

TREK
COMMAND BRIDGE
USER GUIDE



November 2012

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1 What You Need To Know Before You Read This Document

Before reading this document you should be familiar with the material in the TReK Getting Started User Guide (TREK-USER-001). If you have not read this document, you may have difficulty with some of the terminology and concepts presented in this document.

We assume you are an experienced Windows user. Information about how to use a mouse or how to use Windows is not addressed in this user guide. Please see your Windows documentation for help with Windows.

2 Technical Support

If you are having trouble installing the TReK software or using any of the TReK software applications, please try the following suggestions:

Read the appropriate material in the manual and/or on-line help.

Ensure that you are correctly following all instructions.

Checkout the TReK Web site at <http://trek.msfc.nasa.gov/> for Frequently Asked Questions.

If you are still unable to resolve your difficulty, please contact us for technical assistance:

TReK Help Desk E-Mail, Phone & Fax:

E-Mail:	trek.help@nasa.gov
Telephone:	256-544-3521 (8:00 a.m. - 4:30 p.m. Central Time)
Fax:	256-544-9353

TReK Help Desk hours are 8:00 a.m. – 4:30 p.m. Central Time Monday through Friday. If you call the TReK Help Desk and you get a recording please leave a message and someone will return your call. E-mail is the preferred contact method for help. The e-mail message is automatically forwarded to the TReK developers and helps cut the response time.

3 Introduction

The Command Bridge application provides the ability to capture a command sent on a network and forward it to any TReK command destination. This application was originally developed for internal use at MSFC in support of Payload Operations Integration Center (POIC) cadre training. However, since this capability can also be

beneficial in a payload test environment, the Command Bridge application has been added to the TReK installation to provide expanded capabilities for all users.

The Command Bridge works by ‘bridging’ between TReK Telemetry Processing and TReK Command Processing. Figure 1 shows an example data flow. In this example, the Ground Support Equipment (GSE) computer software generates a command and sends it out on the network. The TReK Telemetry Processing application has been configured by the TReK Command Bridge application to receive the incoming command data. The Command Bridge application retrieves the ‘telemetry’ using the TReK User API, and then passes it to a destination in the Command Processing application using the TReK Command User API.

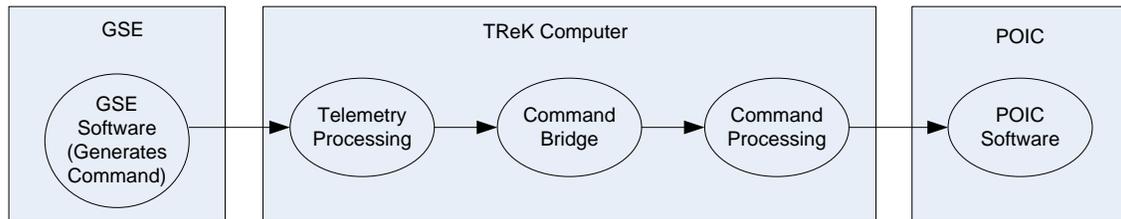


Figure 1 Command Bridge Data Flow

This scenario shows one of the ways the Command Bridge can be used if you have non-TReK software that generates flight commands for your payload. The Command Bridge allows a means of getting that data to the POIC without having to rewrite the code using TReK API calls.

A few notes:

- The Command Bridge application uses the Telemetry Processing User API to automatically configure Telemetry Processing. However, you will need to manually add a command destination in Command Processing to get everything working.
- The Command Bridge supports two packet types: CCSDS and UFO. CCSDS is the default packet type. When using CCSDS the ‘command data’ must be sent in a CCSDS packet and the APID value is checked. The UFO packet type provides the capability to send “unidentifiable” packets through the bridge. When using UFO the ‘command data’ format will not be checked. The UFO packet type makes it possible to configure one bridge to pass through multiple command APIDs.

4 Command Bridge Main Window

The Command Bridge main window consists of two main areas as shown in Figure 2. The top part of the main window contains a list of bridges. When you start the Command Bridge application the list will be empty. This is because you have not yet added any

bridges to the list. The bottom part of the window is a message area that is used to display important status and error messages about the bridge activities in progress.

