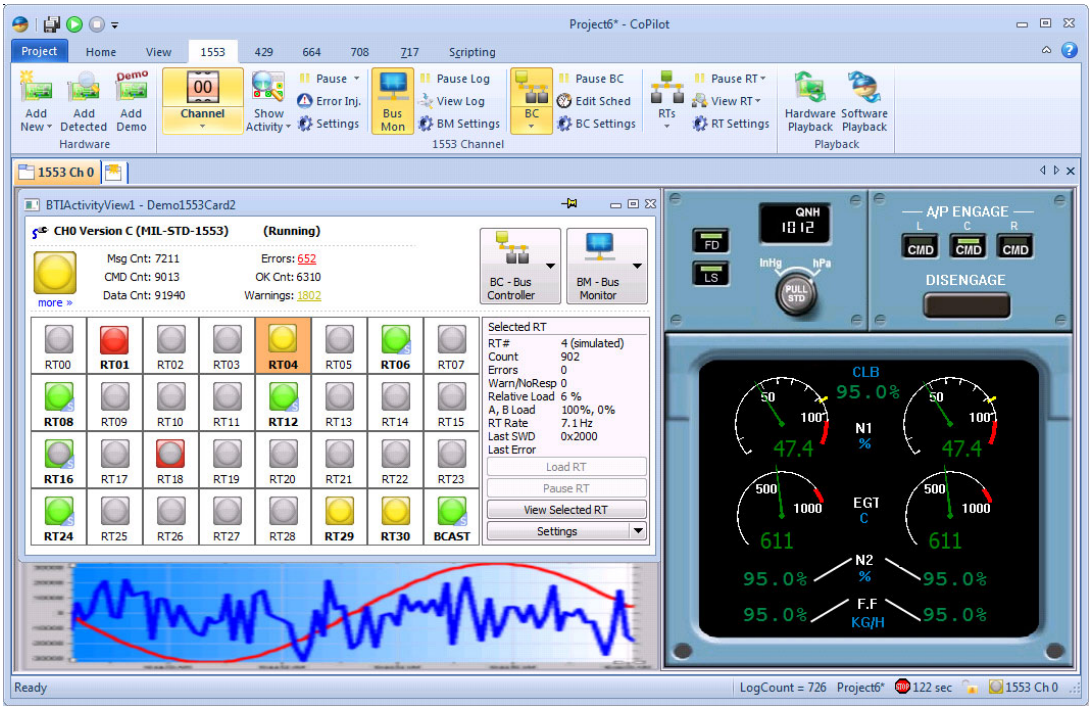
Getting Started Guide to

CoPilot

Version 6
Rev B



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Introduction

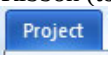
Overview

CoPilot is a powerful software tool that allows easy interaction with live avionics databuses (or previously recorded avionics data) for purposes such as verifying, troubleshooting, testing, or developing avionics systems and equipment. The intuitive program includes the capability to monitor, record, replay, analyze, or simulate databus activity. CoPilot is the perfect complement to Ballard's comprehensive line of hardware interface products that enable physical connection to avionics databuses including MIL-STD-1553, ARINC 429, ARINC 664/AFDX, ARINC 708 and various other databuses.

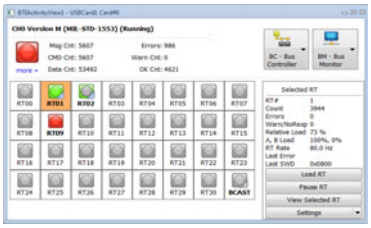
CoPilot simplifies data analysis and generation with a variety of features, including: engineering unit conversion, data and performance monitoring and logging, graphical displays, and hardware and software playback. Using the auto-detection features and the intuitive and interactive graphical interface, users can quickly and easily analyze databus activity, view and interact with data, and optimize CoPilot for each application. All configurations and data can be saved for later reuse or analysis by CoPilot and other applications.

New in CoPilot 6

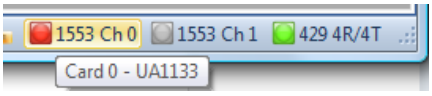
CoPilot 6 is the culmination of feedback and experience from hundreds of customers looking for a simpler user experience for both the casual and experienced user. CoPilot 6 retains the features of CoPilot 5 but adds improvements in the User Interface (UI), protocol analysis, start-up experience, and ease-of-use. The following are a few of the things to look for in CoPilot 6:

- New Ribbon (toolbar) interface
- New 

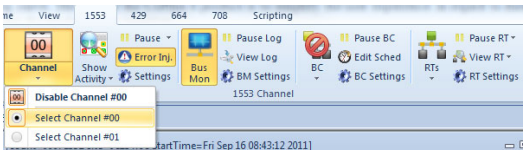
tab on the ribbon shows the Backstage – an improvement to the CoPilot 5 Start Page with additional project management commands, tools and much more
- Protocol Analysis – new displays easily show bus activity with the ability to drill into details and view status



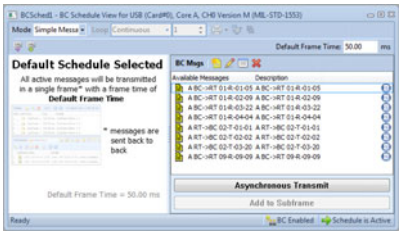
- Increased use of status indicators (including clickable status bar bus overview icons and 'Global Control')



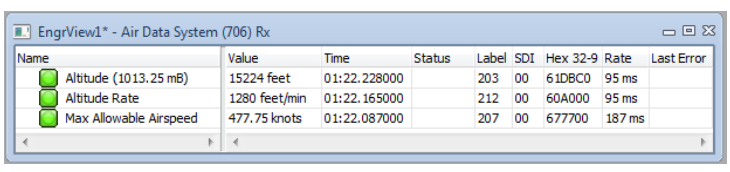
- Automatic creation and organization of buses into individual named workspaces with displays to show activity
- New 1553 Message View
- Quick links on the system menu  to save, start, and stop.
- Easy to use protocol toolbars operate on the selected channel and provide both state information and control of common functions



- Improved 1553 Schedule display with integrated message list



- New 429 Label View auto-updates as labels are added and removed from the channel



Key Features

CoPilot is a powerful and comprehensive tool for engineers, developers, maintenance personnel, and others involved with avionics systems and equipment. The following are just a few of the beneficial features of the software.

Auto Discovery of Hardware and Bus Activity

Complicated project setup and configuration are a thing of the past. Each time you start CoPilot, it searches your computer for all connected databus hardware and immediately starts showing databus activity on screen. You are up and running in seconds.

Simultaneous Operation of Multiple Databus Protocols

Whether your project is large or small, simple or complex, CoPilot has you covered. It simultaneously supports MIL-STD-1553, ARINC 429, ARINC 664/AFDX and ARINC 708 databuses as well as other protocols like serial links and Discrete I/O.

Flexible Data Representation

CoPilot provides multiple ways to view databus activity so you can choose the one most effective for the task at hand: Activity View to see bus topology, graphical controls to observe data in real time, strip charts to see how data is changing, tables to examine raw data, and more – the choice is yours.

View and Manipulate Data in Engineering Units

Data analysis is more productive when you can see all the details: feet, knots, degrees, etc. That's why CoPilot translates raw data into clearly understood engineering units using its comprehensive library of industry definitions. You can easily supplement this database with your own definitions and apply to other projects or share with other users.

