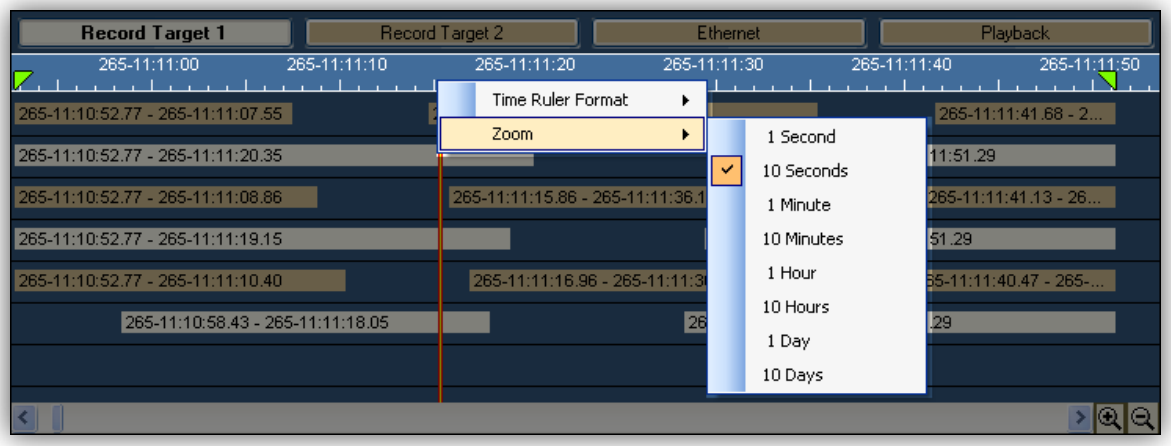
Based on the start packet and assuming 10,000,000 clock ticks per second, the last time packet should have a counter value of 1,010,000,000. The delta of 200,000 is 2% and exceeds the 1% limit. The display will automatically switch to Relative Time.



Whether displaying Recorded Time or Relative Time, it is possible to change the resolution of the Time Ruler and the Data Segment displays in the Data Grid. To change the Time Ruler Format from the Data Grid display, right click on the Time Ruler, select Zoom, and select the desired time resolution.

In Record and Playback mode, if there is too much data to display for the resolution selected, the Zoom will adjust to the lowest possible resolution that properly displays all of the data set information.

In Idle mode it is possible to zoom to any level. However, it may not be possible to view all data at the higher zoom level.



It is possible to change the Time Ruler Format and the Zoom level during Record and Playback as well as when in the Idle mode.

The settings are different for each tab and are remembered even if the application is closed.

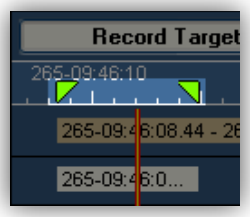
Zoom Buttons

In addition to using the Right Click toolbar or the menu selections, it is possible to use the magnifying glass icons in the bottom right hand corner of the Data Grid to change the Zoom level of the Data Grid display.

Select the "+" magnifying glass to zoom in to a higher time resolution view of the data segments and show greater detail.

Select the "–" magnifying glass to zoom out to a lower time resolution view of the data segments and see the bigger picture.

Left and Right Constraint Markers



On the Time Ruler are two green triangles. They are *dark green* when the Use Constraints feature is disabled. They are *bright green* when the Use Constraints feature is enabled. The picture to the right shows them enabled. It is possible to move a marker by dragging it. To do so, left click on it and drag it to the desired position.

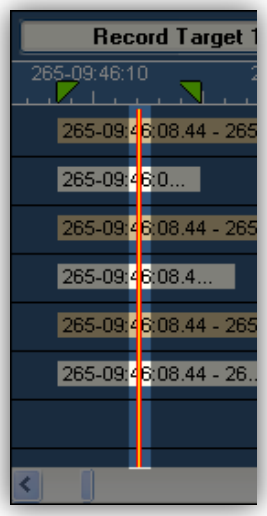
For the left hand marker…

- Dragging it past the beginning of data will cause the marker to be snapped to the beginning of data.
- Dragging it past the right hand marker will cause the right hand marker to also be moved to the right. If there is enough data remaining, the right hand marker will be moved so that the spacing remains the same as it was before the move. If there is not enough data remaining, the right hand marker will be moved to the end of data.

For the right hand marker…

- Dragging it past the end of data will cause the marker to be snapped to the end of data.
- Dragging it past the left hand marker will cause the left hand marker to also be moved to the left. If there is enough data remaining, the left hand marker will be moved so that the spacing remains the same as it was before the move. If there is not enough data remaining, the left hand marker will be moved to the beginning of data.

Current Time Marker

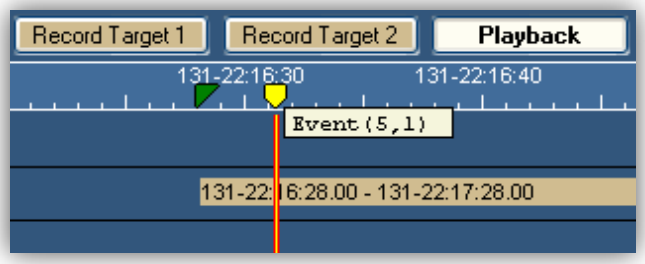


Running from the top to the bottom of the data grid is a yellow line with a red outline called the Current Time Marker. During Record and Playback this marker shows the current position in the data file. When in idle mode, this marker shows where playback would start.

To move the Current Time Marker, left click on the Time Ruler. The Current Time marker will move to the selected time and the Data Grid will be redrawn to place the Current Time Marker in the middle of the display window.

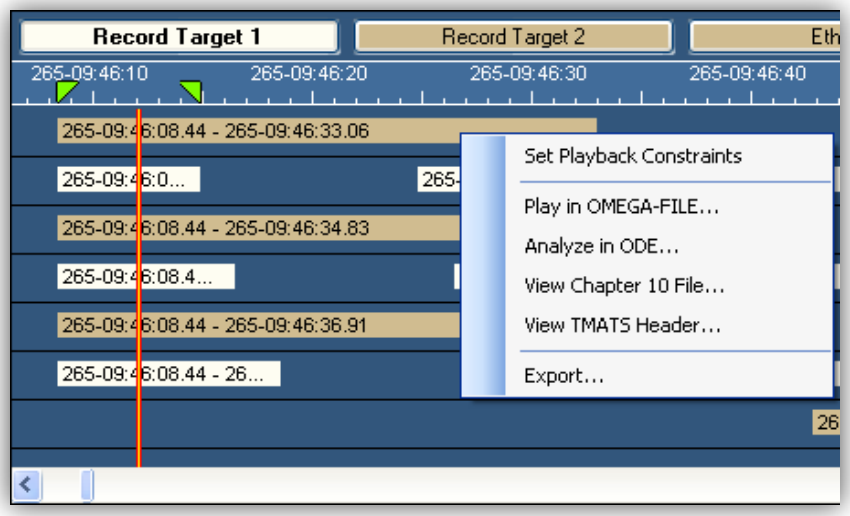
Event Marker

When a file is loaded for playback on the Playback grid, the first 32 Event Markers found in the file will be displayed on the Time Ruler. To identify event details, hover over the yellow event marker of interest.



Right Click Options

There are several right-click options available for each data segment in the Data Grid display.



Set Playback Constraints will set the playback constraints to match the beginning of data and the end of data for the current data segment. Selecting this does not change whether or not Use Constraints is enabled.

Play in OMEGA-FILE will open the OMEGA-SERV software application and allow the user to view and play back the Chapter 10 data file as if at a real-time Telemetry Data Processing Ground Station. This does require that project be defined within OMEGA-SERV. Review the OMEGA-SERV File Playback help files for additional details on how this works.

Analyze in ODE will open the ODE Desktop software application and allow the user to analyze the data stored in the Chapter 10 data file. This does require an applicable OSPROJ file and supposes that the data set has already been manually published within ODE Publisher or was automatically published by ODE during data collection. Review the ODE help files for additional details on how this works. It is possible to change whether this button will start the ODE Publisher or the ODE Desktop application. To establish which one, place a shortcut to the ODE application in the directory C:\Chapter 10 File Analysis Tools and name the shortcut “Start ODE.”

If OMEGA-SERV or ODE are not installed an information box will pop up advising the user of the need to install the appropriate software. Contact Telemetry and Data Systems for more details on acquiring OMEGA products.

View Chapter 10 File opens a Chapter 10 file viewer of your choice. To establish the viewer, place a shortcut to the Chapter 10 file viewer program in the directory C:\Chapter 10 File Analysis Tools and name the shortcut “Start Ch10 Packet Viewer.” This will bring up the viewer and allow you to select the Chapter 10 file of interest.

View TMATS Header opens a TMATS file viewer of your choice. To establish the viewer, place a shortcut to the Chapter 10 file viewer program in the directory C:\Chapter 10 File Analysis Tools and name the shortcut “Start TMATS File Viewer.” This will bring up the viewer and allow you to select the TMATS file of interest.

Export will create a new Chapter 10 file. This file will include a revised TMATS header packet that eliminates all information from unselected channels, all time channel packets, and only the data packets for the selected channel.

Channel Configuration

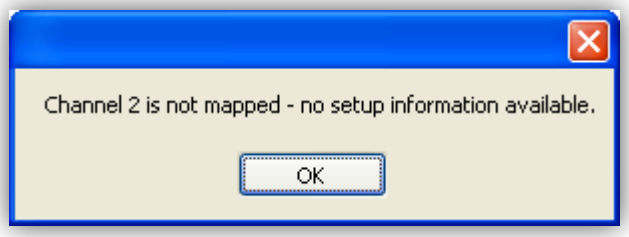
To review or make changes to the configuration of a data channel, it is necessary to left click on the Channel Number, the Channel Type, or the Channel Name within the Channel Details section of the Channel Grid. This will bring up a Setup window that is specific to the channel type.

The title bar of the new configuration window will include the corresponding channel type, the channel number, and the channel name for the channel selected.

To change the configuration of a channel for the next recording, the Data Grid must be open and must be displaying any tab except the Playback tab.

If a channel configuration window is opened when the Data Grid is displaying data on the Playback tab, it is only possible to make changes to the output channel.

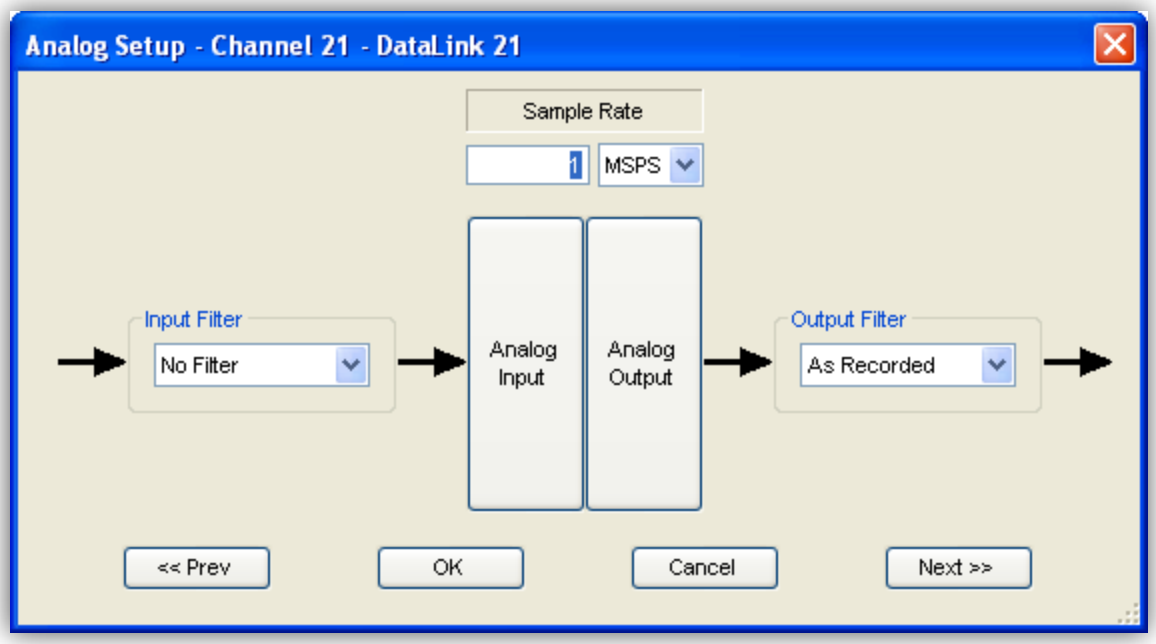
To see the setup information for a prerecorded channel, the recorded channel must be mapped to a playback channel. Then, while the Playback tab is still selected, open the channel configuration and review the input options. All input fields will be grayed out but will still be viewable. If a channel is not mapped, the user will receive notice that no setup information is available.



For all channel types, each window will have an **OK** and a **Cancel** button. Selecting Cancel will discard all changes made to all configuration windows that are subordinate to the current window. For example, selecting Cancel on the PCM Setup page will discard all changes made to the PCM Input Setup page, even if the user had selected OK on the PCM Input Setup page.

Analog Channel Configuration

The main Analog Setup window allows for setting the sample rate and filter settings for each Analog channel.



It also allows the user to bring up sub-windows used to set up the Signal Level and Packet Format setting for the Analog Input and the Signal Level for the Analog Output.

Use this screen to change the sample rate and to select whether any filters are to be applied to the input and output signals.

Select the **Analog Input** button to open the Analog Input Setup window.

Select the **Analog Output** button to open the Analog Output Setup window.

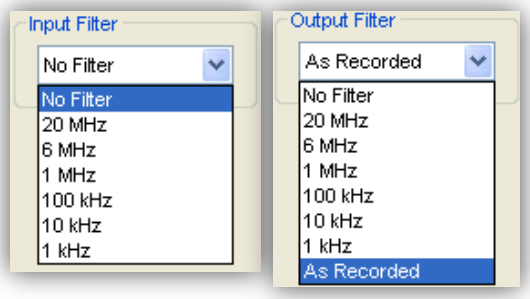
Select **OK** to commit the changes and close the window.

Select **Cancel** to discard the changes to this channel and close the window.

The Analog Channel Setup screens also has **<<Prev** and **Next>>** buttons to allow quick maneuvering to the setup screens for the other channels in the system. If any changes have been made to the channel setup, when selecting either of these buttons, it is the same as hitting the **OK** button, committing any changes, and opening the setup window for another channel.

Setting the Input and Output Filters

The input and output filters can be set using the filter dropdown menus available on the main Analog Setup menu. Select the filter bandwidth of choice.



The default value for the Input Filter is 'No Filter'. It is highly recommended that this setting not be used and that the lowest acceptable filter selection be used.

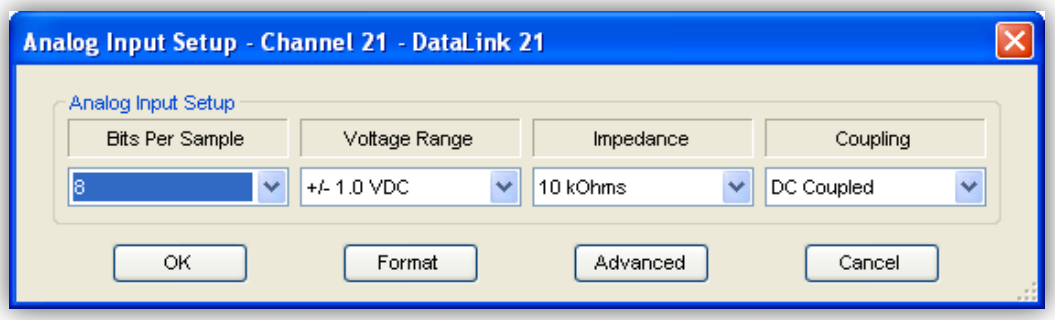
The default value for the Output Filter is 'As Recorded'. With this setting, if an input filter was selected during recording, during playback the output filter will automatically be set to the same setting as the input filter.

Changing the Output Filter setting for a channel causes that change to be applied to all playback operations regardless of which Data Grid tab has been selected. For instance, changing the Output Filter for a channel to "1 MHz" while the Record Target 1 tab is selected will also mean that the Output Filter for that channel will be "1 MHz" when playing back from the Playback tab.

Filters are not applied to the output signal when operating in Record or Monitor mode with Data Loop Thru Enabled.

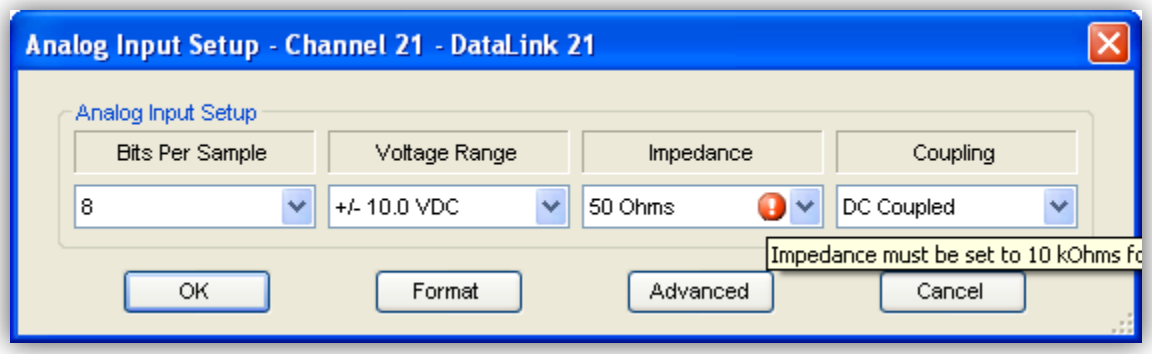
Analog Input Setup Screen

The Analog Input Setup screen allows for the setting of the Analog Input signal sampling characteristics. The list of available setup options in each drop-down menu is determined by using the same physical lists that are used by the hardware device drivers, eliminating the possibility of options being available in the list that are not actually applicable to the hardware.



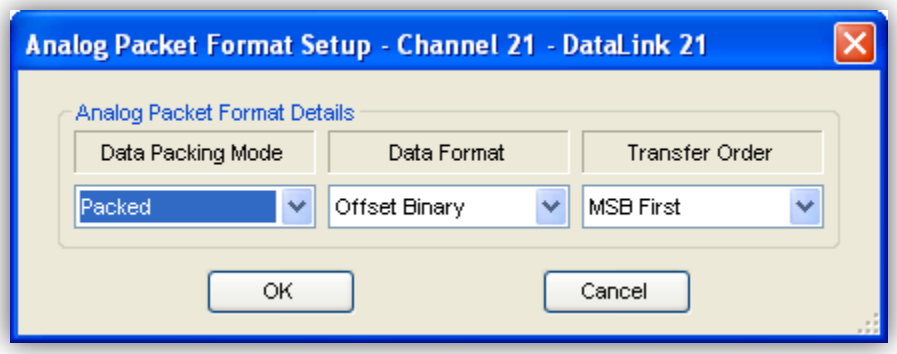
Field	Purpose
Bits Per Sample	Sets the sample size as bits per sample.
Voltage Range	Sets the input voltage range.
Impedance	Sets the impedance for the selected Source.
Coupling	Sets the coupling method for the incoming signal.

It is possible for the user to attempt to setup incompatible configurations. For example, it may be that due to certain current limitations within the hardware it is not possible to select both a +/-10.0 VDC voltage range and 50 ohms impedance. The evaluation is not performed until the user attempts to leave the window. At that point a red exclamation mark will be displayed in the field that needs to be adjusted. Hover over the mark with the cursor to view notes on what must be changed.



Analog Packet Format Setup Screen

The Analog Packet Format Setup screen allows for setting the details of how the sampled Analog data will be packaged into chapter 10 packets. As with other settings, the contents of each drop-down menu are determined by the same physical lists that are used by the hardware device drivers. As newer revisions of hardware add new capabilities, the menus will automatically reflect any new options available in a particular drop-down list. If an incompatible selection is made a red exclamation mark will indicate where to make changes to eliminate the conflict.

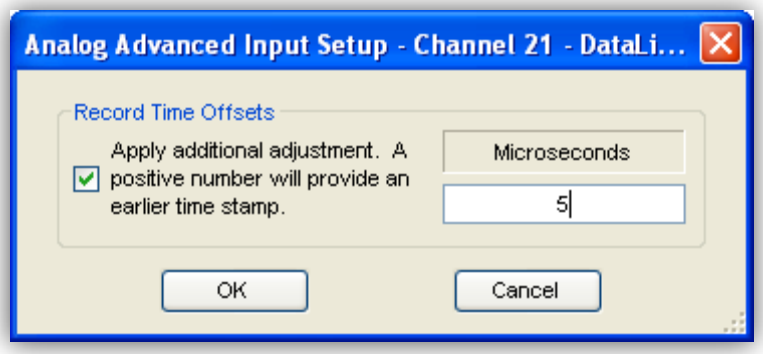


Field	Purpose
Data Packing Mode	Sets the Data Packing Mode. The default mode is **Packed**.
Data Format	Sets the Data Sampling Format. The default format is **Offset Binary**.
Transfer Order	Sets the Data Transfer Order. The default is **MSB First**.

Analog Advanced Input Setup Screen

The Analog Advanced Input Setup screen allows for making adjustments to the Chapter 10 counter time stamps for the channel. These adjustments can be made to accommodate known data link transport delays and allow for more accurate recording of time correlated data.

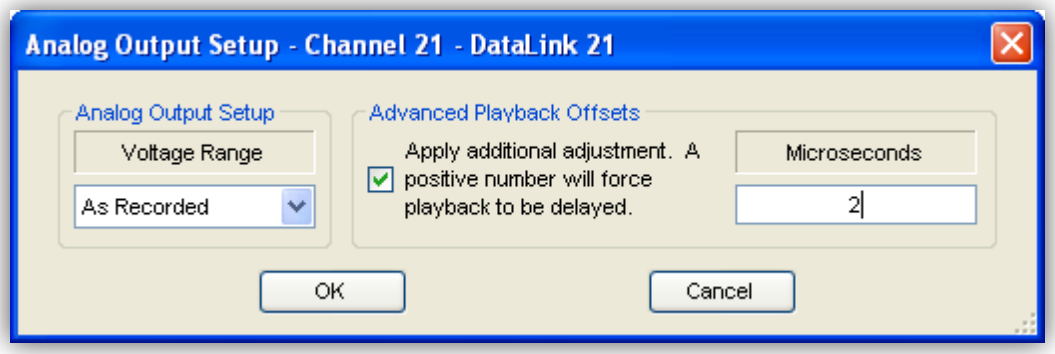
It is possible to make this manual adjustment by checking the box on the left and entering a number in microseconds. In the screen shot below, this would mean that the data on this channel would receive a Chapter 10 counter stamp that is 5 microseconds less than data simultaneously received on another channel that did not have this adjustment made.



Analog Output Setup

The Analog Output Setup screen allows for setting Analog Output related parameters.

By default, the Recorder will always play back the data at the recorded rate as specified in the TMATS header packet in the Chapter 10 file or an associated TMATS file.



Field	Purpose
Voltage Range	Sets the Output Voltage Range. The default value is **As Recorded**. In this mode, the data will playback across the same voltage range that was used when it was recorded. 1 volt in will be 1 volt out. If the Voltage Range is set to anything else, the output voltage will be scaled accordingly. For example, consider the case where the input range was originally +/- 2V and the output range is set to +/- 5V. In this case, if the input voltage was +1V, the output voltage will be +2.5V

Just as with Analog Input Setup, it is possible to make an additional manual adjustment by checking the box in the Advanced Playback Offsets group and entering a number in microseconds. In the screen shot above, this would mean that the data on this channel would be played back 2 microseconds later than data being played back on another channel that was similarly time stamped but did not have this adjustment made. This is useful in accounting for known data transport delays that were not properly accounted for during the record process.

Although the **IMUX G2** Recorder does not record using analog subchannels, it is able to play back the first subchannel in analog packets that use the following subchannel structure:

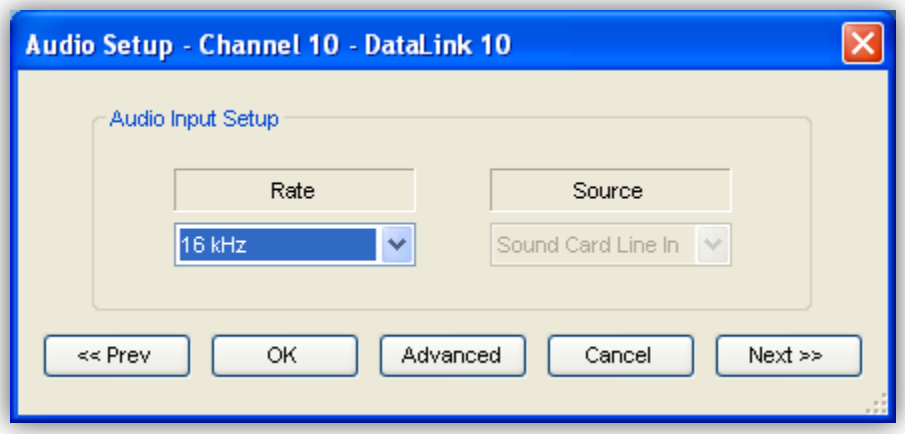
- Only one Channel Specific Data Word is used for all subchannels
- Data is packed with 16 bits per word.

Analog Audio Channel Configuration

The Chapter 10 specification does not specifically call out an Audio channel. However the **IMUX G2** includes the ability to record audio data and play it back within 300-millisecond accuracy using a standard audio card. This data is stored in the Chapter 10 data file as Analog data. For high- end MPEG encoding of audio channels, an audio/video input card must be used.

Audio Setup Screen

There is only one audio channel per **IMUX G2** Recorder. It will record from the source(s) defined by the System Recording Controls. Recording two channels of audio can be accomplished by using the stereo line inputs. The sample quality is always 16-bit stereo and only the sample rate is selectable.