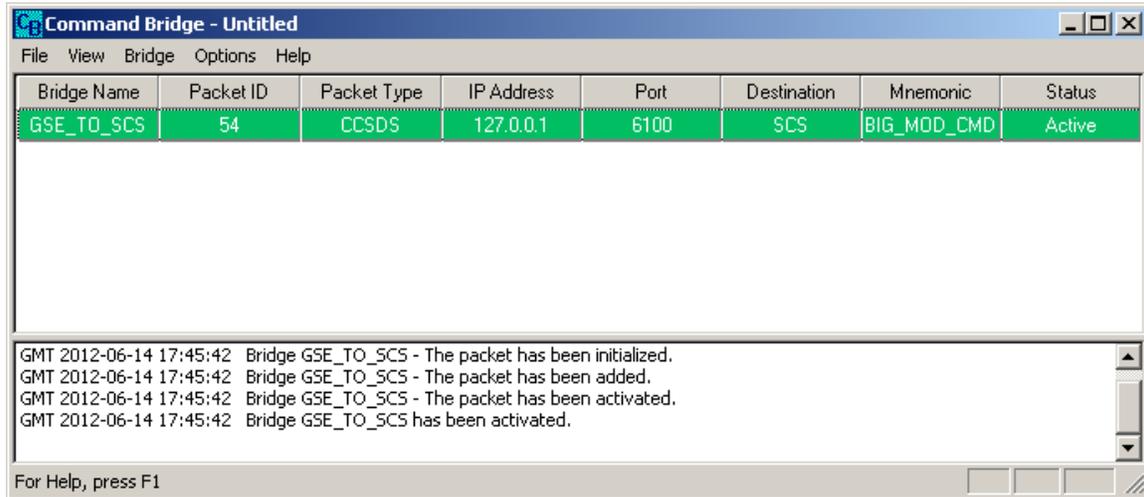


Figure 2 Command Bridge Main Window

There are eight pieces of information that are displayed for each bridge in the bridge list. The Bridge Name uniquely identifies the bridge. The Packet ID, Packet Type, IP Address, and Port identify properties associated with the data flowing into the TReK Telemetry Processing application. The Destination and Mnemonic identify properties associated with the command flow into the Command Processing application. The Status identifies the state of the bridge. This information provides an overview of the bridge's configuration.

When you add a bridge to the bridge list, the bridge row has a color associated with it. The color provides information about the bridge. For example, when using the default colors, if the bridge row is black, this indicates that the bridge has not been activated. If the bridge row is purple, this indicates that the bridge is initializing. If the bridge row is green, this indicates that the bridge is ready to perform the command data routing. The colors are helpful in providing immediate information about the general configuration and status of each bridge in the list.

5 Command Bridge Menus

The Command Bridge application contains five main menus: File, View, Bridge, Options, and Help. Each of these menus is described in more detail below.

5.1 File Menu

The File menu is used to create, open, and save command bridge configurations and to exit the Command Bridge application. A Command Bridge configuration is comprised of the bridges in the bridge list along with all the information associated with each bridge.

This includes the color preferences you set in the Set Color Preferences dialog. When you save a configuration, the Command Bridge application will default to the <base_path>\configuration_files\command_bridge directory.

If the operating system is installed in the default directory on the C drive then:

<base_path> = C:\Documents and Settings\<username>\Application Data\TReK

You can save your configuration files anywhere you like, but this default directory provides an easy way for you to keep up with your files.

Each of the items on the File menu is described below.

New

New provides a way to start a new configuration. When you start a new configuration any bridges in the list are deleted and all activities associated with those bridges are stopped. If there are unsaved bridges in the bridge list when New is selected, you will be given the option of saving the configuration before all the bridges are deleted from the bridge list. The New menu item will be insensitive when there are bridges in the bridge list which are initializing. As soon as the bridge(s) finish initializing the menu item will be available.

Open

Open provides a way to open a previously saved configuration. The Open menu item will be insensitive when there are bridges in the bridge list which are initializing. As soon as the bridge(s) finish initializing the menu item will be available.

Save

Save provides a way to save the current configuration. The Save menu item will be insensitive when there are bridges in the bridge list which are initializing. As soon as the bridge(s) finish initializing the menu item will be available.

Save As

Save As provides a way to save the current configuration with another name. The Save As menu item will be insensitive when there are bridges in the bridge list which are initializing. As soon as the bridge(s) finish initializing the menu item will be available.

Exit

Exit provides a way to exit the Command Bridge application. The Exit menu item will be insensitive when there are bridges in the bridge list which are initializing. As soon as the bridge(s) finish initializing the menu item will be available.

5.2 View Menu

The View menu is used to change attributes associated with the Command Bridge main window. There are three items on the View menu. Each is described below:

Status Bar

The Status Bar is located at the very bottom of the Command Bridge main window. The status bar is used to display messages and useful information to you without interrupting your work. The status bar has "panes," which include "indicators" and a "message line." The indicators provide the status of items such as SCROLL LOCK. The message line on the status bar can display information about program status or about a toolbar button or menu item that you are pointing to with the mouse. If you select the Status Bar item on the View menu, this will toggle the Status Bar on and off.

Set Color Preferences

The Set Color Preferences option brings up the Set Color Preferences dialog. This dialog can be used to turn off, turn on, or change the colors used in the Command Bridge main window.