Automated Test Environment (ATE)

CoPilot is an invaluable tool for production environments as well. The built-in Test Manager delivers a complete solution for test development and test management. Extensive scripting capability and OLE automation provide full control over automated testing and full integration with associated hardware and software components.

Powerful Scripting Environment

Expand and customize CoPilot features and functions to perfectly meet the needs of your project using the comprehensive built-in script development environment. Integrated Python programming and debugging tools include watch window, object browser, command prompt, and break points with single step operation.

Comprehensive Program Security

Global security settings within CoPilot allow you to lock down and password-protect a variety of program features, creating a secure runtime environment. With this "Read Only Mode", you can allow or restrict user access to configuration settings, data editing, display views, screen layout, test management, proprietary Python code and more.

Sophisticated Graphical Displays

CoPilot graphical displays and virtual instruments provide highly effective ways to view and modify avionics data. From functional radar displays, moving maps or strip charts, to complex reproductions of hardware control panels, CoPilot offers nearly limitless capability to create the working environment you need.

Hardware and Software Playback

With CoPilot, you have the option to playback previously recorded databus activity in two ways: through the interface hardware right onto the databus in order to test or interact with real equipment; or completely within the software to repeatedly examine data at a readable speed using all of the available displays, graphics, and tools.

Error Injection

CoPilot has the unique ability to inject deliberate and controllable errors onto the databus. These non-standard scenarios, which might include logical, electrical, or parity issues, are useful to determine precisely how systems respond under such circumstances.

Learn and Work with Demonstration Interfaces

When using CoPilot, you have the option of activating demonstration interfaces (demo cards). This software feature mimics databus interface hardware as if it were attached to the computer. The simulated live data this provides is very useful for learning CoPilot or prototyping new solutions.

And So Much More!

CoPilot is the most comprehensive databus simulation and analysis software on the market today. Its features and capabilities are just too numerous to list here. The best way to discover the power of CoPilot is to try it for yourself.

About This Guide

This *Getting Started Guide* is an overview designed to help you quickly learn the basics of operating the CoPilot graphical user interface software and highlights some of the key differences between CoPilot Version 6 and Version 5.

Note: This guide assumes the reader is familiar with the specification/protocol they are intending to use with CoPilot. This document is not a protocol tutorial.

Evaluating the Software

Software Licensing that Makes Sense

The CoPilot license was designed to be simple. There are no dongles to lose or expensive site licenses to manage, just a simple software key embedded in the Ballard databus interface hardware. You can freely install CoPilot on as many computers as you need for pre-run setup, scripting, or post analysis. When you need to access the live databus, just connect any of these computers to the licensed hardware.

Evaluation Hardware

CoPilot operates licensed hardware and software-based demonstration chards. If your hardware was not purchased with a CoPilot key (license), contact Ballard Technology to obtain a temporary license to use the software with actual hardware.

Demonstration Cards

As mentioned above, CoPilot includes demonstration (Demo) cards that allow you virtually analyze databuses. This allows you to “try out” the features and capabilities of CoPilot without the need for a keyed Ballard hardware or access to an active databuses. The 1553 Demo card emulates a 1553 Level C device and includes multi-terminal simulation, along with concurrent monitoring. The 429 Demo card emulates an 8 channel (4 receive and 4 transmit) ARINC 429 device. The 664/AFDX Demo card emulates a single-redundant (or dual-independent) ARINC 664/AFDX device. Some features aren’t available on demonstration cards.

Before You Begin

Install and Open CoPilot

To install CoPilot, insert the CoPilot CD into your drive. A menu screen will automatically open. Click the **Install CoPilot** link and follow the directions. If the menu screen does not automatically launch, run the **INSTALL.EXE** program in the INSTALL folder on the CoPilot CD.

If you already have a version of CoPilot installed on your machine, the old version of CoPilot (version 5 or earlier) can remain on your computer and the new CoPilot version 6 can be installed alongside this prior version. If necessary, the CoPilot 6 installation will update Copilot 5 to the latest 5.x version for side-by-side compatibility with CoPilot 6.

Note that files and projects saved in CoPilot version 6 will not be able to be opened by previous versions of CoPilot. However, projects saved in CoPilot version 5 can be opened in CoPilot version 6. Be sure to save a copy of the files you still intend to open with the previous version.

After installation is complete, open CoPilot from the Start | Programs menu or by double clicking the CoPilot  icon on your desktop.

Other Resources

This guide is not an exhaustive description of all the features of CoPilot. You are encouraged to refer to other resources for more detailed information. These include:

- The CoPilot User's Manual (on the CoPilot CD)
- Samples and Templates available from the Backstage
- The example projects and scripts (on the CoPilot CD)
- The learning video library at www.ballardtech.com/copilot (and on the CoPilot CD in the MEDIA directory)

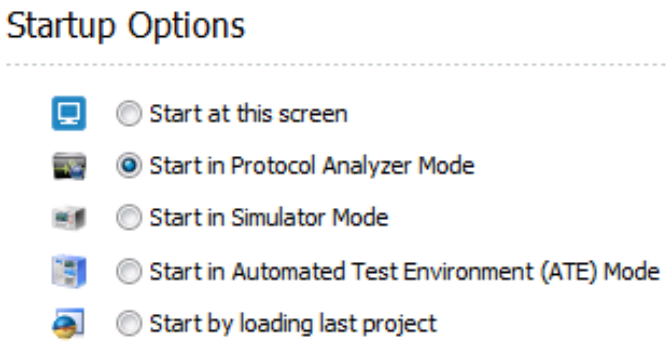
CoPilot Basics

Start-up Modes

The default CoPilot start-up mode is to begin in Protocol Analyzer mode. The Protocol Analyzer mode automatically detects keyed Ballard hardware then begins monitoring databus activity. The start-up options on the Quick Start tab on the Backstage (

tab on Ribbon) include the following:

- **Start at this screen** – the Backstage screen is shown when CoPilot is started.
- **Start in Protocol Analyzer Mode** – automatically detects keyed Ballard hardware then begins monitoring databus activity.
- **Start in Simulator Mode** – automatically detects keyed Ballard hardware and allows the user to make additional configuration changes before CoPilot is run.
- **Start in Automated Test Environment (ATE) Mode** – automatically detects keyed Ballard hardware and shows various ATE/test scripting displays.
- **Start by loading last project** – loads the most recently used project.