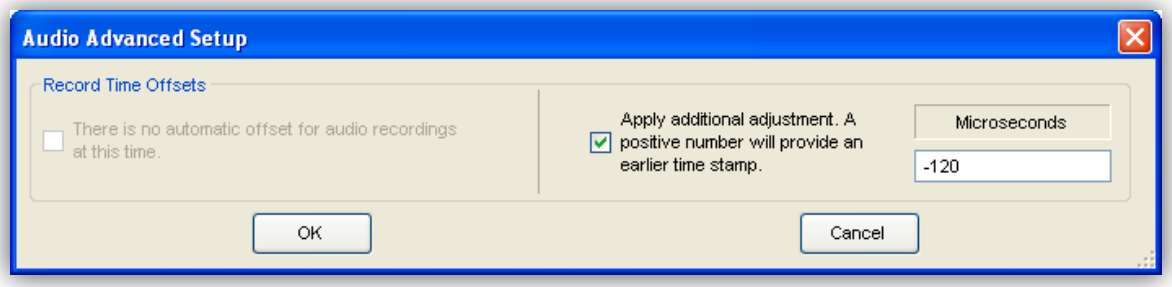
Select **OK** to commit the changes and close the window.

Select **Cancel** to discard the changes to this channel and close the window.

The Audio Setup screen also has **<<Prev** and **Next>>** buttons to allow quick maneuvering to the setup screens for the other channels in the system. If any changes have been made to the channel setup, when selecting either of these buttons it is the same as hitting the **OK** button, committing any changes, and opening the setup window for another channel.

Select **Advanced** to open the Audio Advanced Setup window.

Audio Advanced Setup Screen



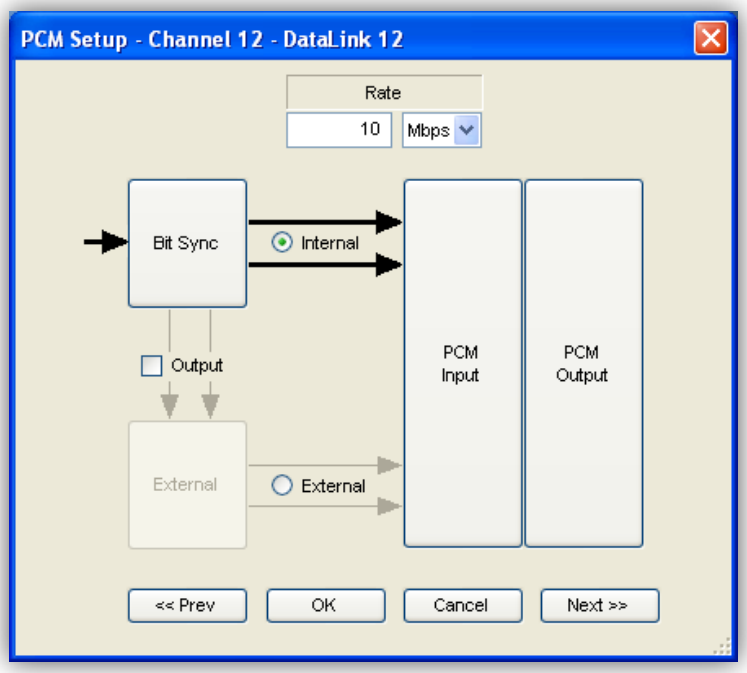
Just as with the PCM Input Setup screen, it is possible to make an additional manual adjustment by checking the box on the right and entering a number in microseconds. In the screen shot above, this would mean that the data on this channel would receive a Chapter 10 counter stamp that is 1200 ticks greater than data simultaneously received on another channel that did not have this adjustment made.

A similar screen is available for making timing adjustments during playback.

PCM Channel Configuration

The main PCM Setup window allows for setting the expected rate of the input channel and the signal routing options.

It also allows the user to bring up sub-windows used to set up the Bit Sync, the PCM Input, and the PCM Output.



Use this screen to change the data rate and to select whether the PCM will receive its input directly from the Bit Sync or from an external source.

Select the **Bit Sync** button to open the Bit Sync Setup window.

Select the **PCM Input** button to open the PCM Input Setup window.

Select the **PCM Output** button to open the PCM Output Setup window.

Select the **Internal** radio button to have the PCM Input obtain clock and data directly from the integrated Bit Sync. Whenever **Internal** is selected, the Bit Sync button will be available.

Select the **External** radio button to have the PCM Input obtain clock and data from an outside source. When **External** is selected, the Bit Sync may or may not be available. To make the Bit Sync available, ensure that the **Output** box is checked.

If the **Output** box is checked, the Bit Sync will generate Clock and Data and will make it available on the rear panel connector. If the **Output** box is not checked, the Clock and Data will not be available at the rear panel connector.

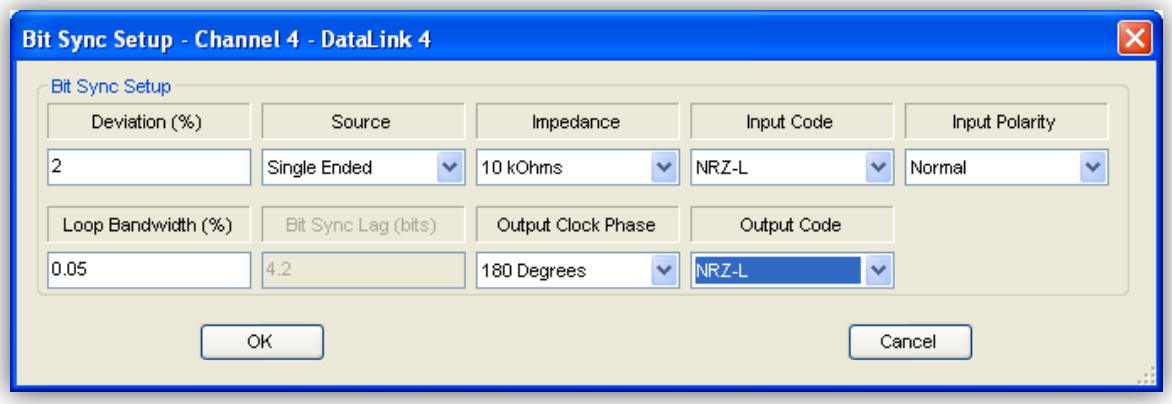
Select **OK** to commit the changes and close the window.

Select **Cancel** to discard the changes to this channel and close the window.

The PCM Channel Setup screens also has **<<Prev** and **Next>>** buttons to allow quick maneuvering to the setup screens for the other channels in the system. If any changes have been made to the channel setup, when selecting either of these buttons, it is the same as hitting the **OK** button, committing any changes, and opening the setup window for another channel.

Bit Sync Setup Screen

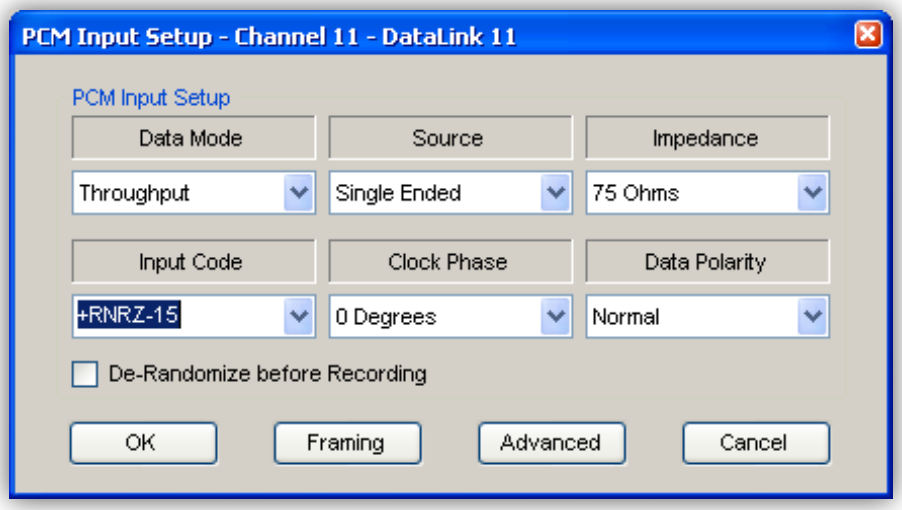
The Bit Sync Setup screen allows for the setting of all Bit Sync related parameters. The list of available setup options in each drop-down menu is determined by using the same physical lists that are used by the hardware device drivers, eliminating the possibility of options being available in the list that are not actually applicable to the hardware.



Field	Purpose
Deviation (%)	Sets the maximum amount of absolute deviation from the target rate that a signal can have and still be considered in lock.
Source	If a Bit Sync has multiple input options, this list will include all of the available input sources.
Impedance	Sets the impedance for the selected Source.
Input Code	Sets the input code of the signal; used for selecting the algorithm that determines what signals will be counted as 1's (ones) and what will be counted as 0's (zeros). Note: Unlike the PCM Input Setup, if the Bit Sync Input Code is set to one of the Randomized NRZ-L codes, the data will be de-randomized and passed along as NRZ-L data.
Input Polarity	Sets whether an input "1" will be counted as a "1" or a "0."
Loop Bandwidth (%)	Sets how much a bit time can change from one bit to the next and still be tracked. A wider loop bandwidth may be necessary to capture a very jittery signal, but the result is a very jittery PCM clock and data stream.
Bit Sync Lag (bits)	This is a parameter that is reported by the hardware and placed here for reference. Every Bit Synchronizer has a lag time between when a signal comes into it and when the signal goes out. This time is measured in number of bits and the actual time lag is a function of the data rate. Knowing this number is helpful in determining true time data correlation.
Output Clock Phase	Sets the relationship of the output clock to the output data.
Output Code	Sets the PCM output code for the Bit Synchronized data.

PCM Input Setup Screen

The PCM Input Setup screen allows for setting the PCM input related parameters associated with receiving data from an external PCM source. If the Source is Bit Sync, these settings are irrelevant and are grayed out. As with the Bit Sync settings, the contents of each drop-down menu are determined by the same physical lists that are used by the hardware device drivers. As newer revisions of hardware add new capabilities, the menus will automatically reflect any new options available in a particular drop-down list.

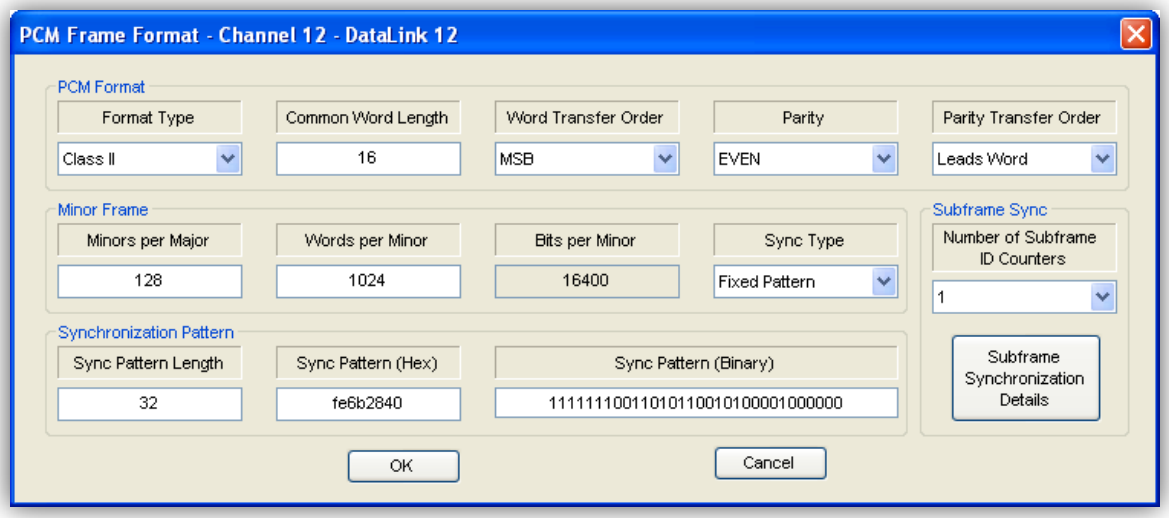


Field	Purpose
Data Mode	The default mode is the PCM **Throughput** mode as described in the Chapter 10 Specification. Other available selections are **Packed** and **Unpacked**. Regardless of the mode selected, the **Framing** button is always enabled to allow access to the additional framing setup information.
Source	If a PCM Input has multiple input options, this list will include all of the available input sources.
Impedance	Sets the impedance for the selected Source.
Input Code	Sets the PCM Input Code format for the data being recorded. Note: In Throughput mode, if the PCM Input Code is set to one of the Randomized NRZ-L codes, the data will not be de-randomized, unless the “derandomize data” check box is checked. Each bit will be stored as the same value it was received. Viewing the packet with a packet viewer will show
Clock Phase	Sets the expected relationship of the input clock to the input data
Data Polarity	The Data Mode selected will have an effect on how this setting is applied. When operating in Throughput Mode the field is informational only and is used to indicate whether the bits stored should be inverted prior to any further processing. “Normal” indicates they do not need to be inverted. “Inverted” indicates that the do need to be inverted prior to

Field	Purpose
	any decommutation. When operating in Packed or Unpacked mode, the field is used to setup how the hardware will process the bits prior to searching for frame synchronization. "Normal" indicates that the bits will be processed as they are received. "Inverted" indicates the hardware is to invert the incoming bits prior to processing. "Auto" indicates that the hardware is to attempt to establish synchronization both ways. When set to Auto, any data that is inverted will be stored normally. For some examples, consider when the synchronization pattern is set to EB90: 1) If Data Polarity is set to Normal and the incoming pattern is EB90, EB90 is stored in the packet. 2) If Data Polarity is set to Normal and the incoming pattern is 146F, no synchronization is found and no packets are created. 3) If Data Polarity is set to Inverted and the incoming pattern is EB90, no synchronization is found and no packets are created. 4) If Data Polarity is set to Inverted and the incoming pattern is 146F, EB90 is stored in the packet. 5) If Data Polarity is set to Auto and the incoming pattern is EB90, EB90 is stored in the packet. 6) If Data Polarity is set to Auto and the incoming pattern is 146F, EB90 is stored in the packet.
De-Randomize before Recording	Only enabled for +RNRZ-15 setting with version BM or higher. If checked the input signal to the PCM Input module will de-randomized the signal before being recorded. Otherwise, the incoming signal is recorded as is.

PCM Frame Format Screen

The PCM Frame Format Setup screen allows for setting the frame format details for the selected PCM stream. These values will be used as the default values for the PCM Snapshot viewer. In Throughput mode, all fields are optional. In Packed mode, the Common Word Length, Words per Minor, Sync Pattern Length, and Sync Pattern fields must be provided. Only valid entries will be updated and saved. The PCM Subframe Synchronization Setup Screen can be accessed by selecting the Subframe Synchronization Details button.



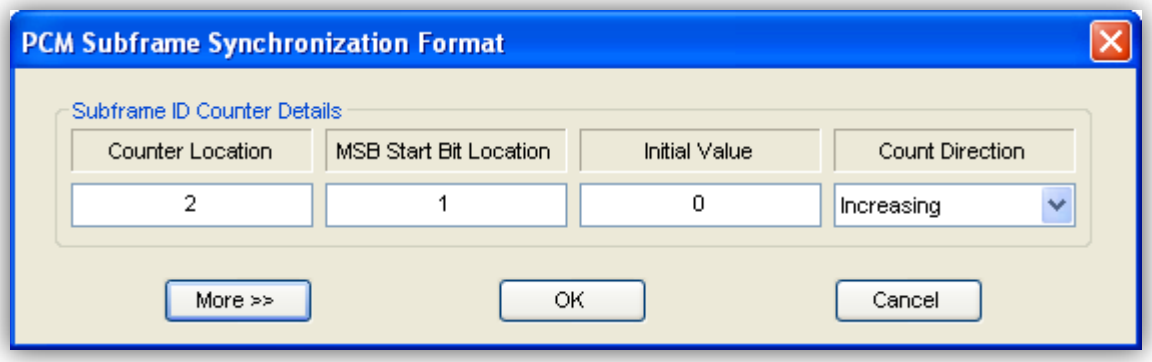
Field	Purpose
Format Type	Type of PCM Format. The drop down list is limited to those specified by the TMATS P-d/TF attribute. Packed mode data is stored MSB oriented and 32 bit aligned.
PCM Format Section	
Common Word Length	Specifies the number of bits for the default PCM data word size.
Word Transfer Order	Specifies the default for the first bit transferred in normal time sequence. In Packed mode, only MSB formatted data is supported
Parity	Specifies the normal word parity.
Parity Transfer Order	Specifies the location of the parity bit relative to the data word.
Minor Frame Section	
Minors per Major	Specifies the number of Minor Frames in the Major Frame.
Words per Minor	Specifies the number of words in a Minor Frame. The Minor Frame synchronization pattern is always considered to be one word regardless of its length.
Bits per Minor	Calculated value defined as the number of bits in a minor frame including the minor frame synchronization pattern.
Sync Type	Specifies the Minor Frame Synchronization Type
Synchronization Pattern Section	
Sync Pattern Length	Specifies the minor frame synchronization pattern length in number of bits.
Sync Pattern (Hex)	Specifies the minor frame synchronization pattern using a hexadecimal format. Assumes that the left most bit is the first bit transmitted. Upon exit from this field, the binary Sync Pattern is automatically updated.
Sync Pattern (Binary)	Specifies the minor frame synchronization pattern using a binary bit pattern. Assumes that the left most bit is the first bit transmitted. Upon exit from this field, the hexadecimal Sync Pattern is automatically updated.
Sync Mask (Hex)	Specifies the minor frame synchronization bit mask using a hexadecimal format. The most significant bit of the mask corresponds to the most significant bit of the sync pattern. Upon exit from this field, the binary Sync Mask is automatically updated. When operating in packed mode, this mask controls the primary frame synchronization compare engine. A '1' bit within the mask will cause the corresponding Sync Pattern bit to be compared to the incoming data. A '0' bit within the mask will cause the corresponding Sync Pattern bit to not be compared to the incoming data.
Sync Mask (Binary)	Specifies the minor frame synchronization bit mask using a binary format. The most significant bit of the mask corresponds to the most significant bit of the sync pattern. Upon exit from this field, the hexadecimal Sync Mask is automatically updated. When operating in packed mode, this mask controls the primary frame synchronization compare engine. A '1' bit within the mask will cause the corresponding Sync Pattern bit to be compared to the incoming data. A '0' bit within the mask will cause the corresponding Sync Pattern bit to not be compared to the incoming data.

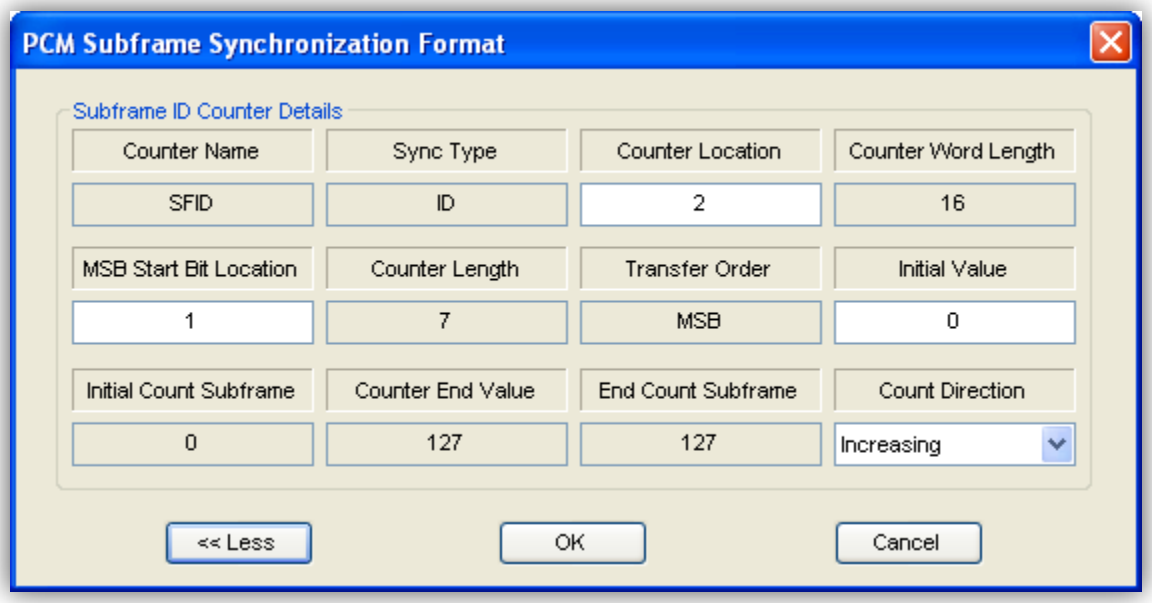
Field	Purpose
Synchronization Criteria Section	
Max Bit Slip	Specifies the number of bits the frame synchronization word is permitted to slip left (negative, ahead) or right (positive, behind) from the expected location of the frame synchronization word and still be counted as a valid instance.
Matches For Lock	Specifies the number of times in a row a valid synchronization pattern must be found in the expected location in order to move from Search to Lock. Specifying a value of "0" indicates that Lock is established when the first instance of the synchronization pattern is found.
Bit Errors For Lock	Specifies the maximum number of bits in the synchronization pattern that can be in error and the pattern still be counted as valid. Only applies when moving from Search to Lock.
Misses to Drop	Specifies the number of times in a row an invalid synchronization pattern must be found in the expected location in order to move from Lock to Search. Specifying a value of "1" indicates that Lock is dropped when the first instance of an invalid synchronization pattern is found.
Bit Errors to Drop	This field specifies the maximum number of bits in the synchronization pattern that can be in error and the pattern still be counted as valid. Only applies when moving from Lock to Search. Value must be "1" or greater.
Subframe Synchronization Section	
Number of Subframe ID Counters	Specifies the Number of Subframe ID Counters that are defined within the minor frame. Only allowable values are 0 and 1.

PCM Subframe Synchronization Format Screen

The PCM Subframe Synchronization Format screen allows for setting the Subframe ID counter details. There are two views available for this screen. A limited view allows the user to see only the fields that require user data entry. The more verbose screen displays all of the calculated and hard coded values that are based on the user data. Use the **Less** and **More** buttons to switch between views.

When attempting to save the entries via the [OK] button, any invalid value will be flagged. The user will be prompted to save any valid fields. Only valid entries will be updated and saved. Invalid values will not be output to a TMATS file nor to the Computer Generated Format 1 (TMATS header) packet of the recorded file.





Field	Purpose
Counter Name	Specifies the Subframe ID Counter Name. Hard coded to "SFID".
Sync Type	Defines the Subframe Synchronization Type. Hard Coded to ID Counter "ID".
Counter Location	Specifies the Minor Frame word position for the ID Counter. The value must be greater than 1 (one) and less than the specified number of words in a Minor Frame.
Counter Word Length	Specifies, as a number of bits, the word length for the word containing the ID Counter. Automatically set to match the Common Word Length.
MSB Start Bit Location	Specifies the bit location within the Counter Word that serves as the Most Significant Bit for the counter.
Counter Length	Specifies, as a number of bits, the subframe ID Counter Length. The value is calculated based on the number of Minor Frames per Major and the ID Counter Initial Value.
Transfer Order	Specifies whether the most or least significant bit is transferred first. Automatically set to the same value as the Word Transfer Order. In Packed mode, only MSB formatted data is supported.
Initial Value	Specifies the expected Initial Value of the ID Counter.
Initial Count Subframe	Specifies the minor frame number associated with the initial count value. Automatically set to match the Initial Value.
Counter End Value	Specifies the end value of the ID Counter. Automatically calculated based on the Initial Value, Number of Minors per Major, and the Count Direction.
End Count Subframe	Specifies the minor frame number associated with the end count value. Automatically set to match the Counter End Value.
Count Direction	Specifies the direction of the ID Counter, either increasing or decreasing.

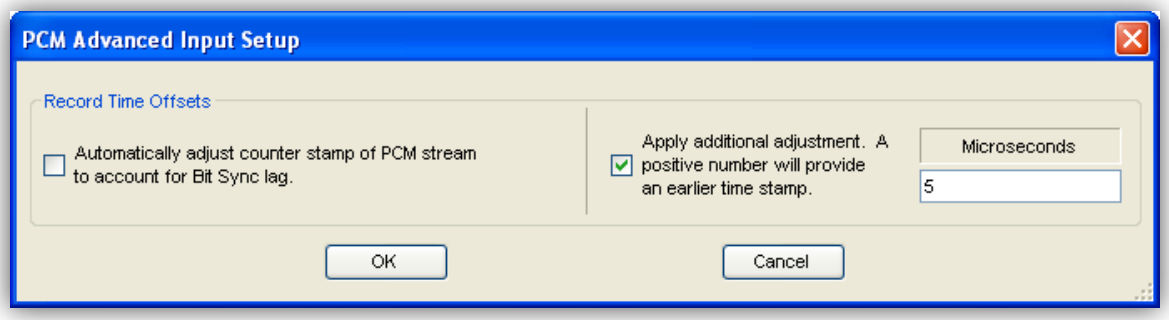
PCM Advanced Input Setup Screen

The PCM Advanced Input Setup screen allows for making adjustments to the Chapter 10 counter time stamps for the channel. These adjustments can be made to accommodate known data link transport delays and allow for more accurate recording of time correlated data.

When recording multiple PCM streams that are operating at different rates through Bit Synchronizers, each stream will experience different Bit Sync data processing lag times. This Bit Sync lag is expressed in bit times and can be found on the Bit Sync Setup screen.

On the left-hand side of the Record Time Offsets group, is a check box that enables the user to choose whether or not to automatically account for the Bit Sync lag when time stamping the data from that particular PCM stream. Checking the box will automatically adjust the counter by "X" microseconds where

X = Bit Sync Lag (in bits) x 1,000,000 / Bit Rate.

