User's Manual
QuikView/1553

abaco
S Y S T E M S

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Abaco Systems, Inc.
26 Castilian Drive, Suite B
Goleta, CA 93117
Main   +1 805-965-8000 or 877-429-1553 (US-only)
Support   +1 805-883-6097

avionics.support@abaco.com (email)

https://www.abaco.com/products/avionics

Additional Resources

For more information, please visit the Abaco Systems website at:
www.abaco.com

Contents

Figures

Introduction

Introduction

This document describes Abaco Systems' QuikView/1553 software for members of Abaco Systems' MIL-STD-1553 product line. This software product provides a simple, easy-to-use graphical interface to many of Abaco's MIL-STD-1553 products including the R15-USB, QPCX-1553, QPCI-1553, QCP-1553, QPMC-1553, R15-EC, RXMC-1553, RXMC2-1553, RPCIE-1553, R15-LPCIE, R15-MPCIE, and other derivative products.

Although QuikView/1553 is intended as an installation checkout aid, it is also capable of performing basic communication tasks on the 1553 bus.

QuikView/1553 Description

QuikView/1553 is a simple user interface that uses the high-level programmer's library called BusTools/1553-API. It provides basic Bus Controller (BC), Bus Monitor (BM) and Remote Terminal (RT) programming capabilities as well as diagnostic tools.

For more detailed information about the 1553 bus, BusTools/1553-API, or hardware installation, please refer to the following Abaco Systems documents:

- MIL-STD-1553 Tutorial
- BusTools/1553-API Software User's Manual
- BusTools/1553-API Software Reference Manual
- MIL-STD-1553 Hardware Installation Guide

Abaco Systems also supplies a full-function visual interface for MIL-STD-1553 data bus products, the BusTools/1553 Visual Analyzer for Windows, which runs under the Windows™ operating system. BusTools/1553 provides graphical access to features supported by the underlying hardware and includes the ability to save the setup information, record bus traffic, play back previously recorded traffic, and many other functions.

For further information about BusTools/1553, contact Abaco Systems at (866) 652-2226, or visit the Abaco Systems website at http://www.abaco.com.

QuikView/1553 Overview

Definitions

Using QuikView/1553, an Abaco Systems 1553 board can be programmed to demonstrate each of the available modes, Bus Controller, Remote Terminal, or Bus Monitor. QuikView/1553 allows you to define a single BC message to a specific RT which can then be monitored (if the board is multi-function and allows you to run the three modes simultaneously).

Bus Controller (BC) - The Bus Controller is responsible for directing the flow of data on the 1553 bus. Only one bus controller may be active at a time. The bus controller is the only device allowed to issue commands onto the data bus. QuikView/1553's BC Message screen allows you to define a single BC Message to be sent on the bus.

Remote Terminal (RT) - A Remote Terminal receives commands from the BC and stores data received from the BC or transmits data requested by the BC. A 1553 board configured as an RT can simulate all 31 RTs. The BC message addresses an RT using a subaddress and the transmit/receive (T/R) bit. QuikView/1553's RT Configuration screen allows you to define a single combination of RT, subaddress, and T/R.

Bus Monitor (BM) - A Bus Monitor is a device that listens to the exchange of information on the 1553 bus. QuikView/1553's BM Configuration screen allows you to watch the activity on a single combination of RT, subaddress, and T/R.