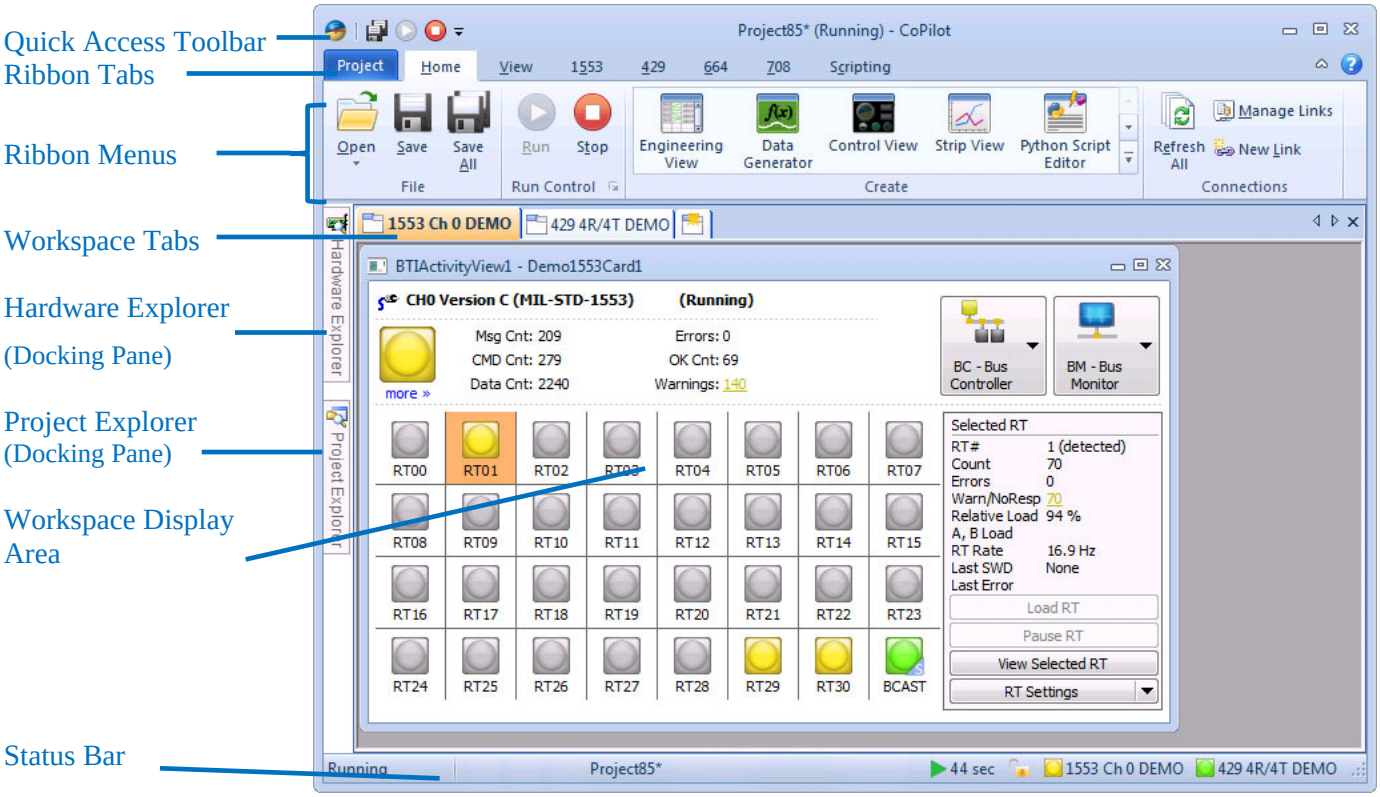


The CoPilot Environment

The CoPilot environment consists of an integrated set of windows, ribbon tabs, toolbars, panes, workspaces, and other elements that allow you to create, edit, organize, and run a CoPilot project. Refer to the following image that shows the features described in this section.

The quick access toolbar contains controls to save the current project, start and stop CoPilot. The Ribbon tabs group CoPilot commands into Ribbon Menus. When commands are not available, for example, pressing the run button while CoPilot is already running, the command button is disabled. Moving the mouse over a command in the Ribbon without clicking the mouse will display a tool tip with additional information.

Workspaces are used to group and sort display view windows in the display area as shown by the '1553 Ch 0 DEMO' and '429 4R/4T DEMO' in the sample image below. CoPilot automatically creates additional workspaces when hardware is added to a project. Various types of view windows, such as an Engineering View or Data Generator, are hosted in the Workspace Display area. Activity Views are used to both show the bus activity and to configure the hardware. Alternately, the Hardware Explorer pane may be used to configure the hardware. For more advanced users, the Project Explorer tree pane manages the component files (hardware devices and view windows) that are part of the project. The Project Explorer pane and all other panes are dockable windows used for display and configuration that may be moved around, pinned to the side of a window (as shown in the image below), or undocked from the CoPilot application to change the display layout (see the CoPilot User's Manual for additional information).



The CoPilot desktop environment

The status bar along the bottom of the CoPilot desktop displays status information, project information, run time state and duration, and current bus activity status. Clicking a status icon switches the workspace to view that activity.

CoPilot Principles of Operation

There are certain consistent principles used throughout the CoPilot environment. Understanding these principles will aid you in using CoPilot effectively.

Users interact with CoPilot through a project. The project records user actions and can be saved, closed, and reopened. Only one project at a time may be open in the CoPilot environment.

Project Files

The project is saved as several files stored within a single project folder (see figure below). This allows device and view files to be shared between projects.

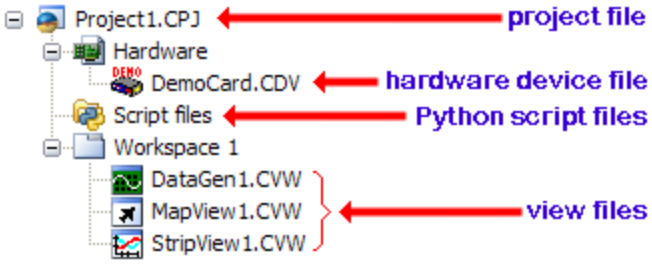
Saving Your Work

Changes to CoPilot are saved in a project. These changes include hardware configuration, views, recorded data, view layout, and scripts. Saved projects can be closed and reopened. Internally, the project is saved as several files stored within a single project folder (see figure below). This allows device and view files to be copied and move between projects. Save the current project using the **Save Project** button from the Ribbon or the Save Project button on the "Project"Backstage. You will be prompted to confirm the addition of new components or when overwriting of saved components.

Some of the different file types include the following types:

- A single **Project file (.CPJ)** organizes the project components and records project settings
- **Device files (.CDV)** are created for each Ballard hardware interface card (or demo card)
- Optional **View files (.CVW)** are created for each view window

- Optional **Python script files (.PY)** contain Python script code to perform the specified operations and extend the functionality of CoPilot



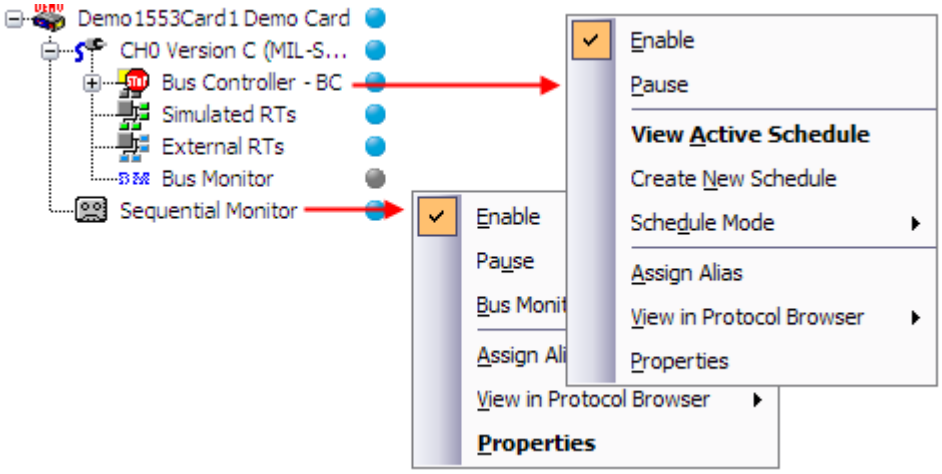
Running a Project

CoPilot supports two basic operational modes: Edit mode and Running mode. When a CoPilot project is activated through the Run button, the hardware configuration defined in the Hardware Explorer pane and topology screens are loaded onto the Ballard hardware and CoPilot displays are activated. CoPilot reverts to Edit mode when the Stop button is pressed.