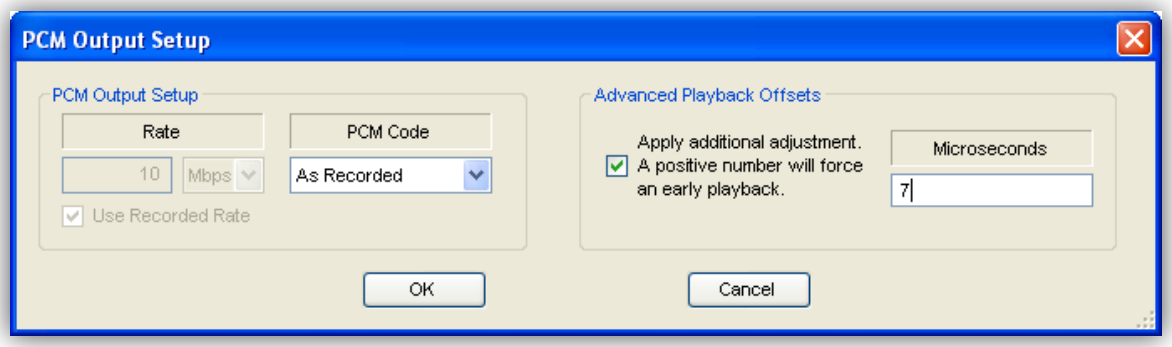


It is also possible to make an additional manual adjustment by checking the box on the right and entering a number in microseconds. In the screen shot above, this would mean that the data on this channel would receive a Chapter 10 counter stamp that is 50 ticks less than data simultaneously received on another channel that did not have this adjustment made.

PCM Output Setup

The PCM Output Setup screen allows for setting PCM Output related parameters.

By default, the Recorder will always play back the data at the recorded rate as specified in the TMATS header packet in the Chapter 10 file or an associated TMATS file. It is also possible to specify alternate playback rates from this screen.



Field	Purpose
Use Recorded Rate	If selected, the output rate will be set to match the rate at which the data was recorded, including on-the-fly changes to data rate. If deselected, output data rate is user defined and TMATS setup change packets will be ignored. Note: Playing back data at a rate other than the actual recorded data rate may cause unexpected results.
Rate	Sets the PCM Output rate. If Use Recorded Rate is deselected, the rate can programmed by the user to the correct rate. This is useful when the TMATS setup records do not have the correct rate specified.
Rate Units	Sets the units for the PCM Output rate value
PCM Code	Sets the PCM Output code to use for data reconstruction. Generally this would be set to As Recorded. However, there are times when a user may want to play back data using a different PCM code due to limitations on the equipment that will be receiving the data.

Just as with PCM Input Setup, it is also possible to make an additional manual adjustment by checking the box on the right and entering a number in microseconds. In the screen shot above, this would mean that the data on this channel would be played back 7 microseconds before data being played back on another channel that was similarly time stamped but did not have this adjustment made. This is useful in accounting for Bit sync lag or other known data transport delays that were not properly accounted for during the record process.

Although the **IMUX G2** Recorder uses PCM throughput mode during recording to ensure that every bit is captured, regardless of frame lock status, it is able to play back packed and unpacked mode data packets that use either of the following structures:

- Packed mode data in MSB First format

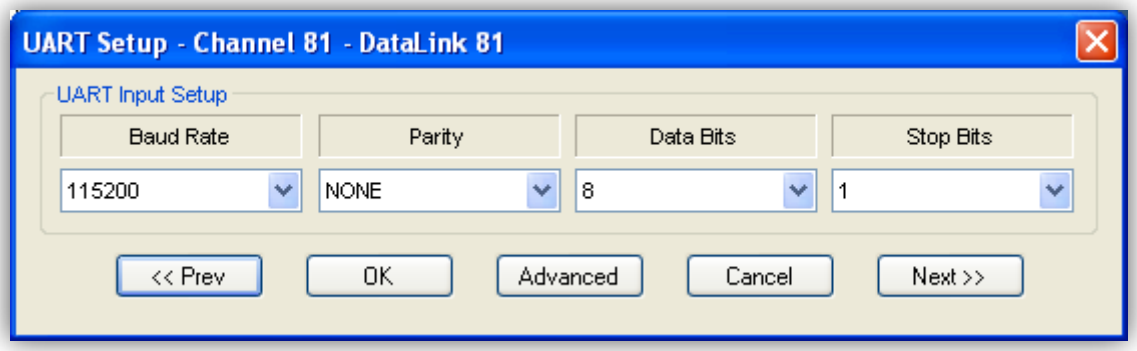
- Unpacked mode data in MSB First format

Note that PCM snapshot viewers work only with throughput mode data.

UART Channel Configuration

UART Setup Screen

The UART Setup screen allows for setting the parameters associated with receiving data from an external UART source.



Field	Purpose
Baud Rate	Sets the baud rate for the channel. Choose from the drop-down list. Note: The UART setup information in the hardware configuration file includes a field to signify whether the hardware is installed to support either higher speed or lower speed signals. This setting is used to determine the available baud rates.
Parity	Sets the parity for the channel. Choose from the drop-down list.
Data Bits	Sets the data bits for the channel. Choose from the drop-down list.
Stop Bits	Sets the stop bits for the channel. Choose from the drop-down list.

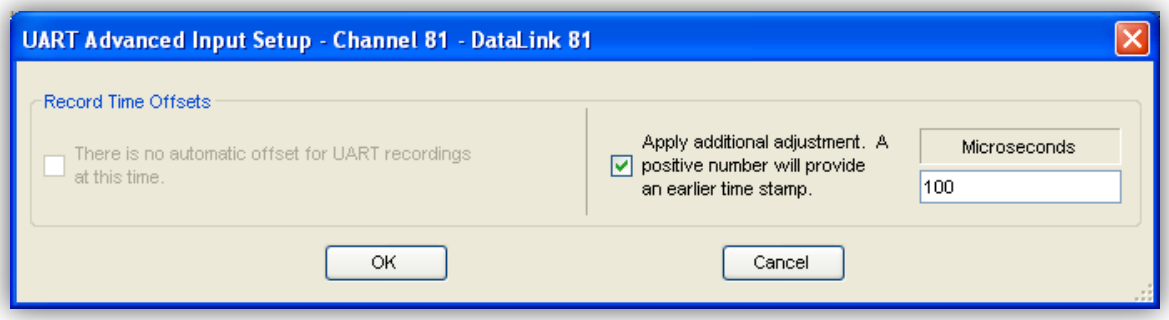
Select **OK** to commit the changes and close the window.

Select **Cancel** to discard the changes to this channel and close the window.

The UART Setup screen also has **<<Prev** and **Next>>** buttons to allow quick maneuvering to the setup screens for the other channels in the system. If any changes have been made to the channel setup, when selecting either of these buttons it is the same as hitting the **OK** button, committing any changes, and opening the setup window for another channel.

Select **Advanced** to open the UART Advanced Setup window.

UART Advanced Setup Screen



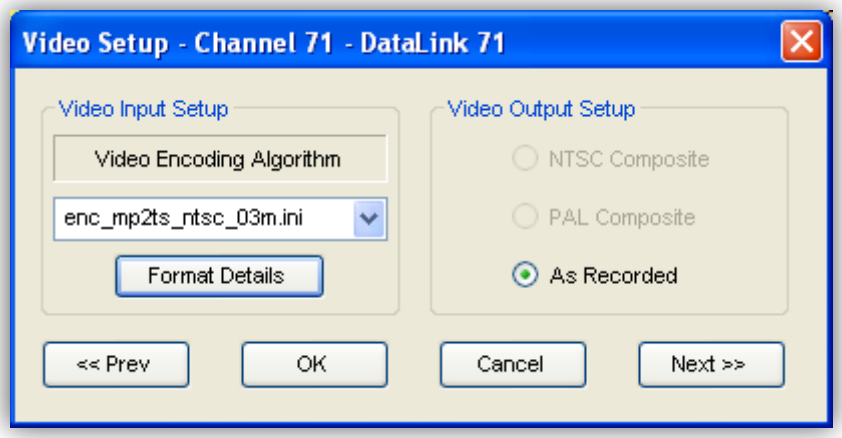
Just as with the PCM Input Setup screen, it is possible to make an additional manual adjustment by checking the box on the right and entering a number in microseconds. In the screen shot above, this would mean that the data on this channel would receive a Chapter 10 counter stamp that is 1000 ticks earlier than data simultaneously received on another channel that did not have this adjustment made.

A similar screen is available for making timing adjustments during playback.

Video Channel Configuration

Video Setup Screen

The Video Setup screen allows for setting the parameters associated with receiving and playing back data from an external video source.



This Video Setup screen varies from other setup screens in that it allows making both input and output selections from the same screen.

The **Video Input Setup** group allows the user to select a Video Encoding Algorithm from a list of available installed algorithms and to open another window that will display the format details for the selected algorithm. The encoding algorithms have names that can be deciphered. In the selection above, the encoding is MPEG 2, Transport Stream, NTSC, 3 Mbps constant bit rate.

The **Video output Setup** group allows the user to select whether to reproduce the recorded video in the same format in which it is recorded, or specifically to play it as NTSC or PAL composite.

Select **Format Details** to review the video packet format details.

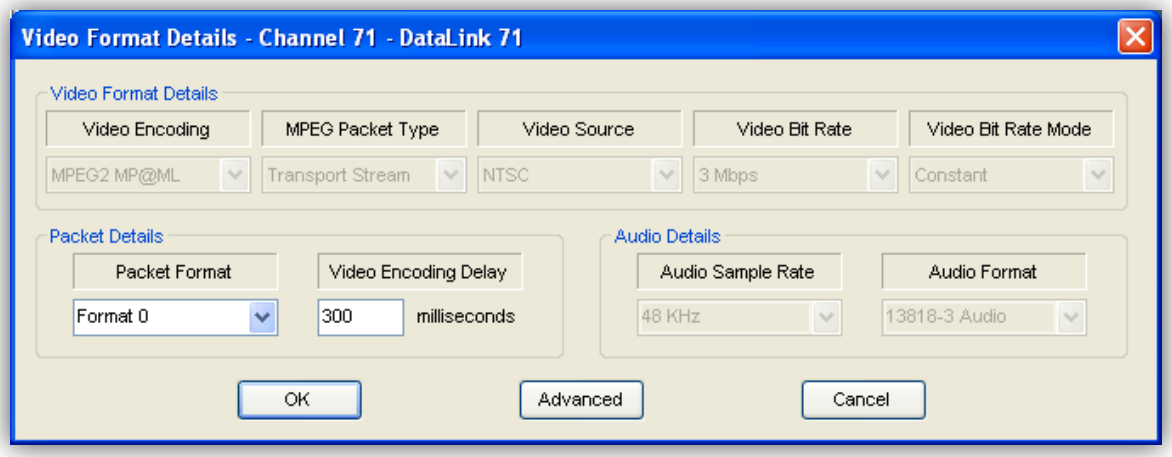
Select **OK** to commit the changes and close the window.

Select **Cancel** to discard the changes to this channel and close the window.

The Video Setup screen also has **<<Prev** and **Next>>** buttons to allow quick maneuvering to the setup screens for the other channels in the system. If any changes have been made to the channel setup, when selecting either of these buttons it is the same as hitting the **OK** button, committing any changes, and opening the setup window for another channel.

Video Format Details Screen

The Video Format Details screen displays the details for the video packets.



The group labeled **Video Format Details** displays the details for the selected video encoding algorithm.

Field	Purpose
Video Encoding	Displays both the selected encoding scheme and the resolution.
MPEG Packet Type	Displays whether Packet Stream or Transport Stream has been selected.
Video Source	Displays whether NTSC or PAL has been selected.
Video Bit Rate	Displays what Video Bit Rate has been selected.
Video Bit Rate Mode	Displays whether the Video Bit Rate is Constant or Variable.

The group labeled **Packet Details** allows the setting of details associated with the format of the Chapter 10 data packet.

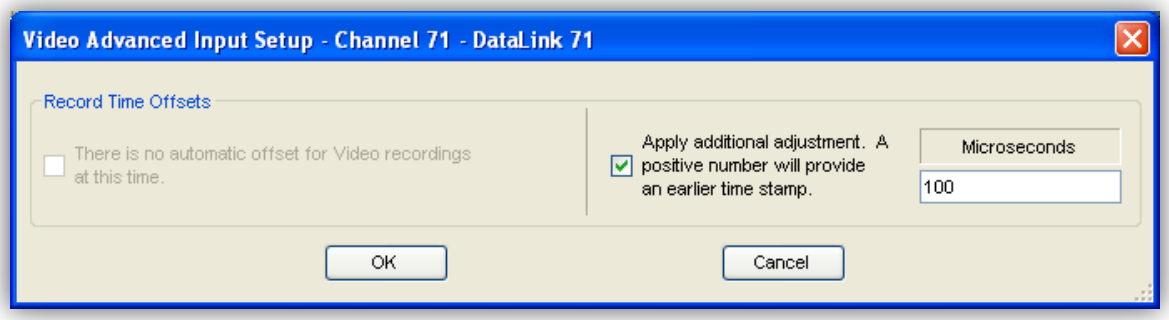
Field	Purpose
Packet Format	Allows Selection of Format 0, 1, or 2. This value may be restricted based on the encoding algorithm selected. Choose from the drop-down list.
Video Encoding Delay	This field specifies the known video encoding delay in milliseconds. Type in the value as a decimal integer.

The group labeled **Audio Details** allows the setting of details associated with the capture of audio for inclusion in the video packet.

Field	Purpose
Audio Sample Rate	Allows selection of the audio sample rate. This value may be restricted based on the encoding algorithm selected. Choose from the drop-down list.
Audio Format	Allows selection of the audio encoding algorithm. This value may be restricted based on the encoding algorithm and packet format selected. Choose from the drop-down list.

Select **Advanced** to open the Video Advanced Setup window.

Video Advanced Setup Screen



Just as with the PCM Input Setup screen, it is possible to make an additional manual adjustment by checking the box on the right and entering a number in microseconds. In the screen shot above, this would mean that the data on this channel would receive a Chapter 10 counter stamp that is 1000 ticks earlier than data simultaneously received on another channel that did not have this adjustment made.

A similar screen is available for making timing adjustments during playback.

Ethernet Channel Configuration

Ethernet Setup Screen

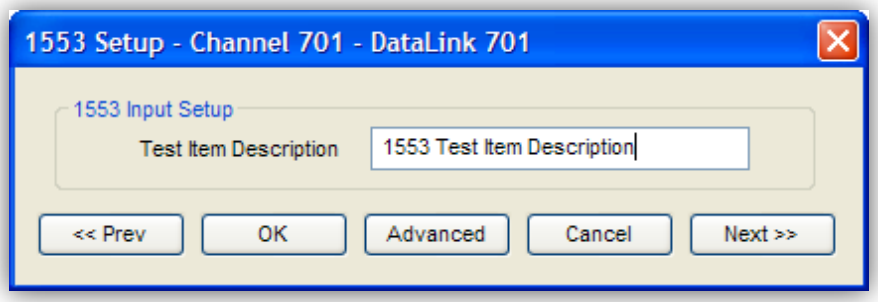
There is no Ethernet Channel Setup screen required at this time. Ethernet channels record all network traffic.

Note: Because the Ethernet connections are the same for both inputs and outputs the system does not provide a monitor feature during record even when Data Loop Through Enabled is selected.

1553 Channel Configuration

1553 Setup Screen

The 1553 Setup screen allows for setting the parameters associated with receiving data from an external 1553 source.



Field	Purpose
Test Item Description	Enter the text description for the channel

Select **OK** to commit the changes and close the window.

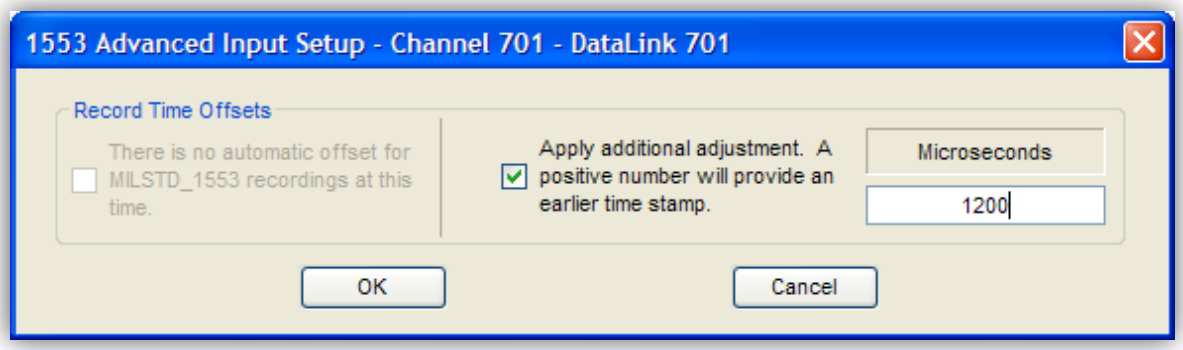
Select **Cancel** to discard the changes to this channel and close the window.

The 1553 Setup screen also has **<<Prev** and **Next>>** buttons to allow quick maneuvering to the setup screens for the other channels in the system. If any changes have been made to the channel setup, when selecting either of these buttons it is the same as hitting the **OK** button, committing any changes, and opening the setup window for another channel.

Select **Advanced** to open the 1553 Advanced Input Setup window.

Note: Because the 1553 connections are the same for both inputs and outputs the system does not provide a monitor feature during record even when Data Loop Through Enabled is selected.

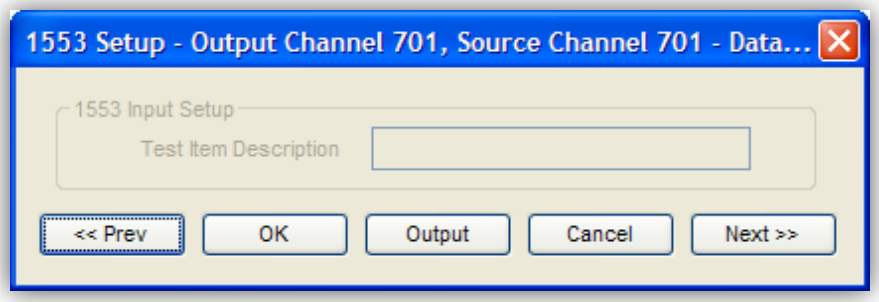
1553 Advanced Setup Screen



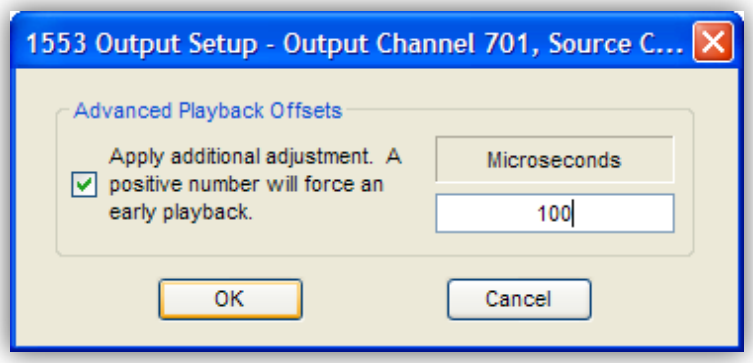
It is possible to make an additional manual adjustment by checking the box on the right and entering a number in microseconds. In the screen shot above, this would mean that the data on this channel would receive a Chapter 10 counter stamp that is 1200 ticks greater than data simultaneously received on another channel that did not have this adjustment made.

1553 Output Channel Setup Screen

When accessing the setup screen from the Playback tab, the setup screen has one variation. The center button is changed from **Advanced** to **Output**. Select **Output** to view the advanced Output options.



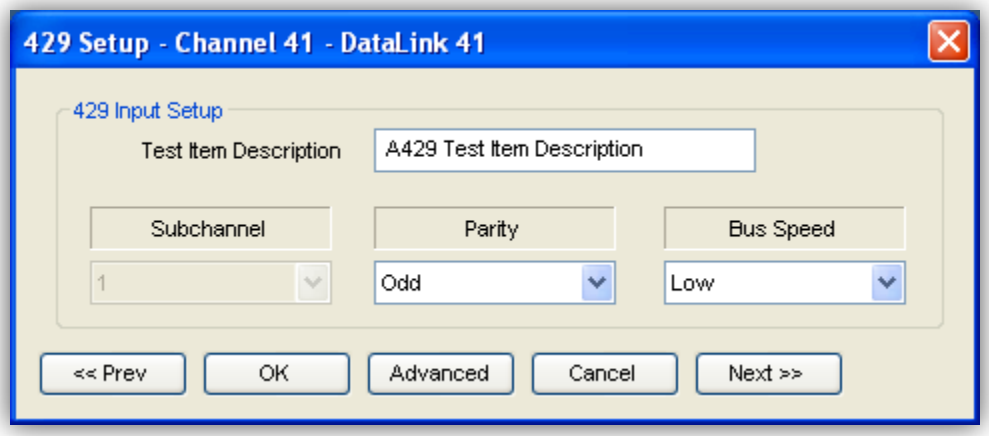
This screen allows the user to make an adjustment in the playback timing.



429 Channel Configuration

429 Setup Screen

The 429 Setup screen allows for setting the parameters associated with receiving data from an external 429 source.



Field	Purpose
Test Item Description	Enter the text description for the channel
Subchannel	The Subchannel / Bus is hard coded to “1” for all record sessions.
Parity	Select either Odd or None to indicate polarity of the 429 bus
Bus Speed	Select either Low or High to indicate speed of 429 bus to be recorded

Select **OK** to commit the changes and close the window.

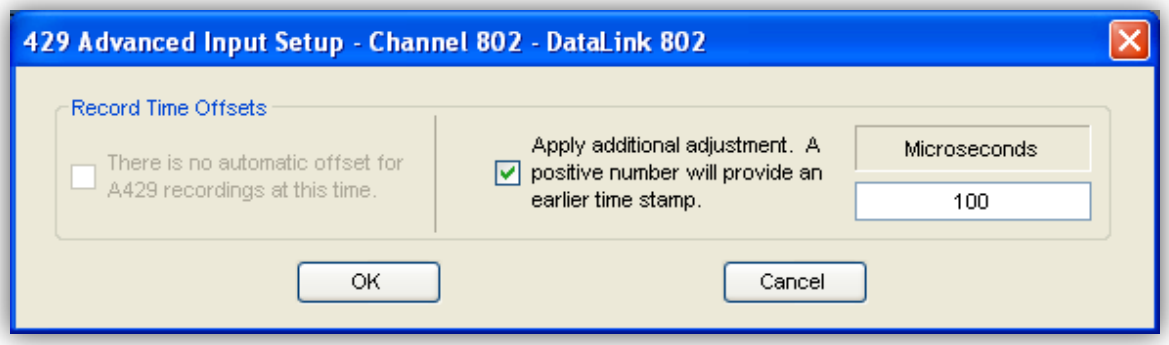
Select **Cancel** to discard the changes to this channel and close the window.

The 429 Setup screen also has **<<Prev** and **Next>>** buttons to allow quick maneuvering to the setup screens for the other channels in the system. If any changes have been made to the channel setup, when selecting either of these buttons it is the same as hitting the **OK** button, committing any changes, and opening the setup window for another channel.

Select **Advanced** to open the 429 Advanced Input Setup window.

Note: Because the 429 connections are the same for both inputs and outputs the system does not provide a monitor feature during record even when Data Loop Through Enabled is selected.

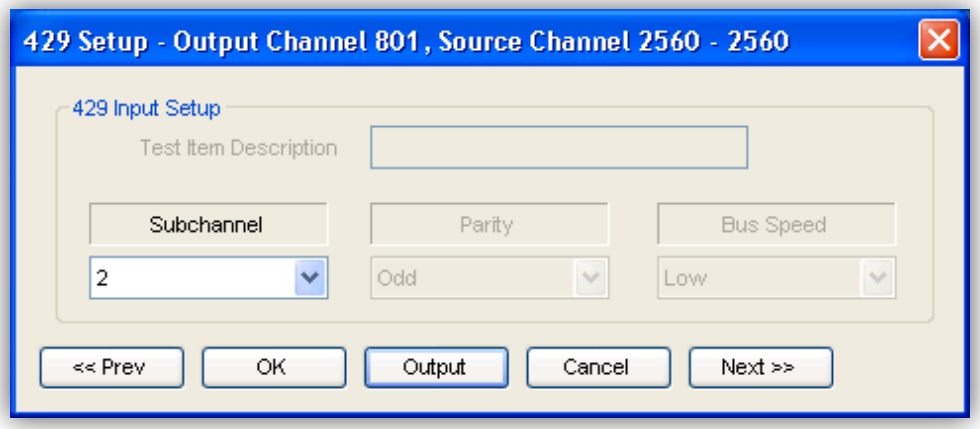
429 Advanced Input Setup Screen



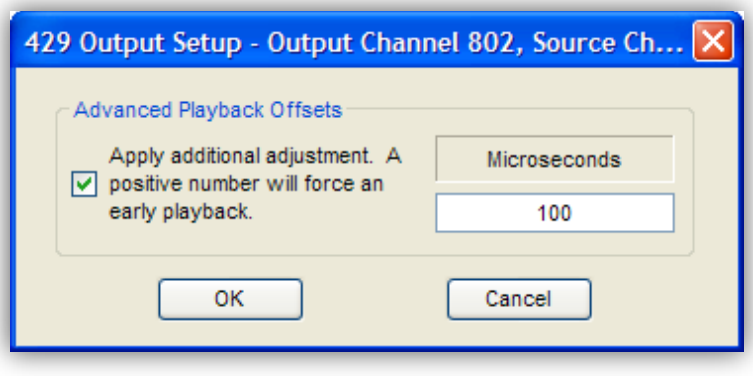
It is possible to make an additional manual adjustment by checking the box on the right and entering a number in microseconds. In the screen shot above, this would mean that the data on this channel would receive a Chapter 10 counter stamp that is 100 ticks greater than data simultaneously received on another channel that did not have this adjustment made.