Clear Message Area

As mentioned in section 4, the message area is located at the bottom of the Command Bridge main window. This is where important status and error messages will be displayed while you are working with the application. If you select the Clear Message Area item on the View menu, this will clear all the messages in the Message Area. Once they have been cleared, you cannot get them back.

5.3 Bridge Menu

The Bridge menu is the most frequently used menu in the Command Bridge application. It is used to add bridges to the bridge list in the main window, and to control all the activities associated with each bridge. Each of the items on the Bridge menu is described below.

Add Bridge

Add Bridge is used to add a bridge. When you select Add Bridge, a dialog box will be presented so that you can fill in the information needed to create the bridge.

Activate Bridge

Activate Bridge is used to tell Command Bridge to activate the bridge and prepare to evaluate incoming commands on the network. The Activate Bridge option is only available when you have a bridge selected that is not activated (i.e., Bridge Status is Inactive.)

Deactivate Bridge

Deactivate Bridge is used to shutdown the services associated with a particular bridge. When you select a bridge in the bridge list, and then select the Deactivate Bridge option, the bridge will be deactivated and the services associated with that particular bridge will be stopped. The Deactivate Bridge option is only available when you have an active bridge selected. If you want to delete the bridge from the list, use the Delete Bridge option.

Delete Bridge

Delete Bridge is used to shutdown and delete the selected bridge. When you select a bridge in the bridge list, and then select the Delete Bridge option, the bridge will be removed from the list and the services associated with that bridge will be stopped. The Delete Bridge option is only available when you have a bridge selected.

Show Bridge Properties

Show Bridge Properties is used to see a complete list of properties about a particular bridge. The bridge properties are defined when you add the bridge to the bridge list using the Add Bridge dialog.

5.4 Options Menu

The Options menu is used to access information about general command bridge attributes and specific bridge status information. Each of the items on the Options menu is described below.

Set Command Bridge Options

This item is used to set Command Bridge application options such as the default directory to be used for Command Bridge configuration files.

5.5 Help Menu

The Help menu is used to access on-line help for the Command Bridge application. Each of the items on the Help menu is described below.

Help Topics

Used to access the typical Windows Contents and Index on-line help window.

About Command Bridge

Used to view the About Command Bridge dialog.

5.6 Bridge List Pop-Up Menu

The Bridge List pop-up menu can be accessed by clicking the right mouse button in the bridge list area of the main window. If you right click in the bridge list area of the window, but you do not click on a bridge in the list, many of the menu items will be insensitive. This is because many of the menu items are only applicable when a bridge is selected. If you right click on a bridge in the bridge list all the menu items which are applicable to that particular bridge at that moment in time will be sensitive. The Bridge List Pop-Up menu is identical to the Bridge menu on the menu bar.

5.7 Windows Edit Pop-Up Menu

The standard Windows Edit Pop-Up Menu can be accessed whenever your cursor is located inside an edit field inside the Command Bridge application. This menu contains the standard edit commands such as Cut, Copy, and Paste.

6 Command Bridge Dialog Boxes

This section describes all the dialog boxes in the Command Bridge application. For an example of how some of these dialogs are used while working with the Command Bridge application please see the TReK Command Bridge Tutorial (TREK-USER-043).

6.1 Set Color Preferences Dialog

The Set Color Preferences dialog is shown in Figure 3 below. It is used to control the color feature associated with the Command Bridge main window bridge list. The color of a bridge in the bridge list indicates the bridge's status. The color feature can be turned off. If it is off, the bridges in the bridge list will always be black. If the color feature is on, the bridges in the bridge list will turn a specific color based on the bridge status and the colors assigned in the Set Color Preferences dialog.

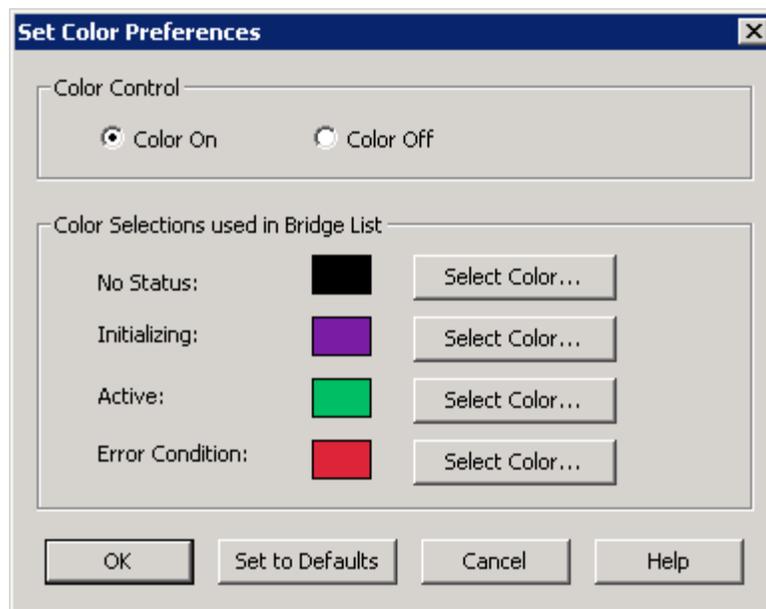


Figure 3 Set Color Preferences Dialog

Each field and control on the Set Color Preferences dialog is described below.