- **Edit Mode—**This mode is the default state for CoPilot during which most data initialization, configurations, and other settings are specified. No interaction with the databus or Ballard hardware takes place in Edit mode.
- **Running Mode—**When Running mode is initiated through the Run button, active objects (configured in Edit mode) are transferred to the Ballard avionics hardware. CoPilot actively transmits or receives on the databus and all displays, controls, and windows are animated during the simulation. While the project is running, you can modify data, pause and restart channels, add and delete items from view windows, add new views, remove existing views, and perform many other operations.

Context Menus

You can interact with objects in the various docking panes and view windows in the workspace display area using context menus, or "shortcut menus." Right click on items to access their context menu (see following figure).



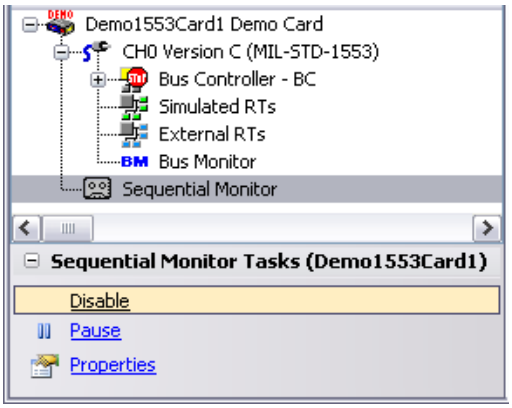
Context Menus are shown from a Right Mouse Click

Default Commands

The default command in each context menu is bolded (see figure on previous page). Simply double-clicking the item (without opening the context menu) will perform the bold entry from the context menu. The default commands for many items may change between simulation (running) and design (not running) to reflect the commands most likely to be used.

Hardware Explorer Tasks

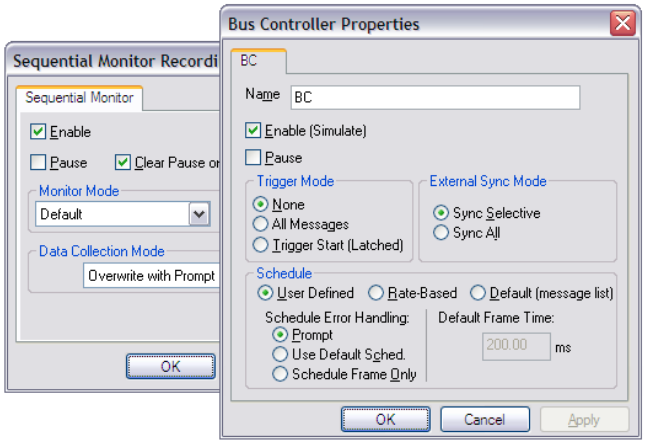
Selecting an item in the Hardware Explorer shows a list of available “quick tasks” for that item. These tasks lists contain the actions most commonly performed on that item. However, if more than one item is selected, then the task list will reflect those common tasks that can be performed by all the selected objects. The <Shift> and <Ctrl> keys are used for multi-selecting items in the Hardware Explorer. Objects can be deleted with the <Delete> key.



Hardware Explorer Task for a Sequential Monitor Object

Modifying Settings with Property Pages

Objects can be configured and customized through property page dialogs. The figure below shows a few property page examples. Property pages often have multiple tabs used to logically group the properties. The property pages of an object are accessed from the “Settings” command in the ribbon and Activity Views or from the object’s context menu.



Examples of Property Pages

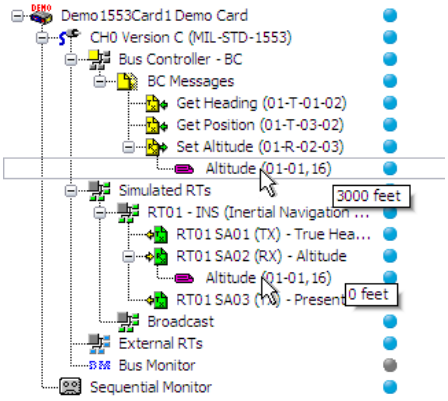
Drag and Drop

The “drag and drop” procedure is used throughout CoPilot to link objects, copy configurations, and automate functions. You can drag and drop objects from the Hardware Explorer into windows in the display pane (such as the Data Generator View or Object Browser). Messages, subaddresses, and fields can be copied to other locations in the Hardware Explorer by dragging and dropping. If you attempt to drag an item to an area that cannot accept it, a warning dialog will appear and the action will not be completed.

Tool Tips

If you are unsure of what a button does or need additional information, tooltips throughout CoPilot may provide the help you need. For example, objects in the Hardware Explorer pane use tool tips to display additional information. In addition, Ribbon commands, properties pages, buttons, status bar text, and other objects and windows throughout CoPilot use

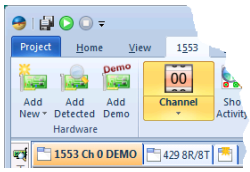
tool tip displays. To display the tool tip for an item, hold the mouse over the item without moving for a few seconds. A popup will appear with status, configuration, or data information. (see figure below).



Example tooltip text strings displaying additional information

Analyzing the Bus

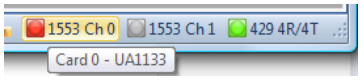
Analyzing the bus is now even easier with CoPilot 6. The start-up Protocol Analyzer Quick Start Mode automatically configures installed hardware to monitor and display databus activity. Redesigned Activity Views replace the CoPilot 5 Protocol Browser and display the bus topology with statistics and allow for configuration. CoPilot automatically creates a workspace tab and an Activity View for each MIL-STD-1553 channel and each ARINC 429 channel group for all hardware devices added to CoPilot. A 717 Word View is added for each ARINC 717 channel. Additionally, the status of each 1553 channel, 717 channel and 429 channel group is displayed in the status bar; clicking on these icons will display the appropriate activity view. The Global Control pane provides start and stop control with a global status indicator. The Global Control pane is described in the following section with the Home Ribbon tab.



Worskpace tabs and protocol Ribbon

Global Control pane

Note: When working with multiple protocols and workspaces, the easiest way to show the desired Activity View is to click the status icon in the Status Bar.



Status indicators in Status Bar

Status Icon States

The status icons displayed throughout CoPilot indicate both current and historical state and can also indicate configuration.

State Colors

No activity/Not configured

Good status, no errors

Warnings

Errors

Configuration

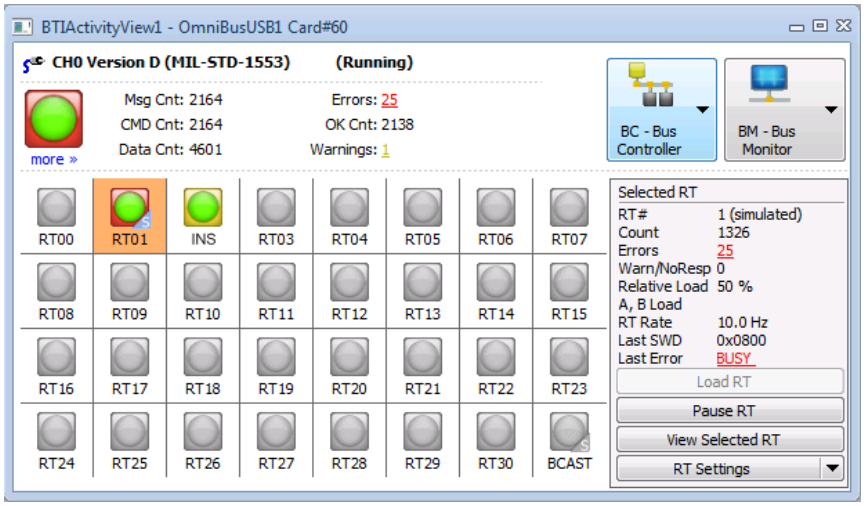
Paused

'S' for Simulated RT

Analyzing MIL-STD-1553 Traffic

Activity View: 1553 Channel

The Activity View provides an overview of the databus topology showing traffic for each MIL-STD-1553 channel. As the image below shows, there is traffic to two RTs: RT01 and the INS (RT02). At the channel-level, the upper left portion of the view displays the channel summary while the central grid shows the status icon for the RTs on the channel. The summary for the channel displays the number of messages, commands and data words along with the number of errors, OK messages, and warnings. To see additional Channel-level statistics, click the more » link below the large top-left channel status icon. When an RT is selected, the pane on the right side displays details for the selected item.