429 Output Channel Setup Screen

When accessing the setup screen from the Playback tab the Subchannel field is activated. If there is more than one subchannel defined, the field will be selectable and any one of the multiple subchannels may be selected for playback. If the TMATS information for the data file does not specify any subchannel information, all data from all active subchannels will be played. Also, the center button is changed from **Advanced** to **Output**. Select **Output** to view the advanced Output options.



This screen allows the user to make an adjustment in the playback timing.

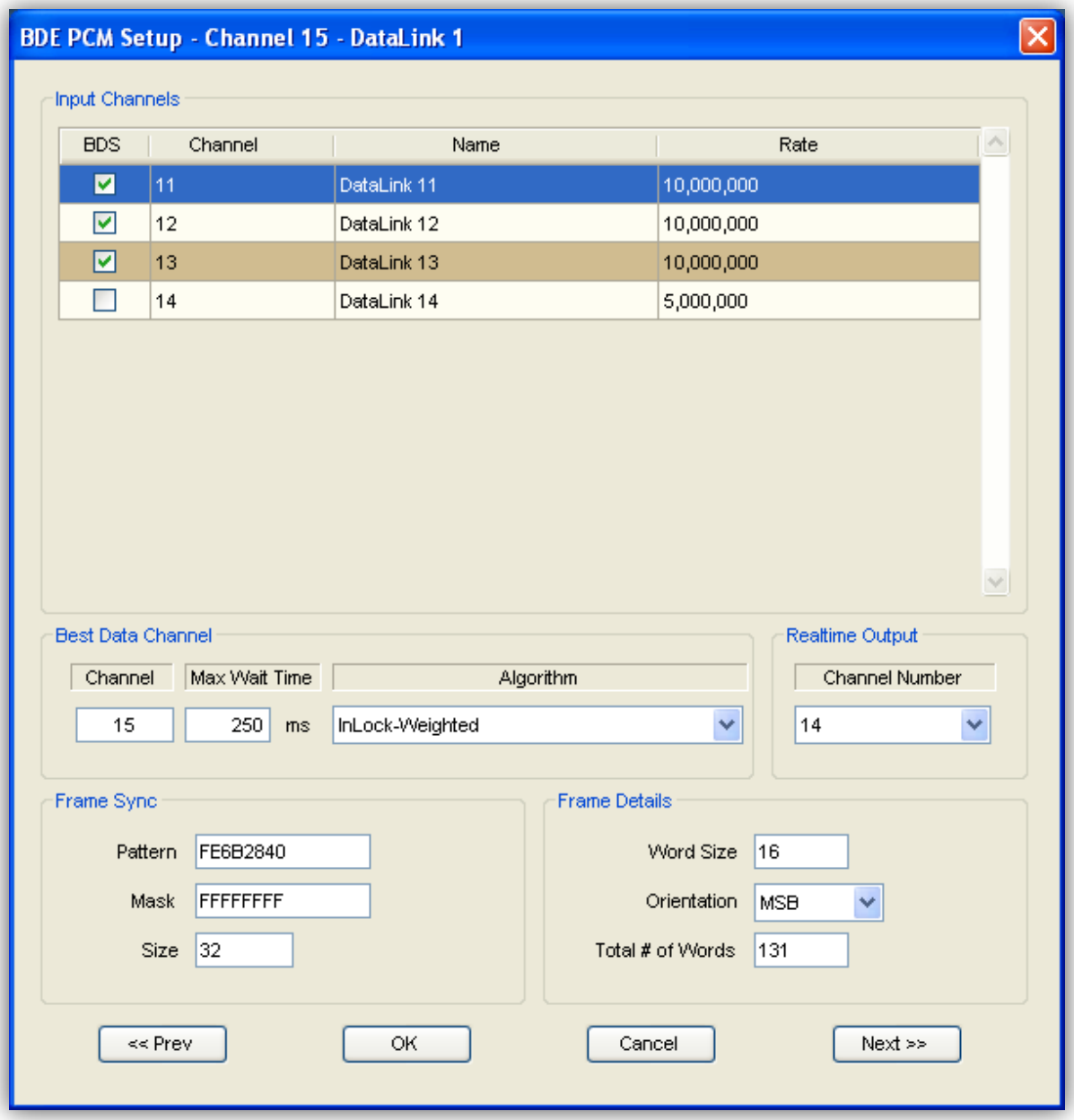


Best Data Engine (BDE) PCM Channel Configuration

IMUX G2 has the ability to operate with an integrated Best Data Engine (BDE). When this feature is enabled and properly configured, multiple PCM data streams will be merged into one Best Data Stream and provided to any targets enabled to receive data from that channel. The output format of the BDE channel follows all of the rules for a standard PCM channel. Once the data is recorded it can be mapped and played back just like any other PCM channel.

BDE PCM Setup Screen

The BDE PCM Setup screen is broken up into five major groups: **Input Channels**, **Best Data Channel**, **Real Time Output**, **Frame Sync,** and **Frame Details**.



The **Input Channels** group displays available PCM channels that are configured in Throughput mode and allows for selecting which PCM streams will be included as best data source (BDS) inputs to the BDE. When the initial channel selection is made, only channels that have the same data rate can be selected for inclusion in the BDE processing.

Note: It is valid for there to be multiple R-groups in a TMATS header. It is also valid for the same channel number, also known as track ID, to appear in each group. It is not valid for the same channel number to appear more than once in a single R-group. The BDE setup screen will display a channel number only once, regardless of how many times it appears in the TMATS header. The order of precedence for determining which channels to present in the BDE PCM Setup Screen is listed below.

1. The R-group with the ID attribute set to "TDS" is given priority.
2. Subsequent R-groups are read in index order (i.e., R-2 is read before R-3).
3. Within each R-group, the channel definitions are read in index order (i.e., R-2\TK1-1 is read before R-2\TK1-2). If a duplicate channel number is ever encountered, the first instance is retained and any remaining instances are ignored.

Example:

Assume the following TMATS snippet where several attributes are presented in a somewhat random order:

R-2\ID:RGroup 2
R-2\TK1-1:1
R-2\TK1-2:2
R-2\TK1-4:3
R-2\TK1-3:3
R-3\ID:TDS
R-3\TK1-1:1
R-1\ID:RGroup 1
R-1\TK1-1:2

The Result:

1. R-3 is given first priority because the R-3\ID:x attribute is set to TDS. Therefore, Channel 1 will use the definition from R-3.
2. Of the two remaining R-groups, R-1 and R-2, R-1 is given next priority because it is the lower index number. Therefore, Channel 2 will be defined in R-1.
3. Within R-2, Channel 3 is defined twice, in R-2\TK1-4:x and R-2\TK1-3:x. R-2\TK1-3 is given priority because it is the lower index number. Therefore, Channel 3 will be defined by TK1-3 in R-2.

The **Best Data Channel** group allows for setting the BDE channel number and the options that define how and which BDE algorithm will be applied.

Field	Purpose
Channel	Allows for setting the Chapter 10 channel number of the output BDE PCM stream.
Max. Wait Time	In order for the BDE to work, it needs to collect data from multiple similar sources. The Chapter 10 standard allows data packets to be held off and merged into the Chapter 10 file up to one second after packets from another stream have been recorded to the file. When processing previously recorded files, a stand alone BDE application would need to wait the entire one second before processing current data. In real-time applications this allowable delay may not be acceptable, and it might not even be occurring. This field allows for a shorter maximum wait time to be specified. If matching data is not available in time, the best decision will be made without it. The value is entered as a decimal integer that specifies the maximum number of milliseconds the algorithm will wait for "matching data" before it makes a best data selection.
Algorithm	Allows for the selection of the preferred BDE processing algorithm. The drop-down list is currently limited to two, but in the future, it will be automatically updated whenever additional BDE processing algorithms are installed on the system. BitVote – Aligns data and performs a simple bit-by-bit count. For each bit location, the bit value occurring the most often will be selected. Only use this algorithm with three or more sources. Using it with just two sources usually makes the data look worse. InLock-Weighted – Aligns data and makes decision based on which streams have been in lock the most, for the longest period of time, most recently. It is a fairly complicated algorithm; the details of which are outside the scope of this manual.

The **Realtime Output** group allows for selecting which available PCM output channel will be used for real time output of the resultant BDE stream. The channel must be disabled and it must not be selected as a BDE input channel. If there is no desire to create a physical output stream while in Monitor or Record modes, set this value to "None". Regardless of this setting, the Best Data Engine will create BDE packets for inclusion in the recording.

Field	Purpose
Channel Number	Allows for selecting an unused channel for real time play back in Monitor and Record modes. Selecting "None" will release any previously reserved channel.

The **Frame Sync** group allows for setting the Frame Sync parameters for the minor frames of data in the PCM stream. The entire frame sync is counted as one word.

Field	Purpose
Pattern	Allows for setting the Frame Sync Pattern. The value is entered in hexadecimal.
Mask	Allows for setting the Frame Sync Mask. The value is entered in hexadecimal.
Size	Allows for setting the Frame Sync Size. The value is entered in decimal.

The **Frame Details** group allows for setting the Frame Details for the minor frames of data in the PCM stream.

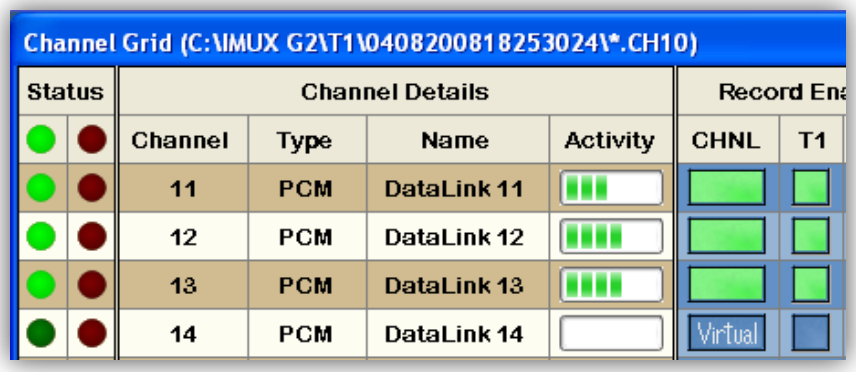
Field	Purpose
Word Size	Allows for setting the size the PCM Word Size. The value is entered in decimal.
Orientation	Allows for selecting the PCM Word Orientation. Choose from the drop-down list.
Total # of Words	Allows for setting the # of PCM Data Words in the minor frame. This value includes the Frame Sync word. The value is entered in decimal.

Select **OK** to commit the changes and close the window.

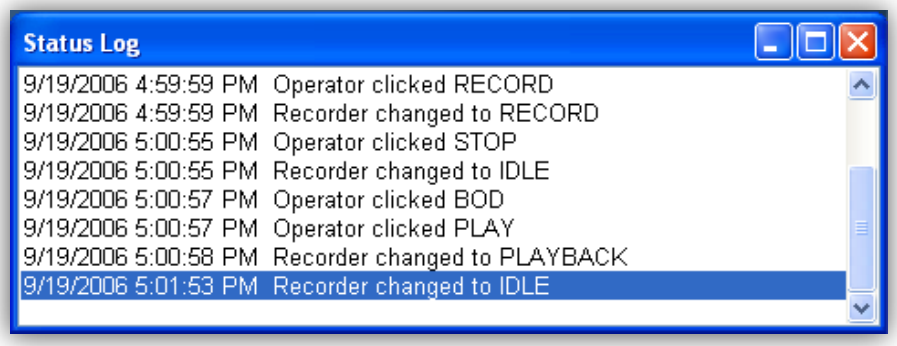
Select **Cancel** to discard the changes to this channel and close the window.

The **BDE PCM Setup** screen also has **<<Prev** and **Next>>** buttons to allow quick maneuvering to the setup screens for the other channels in the system. When selecting either of these buttons, it is the same as hitting the **OK** button, committing any changes, and opening the setup window for another channel.

The following screen shows that PCM channel 14 has been selected as a real time output for the BDE virtual stream. It is the result of applying the settings displayed in the previously shown BDE PCM Setup screen. The channel is shown as disabled, with the word “Virtual” in order to indicate it can not be used as an input. Because it has been “hijacked” for use with a virtual stream, the channel will not loop through any data connected to the input and it can not be enabled for recording.



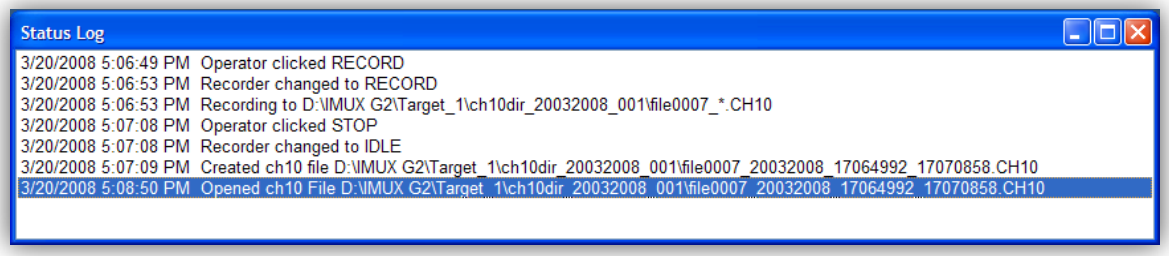
Status Log



The **Status Log** maintains a log of selected types of events and error conditions that occur in the system. It is possible to change the selected types that will be reported from the System Integrity Monitor Setup page.

In addition to providing a log of events and errors the **Status Log** keeps track of the file paths and file names that have been used. When recording starts an entry will be made to specify the path and partial file name being used to record the current target data. When recording is completed an entry will be made to specify the complete path and final name of the recorded file. When a file is opened for playback an entry will be made to specify the complete path and name of the opened file.

Separate entries will be made for each channel as it is enabled or disabled either for record or for assignment to an individual target. The data rate for the recorder and targets will be updated if the recorder is in monitor or record mode.

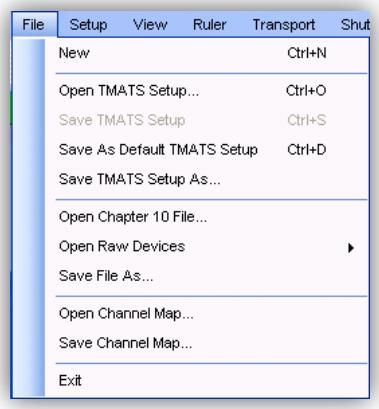


All data that appears in the Status Log can also be stored to disk in a long-term log file. This log file is stored in the G2 program directory and is named “G2LogFile” When the file gets too big, it will automatically be renamed “G2LogFile.old” and a new “G2LogFile” file will be created. When this file gets too big, it will overwrite the “G2LogFile.old” file without warning.

The Status Log display will be cleared each time the application is closed and reopened. This will not affect the data stored in the “G2LogFile” file.

To clear the Status Log display, right click in the Log File window and select **Clear**. This will not affect the data stored in the “G2LogFile” file.

Menu Details

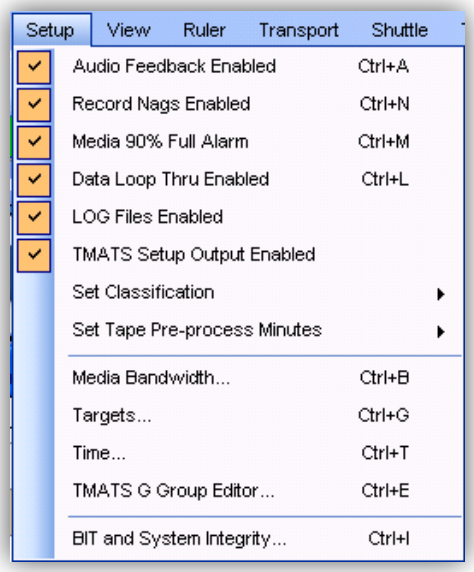


File

- *New* will clear all current record and playback activity and return to the same state as if the application were just started.
- *Open TMATS Setup* will open a TMATS file that will be used to configure the record channels.
- *Save TMATS Setup* will save a TMATS file that contains the current configuration of the record channels. If a TMATS file was opened, this will overwrite the previous TMATS file. If not, it will operate the same as Save As….
- *Save as Default TMATS Setup* will save a TMATS file with the current configuration of the record channels. This file will be used to configure the record channels when the application is started and when *New* is selected.
- *Save TMATS Setup As* will save a new TMATS file that contains the current configuration of the record channels.
- *Open Chapter 10 Data File* will open a prerecorded data set and display the data on the Playback tab of the Channel Grid. When selected, the Channel Grid, if open, will make the Playback tab the active data grid.
- *Open Raw Devices* will populate a list of Tape Devices and Disk devices (on a USB or 1394 Firewire interface) which can possibly contain a DTF file structure. Once a device is selected a list of the files located on the device can be selected. The selected file is then opened for playback. For example:

- *Save File As* will save the current Chapter 10 data set under a different name.
- *Open Channel Map* will open a Channel Map file that assigns particular channel numbers from the current selected playback file to the current available hardware channels.
- *Save Channel Map* will save a Channel Map file for future recall.
- *Exit* will exit the application.

Setup



The Setup menu allows for setting the configuration of the system as whole. The only way to access the items on this menu is through the menus or the associated Hot Keys.

Audio Feedback Enabled

The **IMUX G2** GUI includes an audible click that is played every time a button or icon is selected. It was included to provide additional positive feedback to the user when using a touch screen device.

This menu item allows the user to turn this audible click on and off.

When enabled, a checkmark will be displayed to the left of the text.

It is also possible to change the audible click by placing a *.wav file in the same directory as the executable and naming the file “G2_Sound.wav.”

Record Nags Enabled

This menu item allows the user to enable and disable the Record Nags.

When this feature is enabled, the IMUX G2 will query the user for confirmation every time an action is taken that will affect the current recording of data. For example, the message box shown below will be displayed if a user attempts to stop the recording while in Record mode.

There are many different messages that might be displayed based on what a user is trying to change. As another example, the following message will be shown if a user attempts to disable a channel while in Record mode.

When Record Nags are enabled, a checkmark will be displayed to the left of the text.

Media 90% Full Alarm

The IMUX G2 GUI includes an alarm that is played when a media becomes 90% full during record/monitor operations.

This menu item allows the user to enable and disable this media alarm.

When enabled, a checkmark will be displayed to the left of the text. Enabling the alarm will cause a default notifying alarm to sound when a media becomes 90% full during record/monitor operations. The alarm will automatically turn off when the media is no longer 90% full. Note that if disk space is made available while the alarm is sounding, it may take the system up to one minute to detect the newly freed space. Because High Speed media only utilize pre-allocated disk space, newly freed space is not available to extend any active High Speed record sessions.

It is also possible to change the alarm sound that is played when a media becomes 90% full by placing a *.wav file in the same directory as the executable and naming the file "G2_Alarm_Sound.wav."

Data Loop Thru Enabled

This menu item allows the user to enable and disable the Data Loop Thru feature.

The IMUX G2 can play back data as it is being recorded. These data are not sent to the media prior to being reconstructed. The data are captured by the record channel, converted to a parallel digital format, transferred to the corresponding playback channel, and reconstructed.

Because this feature works even when in Monitor mode, having data play out in Loop Through is not a guarantee that the data has made it to a Chapter 10 file. When Data Loop Thru is enabled, it is not possible to play back other data sets at the same time a new data set is being recorded.

When Data Loop Thru is enabled, a checkmark will be displayed to the left of the text.

This is a global setting and applies to all channels.

Log Files Enabled

This menu item allows the user to enable and disable both the TOC file and the Playback and Recording Event Logging features.

It affects both the status logging file referenced elsewhere in the manual and the creation of a table of contents (TOC file) that is used to track set-up changes that occurred during the recording of the data file (see the FAQs).

When Log Files are enabled, a checkmark will be displayed to the left of the text.

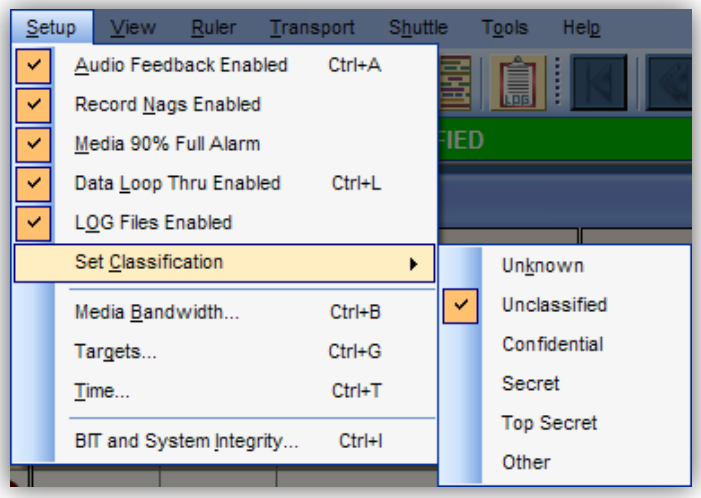
TMATS Setup Output Enabled

This menu item allows the user to enable or disable the output of the TMATS Setup record for the Ethernet (UDP) target. The output rate when enabled will be once per second.

When selected, a checkmark will be displayed to the left of the text.

Making changes here will affect the Ethernet target output in all G2 modes (Monitor, Record, and Playback).

Set Classification

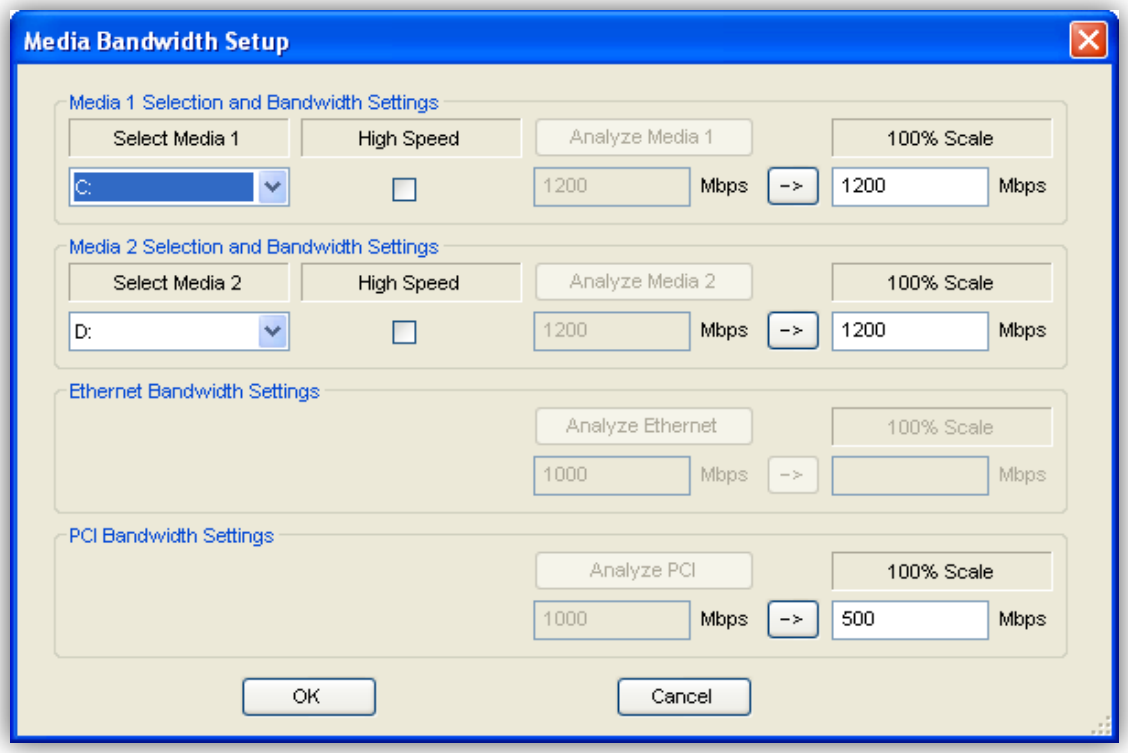


This menu item allows the user to set the classification level for the next data file to be recorded.

When selected, a checkmark will be displayed to the left of the text.

Making changes here will change what will be displayed on the Classification bar.

Media Bandwidth Setup Menu



Selecting **Media Bandwidth...** will open the Media Bandwidth Setup window. This window is used to make Media and Bandwidth setting selections.

It is possible to select up to 2 media for recording. Use the drop-down menu to select the drive letter of the desired media. To be able to select "None" from the drop down list, all targets assigned to the media must be disabled.

The **High Speed** recording option allows the **IMUX G2** to directly manage the disk I/O to the selected media. If this option is selected, when recording starts, 98% of the remaining space on the media will be reserved for data recording. In order to use high speed media, the user must have the permission SE_MANAGE_VOLUME_NAME. In addition, for media to be selected as High Speed, the media must not be the system drive. Any other drive that the Operating System considers to be a Removable Drive, Fixed Drive, or RAM Disk is eligible for high speed designation. Network drives are not eligible for high speed recording. Furthermore, only one target may point to a high speed media. If a media has more than one target pointing to it, the request to make it high speed will fail.

Selecting a media as High Speed will have an effect on the space remaining information that is displayed in the Status Tray. High speed media are labeled with a prefix of "HS_" in the status bar. The space remaining for high speed media is the percentage of the disk space that has been pre-allocated for high speed recording minus the bytes already recorded to disk. This allows the user to see how much space is remaining for any particular record session. Note that because High Speed media only utilize pre-allocated disk space, newly freed space is not available to extend any active High Speed record sessions.