Color On

Turns the color feature on.

Color Off

Turns the color feature off.

No Status Color

The color assigned when the status of the bridge is “Inactive”. “Inactive” indicates that there is no information available about the bridge. This will be the case when the bridge has been added to the bridge list but it has not been activated. In this situation, the Command Bridge has not been told to do anything about the bridge and therefore has no status information about the bridge. (Default Color: Black)

Initializing Color

The color assigned when the status of the bridge is “Initializing”. This status will occur when the bridge is in the process of activating. (Default Color: Purple)

Active Color

The color assigned when the status of the bridge is “Active” or ready to accept connections. This status will occur when the bridge has been activated. (Default Color: Green)

Error Condition Color

The color assigned to a bridge when an unknown error occurs. (Default Color: Red)

Buttons

Select Color

The Select Color button is used to access the standard Windows Color dialog in order to change the assigned color.

Set to Defaults

The Set to Defaults button will reset all the fields and controls in the Set Color Preferences dialog box to the original values that were in place when the TReK software was installed.

6.2 Add Bridge Dialog

The Add Bridge dialog is used to add a bridge to the bridge list in the main window. The Add Bridge dialog is shown in Figure 4.

Figure 4 Add Bridge Dialog

Each field on the Add Bridge dialog is described below.

Bridge Name (Required Field)

This field is used to name the bridge.

Telemetry Database (Required Field)

This field is used to identify a TReK Telemetry Database. This database will be used by the TReK Telemetry Processing application to identify the incoming command data by using the APID in the packet. This field should contain a full path to a valid TReK telemetry database that contains a valid CCSDS packet. You can use the Browse button to select a database.

Packet ID (APID) (Required Field)

The APID should be a CCSDS or UFO packet identifier from the specified Telemetry Database. The telemetry database delivered with TReK contains a CCSDS packet with an APID value of 54 and a UFO packet with an APID value of 51.

Packet Type (Required Field)

The Packet Type should be CCSDS or UFO.

IP Address (Required Field)

This field is used to identify the IP address that should be used by the Telemetry Processing application to receive the commands. This field should default to a valid IP address for the computer. If more than one IP address exists, you may need to change this field.

Port (Required Field)

This field is used to identify the port that should be used by the Telemetry Processing application to receive the commands.

Destination (Required Field)

This field is used to identify the name of the destination in the TReK Command Processing application. It must be an exact match of the name of the destination in the command processing application. You will need to add and activate this destination in the Command Processing application before the Command Bridge can successfully route the commands.

Mnemonic (Required Field)

This field is used to identify the mnemonic that should be used when routing the commands. The command database delivered with TReK contains a default mnemonic named BIG_MOD_CMD.

6.3 Browse for IP Address Dialog

The Browse For IP Address dialog is shown in Figure 5. This dialog is used to search a TReK system for all IP addresses or network cards associated with the system.

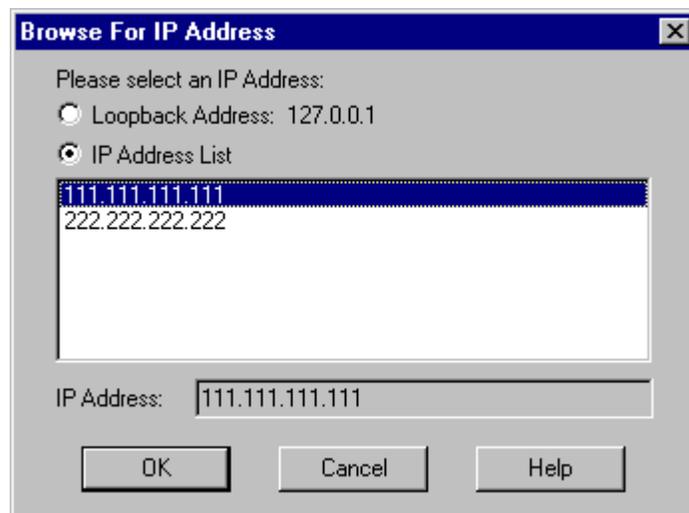


Figure 5 Browse For IP Address Dialog

Each field in the Browse For IP Address dialog is described below.

Please select an IP Address: (Required Field)

You have two options when choosing an IP address. If your TReK system does not have network connectivity (such as no ethernet card or modem or the system is not connected to a network), you need to use the standard loopback address (127.0.0.1). This option is provided by choosing the “*Loopback Address: 127.0.0.1*” radio button. Users with one or more network cards will need to choose which network card or IP Address they would like to use. Choosing the “*IP Address List*” radio button provides this option. The user must then select an IP address from the list.