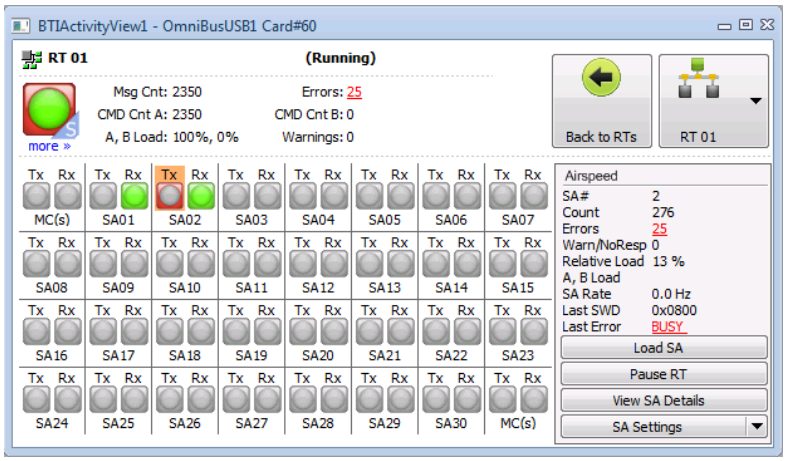
1553 Channel-level Activity View

Additional features:

- Double-click to 'drill into' an RT – see the details for that item
- Right-click on the background (not on an RT) for channel commands
- Right-click on an RT for additional RT commands
- Buttons perform common user tasks and configurations
- Configuration buttons for the Bus Controller (BC) and Bus Monitor (BM)
- User clearable statistics counters (via 'more' detailed statistics or from a context menu)
- Clickable errors/warnings to display filtered log data (when logging)

Activity View: 1553 RT

Viewing the Selected RT (or drilling into an RT) displays the RT in the Activity View. The RT-level of the Activity View provides an overview of the databus traffic for the MIL-STD-1553 RT. As the image below shows, there is traffic to three SAs: SA01-RX, SA02-TX and SA02-RX. For this RT-level, the upper left portion of the view displays the RT summary while the central grid shows the status icon for the individual SAs on the channel. The summary for the RT displays the number of messages, commands and bus load along with the number of errors, OK messages, and warnings. To see additional RT-level statistics, click the more » link below the large top-left RT status icon. When an SA is selected, the pane on the right side displays details for the selected item.



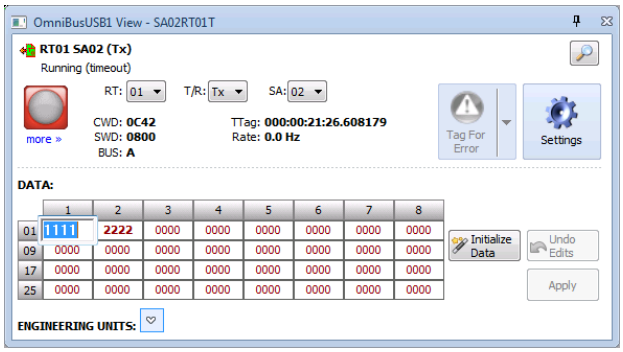
1553 RT-level Activity View

Additional features:

- Double-click to 'drill into' an SA – see the details for that item
- Right-click on the background (not on an SA) for RT commands
- Right-click on an SA for additional commands
- Buttons perform commonly user tasks and configurations
- Configuration button for the Remote Terminal (RT)
- User clearable statistics counters (via 'more' detailed statistics or from a right-click)
- Clickable errors/warnings to display filtered log data (when logging)

1553 Message View

Viewing the SA details from an Activity View (or drilling into an SA) displays the SA in a 1553 Message View. The 1553 Message View provides an overview of the message. As the image below shows, the upper left portion of the view displays the message summary while the central grid shows the data. To see additional message details, click the more » link below the status icon. Additional controls allow for modifying data, displaying engineering units, error injection, and data list buffers.



1553 Message View

Additional features:

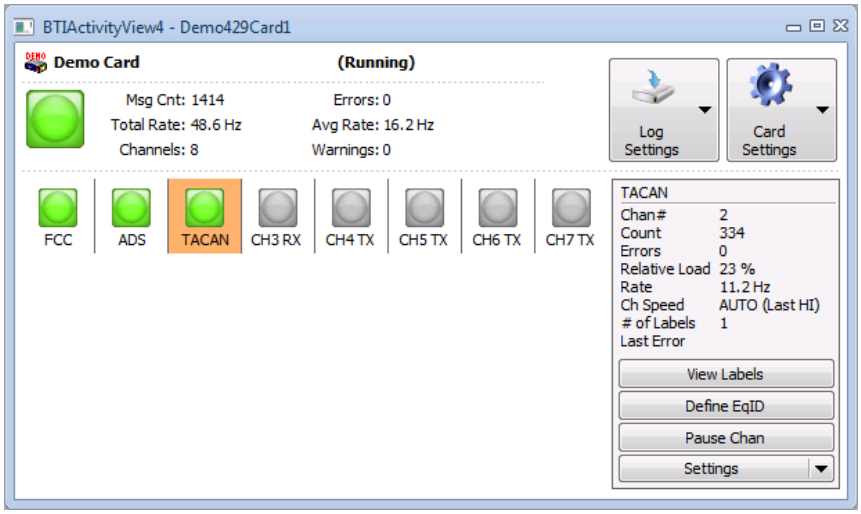
- Search button  to view previously configured messages
- RT, T/R, and SA drop lists for 'dialing' into an SAs of interest
- Edit and initialize data values

- Configurable data list buffers (for Rx BC Msgs and Tx SAs)
- Right-click on the background for additional commands
- Show/hide engineering unit (fields) interpretation of data
- Create new displays or graphs from engineering units

Analyzing ARINC 429 Traffic

Activity View: 429 Core

The Activity View provides an overview of the databus topology showing traffic for all 429 channels on the core (or Card for devices with only one core). As the image below shows, the Demo Card is receiving data on Channels 0, 1, and 2 without any errors or warnings. The upper left portion of the view displays the core/card summary while the central grid shows the status icon for each of the channels. The summary for the core/card displays the number of messages, average rate and number of channels, along with the number of errors, and warnings. When a Channel is selected, the pane on the right side displays details for the selected item.