QuikView/1553 Board Setup Screen

When you run QuikView/1553, the first screen you see is the Board Setup screen.
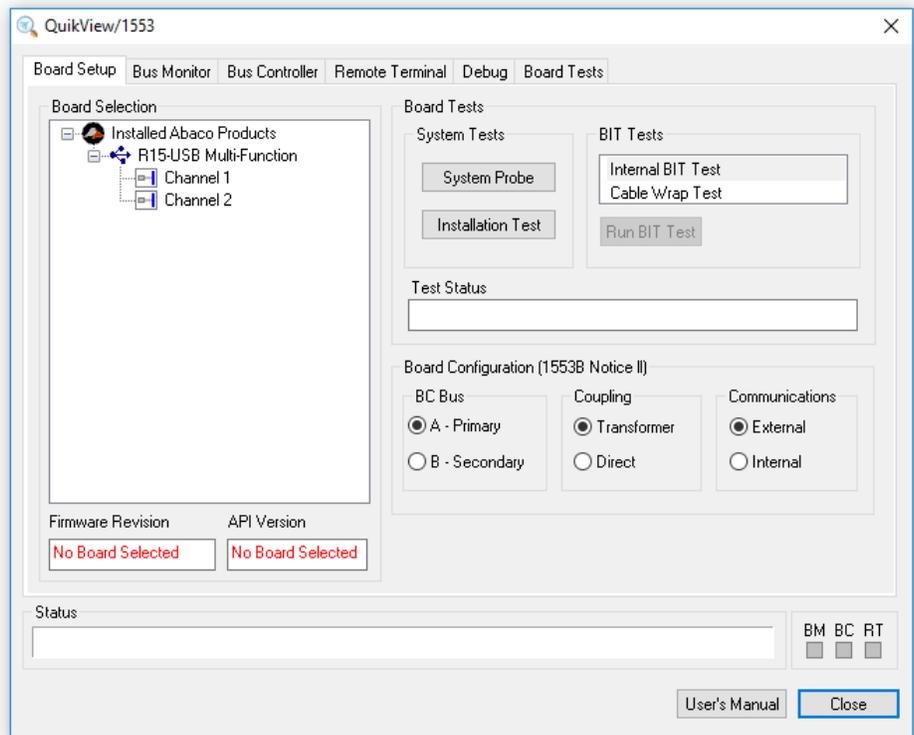
Figure 1: QuikView/1553 Board Setup Screen

This screen contains the board and channel selection box. Before proceeding, you must select a board and a channel on the board. Only available boards and channels appear (the boards installed on the system are automatically detected by QuikView/1553). Each board is identified as single-, dual-, or multi-function. A single-function board can run only one of the available operational modes (Bus Controller, Remote Terminal, and Bus Monitor) at any one time. A dual-function board can run Bus Monitor at the same time as either Bus Controller or Remote Terminal. A multi-function board can run all three operational modes at the same time.

The Board Setup screen allows you to select Primary or Secondary BC Bus, Direct or Transformer Coupling and Internal or External Communications in the Board Configuration area. These settings are not used when testing the board installation, but are applied to the Operational Mode screens. Currently, only 1553B Notice II message traffic is supported.

Output amplitude is always set to maximum and is not adjustable.

Channel Selection

When you select a channel, the channel is opened and the screen changes as illustrated in Figure 2
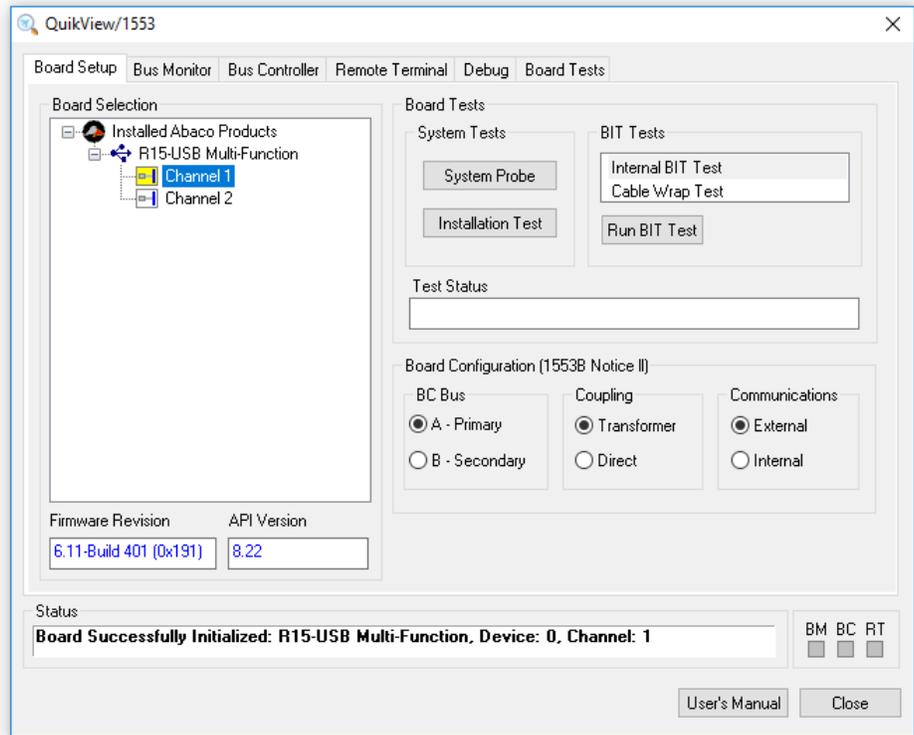