IP Address

The IP Address field is filled in when you select the Loopback IP address or an IP Address in the list. The IP Address will be copied to the dialog box that contained the button you used to bring up the Browse For IP Address dialog.

6.4 Bridge Properties Dialog

The Bridge Properties dialog is used to view and modify bridge properties. The bridge properties are defined when you add the bridge to the bridge list using the Add Bridge dialog. The Show Bridge Properties dialog is identical to the Add Bridge dialog. If the bridge is active, some of the fields will be insensitive because they cannot be modified.

Bridge Properties for Bridge GSE_TO_SCS

General

Bridge Name:

Bridge From (Command Data flowing into TReK Telemetry Processing)

Telemetry Database: ...

Packet ID (APID):

Packet Type:

IP Address: Browse...

Port:

Bridge To (TReK Command Processing)

Destination:

Mnemonic:

OK Cancel Help

Figure 6 Bridge Properties Dialog

6.5 Set Command Bridge Options Dialog

The Set Command Bridge Options dialog is shown in Figure 7. This dialog provides a way to set application defaults. For example, you can set the default directory for command bridge configuration files.

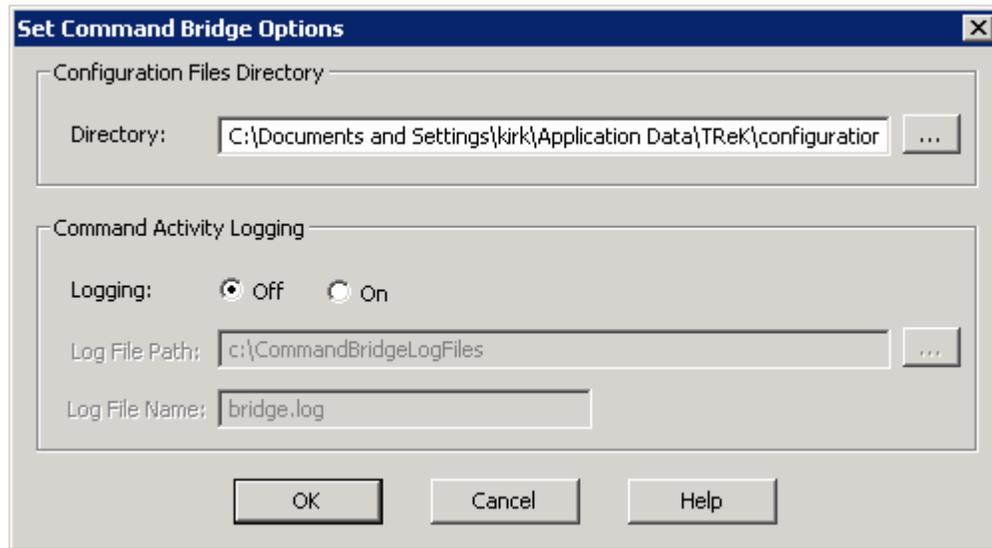


Figure 7 Set Command Bridge Options Dialog

Each field in the Set Command Bridge Options dialog is described below.

Directory

This property provides a way to set a user-specified default directory for command bridge configuration files. You can leave this field blank. If you leave it blank, TReK will use the following directory:

```
<base_path>\configuration_files\command_bridge
```

The <base_path> on a Windows XP computer is shown below.

```
<base_path> = C:\Documents and Settings\<username>\Application Data\TReK
```

Logging (Required Field)

This field is used to turn logging on or off. If logging is turned on, the time and hex pattern of each command routed is written to the file.

Log File Path (Required Field if Logging is On)

This field is used to identify the path of the log file.

Log File Name (Required Field if Logging is On)

This field is used to identify the name of the log file.

6.6 Deactivate Bridge Warning Message Dialog

The Deactivate Bridge Warning message dialog will appear if you attempt to deactivate a bridge from the bridge list in the main window. If you are sure you want to proceed answer Yes. If you do not want to proceed answer No and no action will be taken.

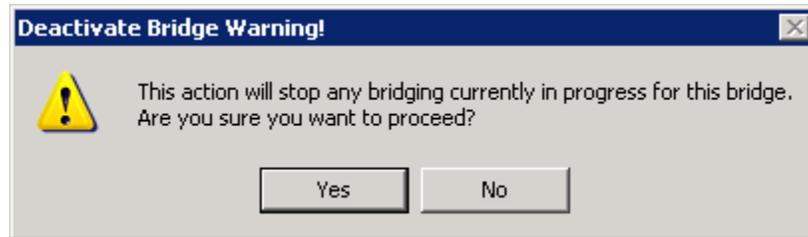


Figure 8 Deactivate Bridge Warning Message Dialog

6.7 Delete Bridge Warning Message Dialog

The Delete Bridge Warning message dialog will appear if you attempt to delete a bridge from the bridge list in the main window. If you are sure you want to proceed answer Yes. If you do not want to proceed answer No and no action will be taken.