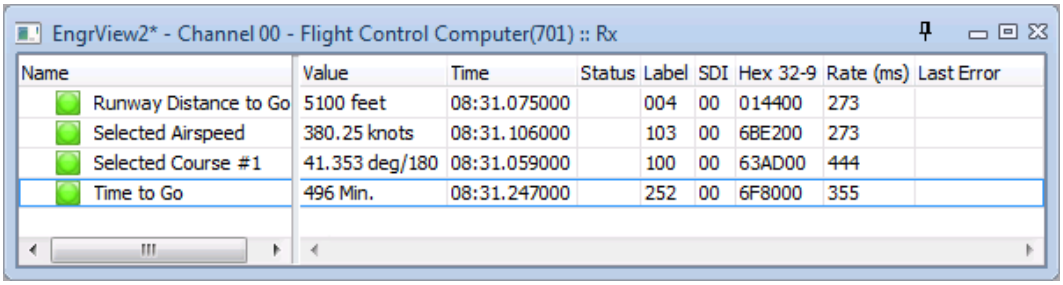
429 Card/Core-level Activity View

Additional features:

- Double-click to 'drill into' a Channel – see the details for that item
- Right-click on the background (not on a channel) for core/card commands
- Right-click on a Channel for additional commands
- Buttons perform commonly user tasks and configurations
- Configuration buttons for the Log and Card/Core
- User clearable statistics counters (via 'more' detailed statistics or from a right-click)
- Clickable errors/warnings to display filtered log data (when logging)

429 Label View

Viewing the labels of an ARINC 429 channel (i.e. by double-clicking an ARINC 429 channel in the Activity View) shows the channel in a linked Engineering View. As labels are added or removed from the channel, they are added or removed from the linked engineering view. The Engineering View is provides a concise user-configurable display of labels on that channel; this includes engineering values, last timetag, status, rate, errors, and more.



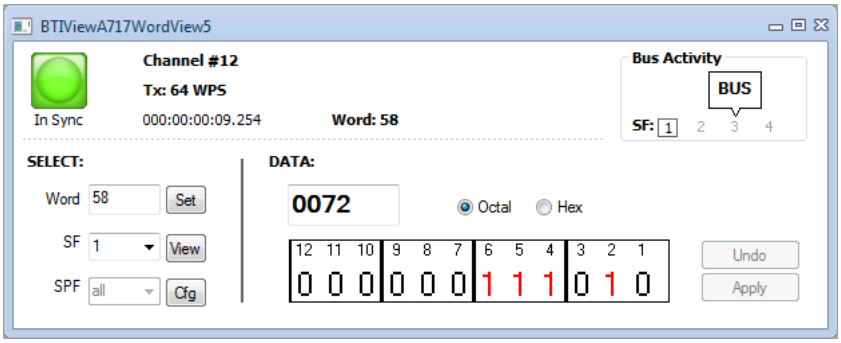
ARINC 429 Engineering View

Additional commands are available by right-clicking on a label, the background, or on the column headers. From the context menu it is possible to clear the statistics on a particular label, or the entire channel.

Analyzing ARINC 717 Traffic

717 Word View

The 717 Word View shows and allows editing (for transmit) of the selected channel status with the data value of an individual word in octal or hex. The word can range from 1 to the channel speed in words-per-second (WPS). As the image below shows, Channel #12 data is transmitting without any warnings or errors. The Bus Activity indicator shows the selected subframe (SF) and what subframe is currently being transmitted on the bus. The timetag (i.e. 000:00:00:9.254) displays the most recent time of the filtered word.



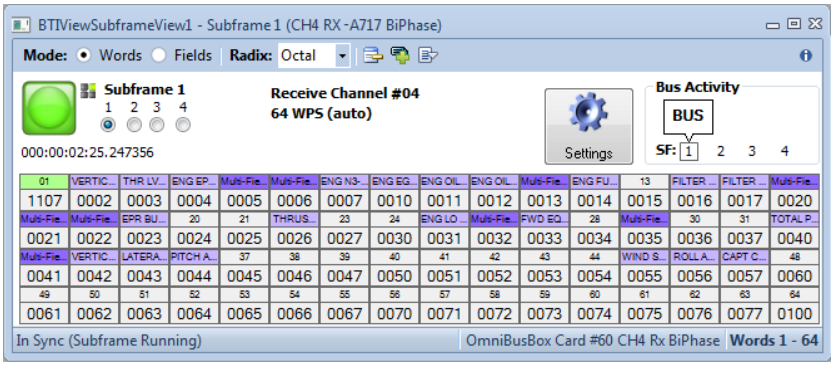
717 Word View

Additional features:

- Change the word value in binary, hex, or octal
- Once data is user modified, background highlighting is changed until the data is applied
- Data changes are atomic – change occurs when ‘Apply’ is pressed
- Double-click individual binary bits to toggle the bit value
- User clearable statistics counters to clear previous history (from a right-click)

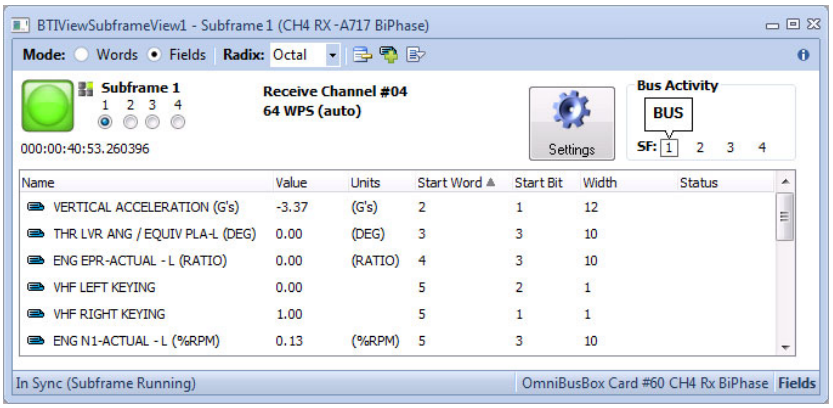
717 Subframe View

Viewing a subframe of an ARINC 717 channel with a Subframe View shows the data or fields of the subframe and the subframe’s status. The Radix setting changes the radix display of the data words while in the ‘Words’ mode. As the image below shows, Channel #4 data is receiving without any warnings or errors. The Bus Activity indicator shows the selected subframe (SF) and what subframe is currently being transmitted on the bus. The timetag (i.e. 000:00:02:25.247) displays the most recent time of the filtered subframe. Subframe words and fields data are not editable for receive channels but may be edited for transmit channels.



717 'Words' Mode of Subframe View

Changing the Subframe View to the 'Fields' mode displays the configured engineering units (fields). This mode displays a list of the configured fields sorted by start word.



717 'Fields' Mode of Subframe View

Additional features:

- Click the 'Context Menu' button or right-click to show additional options
- The 'Word View' button at the top of the view displays a 717 Word View
- The 'Add' button at the top of the view can be used to add additional engineeruing unit fields
- In 'Words' mode, the background color of the word description indicates the following:

Color	Meaning	Applies to…
Green	In Sync	Sync Word
Red	Not in Sync	Sync Word
Light Purple	Field is defined on word	Field's Word
Purple	Multiple fields defined on word	Field's Word
Light Orange	Superframe counter word	Superframe Counter's Word
Orange	Superframe field defined on word	Superframe Field's Word

- In 'Words' mode, field names are shown instead of the word number when fields are defined; if more than one field is defined, then 'Multi-Field' is displayed
- In 'Fields' mode, edit and display engineering unit data or change field definitions
- When Superframes (SPF) are defined, a drop-list is available to select the SPF (i.e. SPF: 1 of 16)
- User clearable statistics counters to clear previous history (from a right-click or context menu)

- Read-only data words are colored light gray (i.e. Sync Word, the SPF counter, and receive data words)
- Change the word value in hex, or octal
- Once data is user modified, background highlighting is changed until the data is applied
- Data changes are atomic – change occurs when ‘Apply’ is pressed

Analyzing Other Protocols

In addition to operating MIL-STD-1553, ARINC 429 and ARINC 717, CoPilot can be used with other protocols. Additional protocols include: ARINC 664/AFDX, ARINC 708 and other protocols like serial links and Discrete I/O.