Figure 2: QuikView/1553 Board Setup Screen, Channel Selected

The selected channel is highlighted and represented by a yellow icon. The board's Firmware Version and the API Version appear, and the description of the selected board and channel is displayed in the status bar at the bottom of the tab.

Also, the BIT Tests (on the Board Setup tab) and the other 1553-related functions (BC, BM and RT) are enabled.

1553 Mode Status Display

Notice the three indicators in the lower right-hand corner (BM BC RT). Each of them changes from gray to green when the associated mode is started. Indicators appear red if a 1553 bus error is detected while the mode is running or yellow in case of a no-response.

Clicking one of these indicators opens a diagnostic dialog box giving more details about what the current problem is for each one of the functions (BC, BM and RT) and proposing actions to fix it.

This panel is intended to help you setting up an operational testing environment by pointing out connection and configuration problems. It handles the basic cases by analyzing the type of board, the configuration selected in the Board Setup tab and the current state of each function, then depending on the type of problem a solution is proposed (connect the board to an external bus with a valid RT, for example).
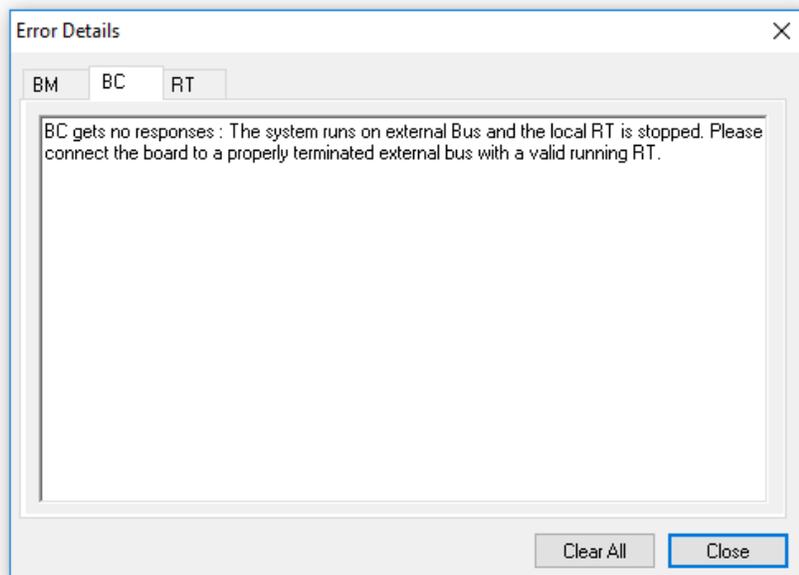

Figure 3: QuikView/1553 Diagnostic Window

You can clear the content of this diagnostic window by clicking the **Clear All** button.

Board Tests

The Board Setup screen also provides different tests to verify correct installation of the hardware. Please note that some tests may not be available for certain board types.