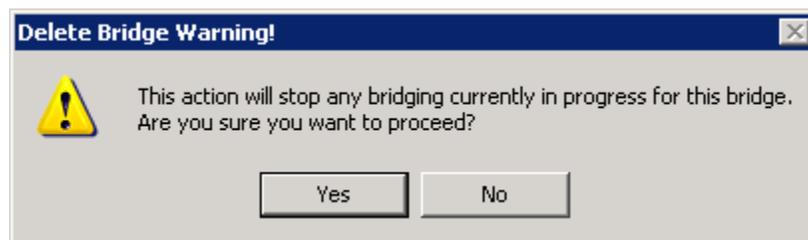


Figure 9 Delete Bridge Warning Message Dialog

6.8 Close Configuration Warning Message Dialog

The Close Configuration Warning message dialog will appear if you attempt to perform a New or Open and there are bridges in the bridge list. If you are sure you want to proceed answer Yes. If you do not want to proceed answer No and no action will be taken.

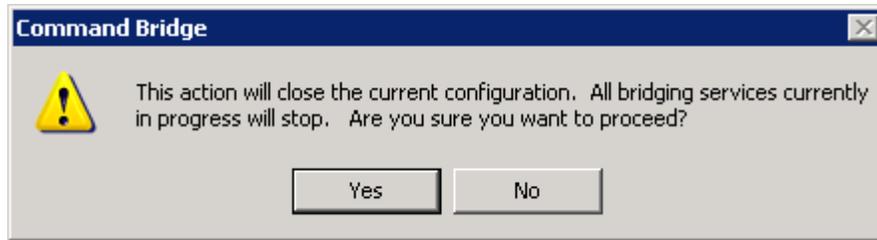


Figure 10 Close Configuration Warning Message Dialog

6.9 Save Changes Message Dialog

The Save Changes message dialog will be displayed when you close the current configuration by selecting New, Open, or Exit. The Save Changes message dialog provides a way to save the current configuration before closing it.

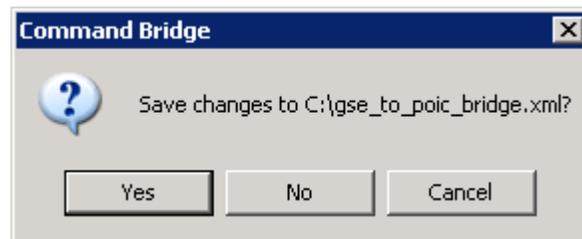


Figure 11 Save Changes Message Dialog

6.10 Exit Confirmation Message Dialog

The Exit Confirmation message dialog is displayed to help you avoid exiting the Command Bridge application by accident. It will be displayed only if you exit the application with the current configuration unchanged. If the configuration has changed, you will be prompted with the Save Changes dialog instead of the Exit Confirmation dialog. If you are prompted with the Exit Confirmation dialog and you are sure you want to exit, answer Yes. If you do not want to exit the application, answer No and the application will not proceed with the exit.

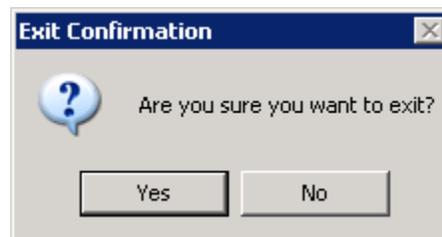


Figure 12 Exit Confirmation Message Dialog

7 Special Topics

There are no special topics at this time.

Appendix A Glossary

Note: This Glossary is global to all TReK documentation. All entries listed may not be referenced within this document.

Application Programming Interface (API)	A set of functions used by an application program to provide access to a system's capabilities.
Application Process Identifier (APID)	An 11-bit field in the CCSDS primary packet header that identifies the source-destination pair for ISS packets. The type bit in the primary header tells you whether the APID is a payload or system source-destination.
Calibration	The transformation of a parameter to a desired physical unit or text state code.
Communications Outage Recorder	System that captures and stores payload science, health and status, and ancillary data during TDRSS zone of exclusion.
Consultative Committee for Space Data Systems (CCSDS) format	Data formatted in accordance with recommendations or standards of the CCSDS.
Consultative Committee for Space Data Systems (CCSDS) packet	A source packet comprised of a 6-octet CCSDS defined primary header followed by an optional secondary header and source data, which together may not exceed 65535 octets.
Conversion	Transformation of downlinked spacecraft data types to ground system platform data types.
Custom Data Packet	A packet containing a subset of parameters that can be selected by the user at the time of request.
Cyclic Display Update Mode	A continuous update of parameters for a particular display.
Decommutation (Decom)	Extraction of a parameter from telemetry.
Discrete Values	Telemetry values that have states (e.g., on or off).