Additional analysis features include data logging with Sequential Monitor Views, scripting, graphical controls and more. The Engineering View allows user-configurable display of multiple engineering unit fields from various protocols. See the CoPilot User’s Manual for additional information for these and other available features.

The Ribbon Interface

The new Ribbon interface introduced in CoPilot 6 provides improved organization of tools and workspaces so you find what you need faster. This intuitive Ribbon interface is a menu that gives you easy one-click access to a comprehensive set of controls.

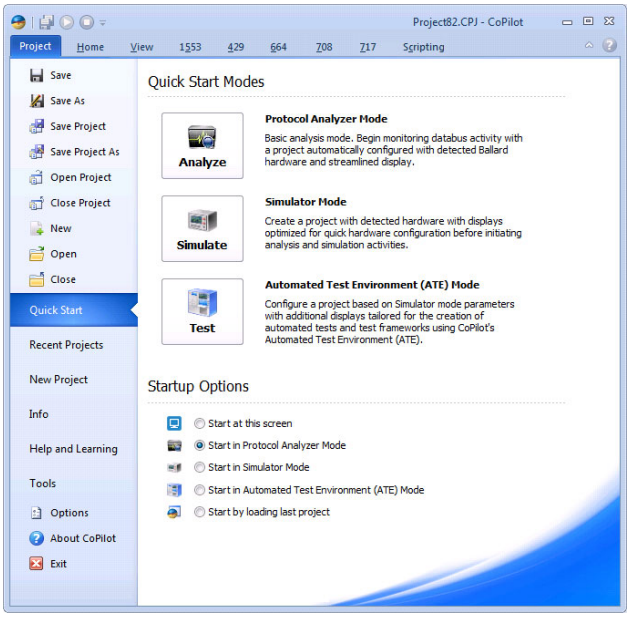
Overview

The CoPilot Ribbon is designed to help you quickly find the commands that you need to complete a task. Commands are organized in logical groups, which are collected together under tabs. Each tab relates to a type of activity or particular avionics protocol, such as Scripting or MIL-STD-1553. The CoPilot Ribbon menu also introduces the new CoPilot Backstage view (the “Project” Ribbon menu tab). The Ribbon replaces the toolbars used in CoPilot 5.

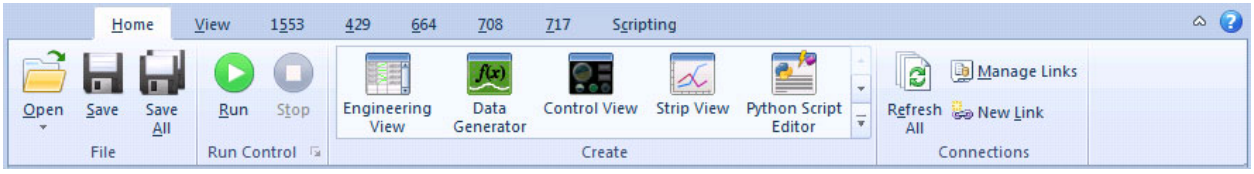
Project Tab (Backstage View)

Selecting the Project Tab of the CoPilot Ribbon shows the Backstage View. The Backstage View is where you manage your project and files, find help and learning resources, access associated tools, control the startup options and set user preferences.

The Backstage View in CoPilot 6 replaces the Start Page along with the project and help menus used in earlier releases of CoPilot.



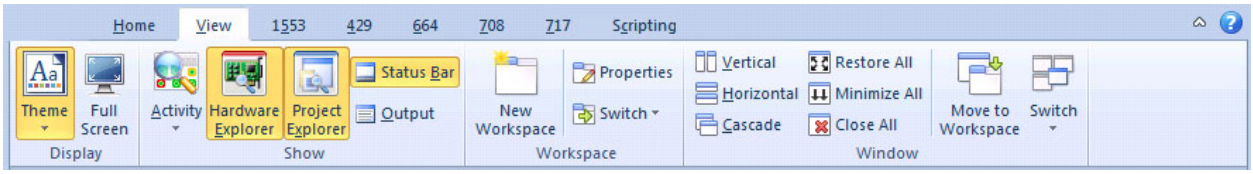
Home Tab



The Home tab of the CoPilot Ribbon has been designed to make it convenient for you to get to the project features you use the most. If you are familiar with earlier versions of CoPilot, you will find new features here.

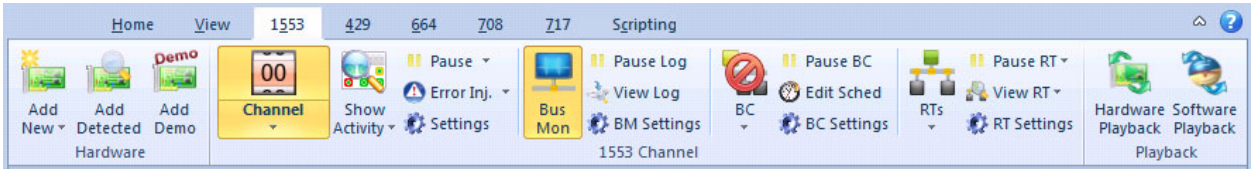
The Home tab includes control groups for file management, run control, creating CoPilot views, and managing connections (links). The Run Control group also has a special icon in the lower right corner which shows the Global Control pane.

View Tab



The View tab of the CoPilot Ribbon is the location for view manipulations commands. The View tab includes control groups for CoPilot environment display options, the Show group for frequently used displays, the Workspace management group, and the Window management group.

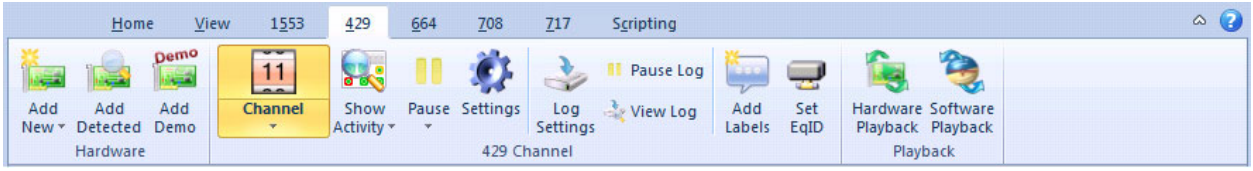
1553 Tab



The 1553 tab of the CoPilot Ribbon hosts specialized groups of controls for MIL-STD-1553 operation and analysis. The 1553 tab includes control groups for adding hardware devices, MIL-STD-1553 protocol channel operations, and databus playback.

The 1553 Channel group contains a variety of protocol specific controls. The controls in this group all operate on the currently selected MIL-STD-1553 channel. Use these controls to quickly discover current activity, inspect logged data recordings, and configure databus hardware.