The first set of tests are called the **System Tests**. They are executed at the system level and therefore there is no need to select a board and channel before starting them. The system tests are composed of two options:

- **System Probe** launches a scan of the system to detect all installed Abaco Systems avionics products as well as any known installation issues. The results are displayed in a separate window appearing once the scan is done.   The results are also saved to a file named "CEI Report.txt" on the Windows desktop.
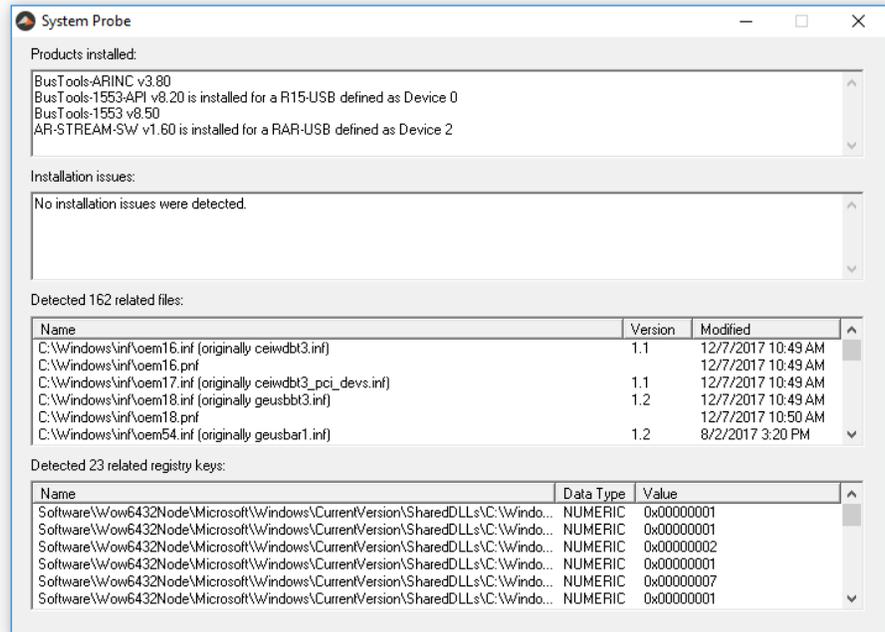

Figure 4: System Probe

- **Installation Test** checks the channels of all the boards detected by the software. QuikView/1553 will go through each channel and try to initialize it to see if it is operational. The results of the test are shown in the **Test Status** box. This operation can take time if a large number of boards are detected in the system.

  Then, once you have selected a board and channel, you can select and run one of the following **BIT Tests** to test one specific board:

- From the **BIT Tests** list, select a test:
  o **Internal BIT Test**: Runs BusTools_BIT_InternalBit()
  o **Cable Wrap Test** (if available): Runs BusTools_BIT_CableWrap()

- Click the **Run BIT Test** button.
  The results of the test are shown in the **Test Status** box. If the selected BIT test passes, the board has been installed correctly.

- Click the **Close** button at any time to stop any 1553 operation that might be in progress. Clicking **Close** closes the BusTools/1553-API and any open board/channel combination. The QuikView/1553 program then exits.

Operational Screens

Once the Board Setup screen has been used to select a board and channel, you can select one of the following screens:

- Bus Monitor (BM) Configuration
- Bus Controller (BC) Configuration
- Remote Terminal (RT) Configuration
- Debug
- Board Tests

The BM, BC, and RT Configuration screens have a data entry and display section, a **RUN/STOP** button, and various controls and options. If you have selected a single-function board, only one of these three screens can be run concurrently. If you have selected a dual-function board, only the BM and either the RT or BC may be run concurrently.

If an R15-USB-MON board is selected, the BC and RT screens are not available (since the R15-USB-MON is a BM-only board).

These screens are detailed in the sections that follow.