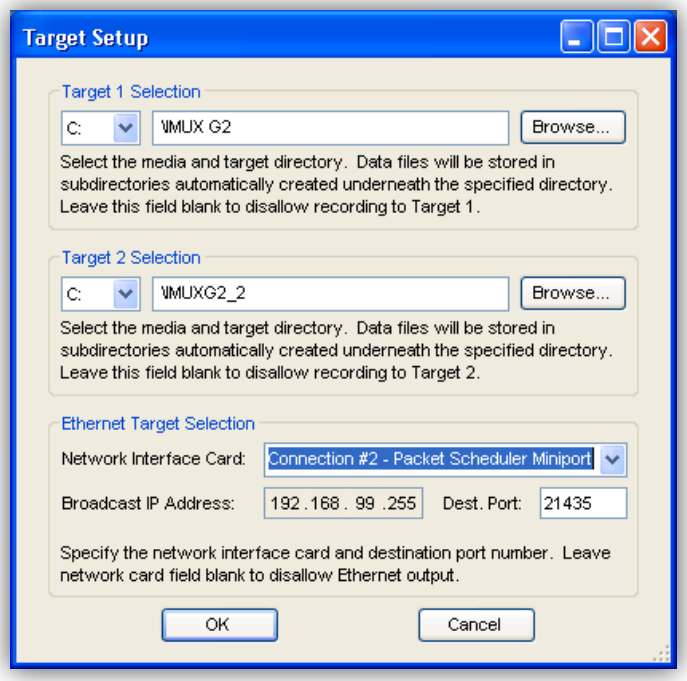
A future option for **IMUX G2** will be the ability to automatically analyze the maximum sustainable transfer rate to the selected media and across the PCI bus. At that time the Analyze Media X, Analyze Ethernet, and Analyze PCI buttons will be enabled.

In the status tray at the bottom of the **IMUX G2** GUI application is a tri-color meter that monitors how much of the allocated Media or PCI Bandwidth is currently being utilized. The fields titled **100% Scale** are used to determine what rate will be considered 100% usage of allocated rate. For each media and the PIC bus, select a transfer rate that will be used as the 100% scale.

For example: If 1200 Mbps is entered in as the 100% scale for Media 1 and if the aggregate data transfer rate to and from Media 1 is 600 Mbps, the meter will show 50% utilization.

Select **OK** to keep all changes and close the window. Select **Cancel** to discard all changes, return to the original settings and close the window.

Target Setup Window



After the Media have been defined, it is possible to select directories on the media as targets for recording. This can be done by selecting **Targets...** from the Setup menu.

For each Target, use the drop-down options to select from the media locations assigned in the previous step. It is acceptable to have both Targets point to the same Media.

For each Media Target, type in a path for recording or browse to a preexisting path.

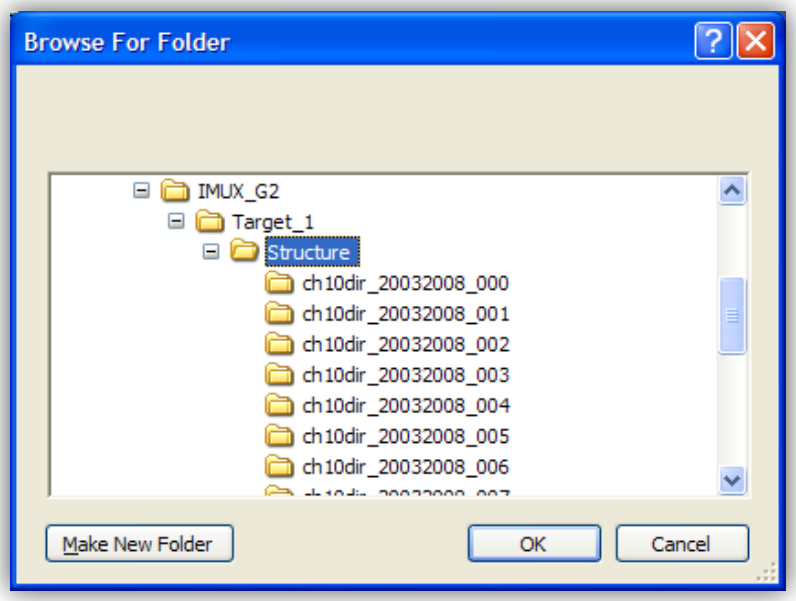
- It is possible to have both targets be different directories on the same media.
- To record to the root directory of the selected media, enter "****"
- Leaving the Target path blank will result in the target being disabled.

The image below shows a typical directory structure as viewed from the Target Browse button.

In this example, the user set a Target Directory of \IMUX_G2\Target_1\Structure. For each record session, a new subdirectory will be created in the target directory.

The subdirectory structure is: ch10dir_ddmmyyyy_xxx where
dd is two digit day of month
mm is two digit month of year
yyyy is four digit year
xxx is a sequential counter of recordings made in the directory.

The date information is taken from the current system time.



For the Ethernet (UDP) Target, use the drop-down options to select the Network Interface Card (NIC). The NIC is displayed as "Network name (IP Address) – Description". If the NIC is not connected, its IP address will be displayed as "Unavailable". The setup values will be used for both RECORD/MONITOR and PLAYBACK Ethernet targets.

- The Broadcast IP Address field is read-only and will be automatically filled in with a valid Broadcast address based upon the selected NIC Unicast address. If this automatically derived address is not what is desired, it can be edited. Specifying a Multicast/Unicast IP address will also work.

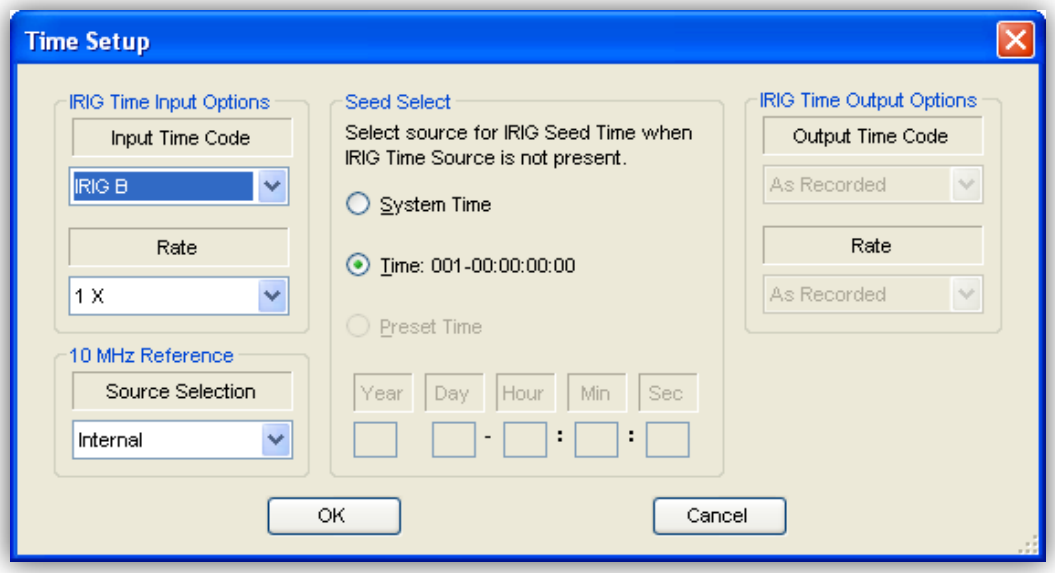
- The destination port number defaults to 21435 and is the client's port number to read the UDP packets from G2. This field can be edited to meet the UDP client's requirements.

- Leaving the Target NIC blank will disable the target.

Select **OK** to keep all changes and close the window.

Select **Cancel** to discard all changes, return to the original settings, and close the window.

Time Setup Window



Selecting **Time…** from the Setup menu will bring up the Time Setup window

IRIG Time Input Options
It is possible to select the IRIG Time Input Code for the system. Available selections are **IRIG B**, **IRIG A**, and **IRIG G** standard time codes.

Future versions of **IMUX G2** will allow selecting recording at rates other than 1X.

10 MHz Reference
It is possible to slave the Chapter 10 Recorder 10 MHz counters to an external 10 MHz source. To do this, choose **External** as the 10 MHz Reference Source Selection. Select **Internal** to use the onboard 10 MHz digitally tuned oscillator as a reference.

Seed Select
It is possible to seed the IRIG Time start value of the **IMUX G2** with the current System Time. Once the time channel is started it will freewheel until it is reset by some activity in the GUI or until it is able to lock on to an external time source.

It is also possible seed the IRIG Time start value with 001-00:00:00.00.

Note that the IRIG Time channel is re-seeded whenever it is reset. The channel is reset immediately after every record, every playback, and every time a user closes the Time Setup menu by using the **OK** button. This allows the channel to start looking for and possibly obtain lock on the signal being provided prior to a user starting a Record session. Already being in lock with an external source when recording is started will reduce startup times and ensure both an accurate file name and an accurate first time packet in the recorded file.

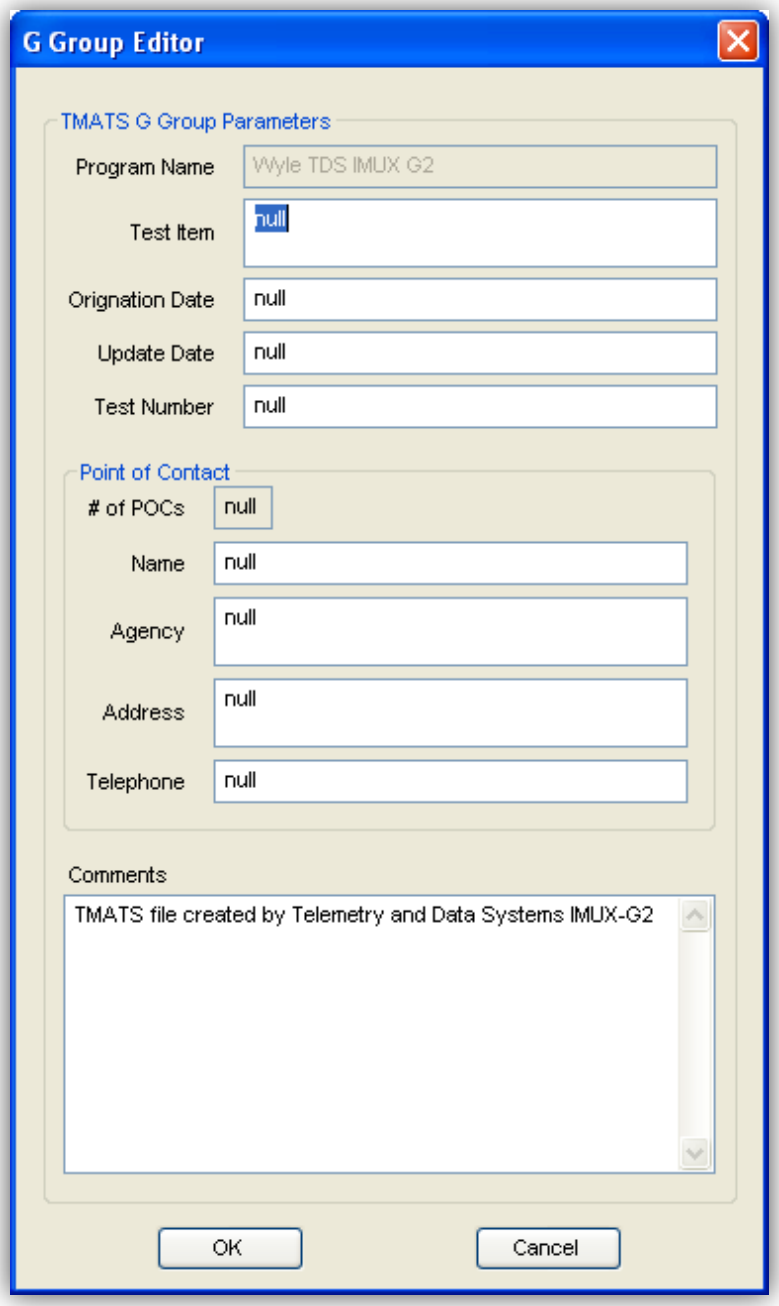
IRIG Time Output Options

Future versions of **IMUX G2** will allow the selection of IRIG Time Output Code regardless of the recorded code. At this time IRIG-200 A, B, and G time codes will always play out as recorded. Other time codes such as Real time, UTC time, and GPS time will play out as IRIG B.

Future versions of **IMUX G2** will allow playing back at rates other than 1X.

Select **OK** to keep all changes and close the window. Select **Cancel** to discard all changes, return to the original settings and close the window.

TMATS G Group Editor Window



Selecting **TMATS G Group Editor…** from the Setup menu will bring up the TMATS G Group Editor window.

The G Group parameters in this editor are associated with the General Information Group defined in the Telemetry Attributes Transfer Standard (TMATS) Chapter 9 of the IRIG 106 standard. If the information is not included in the TMATS file used to configure the unit, then the fields will remain null. When the Playback grid is being displayed, the details from the most recently loaded file will be shown. In all other cases, the information shown indicates what will be included in the TMATS header of the next record session.

Field	Purpose
Program Name	Name of Program. This field is not currently editable. It will either display "Wyle TDS IMUX G2" or the program name read in from the TMATs header of a Chapter 10 file. When the editor is being used to display information from a file loaded to the playback grid, this field will display the Program Name found in the TMAS header of the chapter 10 file. When the editor is being used to display information for a file about to be recorded it will show "Wyle TDS IMUX G2". Take careful note of the following considerations. If a TMATS file is used to load the unit, and it does not have a Program Name attribute identified, if the TMATS information is saved, it will save the Program Name as "Wyle TDS IMUX G2". If a TMATS file is used to load the unit, and it does have a Program Name attribute identified, if the TMATS information is saved, it will save the original name, even though this window will display Program Name as "Wyle TDS IMUX G2". In all cases, a file recorded on an **IMUX G2** will always have the Program Name set to Wyle TDS IMUX G2.
Test Item	Test Item Description.
Origination Date	Date of origination of this mission configuration.
Update Date	Date of update to configuration.
Test Number	Test identification.
# of POCs	Number of points of contact. This field is not editable. It reflects the number of points of contact defined in the TMATS file, TMATS header of a Chapter 10 file or current modifications to POCx-1 in the G Group Editor GUI.
Name	G\POC1-1 name
Agency	G\POC2-1 agency
Address	G\POC3-1 address
Telephone	G\POC4-1 telephone number
Comments	Additional information

If an attribute is not defined it will be displayed showing the text value "null".

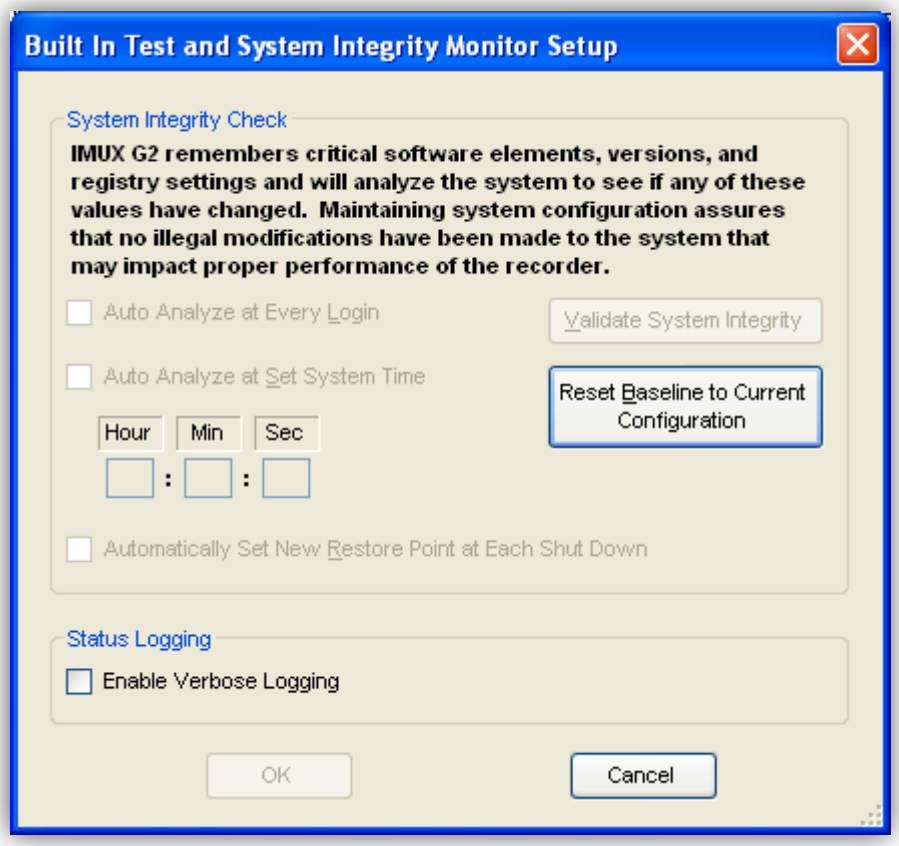
The point of contact fields of the G Group Editor only display the information defined for G\POCx-1. There may be other points of contact defined in a TMATS file or TMATS header of a Chapter 10 file, but the G Group Editor only allows definition, modification or deletion of G\POCx-1.

However, the **# of POCs** field will correctly reflect the value defined for G\POC\N in the TMATS file or TMATS header of a Chapter 10 file. If the user adds or deletes G\POCx-1 in the G Group Editor, this value will be updated when **OK** is selected. The correct **# of POCs** will be displayed when the GUI is reopened.

Select **OK** to keep all changes and close the window. Select **Cancel** to discard all changes, return to the original settings and close the window.

Built In Test and System Integrity Monitor Setup Window

Note: This feature is optional.



The **IMUX G2** can be set to track critical software elements, versions, and registry settings and will analyze the system to determine if any of these values have changed. Maintaining system configuration assures that no illegal modifications have been made to the system that could impact proper performance of the Recorder.

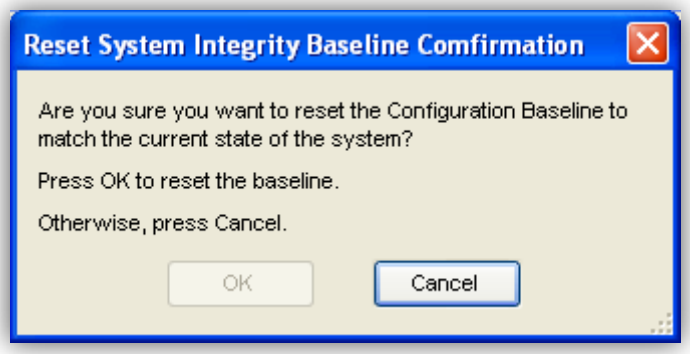
Select **Auto Analyze at Every Login** to reanalyze the system every time a user logs into the machine and starts the application.

Select **Auto Analyze at Set System Time** to re-analyze the system at the same time every day.

Select **Automatically Set New Restore Point at Each Shut Down** to set a new system every time a user logs into the machine and starts the application. This will assist in returning to a known working state if for some reason the system software configuration is corrupted.

It is also possible to validate the system integrity at any time by selecting the **Validate System Integrity** button.

On occasion it might be necessary to make changes because of a new software load or a change in the hardware configuration of the system. When this happens, the system might fail the system integrity check. In those instances it is advisable to reset the baseline to the current configuration to prevent future unnecessary warnings and to establish a new baseline to monitor. To do this, select the **Reset Baseline to Current Configuration** button. When this button is selected, a modal window will pop up to query the user as to whether or not they want to continue.



Select **OK** to keep all reset the system baseline. Select **Cancel** to keep the current baseline and close the Reset window.

It is also possible to set the level of system status log details that will be sent to the Status Log window of the IMUX G2 GUI.

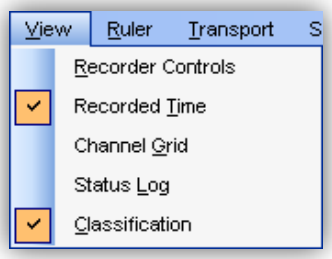
In the Status Logging section of the System Integrity Monitor Setup window, select **Enable Verbose Logging** to log every message that is being sent to the log file. Otherwise, only critical items that affect Recorder performance or data integrity issues will be reported to the on-screen Status Log. Regardless of this setting and what is sent to the on-screen Status Log, all messages will be logged to the status file.

For additional details on the status log see the section titled Status Log.

When done modifying settings within the System Integrity Monitor Setup window, select **OK** to keep all changes and close the window. Select **Cancel** to discard all changes, return to the original settings, and close the window.

Note:	Once the baseline is reset, hitting the cancel button will not undo those changes. Hitting cancel will only undo the setting changes made to the check boxes in the window.

View

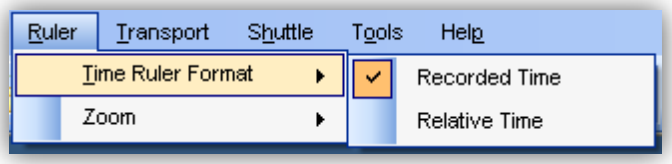


- *Recorder Control* will toggle the display of the Recorder Control window.
- *Recorded Time* will toggle the display of the Recorded Time window.
- *Channel Grid* will toggle the display of the Channel Grid.
- *Status Log* will toggle the display of the Status Log.
- *Classification* will toggle the display of the Classification bar.

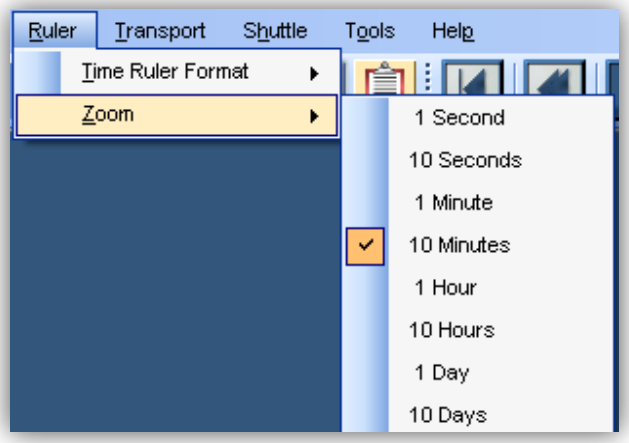
When a view is enabled, a checkmark will be displayed to the left of the text.

For a more detailed understanding of how to use the menu items, review the section titled View Toolbar.

Ruler



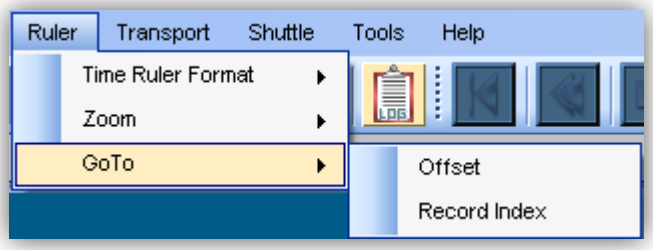
Time Ruler Format will allow setting the Time Ruler in the Data Grid window of the Channel Grid to display either Recorded or Relative Time. The screen shot above shows that Recorded Time has been selected.



Zoom will allow setting the Time Ruler in the Data Grid window of the Channel Grid to be displayed in a resolution from as low as 1 second per major tick mark to as high as 10 days per major tick mark.

The screen shot above shows that a Zoom level of 10 minutes between major tick marks has been selected.

For a more detailed understanding of how to use these menu items, review the section titled Time Ruler.



GoTo allows the user to set the starting offset within a chapter 10 data set. The offset values are only used during playback, from either the RECORD or PLAYBACK grids.

When selected, a submenu will be displayed showing Offset or Record Index.

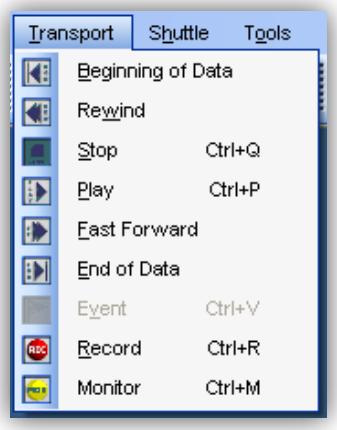
- *Offset* – When selected, a window allowing a raw hexadecimal offset value to be entered will be shown. When entered, the offset will be converted to a time offset on the time ruler and will represent the start of the first chapter 10 packet boundary found after this offset.

- *Record Index* - When selected, a submenu will be displayed showing All, Event, Time, and Other. The All selection will display the Record Index GUI with all record indexes listed. The Event selection will display the Record Index GUI with all Event record indexes listed, if any. The Time selection will display the Record Index GUI with all Time record indexes listed, if any. The Other selection will display the Record Index GUI with all record indexes listed other than Event or Time, if any.

Making changes here will affect the starting offset within a playback sessions in RECORD and PLAYBACK modes.

Note, the GoTo feature has no effect when a DTF on a tape device has been selected for playback.

Transport

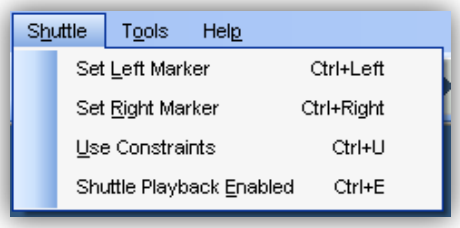


The Transport Controls are just another way to manage the Record and Playback functions of the Recorder. When selected they will operate in a fashion similar to the Recorder Transport Control toolbar and the larger Recorder Transport Control buttons.

When selected or viewed, the menu items will be updated and highlighted to stay in sync with the other Recorder Transport Control methods.