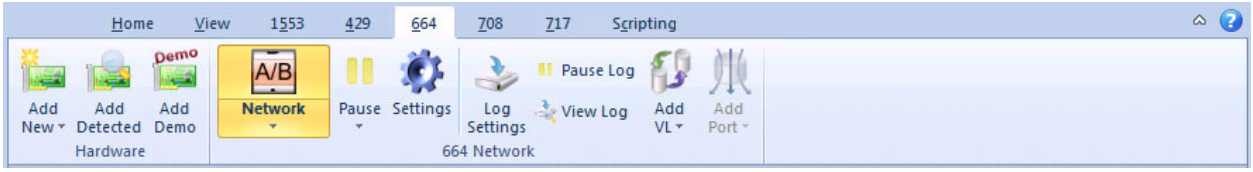
429 Tab



The 429 tab of the CoPilot Ribbon hosts specialized groups of controls for ARINC 429 operation and analysis. The 429 tab includes control groups for adding hardware devices, ARINC 429 protocol channel operations, and databus playback.

The 429 Channel group contains a variety of protocol specific controls. The controls in this group all operate on the currently selected ARINC 429 channel. Use these controls to quickly discover current activity, inspect logged data recordings, and configure databus hardware.

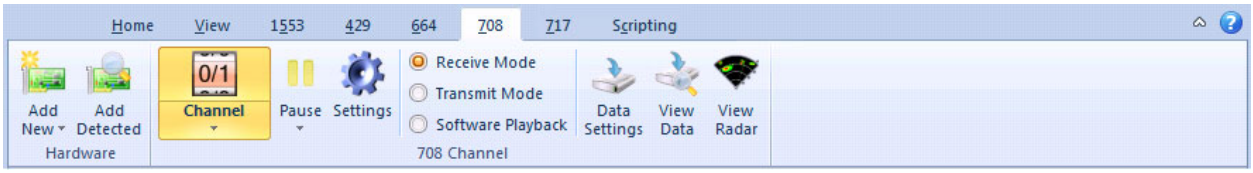
664 (AFDX) Tab



The 664 tab of the CoPilot Ribbon hosts specialized groups of controls for ARINC 664 (AFDX) operation and analysis. The 664 tab includes control groups for adding hardware devices and ARINC 664 (AFDX) protocol network operations.

The 664 Network group contains a variety of protocol specific controls. The controls in this group all operate on the currently selected ARINC 664 (AFDX) Network. Use these controls to quickly discover current activity, inspect logged data recordings, and configure databus hardware.

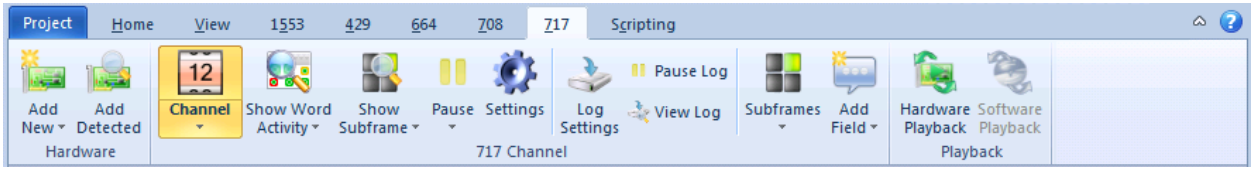
708 Tab



The 708 tab of the CoPilot Ribbon hosts specialized groups of controls for ARINC 708 (Weather Radar) operation and analysis. The 708 tab includes control groups for adding hardware devices and ARINC 708 protocol channel operations.

The 708 Channel group contains a variety of protocol specific controls. The controls in this group all operate on the currently selected ARINC 708 channel pair. Use these controls to quickly discover current activity, inspect logged data recordings, and configure databus hardware.

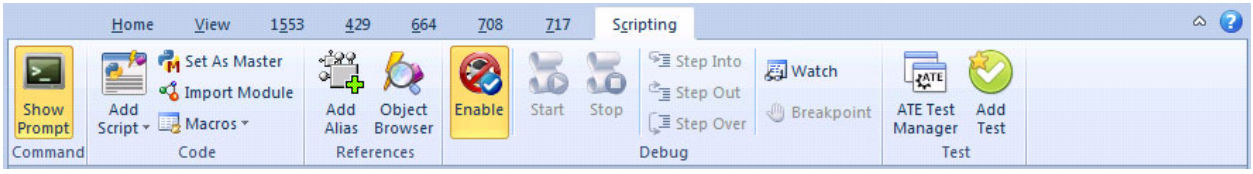
717 Tab



The 717 tab of the CoPilot Ribbon hosts specialized groups of controls for ARINC 717 operation and analysis. The 717 tab includes control groups for adding hardware devices, ARINC 717 protocol channel operations, and databus playback.

The 717 Channel group contains a variety of protocol specific controls. The controls in this group all operate on the currently selected ARINC 717 channel. Use these controls to quickly discover current activity, inspect logged data recordings, and configure databus hardware.

Scripting Tab



The Scripting tab of the CoPilot Ribbon includes a variety of test and scripting tools. The scripting tab includes control groups for the Command prompt, scripting code files, scripting object references, scripting debug controls, and test using the Automated Test Manager.

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Your Source for Avionics Databus Tools

Protocols Supported

- MIL-STD-1553
- ARINC 429/575
- ARINC 629
- ARINC 664/AFDX
- ARINC 708/453
- ARINC 717/573
- Serial
- Discretes
- CSDB
- Space Shuttle (MIA and MDM)
- Custom and non-standard protocols

Platforms

- PCI and PCIe
- cPCI
- PMC and XMC
- PCMCIA
- USB
- Ethernet
- PC/104 and PC/104 plus
- VMEbus
- Industry Pack
- Embedded Boxes

Software

- CoPilot for 1553, 429, AFDX/664, 708, and 717 boards
- BTIDriver™ universal API
- Drivers for Windows®, Linux, VxWorks®, LabView®, Integrity®, DOS® and others
- Custom Applications

Increase Your Productivity with CoPilot

Just the Beginning

In this brief overview, you were introduced to the basics of CoPilot – this only scratched the surface! If you look through the windows, dialogs, and menus in CoPilot, you will discover many options not discussed in this getting started guide. For further information, refer to the *CoPilot User's Manual*. In addition, you can count on new features being continuously added to CoPilot to meet the emerging requirements of a growing number of users.

Take a CoPilot Test Drive

The best way to discover how CoPilot can increase your own productivity is to try it. Ballard Technology would be happy to send you an evaluation copy of CoPilot. With the software alone, you can examine the features available by using emulated Demo cards. If you already have Ballard hardware, a temporary license key can allow you to evaluate the full capability of the software with actual hardware.

Expand Use to Other Databuses

Today's complex avionics systems often utilize multiple protocols, drawing on the strengths of each one. CoPilot supports concurrent operation of MIL-STD-1553, ARINC 429, ARINC 664/AFDX, ARINC 708, ARINC 717 and other protocols. Consequently, with the appropriate Ballard Technology avionics databus cards and CoPilot software, users can monitor, simulate, analyze, compare, and integrate activity on several databuses at the same time. CoPilot users have the advantage of a common environment with features and tools suited to the unique characteristics of each avionics protocol.

Contact Ballard

Our experienced engineering staff is available to discuss your requirements for avionics databus tools and interfaces. For more information about our products or support in the use of this product, call Customer Service. Our hours are 8:00 AM to 5:00 PM Pacific Time, though support and sales engineers are often available outside those hours. We invite your questions and comments on any of our products.

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