BC Configuration Screen

Once you select a currently installed board and channel, you can use the BC Message Screen (see Figure 5) to create a single Bus Controller message. This message can be any valid 1553B message, including any Mode Code. You must specify the RT address, the RT subaddress, the word count and the T/R bit.
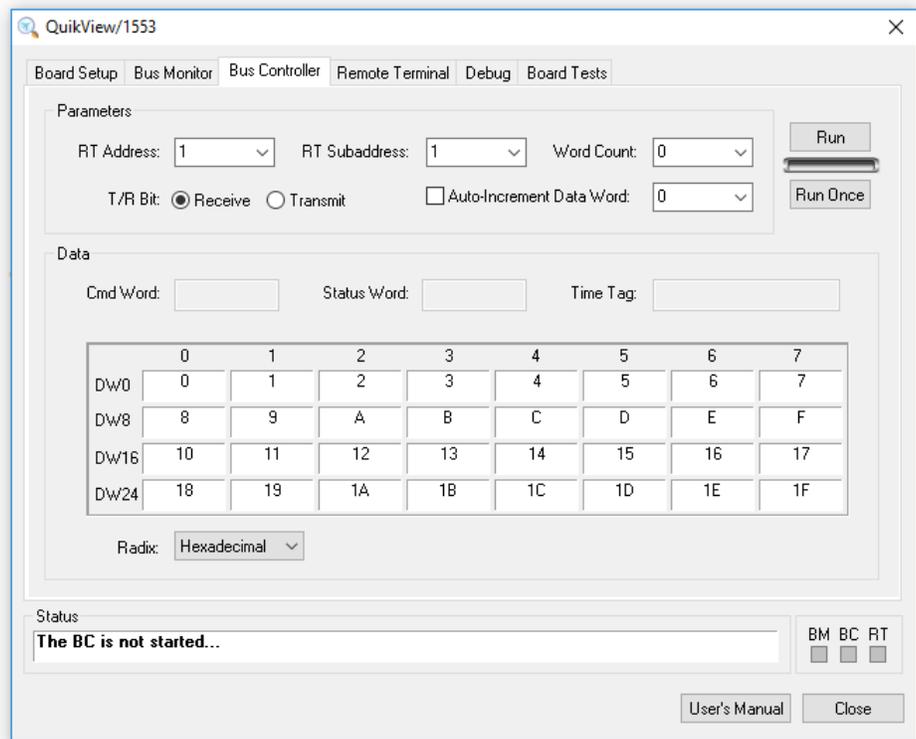
Figure 5: BC Configuration Screen

First, you must select the RT address, the RT subaddress, word count and T/R bit.

QuikView/1553 shows between 0 and 32 data entry / display boxes, depending on your selections. If the T/R bit is set, the data boxes are set to display only. If the T/R bit is clear, you can modify the data boxes. This modified data is sent to the RT when you click the Run button.

If you select Subaddress 0 or 31, you select a Mode Code, rather than a normal BC-RT or RT-BC message. The proper message is transmitted by the BC, even though the mode code name is not displayed. If you enter a mode code, you should take care to select only valid 1553B Notice II mode codes.

Use the **Radix** box to select the format of the data display in the data entry/display boxes. You can select hexadecimal or unsigned decimal 16-bit formats.

The BC Message screen includes a **Run** button that schedules the message for transmission at a (non-adjustable) once-per-second rate. When you click the **Run** button, it changes to a **Stop** button. Clicking the **Stop** button causes the BC to stop sending messages.

While the BC Simulation is running, a **Time** display is updated at a once-per-second rate. This display shows the number of seconds since the BC was started.

RT Configuration Screen

Once you select a currently installed board and channel, you can use the RT Configuration screen (see Figure 6) to identify the RT's response to one BC message. This message can be any valid message, including any Mode Code.
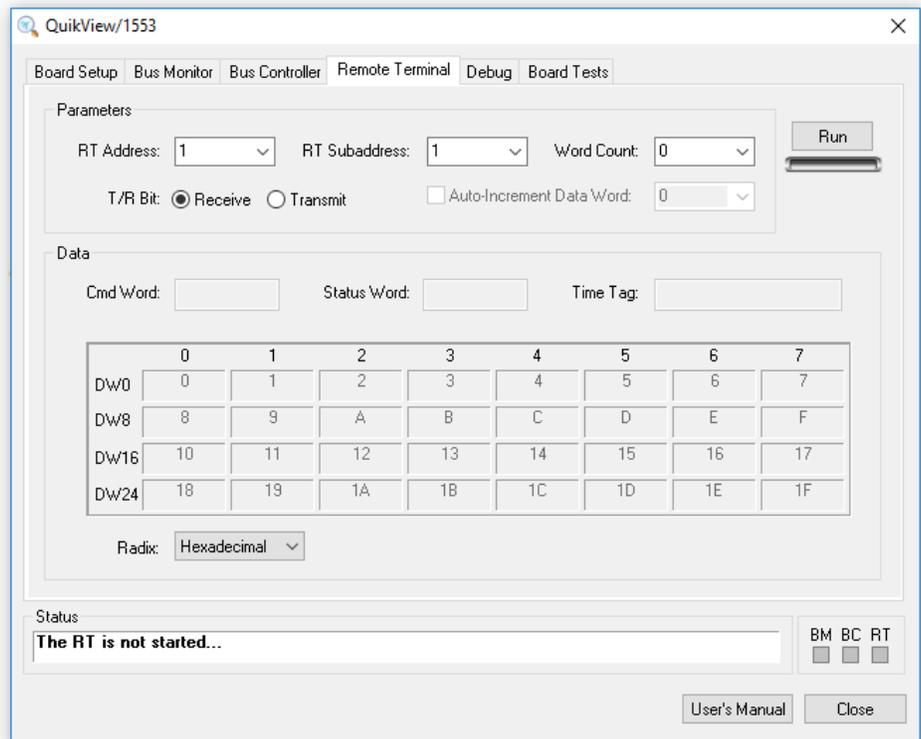
Figure 6: RT Configuration Screen