For a more detailed understanding of how to use these menu items, review the section titled Recorder Transport Control Toolbar

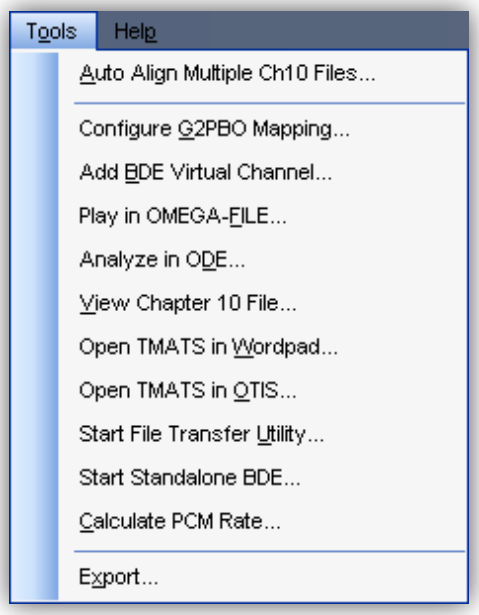
Shuttle



- *Set Left Marker* will set the left marker to the current Time Marker position.
- *Set Right Marker* will set the right marker to the current Time Marker position.
- *Use Constraints* will toggle between using and not using the constraints during playback. When enabled, a checkmark will be displayed to the left of the text.
- *Shuttle Playback Enabled* will toggle between continuous replay of the selected data segment or not. When enabled, a checkmark will be displayed to the left of the text.

For a more detailed understanding of how to use these menu items, review the section titled Playback Constraints (Shuttle) Toolbar.

Tools



Auto Align Multiple Chapter 10 Files

This optional feature allows a user to load multiple Chapter 10 Files and correlate them based on IRIG Time data despite the fact that they have different Chapter 10 counters as the basis for their time data correlation.

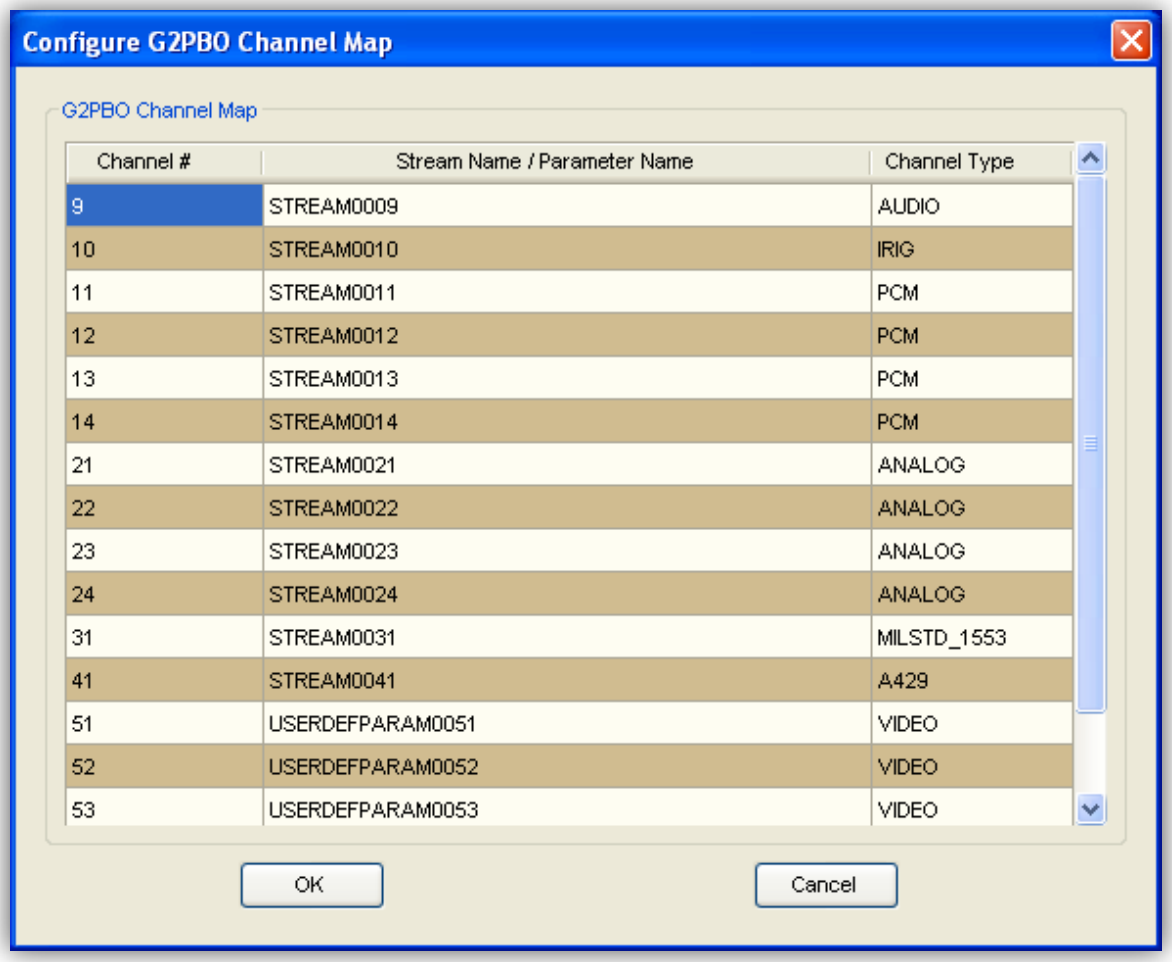
The application will analyze the time packet at the beginning of each Chapter 10 data file and will calculate an offset to apply to the Chapter 10 - 10 MHz Time Counter Stamp of each packet in order to have identical times play back at the same time. The same necessary adjustments are then made to the other data channels and all data is now aligned based on the initial IRIG Time packets.

Configure G2PBO Mapping

When the optional G2PBO feature is installed, selecting **Configure G2PBO Mapping** allows for creating the link between a Chapter 10 channel defined on the IMUX G2 Recorder and a corresponding stream defined in the OMEGA-SERV project. For Video channels, it allows creating a link between a Chapter 10 video channel defined on the IMUX G2 Recorder and a corresponding user defined parameter in the OMEGA-SERV project.

All selected IMUX G2 Recorder channels will appear on the left under the column heading **Channel #**. A corresponding Stream Name or User Defined Parameter Name from OMEGA-SERV must be entered for the data to be properly processed.

The channel type for each Chapter 10 channel will appear under the column heading **Channel Type**.



Select **OK** to commit the changes and close the window.

Select **Cancel** to discard the changes and close the window.

Note 1: When in Record/Monitor mode, data is transferred across the PBO connection from **IMUX G2** to OMEGA immediately and there is no discernable delay between the information displayed in the G2 GUI and the information displayed in OMEGA. When playing back data to both the **IMUX G2** hardware and to OMEGA, there is a noticeable time offset of several seconds between what is displayed in OMEGA and what is being played out of the **IMUX G2**. While the same data is sent to both locations at the same time, the hardware connection maintains a buffer of data in order to be able to ensure it can survive any interruptions in the flow of data caused by system or network events.

Note 2: When OMEGA-SERV is being used with G2PBO, an indicator in the Status control of OMEGA Manager indicates the current status of the PBO connection. This status will either be Disconnected (Red), Connected (Green), or Re-connected (yellow). In addition, a log message accompanies each status change.

Re-connected is considered a warning state because in some projects a temporary loss of data could cause certain calculations to become unreliable. One example is a derived parameter that uses historical information to calculate current values. If the data connection is interrupted, it may be necessary to reload the OMEGA project in order to reset the calculation and restore it to a reliable state. A better long term solution may be to reevaluate the parameter calculation and add methods to internally reset if data interruption causes a problem.

Add BDE Virtual Channel

When the optional G2-BDE feature is installed, selecting **Add BDE Virtual Channel** will add a channel of type BDE to the Channel Grid. Once a channel is added it can not be removed. To return to an environment with no BDE channels defined, it is necessary to restart the controller software.

The temporary addition of a BDE Virtual channel is not retained as part of the system configuration. Every time the controller software is restarted, any previously added BDE Virtual channels will have been deleted and will not show up in the Channel Grid.

The details for how to set up a particular BDE Virtual channel are maintained in TMATS records. Wherever possible, TMATS records that are normally associated with PCM channels are used. Any additional information on how to set up the BDE Virtual channel is stored in vendor records. This allows the channel to show up as a standard PCM channel to all other applications that do not recognize the BDE Virtual channel TMATS vendor records.

If BDE Virtual channel details have been saved in a TMATS file, it is possible to use those details to set up the channel. For this to happen, the BDE Virtual channel must first be added to the Channel Grid. Then open the TMATS file to load the BDE Virtual Channel details.

Virtual channels are recorded as standard PCM channels. The packet format of the BDE channel will be the same format as the selected BDE input channels. When a PCM channel created by the BDE is played back from a previously recorded file, it will appear as a PCM channel.

Because there is no hardware associated with the channel, BDE Virtual channels cannot be played back to hardware from the Record grid. However, if G2-PBO is also installed, BDE data can be played back to OMEGA from the Record grid.

BDE Virtual channels will only operate during Record/Monitor mode. A BDE Virtual channel can not be used to create a new virtual stream during playback. To create a Best Data channel after recording is complete, use the stand-alone Best Data Engine program to process the file.

Play in OMEGA-FILE

Selecting **Play in OMEGA-FILE** will open the OMEGA-SERV software application and will allow the user to view and play back the previously recorded Chapter 10 data file as if at a real-time telemetry ground processing station. This does require that the project be defined within OMEGA-SERV. Review the OMEGA-SERV File Playback help files for additional details on how to play back Chapter 10 files using the OMEGA-SERV File Reader.

Analyze in ODE

Selecting **Analyze in ODE** will open the ODE Desktop software application and allow the user to analyze the data stored in the Chapter 10 data file. This does require an applicable OSPROJ file and supposes that the data set has already been manually published within ODE Publisher or was automatically published by ODE during data collection. Review the ODE help files for additional details on how this works. It is possible to change whether this button will start the ODE Publisher or the ODE Desktop application. To establish which one, place a shortcut to the ODE application in the directory C:\Chapter 10 File Analysis Tools and name the shortcut “Start ODE.”

If OMEGA-SERV or ODE are not installed, an information box will pop up advising the user of the need to install the appropriate software. Contact Wyle Telemetry and Data Systems for more details on acquiring OMEGA products.

View Chapter 10 File

Selecting **View Chapter 10 File** opens a Chapter 10 file viewer of your choice. To establish the viewer, place a shortcut to the Chapter 10 file viewer program in the directory C:\Chapter 10 File Analysis Tools and name the shortcut "Start Ch10 Packet Viewer." This will bring up the viewer and allow you to select the Chapter 10 file of interest.

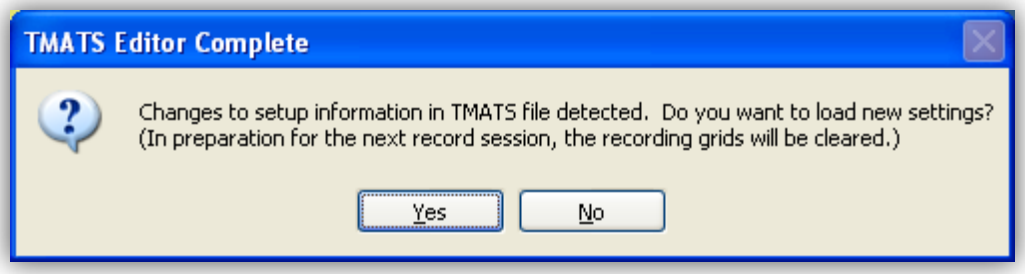
Open TMATS in Wordpad

Selecting **Open TMATS in Wordpad** opens the current TMATS viewer using a simple Wordpad text editor. If any changes are made to the file the user will be prompted as to whether or not the changes should be applied to the next recording session.

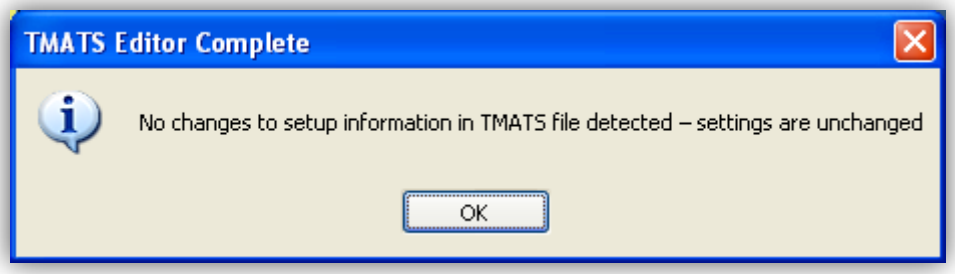
Open TMATS in OTIS

If the OTIS TMATS editor is installed on the system, selecting **Open TMATS in OTIS** will automatically save the current TMATS information to a temporary file, open the file using the OTIS TMATS editor, allow the user to choose to **Save** the modified temporary TMATS file, and automatically load the updated TMATS information when OTIS is closed.

If the editor is closed and changes are detected, the following message box will be displayed.



If the editor is closed and changes are not detected, the following message box will be displayed.



Start File Transfer Utility

Selecting **Start File Transfer Utility** opens a Chapter 10 file transfer utility of your choice. To establish the link to the utility, place a shortcut to the Chapter 10 file viewer program in the directory C:\Chapter 10 File Analysis Tools and name the shortcut "Start File Transfer Utility." This will bring up the selected utility.

Start Standalone BDE

Selecting **Start Standalone BDE** starts the optional stand alone Best Data Engine application which can be used for BDE post processing of previously recorded Chapter 10 data files. If this software is not installed this option will not be enabled.

Calculate PCM Rate

Selecting **Calculate PCM Rate** starts the auto-calculation of the bit rate for all enabled PCM channels that are configured for external input. To initiate the calculation process, the system must be idle and the channel(s) must be in Throughput mode. While the calculation is active, a modal dialog will appear indicating the progress of the calculation process. This progress dialog contains a Cancel button which allows the user to cancel the calculation process. When the calculation completes, the rate for each of the evaluated channels is updated to the computed rate and the dialog is updated to indicate the status of the calculation process.

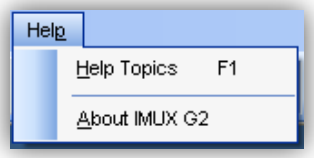
If the computed rate for an individual channel does not fall within the supported range, the individual channel will be disabled.

To view the computed rates, activate the Setup dialog for each of the applicable channels. This calculation process supports calculating bit rates within the range of 3 Kbps – 50 Mbps

Export

This optional feature allows a user to export selected segments of selected channels to a new Chapter 10 file.

Help

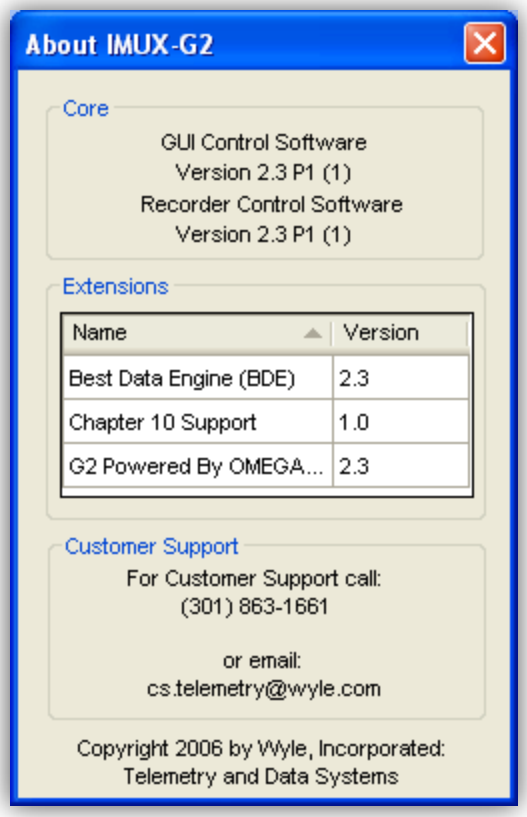


Selecting **Help Topics** will load an electronic version of this manual.

Selecting **About IMUX G2** will pop up a modal window that provides details on installed software version numbers and contact information.

The core software is listed at the top of the screen.

Any extensions to **IMUX G2** are listed in the extensions table.



Remote Control of the IMUX G2 Recorder

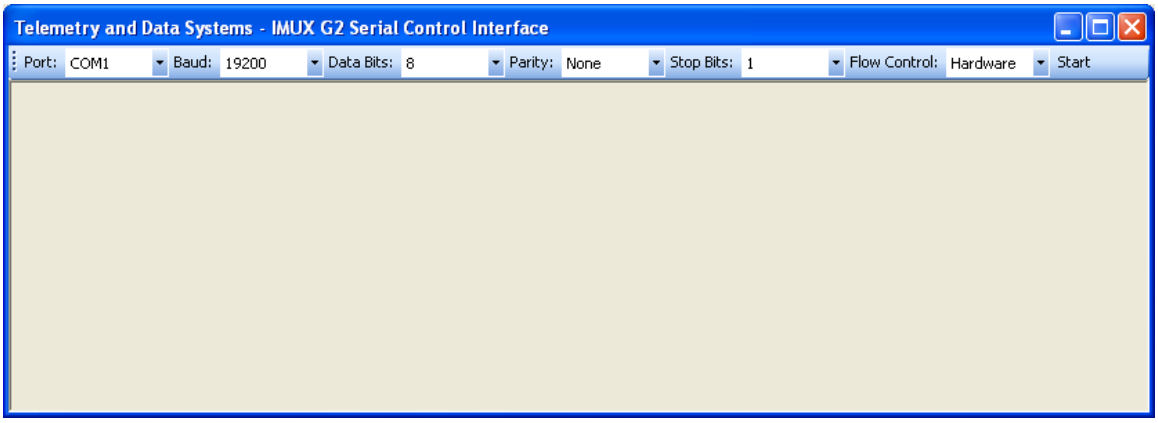
The **IMUX G2** can be controlled remotely via a Serial Control Interface either directly through a serial port on the machine, or using a virtual serial port accessible via a Telnet session.

Serial Control Setup

To use the serial port application, browse to the installation directory, typically "C:\Program Files\Telemetry and Data Systems\G2", and select the application "G2SerialController.exe".

The application is used to establish the communication connection and to monitor and display the command and response sequences. It cannot be used to issue commands.

Select the required communication port settings using the drop down menus located at the top of the window. Select **Start** to allow communication. After **Start** has been selected the text will change to **Stop**. To stop communications or change settings, select **Stop**. To close the application select the white "**x**" in the red box in the upper right hand corner of the window.



Default start-up options are stored in a serial configuration file as described in Appendix 6 – **IMUX G2** Serial Controller Configuration Files.

Telnet Control Setup

Telnet control is accomplished by using the serial control application previously described as well as a Virtual Serial Port application that is included on the system. The HW Virtual Serial Port 2.5.10 Software is installed on **IMUX G2** systems and configured with default values. This application receives commands via TELNET and sends them to a virtual serial port on the same system. The following steps describe how to configure with the default values.

Start up the HW Virtual Serial port application by selecting the Windows **Start -> All Programs -> HW Virtual Serial Port 2.5.10 -> HW Virtual Serial Port**.

Within the application, on the Settings tab, ensure the following items are checked and then select "Save Settings Now":

- ✓ HW VSP works as the TCP Server only
- ✓ Create VSP Port when HW VSP startup

- ✓ Hide to Tray when HW VSP startup
- ✓ Start HW VSP with Windows

Within the application, on the Virtual Serial Port tab, set the IP address (default is *127.0.0.1*) and the Port (default is *23*). Set the port Name to a valid unused com port name such as *COM5*. Select "Create COM".

If successful, the following message will be displayed in the application window:

Sending test ping to 127.0.0.1 device
Virtual serial port COM5 created

Using Telnet for Remote Control

Remote control of the **IMUX G2** recorder cannot run concurrent with the **IMUX G2** GUI. If the GUI is running, exit the **IMUX G2** GUI application.

1. Start the **IMUX G2** Controller application on the **IMUX G2** system.
2. Start the **IMUX G2** Serial Controller application on the **IMUX G2** system. The application can be found in the **IMUX G2** installation directory: C:\Program Files\Telemetry and Data Systems\G2\G2SerialController.exe.
3. Determine the IP address of the G2 system.
    a. Select Windows **Start -> Run** and type in CMD
    b. At the command prompt, type in **ipconfig**
    c. Note the IP address _____
4. On a remote system networked to the G2 system, set up the HyperTerminal
    a. Start HyperTerminal by selecting Windows **Start-> All Programs-> Accessories->Communications->HyperTerminal**
    b. HyperTerminal window will come up with a Connection Description Window in front of it. Type in a name for the connection and select on **OK**.
    c. The "**Connect To**" window will come up. If the "Connect To" window does not automatically appear, click the drop list next to "Connect Using" and choose TCP/IP (Winsock). In the "**Connect using**" field, select "**TCP/IP (Winsock)**".
    d. Set the IP address to the IP address of the **IMUX G2** noted in step 3c.
    e. Set port number to **23** and select **OK**.
    f. Within the application, select **File -> Properties -> Settings -> ASCII setup** and ensure the application is set to "**Send line ends with line feeds**" and to "**Echo typed characters locally**". Exit all setup dialog windows.
5. Send Commands from the HyperTerminal via Ethernet, for example "**.STATUS**"

Appendix 1 – Frequently Asked Questions

1. *What happens to my current record or playback session if the GUI is shut down?*
   In both Record and Playback mode, the session will continue. However, when the GUI is reopened while the unit is in Record mode, all data segments will be gone and the display will start drawing new data segments based on the current channel configuration.

2. *How is the channel configuration determined when recording a data file?*
   When opening the application for the first time, the software will automatically load the information in the Default TMATS file. It is also possible to load a TMATS file from another location. If that is done, then any settings that are included in that TMATS file will override the previous settings. In addition, it is possible to make changes manually using the channel setup screens. Any changes made in the channel setup screen will override the previous settings.

3. *How can I rename my channel?*
   A channel can be renamed by changing it in the TMATS header file and loading the TMATS header.

4. *What is the default channel naming configuration?*
   The default naming convention is “DataLink X” where X is the Channel Number.

5. *How do I change the default configuration file?*
   Change the default configuration file by selecting *File > Save As Default TMATS Setup.*

6. *How is the channel configuration determined when playing back a data file?*
   The channel configuration is determined first by the information in the TMATS packet that is in the Chapter 10 data file. When loading a new data file, the software will also automatically look for a TMATS file with the same name located in the same directory. Any settings that are included in that file will override the previous settings. In addition, it is possible to make changes manually using the channel setup screens. Any changes made in the channel setup screen will override the previous settings.

7. *How can I see how a channel was setup in a previously recorded Chapter 10?*
   Move to the Playback tab in the Data Grid. Open the data file of interest. Map the recorded channel of interest to a playback channel. Click on the Channel Number in the Channel Details Section to open the PCM Setup window. The information for the record settings for the channel will be displayed.

8. *If I have multiple data segments with different configurations on a single channel, how do I make sure I am looking at the configuration information for a particular segment?*
   Place the Current Time Marker so it is over the Data Segment of interest. All configuration information that is displayed will be for what was in effect at that Time location.

9. *How does the system keep track of configuration changes?*
   Whenever a channel is disabled or enabled during a recording, a Computer Generated Format 2 Event is generated to mark the channel Configuration Change. This is closely followed by a complete Computer Generated Format 1 Setup record with the Setup Record Configuration Change bit(8) set in the channel specific data. The controller and playback use these packets to determine how to draw the displays and what configuration information to use. To speed up file access the Computer Generated Format 3 packets containing Recording Indexes are used to locate the Event packets.

10. What is the Table of Contents (.toc) file and why do I care about it?*

In earlier versions of **IMUX G2** software, the Table of Contents file was a support file created when recording a Chapter 10 file on an **IMUX G2** recorder. Each file contained a summary of all disabling, enabling, and reconfiguring of data channels during a record session. This file was stored in the same directory as the data file and had the same name but with the ".toc" extension. During playback this file was used to create the Data Segments in the Data Grid portion of the Channel Grid display. As of version 2.7 these files are no longer used.

11. What will the data grid show if I want to play back a Chapter 10 file recorded on someone else's Chapter 10 Recorder?

The question should really be "what would be displayed on the data grid if the file selected for playback is not a Chapter 10 file from an **IMUX G2** recorder. In this case, any recorded channel that is defined in the TMATS packet that is mapped to a playback channel will have a data segment that extends for the entire period regardless of whether or not the channel was enabled for the entire recording period.

12. What is Monitor Mode and how do I use it?

Monitor mode is a mode that is similar to Record except that no data is recorded to the Target locations. It is helpful for ensuring there is signal activity on all input channels, that the IRIG source is connected and in lock, and that the hardware is passing data cleanly to the software. If Data Loop Thru mode is enabled, Monitor mode allows data to be transferred to and reconstructed through the associated playback channels.

13. How often does the GUI update?

The GUI displays receive status updates from the hardware control software approximately 10 times per second. Every item that changes is updated and redrawn as necessary.

14. If an error occurs very quickly will it be viewable by the Status LEDs?

In short, yes. The Status LEDs are updated 10 times per second, but they are not sampled. They are data driven and will light red if there was any error in the last 100-millisecond reporting period. If there was an error, the light will stay lit for at least one second.

It is also possible to hover over a particular LED and see the error counts for the channel. If Verbose Logging is enabled, any error that would cause a channel LED to light red will be reported in the Status Log and stored in the Status Log file.

*15. How do I slave the **IMUX G2** counter to an external 10 MHz time source?*

Select *Setup > Time* to get to the Time Setup menu. In the 10 MHz Reference Source Selection box, select **External.**

16. How do I turn off the sound?

Turn off the sound by hitting **CTRL-A** or by selecting *File > Setup > Audio Feedback Enabled*

17. How do I change the default sound?

Change the default sound by placing a *.wav file in the same directory as the executable and naming the file "G2_Sound.wav."

18. *When using a PCM channel's bit sync input, why do I still get green lights on a channel even if no input is connected.?*

    The green LED indicates that data is flowing from the hardware into the application for processing. When the bit sync input is used it will try and find bits even when there are no bits to be found. The AGC circuit will amplify the input and start to derive bits out of any level of noise it can find. In the near future bit sync lock information will also be represented in the channel LEDS. If the bit sync is not in lock, the red LED will light. It is possible to have both the green and red LEDs lit at the same time.