Dump	During periods when communications with the spacecraft are unavailable, data is recorded onboard and played back during the next period when communications resume. This data, as it is being recorded onboard, is encoded with an onboard embedded time and is referred to as dump data.
Enhanced HOSC System (EHS)	Upgraded support capabilities of the HOSC systems to provide multi-functional support for multiple projects. It incorporates all systems required to perform data acquisition and distribution, telemetry processing, command services, database services, mission support services, and system monitor and control services.
Exception Monitoring	A background process capable of continuously monitoring selected parameters for Limit or Expected State violations. Violation notification is provided through a text message.
Expected State Sensing	Process of detecting a text state code generator in an off-nominal state.
EXPRESS	An EXPRESS Rack is a standardized payload rack system that transports, stores and supports experiments aboard the International Space Station. EXPRESS stands for EXpedite the PRocessing of Experiments to the Space Station.
File transfer protocol (ftp)	Protocol to deliver file-structured information from one host to another.
Flight ancillary data	A set of selected core system data and payload health and status data collected by the USOS Payload MDM, used by experimenters to interpret payload experiment results.

Grayed out	Refers to a menu item that has been made insensitive, which is visually shown by making the menu text gray rather than black. Items that are grayed out are not currently available.
Greenwich Mean Time (GMT)	The solar time for the meridian passing through Greenwich, England. It is used as a basis for calculating time throughout most of the world.
Ground ancillary data	A set of selected core system data and payload health and status data collected by the POIC, which is used by experimenters to interpret payload experiment results. Ground Ancillary Data can also contain computed parameters (pseudos).
Ground receipt time	Time of packet origination. The time from the IRIG-B time signal received.
Ground Support Equipment (GSE)	GSE refers to equipment that is brought in by the user (i.e. equipment that is not provided by the POIC).
Ground Support Equipment Packet	A CCSDS Packet that contains data extracted from any of the data processed by the Supporting Facility and the format of the packet is defined in the Supporting Facility's telemetry database.
Huntsville Operations Support Center (HOSC)	A facility located at the Marshall Space Flight Center (MSFC) that provides scientists and engineers the tools necessary for monitoring, commanding, and controlling various elements of space vehicle, payload, and science experiments. Support consists of real-time operations planning and analysis, inter- and intra-center ground operations coordination, facility and data system resource planning and scheduling, data systems monitor and control operations, and data flow coordination.

IMAQ ASCII	A packet type that was added to TReK to support a very specific application related to NASA's Return to Flight activities. It is not applicable to ISS. It is used to interface with an infrared camera that communicates via ASCII data.
Limit Sensing	Process of detecting caution and warning conditions for a parameter with a numerical value.
Line Outage Recorder Playback	A capability provided by White Sands Complex (WSC) to play back tapes generated at WSC during ground system communication outages.
Measurement Stimulus Identifier (MSID)	Equivalent to a parameter.
Monitoring	A parameter value is checked for sensing violations. A message is generated if the value is out of limits or out of an expected state.
Parameter	TReK uses the generic term parameter to mean any piece of data within a packet. Sometimes called a measurement or MSID in POIC terminology.
Payload Data Library (PDL)	An application that provides the interface for the user to specify which capabilities and requirements are needed to command and control his payload.
Payload Data Services Systems (PDSS)	The data distribution system for ISS. Able to route data based upon user to any of a number of destinations.
Payload Health and Status Data	Information originating at a payload that reveals the payload's operational condition, resource usage, and its safety/anomaly conditions that could result in damage to the payload, its environment or the crew.
Payload Operations Integration Center (POIC)	Manages the execution of on-orbit ISS payloads and payload support systems in coordination/unison with distributed International Partner Payload Control Centers, Telescience Support Centers (TSC's) and payload-unique remote facilities.

Payload Rack Checkout Unit (PRCU)	The Payload Rack Checkout Unit is used to verify payload to International Space Station interfaces for U.S. Payloads.
Playback	Data retrieved from some recording medium and transmitted to one or more users.
Pseudo Telemetry (pseudo data)	Values that are created from calculations instead of directly transported telemetry data. This pseudo data can be created from computations or scripts and can be displayed on the local PC.
Remotely Generated Command	A command sent by a remote user whose content is in a raw bit pattern format. The commands differ from predefined or modifiable commands in that the content is not stored in the POIC Project Command Database (PCDB).
Science data	Sensor or computational data generated by payloads for the purpose of conducting scientific experiments.
Subset	A collection of parameters from the total parameter set that is bounded as an integer number of octets but does not constitute the packet itself. A mini-packet.
Super sampled	A parameter is super sampled if it occurs more than once in a packet.
Swap Type	A flag in the Parameter Table of the TReK database that indicates if the specified datatype is byte swapped (B), word swapped (W), byte and word swapped (X), byte reversal (R), word reversal (V) or has no swapping (N).
Switching	A parameter's value can be used to switch between different calibration and sensing sets. There are two types of switching on TReK: range and state code.