First, you must select the RT address, the RT subaddress, word count and T/R bit.

QuikView/1553 shows between 0 and 32 data entry / display boxes, depending on your selections. If the T/R bit is clear, the boxes are set to display only; otherwise, you can modify them.

Use the **Radix** box to select the format of the data display in the data entry/display boxes. You can select hexadecimal or unsigned decimal 16-bit formats.

The RT Message Configuration screen includes a **Run** button. Clicking this button causes the RT Simulation to run, and any data that is transmitted or received causes the **Time** display to be updated.

When you click the **Run** button, it changes to a **Stop** button. Clicking the **Stop** button causes the remote terminal simulation to stop.

BM Configuration Screen

Once you select a currently installed board and channel, you can use the BM Configuration Screen (see Figure 7) to monitor one 1553 message. This message can be any valid 1553 message, including any Mode Code.
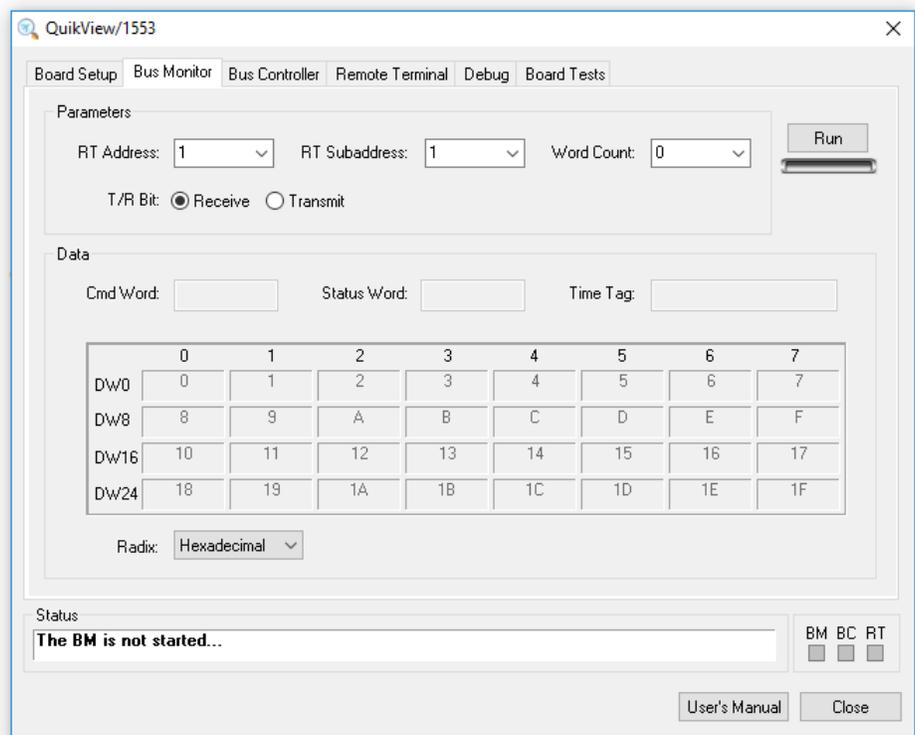
Figure 7: BM Configuration Screen

First, you must select the RT address, the RT subaddress, word count and T/R bit.