19. *I changed the data rate for my channel, why is it not recording properly?*

    We have found that even our testers will sometimes change the numbers for the data rate and forget to change the units. Double check the channel's setup screen and ensure that both the number and the units are properly set.

20. *How do I setup to record two separate missions to two separate targets if the two missions overlap but do not start or stop at the same time?*

    There are several ways to do this but we'll just describe one; we'll also assume that each channel is already configured as required. Using the Record Enable Buttons, enable only the channels that will be needed for the first mission. Ensure that each channel for the mission is enabled in both the CHNL column and in the T1 column. At this point only the channels required for the first mission should be yellow. Using the Record Enable Buttons, now enable the channels that will be needed for the second mission. Ensure that each channel for the mission is enabled in both the CHNL column and in the T2 column. Temporarily disable Target 2 by selecting the 'T2' column header. All of the T2 enable boxes should be faded to blue. When recording starts, only T1 will start recording data. When it is time to start the second simultaneous mission, enable Target 2 by selecting the 'T2' column header. Since the unit is already recording, immediately a new file will be opened and data for the second mission will be stored on Target 2. To stop recording to either target while continuing to record to the other, select the appropriate 'T1' or 'T2' column header. Each time a target is re-enabled a new data file will be started and stored in the same target directory as the previous data file. Selecting 'STOP' will stop all recording to all targets.

21. *The GUI screen sometimes freezes when using the snapshot viewer, will that affect my recorded data?*

    No. The record thread is isolated from the GUI and is not affected by GUI screen updates.

22. *What is Simulation mode and how do I use it?*

    Simulation mode was designed to allow a user to interact with most every part of the GUI without requiring that any hardware be installed in the system. The only screens that can not be viewed while in Simulation mode are the Snapshot viewers. No data is recorded and no data can be played back. To run in Simulation mode, first ensure the **IMUX G2** Controller application is not running. Then start the **IMUX G2** Simulation and the standard **IMUX G2** GUI application.

Appendix 2 – Definitions

BIT – Built In Test.

Channel Grid – the primary GUI window that provides access to all channel-specific record and playback configuration and data information.

Current Time Marker – a yellow line with a red border that shows the current time of a playback or record session. When idle, it shows the location from which the next playback would start.

Data Segment – graphical segments displayed in the data grid that show channel status over time. Each bar includes the start time and stop time as a graphic overlay. A new data segment is started when a channel is enabled during the record process and is stopped when a channel is disabled during the record process.

Data Grid – the right-most portion of the Channel Grid that allows viewing of the recorded data segments

GUI – standard acronym for Graphical User Interface

Idle Mode – when the unit when it is not in Record, Playback, or Monitor mode.

Media – a physical device with a drive letter that is accessible to the IMUX G2 Recorder. It can be a local or remote media as long as it has a drive letter associated with it.

Monitor Mode – when the unit is collecting data and displaying activity but not storing the data to any Target.

Playback Mode – when the unit is currently playing data back from a recorded Chapter 10 file.

Record Mode – when the unit is recording data to predefined Targets on predefined media.

Recorder Transport Control – buttons, icons and menu items that allow for controlling the mode of the Recorder (Idle, Monitor, Record, and Playback) and the Current Time Marker position.

Status Log – a GUI window that provides a viewable log of all status information.

Status Tray – the bottom portion of the IMUX G2 main screen that shows current resource utilization information.

Target – a directory on a media. It is possible to have multiple Targets point to different or even the same directories on the same Media.

Appendix 3 – Icons, Accelerators, and Hot Keys

File

Title	Icon	Accelerator	Hot Keys	Task
New		Alt, F, N	Ctrl + N	Clear all current record and playback activity and return to same state as if the application were just started.
Open TMATS Setup		Alt, F, O	Ctrl + O	Open a TMATS file that will be used to configure the record channels.
Save TMATS Setup		Alt, F, S	Ctrl + S	Save a TMATS file that contains the current configuration of the record channels. If a TMATS file was opened, this will overwrite the previous TMATS file. If not, it will operate the same as Save As….
Save as Default TMATS Setup		Alt, F, D	Ctrl + D	Save a TMATS file with the current configuration of the record channels. This file will be used to configure the record channels when the application is started and when *New* is selected.
Save TMATS Setup As		Alt, F, A		Save a new TMATS file that contains the current configuration of the record channels.
Open Chapter 10 File				Open a prerecorded data set and display the data on the Playback tab of the Channel Grid. When selected, the Channel Grid, if open, will make the Playback tab the active data grid.
Save File As				Save the current data set under a different name.
Open Channel Map				Open a Channel Map file that assigns particular channel numbers from the currently selected playback file to the current available hardware channels.
Save Channel Map				Save a Channel Map file for future recall.
Exit		Alt, F, X		Exit the application.

Setup

Title	Icon	Accelerator	Hot Keys	Task
Audio Feedback Enabled		Alt, S, A	Ctrl + A	Toggle the Audio Feedback feature on and off.
Record Nags Enabled		Alt, S, N		Toggle the Record Nags feature on and off.
Media 90% Full Alarm		Alt, S, M		Toggle the Media 90% Full Alarm feature on and off.
Data Loop Thru Enabled		Alt, S, L	Ctrl + L	Toggle the Data Loop Thru feature on and off.
Log File Enabled		Alt, S, O		Toggle the Log file and TOC features on and off.
Set Classification		Alt, S, C		Set the classification level for the next recorded session. K = Unknown U = Unclassified C = Confidential S = Secret T= Top Secret O = Other
Media Bandwidth		Alt, S, B	Ctrl + B	Open the Media Bandwidth Setup page.
Targets		Alt, S, G	Ctrl + G	Open that Recording Target Setup page.
Time		Alt, S, T	Ctrl + T	Open the Time Setup Page.
TMATS G Group Editor		Alt, S, E	Ctrl + E	Open the TMATS G Group Editor,
BIT & System Integrity		Alt, S, I	Ctrl + I	Open the System Integrity monitor Setup page.

View

Title	Icon	Accelerator	Hot Keys	Task
Recorder Control		Alt, V, R		Toggle the display of the Recorder Control window.
Recorded Time		Alt, V, T		Toggle the display of the Recorded Time window.
Channel Grid		Alt, V, G		Toggle the display of the Channel Grid.
Status Log		Alt, V, L		Toggle the display of the Status Log.
Classification		Alt, V, C		Toggle the display of the Classification bar.

Ruler

Title	Icon	Accelerator	Hot Keys	Task
Time Ruler Format		Alt, R, T		Select between displaying Recorded Time or Relative Time in the Time bar.
Zoom		Alt, R, Z		Select between displaying time in the Time bar in increments of 1 second, 10 seconds, 1 minute, 10 minutes, 1 hour, 10 hours, 1 day, or 10 days per major tick mark.

Transport

Title	Icon	Accelerator	Hot Keys	Task
Beginning of Data		Alt, T, B		Set the Time Marker to the beginning of data location.
Rewind		Alt, T, W		Set the Time Marker to a position that is one major tick marks worth of time prior to the current position.
Stop		Alt, T, S	Ctrl + Q	Stop the current record or playback activity.
Play		Alt, T, P	Ctrl + P	Playback from the current position.
Fast Forward		Alt, T, F		Set the Time Marker to a position that is one major tick mark's worth of time after the current position.

Title	Icon	Accelerator	Hot Keys	Task
End of Data		Alt, T, E		Set the Time Marker to the end of data location.
Event		Alt, T, V	Ctrl + V	Insert an event marker during record. Event markers will be stored in the Chapter 10 data file as Event Marker packets in accordance with the Chapter 10 specification.
Monitor Data		Alt, T, R, M	Ctrl + M	Clear the display and start monitoring the data that is available for recording.
Record Data		Alt, T, R, R	Ctrl + R	Clear the display and start recording to a new Chapter 10 file.

Shuttle

Title	Icon	Accelerator	Hot Keys	Task
Set Left Marker		Alt, H, L	Ctrl+Left	Set the left marker to the current Time Marker position.
Set Right Marker		Alt, H, R	Ctrl+Right	Set the right marker to the current Time Marker position.
Use Constraints		Alt, H, U	Ctrl + U	Toggle between using or not using the constraints during playback.
Shuttle Playback Enabled		Alt, H, E	Ctrl + E	Toggle between continuous replay of the selected data segment or not.

Tools

Title	Icon	Accelerator	Hot Keys	Task
Auto Align Multiple Chapter 10 Files		Alt, O, A		Future Feature: Allows the user to select multiple Chapter 10 input files for input, auto align their data segments based on recorded time, and play them back simultaneously.
Configure G2PBO Mapping		Alt, O, G		Optional Feature: Opens the Configure G2BO Channel Map window.
Add BDE Virtual Channel		Alt, O, B		Optional Feature: Adds a BDE Virtual Channel to the Channel Grid.
Play in OMEGA File		Alt, O, F		Opens OMEGA File and allows the user to play the data in the currently selected Chapter 10 file data segment
Analyze in ODE		Alt, O, D		Opens ODE and allows the user to publish and analyze the data in the currently selected Chapter 10 file data segment.
View Chapter 10 File		Alt, O, V		Opens a user-selected Chapter 10 Viewer to view the TMATS information for the current data segment.
Open TMATS in Wordpad		Alt, O, W		Opens a user-selected TMATS viewer to view the TMATS information for the current data segment.
Open TMATS in OTIS		Alt, O, O		Optional Feature: Opens the OTIS TMATS editor for viewing and editing the current IMUX G2 TMATS configuration information.
Start File Transfer Utility		Alt, O, U		Opens a user selected Chapter 10 File Transfer Utility.
Calculate PCM Rate		Alt, O, C		Starts the auto calculation of the bit rate for all enabled PCM channels that are configured for external input.
Export		Alt, O, X		Future Feature: Exports the selected data segment to a single stream Chapter 10 data file with Time data.

Help

Title	Icon	Accelerator	Hot Keys	Task
Help Topics		Alt, P, H	F1	Opens the Help document.
About **IMUX G2**		Alt, P, A		Opens the About window.

Appendix 4 – IMUX G2 Hardware Configuration Files

The IMUX G2 Hardware Configuration is stored in an XML file named “hconfig.xml..” The file must be stored in the same directory in which the application is stored, under a subdirectory named “ConfigFiles..”

This file is used to determine which I/O channels will be displayed on the Channel Grid and how those channels map to the physical hardware installed in the system.

Each file must start out with the following header lines.

```
<?xml version="1.0" standalone="yes"?>
<hconfig xmlns="http://tempuri.org/hconfig.xsd">
  <hconfigInformation>
    <Version>Version 1.3</Version>
  </hconfigInformation>
```

Each file must end with the following line.

```
</hconfig>
```

PCM I/O are defined as follows.

XML Field	Field Explanation
<PCM4IN1Boards>	Header required to indicate start of each PCM 4in1 board.
<RotaryDialSetting>0</RotaryDialSetting>	Current setting of the hardware rotary switch. Only one board can be set to ‘0’.
<Comment>Factory Default Settings</Comment>	Comment Field
<ChannelType1>IRIG</ChannelType1>	Channel Type for on-board IRIG channel. Do not change this field.
<HardwareChannelNumber1>5</HardwareChannelNumber1>	Hardware Channel Number for on-board IRIG channel. Do not change this field.
<Ch10ChannelNumber1>100</Ch10ChannelNumber1>	Chapter 10 Channel Number to be used for the on-board IRIG channel. This field is user changeable. If multiple 4-in-1 boards are installed this value must be set to 0 for all boards except the Master.
<StreamName1 />	Placeholder for Stream Name for the on-board IRIG channel. It is currently not user changeable.
<ChannelType2>PCM</ChannelType2>	Channel Type for first PCM channel. Do not change this field.
<HardwareChannelNumber2>1</HardwareChannelNumber2>	Hardware Channel Number for first PCM channel. Do not change this field.

XML Field	Field Explanation
<Ch10ChannelNumber2>1</Ch10ChannelNumber2>	Chapter 10 Channel Number to be used for the first PCM channel. This field is user changeable.
<StreamName2>Stream1</StreamName2>	Stream Name for first PCM channel. This field is user changeable.
<ChannelType3>PCM</ChannelType3>	Channel Type for second PCM channel. Do not change this field.
<HardwareChannelNumber3>2</HardwareChannelNumber3>	Hardware Channel Number for second PCM channel. Do not change this field.
<Ch10ChannelNumber3>2</Ch10ChannelNumber3>	Chapter 10 Channel Number to be used for the second PCM channel. This field is user changeable.
<StreamName3>Stream2</StreamName3>	Stream Name for second PCM channel. This field is user changeable.
<ChannelType4>PCM</ChannelType4>	Channel Type for third PCM channel. Do not change this field.
<HardwareChannelNumber4>3</HardwareChannelNumber4>	Hardware Channel Number for third PCM channel. Do not change this field.
<Ch10ChannelNumber4>3</Ch10ChannelNumber4>	Chapter 10 Channel Number to be used for the third PCM channel. This field is user changeable.
<StreamName4>Stream3</StreamName4>	Stream Name for third PCM channel. This field is user changeable.
<ChannelType5>PCM</ChannelType5>	Channel Type for fourth PCM channel. Do not change this field.
<HardwareChannelNumber5>4</HardwareChannelNumber5>	Hardware Channel Number for fourth PCM channel. Do not change this field.
<Ch10ChannelNumber5>4</Ch10ChannelNumber5>	Chapter 10 Channel Number to be used for the fourth PCM channel. This field is user changeable.
<StreamName5>Stream4</StreamName5>	Stream Name for fourth PCM channel. This field is user changeable.
</PCM4IN1Boards>	Trailer required to indicate end of each PCM 4in1 board.

Analog I/O Channels are defined as follows.

XML Field	Field Explanation
</AnalogBoards>	Header required to indicate start of each Analog interface
<RotaryDialSetting>0</RotaryDialSetting>	Current setting of the hardware rotary switch. Only one board can be set to '0'.
<Comment>Factory Default Settings</Comment>	Comment Field.
<HardwareChannelNumber>1</HardwareChannelNumber>	Must be set to as follows: 1: First Analog Channel on Board. 2: Second Analog Channel on Board. 3: Third Analog Channel on Board. 4: Fourth Analog Channel on Board. 5: IRIG Channel on Board.
<Ch10ChannelNumber>21</Ch10ChannelNumber>	Chapter 10 Channel Number to be used for the channel. This field is user changeable. If the board is not the master, set the channel number for the IRIG channel to '0'.
<ChannelType>ANALOG</ChannelType>	When the <HardwareChannelNumber> listed above is set from 1-4, set this field to 'ANALOG'. When the <HardwareChannelNumber> listed above is set to 5, set this field to 'IRIG'.
</AnalogBoards>	Trailer required to indicate end of each Analog interface

Audio I/O Channels are defined as follows.

XML Field	Field Explanation
<AudioBoards>	Header required to indicate start of each Audio Analog interface
<RotaryDialSetting>0</RotaryDialSetting>	Must be set to 0.
<Comment>Factory Default Settings</Comment>	Comment Field.
<HardwareChannelNumber>0</HardwareChannelNumber>	Must be set to 0.
<Ch10ChannelNumber>201</Ch10ChannelNumber>	Chapter 10 Channel Number to be used for the Audio Analog channel. This field is user changeable.
</AudioBoards>	Trailer required to indicate end of each Audio Analog interface

UART I/O Channels are defined as follows.

XML Field	Field Explanation
<UARTBoards>	Header required to indicate start of each UART channel.
<RotaryDialSetting>0</RotaryDialSetting>	Must be set to 0.
<Comment>COM1</Comment>	Comment Field.
<HardwareChannelNumber>1</HardwareChannelNumber>	Must be set to the COM# for the port as understood by the operating system. For example to access COM_1, the value must be set to 1 ; to access COM_2, the value must be set to 2.
<Ch10ChannelNumber>401</Ch10ChannelNumber>	Chapter 10 Channel Number to be used for the UART channel. This field is user changeable.
</UARTBoards>	Trailer required to indicate end of each UART channel.

Video I/O Channels are defined as follows.

XML Field	Field Explanation
<VideoBoards>	Header required to indicate start of each Video channel.
<RotaryDialSetting>0</RotaryDialSetting>	Must be set to 0.
<Comment>Video 1</Comment>	Comment Field.
<HardwareChannelNumber>1</HardwareChannelNumber>	Must be set to 1 for the first Video channel, 2 for the second Video channel, etc...
<Ch10ChannelNumber>501</Ch10ChannelNumber>	Chapter 10 Channel Number to be used for the Video channel. This field is user changeable.
</VideoBoards>	Trailer required to indicate end of each Video channel.

Ethernet I/O Channels are defined as follows. Note that an Ethernet port that is used for channel I/O can not be used for Ethernet Target output.

XML Field	Field Explanation
<EnetBoards>	Header required to indicate start of each Ethernet channel.
<RotaryDialSetting>0</RotaryDialSetting>	Must be set to 0.
<Comment>G2_Port_1</Comment>	Must be set to the "Friendly" name for the Ethernet Port. The Friendly name refers to the user settable name used for the port by the Operating System. This can be changed by going to Network Connections, right clicking on a port, and selecting the Rename option.
<HardwareChannelNumber>1</HardwareChannelNumber>	Must be set to 1 for the first Ethernet channel, 2 for the second Ethernet channel, etc...
<Ch10ChannelNumber>601</Ch10ChannelNumber>	Chapter 10 Channel Number to be used for the Ethernet channel. This field is user changeable.
</EnetBoards>	Trailer required to indicate end of each Ethernet channel.

1553 I/O Channels are defined as follows.

XML Field	Field Explanation
<MILSTD_1553Boards>	Header required to indicate start of each 1553 channel.
<RotaryDialSetting>0</RotaryDialSetting>	Must be set to 0.
<Comment>Factory Default</Comment>	Comment Field
<HardwareChannelNumber>1</HardwareChannelNumber>	Must be set to 1 for the first 1553 channel, 2 for the second 1553 channel, etc...
<Ch10ChannelNumber>701</Ch10ChannelNumber>	Chapter 10 Channel Number to be used for the 1553 channel. This field is user changeable.
</MILSTD_1553Boards>	Trailer required to indicate end of each 1553 channel.

429 I/O Channels are defined as follows.

XML Field	Field Explanation
<A429Boards>	Header required to indicate start of each A429 channel.
<RotaryDialSetting>0</RotaryDialSetting>	Must be set to 0.
<Comment>Factory Default</Comment>	Comment Field
<HardwareChannelNumber>1</HardwareChannelNumber>	Must be set to 1 for the first A429 channel, 2 for the second A429 channel, etc...
<Ch10ChannelNumber>801</Ch10ChannelNumber>	Chapter 10 Channel Number to be used for the A429 channel. This field is user changeable.
<ChannelType></ChannelType>	Channel Type Indicator. Field not currently used, but descriptors are required.
</A429Boards>	Trailer required to indicate end of each A429 channel.

Appendix 5 – IMUX G2 System Configuration Files

The IMUX G2 System Configuration contains system level settings including path details for media and targets and is stored in an XML file named “SystemConfiguration.xml”. The file must be stored in the same directory in which the application is stored, under a subdirectory named “ConfigFiles..”

Each file must start out with the following header lines.

```
<?xml version="1.0" standalone="yes"?>
<SystemConfiguration xmlns="http://tempuri.org/SystemConfiguration.xsd">
```

Each file must end with the following line.

```
</SystemConfiguration>
```

Media details can be manipulated from within the GUI and are stored in this file. The details are defined as follows.

XML Field	Field Explanation
<Media>	Header required to indicate start of each Media device.
<Number>0</Number>	Reference number for this media. First media is “0,” second media is “1”.
<DriveLetter>F:</DriveLetter>	Drive letter of media device as understood by the operating system.
<MaxThroughput>1200</MaxThroughput>	Maximum Throughput field used to determine what throughput rate will indicate 100% on the Status Tray.
<Media>	Trailer required to indicate end of each Media device.

Target details can be manipulated from within the GUI and are stored in this file. The details are defined as follows.

XML Field	Field Explanation
<Targets>	Header required to indicate start of each Target description.
<Number>0</Number>	Reference number for this target. First target is "0," second target is "1", etc....
<MediaNumber>0</MediaNumber>	For targets of Type "Disk": Media Number associated with the Drive Letter on which this target will record data. For other target types this field must be set to "2".
<DirectoryPath>\G2</DirectoryPath>	For targets of Type "Disk": the Directory Path specifying in which directory on the media this target will record data. For targets of Type "OMEGA", "Playback OMEGA", and "SnapshotEthernet": the port number that the two applications will use to communicate. Examples of port numbers to use are "1200" and "1201". This field should only be changed if the applications are not running. For targets of Type "Ethernet" and "PlaybackEthernet": the structure is as follows [Target IP Address] [Target IP Port] [reserved] [Local NIC IP Address]
<Type>Disk</Type>	Specifies the Type of Target. Options include the following. Disk Ethernet OMEGA PlaybackEthernet PlaybackOMEGA SnapshotEthernet
<Enabled>True</Enabled>	Specifies whether or not the target is enabled. If a target is not enabled, no data can be sent to it.
</Targets>	Trailer required to indicate end of each Target description.

System Parameter details can be manipulated from within the GUI and are stored in this file. The details are defined as follows.

XML Field	Field Explanation
<SystemParameters>	Header required to indicate start of System Parameters section.
<PCIMaxBandwidth>500</PCIMaxBandwidth>	PCI Maximum Bandwidth field used to determine what throughput rate will indicate 100% on the Status Tray.
<Clock10MHzReferenceSource>dInternal</Clock10MHzReferenceSource>	Specifies whether 10 MHz Reference clock is set to "Internal" or "External.." Field value should be set to "dInternal" for internal clock. Field value should be set to "dExternal" for external clock.
</SystemParameters>	Trailer required to indicate end of System Parameters section.

Appendix 6 – IMUX G2 Serial Controller Configuration Files

The **IMUX G2** Serial Controller Configuration contains serial port settings for remotely controlling the unit and is stored in an XML file named “SerialConfiguration.xml.”. The file must be stored in the same directory in which the application is stored, under a subdirectory named “ConfigFiles..”

Each file must start out with the following header lines.

```
<?xml version="1.0" standalone="yes"?>
<SerialConfiguration xmlns="http://tempuri.org/SerialConfiguration.xsd">
```

Each file must end with the following line.

```
</SerialmConfiguration>
```

Media details can be manipulated from within the GUI and are stored in this file. The details are defined as follows.

XML Field	Field Explanation
<SerialConfiguration>	Header required to indicate start of serial configuration
<PortName>COM5</PortName>	Com port name
<BaudRate>19200</BaudRate>	Baud Rate: 9600, 19200, 38400, 57600, 115200, 230400, 460800, 921600
<DataBits>8</DataBits>	Data bits: 5, 6, 7, 8
<Parity>None</Parity>	Parity: Even, Odd, None, Mark, Space
<StopBits>1</StopBits>	Stop bits: 1, 1.5, 2
<FlowControl>Hardware</FlowControl>	Flow Control: Xon/Xoff, Hardware, None
</SerialConfiguration>	Trailer required to indicate end of serial configuration

Appendix 7 – Mapping TMATS to IMUX G2

The original release of IMUX G2 was built using the IRIG 106-05 Chapter 9 TMATS standard but borrowed some necessary elements from what was then the pending -07 standard. It is currently up to date with the -09 standard. The table below provides details on the currently used TMATS attributes and where they are accessed from the IMUX G2 environment.

All TMATS attributes are now stored so that each attribute is followed by a CR/LF – allowing easier readability of the information.