Transmission Control Protocol (TCP)	TCP is a connection-oriented protocol that guarantees delivery of data.
Transmission Control Protocol (TCP) Client	A TCP Client initiates the TCP connection to connect to the other party.
Transmission Control Protocol (TCP) Server	A TCP Server waits for (and accepts connections from) the other party.
Telemetry	Transmission of data collected from a source in space to a ground support facility. Telemetry is downlink only.
Telescience Support Center (TSC)	A TSC is a NASA funded facility that provides the capability to plan and operate on-orbit facility class payloads and experiments, other payloads and experiments, and instruments.
User Application	Any end-user developed software program that uses the TREK Application Programming Interface software. Used synonymously with User Product.
User Data Summary Message (UDSM)	Packet type sent by PDSS that contains information on the number of packets sent during a given time frame for a PDSS Payload packet. For details on UDSM packets, see the POIC to Generic User IDD (SSP-50305).
Uplink format	The bit pattern of the command or file uplinked.
User Datagram Protocol (UDP)	UDP is a connection-less oriented protocol that does not guarantee delivery of data. In the TCP/IP protocol suite, the UDP provides the primary mechanism that application programs use to send datagrams to other application programs. In addition to the data sent, each UDP message contains both a destination port number and a fully qualified source and destination addresses making it possible for the UDP software on the destination to deliver the message to the correct recipient process and for the recipient process to send a reply.

User Product	Any end-user developed software program that uses the TReK Application Programming Interface software. Used synonymously with User Application.
Web	Term used to indicate access via HTTP protocol; also referred to as the World Wide Web (WWW).

Appendix B Acronyms

Note: This acronym list is global to all TReK documentation. Some acronyms listed may not be referenced within this document.

AOS	Acquisition of Signal
API	Application Programming Interface
APID	Application Process Identifier
ASCII	American Standard Code for Information Interchange
CAR	Command Acceptance Response
CAR1	First Command Acceptance Response
CAR2	Second Command Acceptance Response
CCSDS	Consultative Committee for Space Data Systems
CDB	Command Database
CDP	Custom Data Packet
COR	Communication Outage Recorder
COTS	Commercial-off-the-shelf
CRR	Command Reaction Response
DSM	Data Storage Manager
EHS	Enhanced Huntsville Operations Support Center (HOSC)
ERIS	EHS Remote Interface System
ERR	EHS Receipt Response
EXPRESS	Expediting the Process of Experiments to the Space Station
ES	Expected State
FAQ	Frequently Asked Question
FDP	Functionally Distributed Processor
FSV	Flight System Verifier
FSV1	First Flight System Verifier
FSV2	Second Flight System Verifier
FPD	Flight Projects Directorate
FTP	File Transfer Protocol
GMT	Greenwich Mean Time
GRT	Ground Receipt Time
GSE	Ground Support Equipment
HOSC	Huntsville Operations Support Center
ICD	Interface Control Document
IMAQ ASCII	Image Acquisition ASCII
IP	Internet Protocol
ISS	International Space Station
LDP	Logical Data Path
LES	Limit/Expected State
LOR	Line Outage Recorder
LOS	Loss of Signal
MCC-H	Mission Control Center – Houston
MOP	Mission, Operational Support Mode, and Project
MSFC	Marshall Space Flight Center
MSID	Measurement Stimulus Identifier

NASA	National Aeronautics and Space Administration
OCDB	Operational Command Database
OS	Operating System
PC	Personal Computer, also Polynomial Coefficient
PCDB	POIC Project Command Database
PDL	Payload Data Library
PDSS	Payload Data Services System
PGUIDD	POIC to Generic User Interface Definition Document
POIC	Payload Operations Integration Center
PP	Point Pair
PRCU	Payload Rack Checkout Unit
PSIV	Payload Software Integration and Verification
RPSM	Retrieval Processing Summary Message
SC	State Code
SCS	Suitcase Simulator
SSP	Space Station Program
SSCC	Space Station Control Center
SSPF	Space Station Processing Facility
TCP	Transmission Control Protocol
TReK	Telescience Resource Kit
TRR	TReK Receipt Response
TSC	Telescience Support Center
UDP	User Datagram Protocol
UDSM	User Data Summary Message
URL	Uniform Resource Locator
USOS	United States On-Orbit Segment
VCDU	Virtual Channel Data Unit
VCR	Video Cassette Recorder
VPN	Virtual Private Network