QuikView/1553 shows between 0 and 32 data display boxes, depending on your selections. All boxes are set to display only.

Use the **Radix** box to select the format of the data display in the data display boxes. You can select hexadecimal or unsigned decimal 16-bit formats.

The BM Configuration Screen includes a **Run** button. Clicking this button causes the Bus Monitor to run, and any data that is received causes the **Time** display to be updated.

When you click the Run button, it changes to a **Stop** button. Clicking the **Stop** button causes the bus monitor to stop

Debug Screen

Once you select a currently installed board and channel, you can use the Debug Screen (see Figure 8) to display memory locations on the selected 1553 board, either to the screen or to a text file.
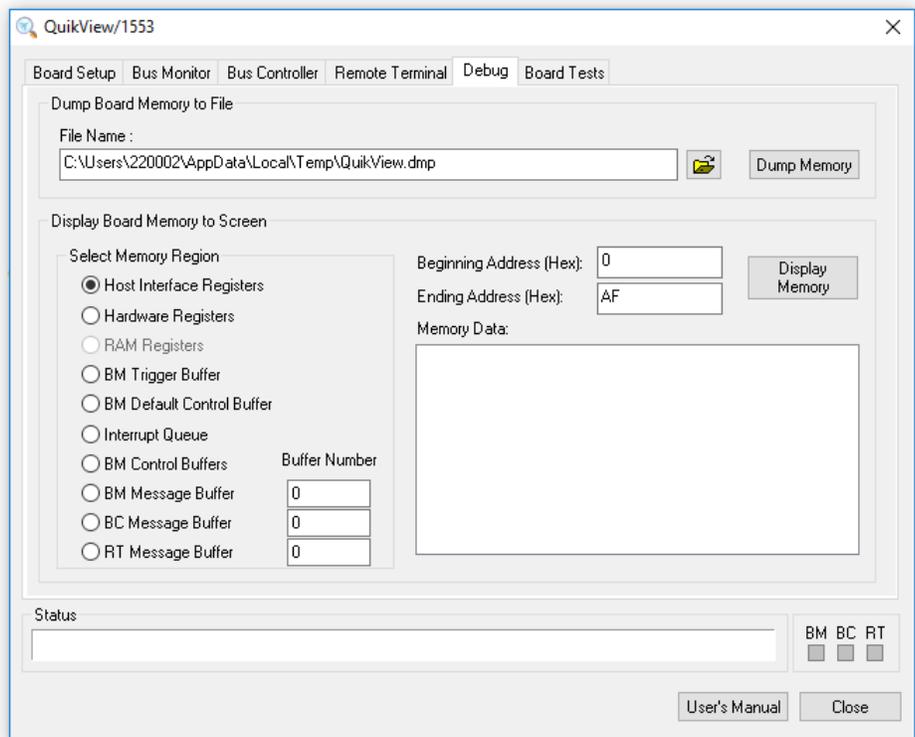

Figure 8: Debug Screen

Dump Memory

When selecting a Windows directory path and filename, make sure the path is available for writing. The file is saved in the current user's "temp" folder by default. You may opt to save the file in any writeable location (for example, the Windows Desktop).