TMATS Attribute (05/07)	TMATS Description	G2 Name / Hard Coded Value	G2 Location	Acceptable Values	Default Values
General for Entire Recording					
G\PN:	Program (Project) Name	Wyle TDS IMUX G2	Hard coded	Any	Wyle TDS IMUX G2
G\TA:	Test Item	Test Item	Setup->TMATS G Group Editor	Any	Any
G\OD:	Origination Date	Origination Date	Setup->TMATS G Group Editor	Any	Any
G\UD:	Update Date	Update Date	Setup->TMATS G Group Editor	Any	Any
G\TN:	Test Number	Test Number	Setup->TMATS G Group Editor	Any	Any
G\POC\N:	Number of Points Of Contacts	# of POCs	Setup->TMATS G Group Editor	Any	Any
G\POC1-1:	POC Name	POC Name	Setup->TMATS G Group Editor	Any	Any
G\POC2-1:	POC Agency	POC Agency	Setup->TMATS G Group Editor	Any	Any
G\POC3-1:	POC Address	POC Address	Setup->TMATS G Group Editor	Any	Any
G\POC4-1:	POC Telephone	POC Telephone	Setup->TMATS G Group Editor	Any	Any
G\DSI\N:	Number of Data Source(s)	1	Hard coded	Any	1
G\DSI-1:	Data Source Identifier	"IMUX G2" (older) or "TDS" (newer)	Hard coded	N/A	“TDS”
G\DST-1:	Data Source Type (Storage)	STO (older), REP (newer)	Hard coded	STO, REP	REP
G\106:	IRIG-106 version (106-09)	5, 7 (older), 9 (newer)	Hard coded	5, 7, 9	9
G\SC:	Security Level	Security Level	Setup-->Set Classification	U, C, S, T, O	U

TMATS Attribute (05/07)	TMATS Description	G2 Name / Hard Coded Value	G2 Location	Acceptable Values	Default Values
G\COM:	Comments	Comments	Setup->TMATS G Group Editor	Any	"TMATS file created by Telemetry and Data Systems IMUX-G2"
R-x\ID:	Data Source Identifier	"IMUX G2" (older) or "TDS" (newer)	Hard coded	Any	1
R-x\N:	Number of Tracks or Channels	Number of Channels	Hconfig file	N/A	SELECTED MEDIA
R-x\RID:	Source Identifier	SELECTED MEDIA	Hard coded	N/A	0
R-x\NSB:	Number of Source Bits	0	Hard coded	N/A	I
R-x\RRML:	Recorder-Reproducer Media Location	I for Internal	Hard coded	N/A	I
R-x\RI3	Original Recording	YES or NO	Set based on how the file was created	Y, N	Y
R-x\RI4	Date and Time Created	MM-DD-YYYY-HH-MI-SS	Set based on current system time at start of recording.	Any	Today
R-x\RI5	Date of Copy	MM-DD-YYYY-HH-MM-SS	Set based on current system time when creating a file using stand alone BDE post processing.	Any	Today
R-x\RI6:	Post Process Modified Recording	N for No	Hard coded	N/A	N
R-x\CRE:	Continuous Recording Enabled	F for False	Hard coded	N/A	F
R-x\RSS:	Recorder-	C for Command Setup File Only	Hard coded	N/A	C

TMATS Attribute (05/07)	TMATS Description	G2 Name / Hard Coded Value	G2 Location	Acceptable Values	Default Values
	Reproducer Setup Source				
R-x\EV\E:	Recording Events Enabled	T for True (newer) F for False (older)	Hard coded	N/A	N
R-x\EV\IEE:	Recorder Internal Events Enabled	T for True (newer) F for False (older)	Hard coded	T, F	N/A
R-x\EV\N:	Number of Recording Events	2	Hard coded	Any	2
R-x\EV\ID-1:	Recording Event Identifier	SETUP_REC_CONFIG_CHANGE	Hard coded		
R-x\EV\D-1:	Recording Event Description	SETUP RECORD CONFIGURATION CHANGE	Hard coded	N/A	
R-x\EV\P-1:	Recording Event Priority	3 for during recording	Hard coded	N/A	3
R-x\EV\T-1:	Recording Event Type	R for Recorder	Hard coded	N/A	R
R-x\EV\LC-1:	Recording Event Limit Count	65535	Hard coded	N/A	65535
R-x\EV\MS-1:	Recording Event Measurement Source	NONE	Hard coded	N/A	NONE
R-x\EV\MN-1:	Recording Event Measurement Name	NONE	Hard coded	N/A	NONE
R-x\IDX\E:	Recording Indexes Enabled	F for False	Hard coded	T, F	T
R-x\IDX\IT:	Recording Index Type	T for Time	Hard coded	N/A	T
R-x\IDX\ITV:	Recording Index Time Interval	10000000 for 10 seconds	Hard coded	N/A	10000000
V-y\TDS\VER:	TDS version of spec	1.0	Hard coded	1.0.0, 1.1.0, 1.2, 1.3	1.3
V-y\ID:	Data Source Identifier	TDS	Hard coded	“IMUX G2”, “TDS”	“TDS”

TMATS Attribute (05/07)	TMATS Description	G2 Name / Hard Coded Value	G2 Location	Acceptable Values	Default Values
V-y\VN:	Vendor Name?	TDS	Hard coded	"TDS"	"TDS"
V-y\TDS\G2N:	Number of G2 channels	Number of Channels	Hconfig file	N/A	1
Applies to ALL Channels					
R-x\TK1-n:	Track Number/Channel Id	Chapter 10 Channel Number	Hconfig file	Any	N/A
R-x\TK4-n:	Channel ID To Recorder Physical Channel	Channel Number	Set to match Ch10 Channel Number found in Hconfig file.	Any	DataLink <chan>
R-x\DSI-n:	Data Source Identifier	Channel Name	Defaults to DataLink <chan> but is user editable on the channel grid	Any	N/A
R-x\CDT-n:	Channel Type	Channel Type	Hconfig file	Any	DataLink <chan>
R-x\CHE-n:	Channel Enabled		Channel Grid	1553IN, 429IN, ANAIN, ETHIN, PCMIN,TIMEIN, UARTIN, VIDIN	N/A
R-x\CDLN-n:	PCM data Source Id (Bus data source Id)	Channel Name	See R-1\DSI-n:	T for Enabled, F for Disabled	Disabled
V-y\TDS\DLN-n:	Data Link Name	Channel Name	See R-1\DSI-n:	Any	DataLink <chan>
V-y\TDS\TYP-n:	Channel Type	Channel Type	Hconfig file	1553IN, 429IN, ANAIN, ETHIN, PCMIN,TIMEIN, UARTIN, VIDIN	N/A
V-y\TDS\CAO-n:	Ch10 apply counter offset	Ch10 Apply Counter Offset	Advanced Input	YES or NO	NO
V-y\TDS\CCO-n:	Ch10 counter offset	Ch10 Counter Offset	Advanced Input	Any	0
V-y\TDS\TGT\N-n:	Number Enabled Targets	Number of Targets	System config file	Any	0
V-y\TDS\TE-n-m:	Targets	Target enabled	Channel Grid	T, F	Unknown
V-y\TDS\LTE-n:	Loop Through Enabled	Loop Through Enabled	Setup menu	T, F	F

TMATS Attribute (05/07)	TMATS Description	G2 Name / Hard Coded Value	G2 Location	Acceptable Values	Default Values
Time Channels					
R-x\TTF-n	Data type format	1 for Format 1 (Time Data)	Hard coded	1	1
R-x\TFMT-n:	Time Format	TimeCode	Time Setup GUI	A, B,G, I	B
R-x\TSRC-n:	Time Source	E for External	Hard coded	I, E	E for External
V-y\TDS\TRA-n:	Time Rate	1	Hard coded	¼, ½, 1, 2, 4	1
V-y\TDS\TSE-n:	Time Seed	ZERO	Hard coded	SYSTEM, ZERO, PRESET	ZERO
Audio Channels					
R-x\ATF-n:	Analog Type Format	1	Hard coded	N/A	1
R-x\ACH\N-n:	Number of Analog channels per packet	2	Hard coded	N/A	2
R-x\ADP-n:	Analog Data Packing Option	YES	Hard coded	N/A	YES
R-x\ASR-n:	Analog Sample Rate	Audio Rate (16, 44.1, 48 khz)	Audio Setup GUI.	16000, 44100, 48000	16000
R-x\AMN-n-m:	Analog Measurement Name	AUDIO<m>	Hard coded	N/A	"AUDIO1"
R-x\ADL-n-m:	Analog Data Size (16 bits)	16	Hard coded	16, 8	16
R-x\AMSK-n-m:	Measurement Bit Mask	FW (full word)	Hard coded	N/A	FW
R-x\AMTO-n-m:	Transfer Order (Default)	D	Hard coded	N/A	D
R-x\ASF-n-m:	Sample Factor (always 0)	0	Hard coded	N/A	0
R-x\AV-n-m:	Audio Present	Y	Hard coded	N/A	Y
R-x\AVF-n-m:	AUDIO FORMAT	WAV	Hard coded	WAV, RAW	WAV
V-y\TDS\ACS-n	Audio Chan1 Source	LINEIN (Sound Card Line In - 2.0 and lower) or DEFAULT (System Default - 2.1)	Hard coded; viewable on Audio Setup GUI.	LINEIN, MIC, OTHER, DEFAULT	DEFAULT

TMATS Attribute (05/07)	TMATS Description	G2 Name / Hard Coded Value	G2 Location	Acceptable Values	Default Values
Analog Channels					
R-x\ATF-n:	Analog Data Type Format	1 = Format 1 (Discrete Data)	Hard coded	1	1
R-x\ACH\N-n:	Number of Analog Channels per Packet	1	Hard coded	Any	1
R-x\ADP-n:	Analog Data Packing Option	AnalogDataMode	Analog Setup GUI	YES, NO	YES
R-x\ASR-n:	Analog Sample Rate	AnalogSampleRate	Analog Setup GUI	Any	1000000
R-x\AMN-n-m:	Analog Measurement Name	ANA_CHxxxx	Hconfig (xxxx = channel #)	N/A	ANA_CH<chan>
R-x\ADL-n-m:	Analog Data Length	AnalogBitsPerSample	Analog Setup GUI	Any	8
R-x\AMSK-n-m:	Measurement Bit Mask		Derived from Analog Setup GUI (Data Mode)	Any	FW
R-x\AMTO-n-m:	Transfer Order (Default)	M – Most Significant Bit First	Hard coded, viewable on Analog setup GUI.	I, m	M
R-x\ASF-n-m:	Sample Factor (always 0)	0	Hard coded	N/A	0
R-x\ASBW-n-m:	Sample Filter 3DB Bandwidth in Hz	AnalogFilter	Analog Setup GUI	0, 1000, 10000, 100000, 1000000, 6000000, 20000000	0
R-x\ACP-n-m:	Signal Coupling	AnalogCoupling	Analog Setup GUI	D	D
R-x\AII-n-m:	Input Impedance	AnalogImpedance	Analog Setup GUI	50, 75, 110, 10000	10000
R-x\AGI-n-m:	Signal Gain (in milliunits)	1000	Hard coded	N/A	1000
R-x\AFSI-n-m:	Full Scale Range in millivolts	AnalogFullRange	Auto Calculated from voltage range on Analog Setup GUI [+/-10-	200, 400, 800, 2000, 4000	2000

TMATS Attribute (05/07)	TMATS Description	G2 Name / Hard Coded Value	G2 Location	Acceptable Values	Default Values
			->20,000; +/-5-- >10,000, etc.]		
R-x\AOVI-n-m:	Input Offset Voltage	0	Hard coded	N/A	0
R-x\AIT-n-m:	Type of Input Signal		Derived from Analog Setup GUI Impedance	D, S	S
R-x\AV-n-m:	Audio Present	N	Hard coded	N/A	N
R-x\AF-n-m:	Format	AnalogCaptureMode	Analog Setup GUI. Only 2 (2's compliment) and O (other) are allowed.	1, 2, F, O.	O
PCM Channels					
R-x\PDTF-n:	PCM Data Type Format	1 for Format 1 (IRIG 106 Ch4/8)	Hard coded	N/A	1
R-x\PDP-n:	PCM Mode (throughput, packed, unpacked.)	TM for Throughput Mode; PFS for Packed Mode	PCM Input GUI.	TM, UN, PFS	TM
R-x\ICE-n	PCM Input Clock Phase	PCM Input Clock Phase	PCM Input GUI	0, 180	0
R-x\IST-n	PCM Input Source	PCMInputType.	PCM Input GUI	RS422, TTL	TTL
R-x\ITH-n:	Input Threshold (volts)	1.8	Hard coded	N/A	1.8
R-x\ITM-n	PCM Input Impedance	PCM Input Impedance; HIGH-Z or LOW-Z	PCM Input GUI	HIGH-Z, LOW-Z	LOW-Z
R-x\PTF-n:	PCM Video type Format.	NONE	Hard coded	N/A	NONE
R-x\MFF\E-n:	PCM Minor Frame Filtering Enabled	F for False	Hard coded	N/A	F
R-x\POF\E-n:	PCM Post Process Overwrite and Filtering Enabled	F for False	Hard coded	N/A	F

TMATS Attribute (05/07)	TMATS Description	G2 Name / Hard Coded Value	G2 Location	Acceptable Values	Default Values
V-y\TDS\PII-n:	PCM Input Impedance	Value of impedance if ITM=LOW-Z	Derived from PCM Input GUI; Rev B Board supports only 75 Ohms.	50, 75 Ohms	75 Ohms
V-y\TDS\PSR-n:	PCM Input Source	PCM Input Source	PCM Input GUI	Internal, External	External
M-x\ID:	Data Source Identifier	Channel Name	See R-1\DSI-n:	Any	DataLink<chan>
M-x\BSG1:	Base band is PCM	PCM	Hard coded	N/A	PCM
M-x\BB\DLN:	Data Link Name	Channel Name	See R-1\DSI-n:	Any	DataLink<chan>
P-d\DLN:	Data Link Name	N/A	N/A	Any	DataLink<chan>
P-d\D1:	PCM Input Code	PcmInputCode	PCM Input GUI	NRZ-L, NRZ-M, NRZ-S, BIO-L, BIO-M, BIO-S, RNRZ-L, OTHER	NRZ-L
P-d\D2:	PCM Bit Rate	PcmRate	PCM GUI	Any	10000000
P-d\D3:	PCM Data Encryption	U	Hard coded	N/A	U
P-d\D4:	PCM Input Polarity	PcmInputPolarity	PCM Input GUI	I, N	N
P-d\D5	PCM Auto Correction	N	Hard coded	N/A	N
P-d\D6:	PCM Data Direction	PcmInputCode	PCM Input GUI	N, R	N
P-d\D7:	PCM Randomizer	PcmInputCode	PCM Input GUI	N, Y	N
P-d\D8:	PCM Randomizer Length	PcmInputCode	PCM Input GUI	“STD”, “OTH”, “N/A”	“N/A”
P-d\TF	Type Format	PCMFormatType	PCM Frame Format GUI	ONE, TWO, 1553, BUS, ALTD, PKTM, OTHER	N/A
P-d\F1:	PCM Common Word Length	PcmWordSize Default = 4	BDE Setup GUI; PCM Frame Format GUI	Any	N/A
P-d\F2:	PCM Word Transfer Order	PcmWordOrientation Default = MSB	BDE Setup GUI; PCM Frame Format GUI	L, M	N/A
P-d\F3:	Normal Word Parity	PcmParity Default = None	PCM Frame Format GUI	EV, OD, NO	N/A

TMATS Attribute (05/07)	TMATS Description	G2 Name / Hard Coded Value	G2 Location	Acceptable Values	Default Values
P-d\F4:	Parity Transfer Order	PcmParityTransferOrder	PCM Frame Format GUI	L, T	N/A
P-d\MF\N:	Number Minor Frames in a Major Frame	PcmMinorsPerMajor Default = 1	Hard coded for BDE channels; PCM Frame Format GUI	Any	N/A
P-d\MF1:	Number of Words in a Minor Frame	PcmTotalWords Default = 2	BDE Setup GUI; PCM Frame Format GUI	Any	N/A
P-d\MF2:	Number of Bits in a Minor Frame	calculated	BDE Setup GUI; PCM Frame Format GUI	Any	N/A
P-d\MF3:	PCM Sync Type	PFT (fixed pattern)	Hard coded	FPT, OTH	N/A
P-d\MF4:	PCM Frame Sync Length	Pcm FrameSyncLength Default = Length of Sync Pattern, if valid; otherwise, 16.	BDE Setup GUI; PCM Frame Format GUI	Any	N/A
P-d\MF5:	PCM Frame Sync Pattern	PcmFrameSync Default = $2^{\text{Sync Pattern Length}}$ -1	BDE Setup GUI; PCM Frame Format GUI	Any	N/A
P-d\SYNC1:	In Sync Criteria	MinorFramesToLock Default = 1	PCM Frame Format GUI		
P-d\SYNC2:	In Sync Pattern Criteria	BitErrorsToLock Default = 0	PCM Frame Format GUI		
P-d\SYNC3:	Number Of Disagrees	MinorFramesToDrop Default = 1	PCM Frame Format GUI		
P-d\SYNC4:	Out Of Sync Pattern Criteria	BitErrorsToDrop Default = 1	PCM Frame Format GUI		
P-d\ISF\N	Number of Subframe ID Counters	SubframeIdCounters Default = 0	PCM Framing GUI	Any	N/A
P-d\ISF1-1	Subframe ID Counter Name	Hard coded to 'SFID'	PCM Subframe Synch Format GUI	N/A	N/A

TMATS Attribute (05/07)	TMATS Description	G2 Name / Hard Coded Value	G2 Location	Acceptable Values	Default Values
P-d\ISF2-1	Subframe Synchronization Type	SubframeSyncType	PCM Subframe Synch Format GUI	N/A	N/A
P-d\IDC1-1	Subframe ID Counter Position	SubframeCounterLocation Default = 1	PCM Subframe Synch Format GUI	Any	N/A
P-d\IDC2-1	ID Counter Minor Frame Word Length	SubframeCounterWordLength (Same value as PcmWordSize)	PCM Subframe Synch Format GUI	N/A	N/A
P-d\IDC3-1	ID Counter MSB Starting Bit Location	SubframeCounterStartBit Default = 1	PCM Subframe Synch Format GUI	Any	N/A
P-d\IDC4-1	ID Counter Length (in Bits)	SubframeCounterLength (Calculated)	PCM Subframe Synch Format GUI	N/A	N/A
P-d\IDC5-1	ID Counter Transfer Order	SubframeCounterOrder(same as PcmWordOrientation) Default = 'Default'	PCM Subframe Synch Format GUI	N/A	N/A
P-d\IDC6-1	ID Counter Initial Value	SubframeCounterStartValue Default = 0	PCM Subframe Synch Format GUI	Any	N/A
P-d\IDC7-1	Initial Count Subframe Number	SubframeInitialValue (same as SubframeCounterStartValue)	PCM Subframe Synch Format GUI	Any	N/A
P-d\IDC8-1	ID Counter End Value	SubframeCounterEndValue	PCM Subframe Synch Format GUI	Any	N/A
P-d\IDC9-1	End Count Subframe Number	SubframeLastValue (same as SubframeCounterEndValue)	PCM Subframe Synch Format GUI	Any	N/A
P-d\IDC10-1	Count Direction	SubframeCountDirection Default = 'Increasing'	PCM Subframe Synch Format GUI	INC, DEC	N/A
P-d\COM:	PCM Randomizer	PcmInputCode	PCM Input GUI	9, 11, 20, 23, OFF, DM-S,	N/A

TMATS Attribute (05/07)	TMATS Description	G2 Name / Hard Coded Value	G2 Location	Acceptable Values	Default Values
	comment detail			DM-M, MDM-S, MDM-M	
V-y\TDS\BLA-n:	Bitsync Lag Adjust	Bitsync Lag Adjust	Advanced Input	YES, NO	NO
V-y\TDS\BOE-n:	Bit Sync Output Enabled	BitSync OutputEnabled	PCM Setup GUI	YES, NO	NO
V-y\TDS\BCP-n:	Bitsync Clock Phase	Bitsync Clock Phase	BitSync Setup GUI	0, 180 Degrees	180 Degrees
V-y\TDS\BIM-n:	Bitsync Impedance	Bitsync Impedance	BitSync Setup GUI	50 Ohms, 75 Ohms, 10 kOhms	10 kOhms
V-y\TDS\BIP-n:	Bitsync Input Polarity	Bitsync Input Polarity	BitSync Setup GUI	Normal, Inverted	Normal
V-y\TDS\BIS-n:	Bitsync Input Source	Bitsync Input Source	BitSync Setup GUI	Single Ended, Differential	Single Ended
V-y\TDS\BPD-n:	Bitsync Percent Deviation	Bitsync Percent Deviation	BitSync Setup GUI	Any	2
V-y\TDS\BPL-n:	Bitsync Percent Loop Bandwidth	Bitsync Percent Loop Bandwidth	BitSync Setup GUI	Any	0.3
V-y\TDS\BIC-n:	Bitsync Input Code (D1)	BitSyncInputCode	BitSync Setup GUI	BIO-S, BIO-M, BIO-L, NRZ-S, NRZ-M, NRZ-L, DM-S, DM-M, MDM-S, MDM-M, OFF, +RNRZ-9, +RNRZ-11, +RNRZ-15, +RNRZ-20, +RNRZ-23, -RNRZ-9, -RNRZ-11, -RNRZ-15, -RNRZ-20, -RNRZ-23,	NRZ-L
V-y\TDS\BIR-n:	Bitsync Input Rate (D2)	N/A	N/A	N/A	N/A
V-y\TDS\PCO-n:	PCM Output Code	PCM Output Code	PCM Output GUI	BIO-S, BIO-M, BIO-L, NRZ-S, NRZ-M, NRZ-L, DM-S, DM-M, MDM-S, MDM-M, OFF, +RNRZ-9, +RNRZ-11, +RNRZ-15, +RNRZ-20, +RNRZ-23, -RNRZ-9, -RNRZ-11, -RNRZ-15, -RNRZ-20, -RNRZ-23,	NRZ-L

TMATS Attribute (05/07)	TMATS Description	G2 Name / Hard Coded Value	G2 Location	Acceptable Values	Default Values
V-y\TDS\PFSM-n:	Frame Sync Mask	PcmFrameSyncMask Default = $2^{\text{Sync Pattern Length}}$ -1	BDE Setup GUI; PCM Framing GUI	Any	N/A
V-x\TDS\BIT_SLIP-y:	Maximum Frame Sync Bit Slip	PcmFrameSyncMaxBitSlip Default = 0	PCM Frame Format GUI		
V-y\TDS\BDE-n\IC:	BDE Input Channels	BDE Input Channels	BDE Setup GUI	BDE Input Channels	N/A
V-y\TDS\BDE-n\AN:	BDE Algorithm Name	BDE Algorithm Name	BDE Setup GUI	Any	N/A
V-y\TDS\BDE-n\MW:	BDE Maximum Wait Time	BDE Maximum Wait Time	BDE Setup GUI	Any	N/A
V-y\TDS\UBS-n	Using Bit Sync	Yes or No	PCM Setup GUI	Yes, No	N/A
UART Channels					
R-x\UTF-n:	UART format (0 is only valid value)	0	Hard coded	N/A	0
R-x\NUS\N-n:	Number of sub channels	1	Hard coded	N/A	1
R-x\USCN-n-m:	sub channel number	1	Hard coded	N/A	1
R-x\UCNM-n-m:	sub channel name	SubChannel_1	Hard coded	N/A	“SubChannel_1”
R-x\UCR-n-m:	baud rate	SerialRate	UART Setup GUI	1200, 2400, 4800, 9600, 19200, 38400, 115200, 230400, 460800, 921600	115200
R-x\UCP-n-m:	Parity	SerialParity	UART Setup GUI	O, E, N	N
R-x\UCB-n-m:	# data bits	SerialDataBits	UART Setup GUI	7, 8	8
R-x\UCS-n-m:	# stop bits	SerialStopBits	UART Setup GUI	0, 2	0
Video Channels					
R-x\VED-n:	video encoding delay	VideoEncodingDelay	Video Setup GUI	Any	300
R-x\VTF-n:	Video type format	VideoPacketFormat	Video Setup GUI; only Formats 0 and 1 are supported today	0, 1, 2	0

TMATS Attribute (05/07)	TMATS Description	G2 Name / Hard Coded Value	G2 Location	Acceptable Values	Default Values
R-x\VXF-n:	type of video carried for Xon2 formats (mpeg2)	0 (for MPEG-2)	Comes from ini file name, but all are mpeg2 so could consider it hard coded	0	0
R-x\VST-n:	video signal input type	1 (for composite)	Hard coded	1	1
R-x\VSF-n:	video signal format type	1 (for ntsc) or 2 (for pal)	Comes from ini file name	Any	1
R-x\CBR-n:	Only one of CBR (Constant) or VBR (Variable Peak) Bit Rate allowed	setupIndex	Comes from ini file name	Any	1000000
R-x\VBR-n:		setupIndex	Comes from ini file name	Any	0
R-x\VDA-n:	Video Data Alignment	L for Little Endian	Hard coded	N/A	L
V-y\TDS\VID-n\MPT:	Packet Type (transport or program stream)	setupIndex	Comes from ini file name	PROGRAM, TRANSPORT	TRANSPORT
MIL-STD-1553 Channels					
R-x\BTF-n	MIL-STD-1553 Bus Data Type Format	1 (for MIL-STD-1553B Data)	Hard coded	1	1
R-x\MRF\E-n:	MIL-STD-1553 Filtering Enabled	F for False	Hard coded	N/A	F
R-x\MOF\T-n:	MIL-STD-1553 Post Process Overwrite and Filtering Enabled	F for False	Hard coded	N/A	F
B-x\DLN:	DataLink Name	Channel Name	See R-x\DSI-n:	Any	DataLink <chan>
B-x\TA:	Test Item	Description	1553 Setup GUI	Any	N/A
B-x\BP:	Bus Parity	OD	Hard coded	N/A	OD
B-x\NBS\N:	Number of Buses	1	Hard coded	N/A	1
B-x\BID-n:	Bus Number	1	Hard coded	N/A	1

TMATS Attribute (05/07)	TMATS Description	G2 Name / Hard Coded Value	G2 Location	Acceptable Values	Default Values
B-x\BNA-n:	Bus Name	Chan Bus0001	Derived from Ch.10 channel number	N/A	Chan<chan> Bus0001
B-x\BT-n:	Bus Type	1553	Hard coded	N/A	1553
Ethernet Channels					
R-x\ENTF-n:	Ethernet type format	0	Hard coded	N/A	0
R-x\NNET\N-n:	Number of networks included in this channel	1	Hard coded	N/A	1
R-x\ENBR-n-m:	Network number	Port Number	Read from hconfig file	N/A	1
R-x\ENAM-n-m:	Network name	Port Name	Read from hconfig file	N/A	Any
Arinc 429 Channels					
R-x\ABTF-n:	ARINC 429 Bus type format	1	Hard coded	N/A	0
R-x\NAS\N:	Number of sub channels	1	Hard coded	N/A	1
R-x\ASN-n-m:	sub channel number	1	Hard coded	N/A	1
R-x\ANM-n-m:	sub channel name	A429_<ch10#>	Hard coded	N/A	A429_<chan>
B-x\DLN:	DataLink Name	Channel Name	See R-x\DSI-n:	Any	DataLink <chan>
B-x\TA:	Test Item	Description	429 Setup GUI	Any	Any
B-x\BP:	Bus Parity	Bus Parity	429 Setup GUI	NO, OD	OD
B-x\NBS\N:	Number of Busses	1	429 Setup GUI	N/A	1
B-x\BID-n:	Bus Number	1	Hard coded	N/A	1
B-x\BNA-n:	Bus Name	Chan____ Bus0001	Derived from Ch.10 channel number	N/A	Chan<chan>_Bus0001
B-x\BT-n:	Bus Type	A429	Hard coded	N/A	A429
End of Table					

Notes

This page intentionally left mostly blank.