Board Tests Screen

Some products may have unique and specific tests that can be selected and performed. These tests are located on Board Tests Screen (see Figure 9). The status of each test will be displayed in the Status box.
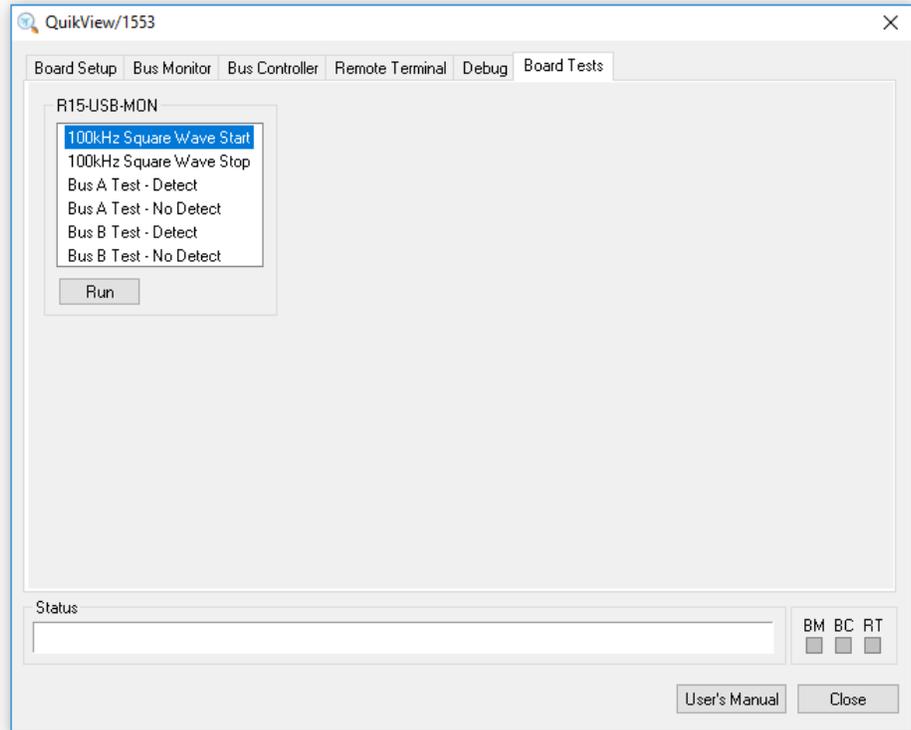

Figure 9: Board Tests Screen

R15-USB-MON

The R15-USB-MON is a version of the R15-USB that functions solely as a Bus Monitor (BM). To verify that the R15-USB-MON is functioning, QuikView has been updated to allow Initialization, Bus Monitor functions, and On-Board Testing of the R15-USB-MON.

Initialization and Bus Monitor functions are conducted on the Board Setup and Bus Monitor tabs. The Board Tests that are unique to the R15-USB-MON are:

100kHz Square Wave Start

Start a 100kHz Square Wave Output Waveform simultaneously on the Bus A and Bus B BNC Test Outputs. The waveform is approximately 475mVpp.

Note: This output waveform test runs until terminated by executing the
next test option: 100kHz Square Wave Stop

100k Hz Square Wave Stop

Stop the 100kHz Square Wave Output Waveform simultaneously on the
Bus A and Bus B BNC Test Outputs.

Bus Tests

The Bus Tests must be performed with the supplied R15-USB-MON Wrap
Cable attached to the R15-USB-MON. This cable assembly is Abaco Part
Number 1320-101-8. This cable assembly is a High-Density DB15 to Bus A
and Bus B Twinax Connectors, approximately 18 inches in length.

The R15-USB-MON Test Output will not drive a normal MIL-STD-1553
Bus. So, connecting the Bus A or Bus B Twinax connectors to a 1553 Bus
will not result in any valid messages transmitted on the 1553 Bus. The Bus
Tests are performed solely on the R15-USB-MON in a wrap/loopback
design.

If measured, the Bus 'Detect' waveform will be approximately 880mVpp,
while the Bus 'No detect' waveform will be approximately 275mVpp.

All Bus Tests generate 1000 Test Messages at a 1kHz Rate (one message
every 1millisecond) on Bus A or Bus B. The test messages stop and the test
reports the number of Messages Sent, the number of Messages Received,
and the number of Errors in those test messages. All 1000 messages are
the same:
  - BC to RT (Receive) Command
  - RT 1, SA 7
  - 32 Data Words

Bus A Test - Detect

Ideally, 1000 messages will be sent, 1000 messages will be received, and
no errors will be detected.

Bus A Test – No Detect

Ideally, 1000 messages will be sent, 0 messages will be received, and no
errors will be detected.

Bus B Test - Detect

Ideally, 1000 messages will be sent, 1000 messages will be received, and
no errors will be detected.

Bus B Test – No Detect

Ideally, 1000 messages will be sent, 0 messages will be received, and no errors will be detected.