DIAMOND SYSTEMS CORPORATION

DAQ EEPROM Debug Utility Guide, version 1.0
February 1, 2010

Introduction:

Often times there are requests for an application for a quick and easy way to display some of the features and contents of DSC boards, such as precise reference voltage values stored during factory testing, or the EEPROM contents. This program uses the Diamond Systems' Universal Driver to easily demonstrate several boards' functionalities using a Graphical User Interface (GUI) within MS Windows.

Features:

The GUI Measure References program has a selectable board type, base address, and Data Acquisition (DAQ) interrupt. The application has the following features:
- Windows XP based utility.
- Works with UD version 6.02.
- Board parameters read from an INI file.
- Read and write the precise reference voltage values that are stored on each board for use with the ADC; either by manually entering values seen on a voltmeter, or by using two models of supported multi-meters on RS-232 port.
- Read the FPGA revision of the board.
- Read board data acquisition EEPROM contents.
- Read FPGA registers and provide dump of the registers on the screen.
- All A/D channels can be sampled and displayed on the screen.
- Test Interrupt generation capability of the board.
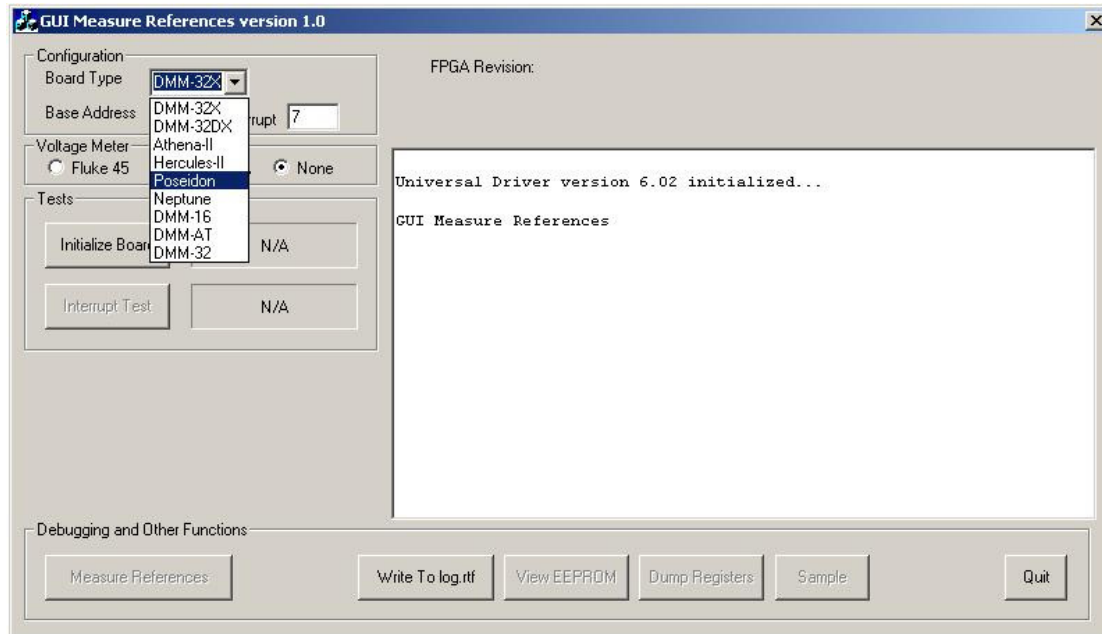- Logging capability to log the text in the main screen in Rich Text File (RTF) format.

Supported Boards
The program can do all the above listed functions for the following boards:
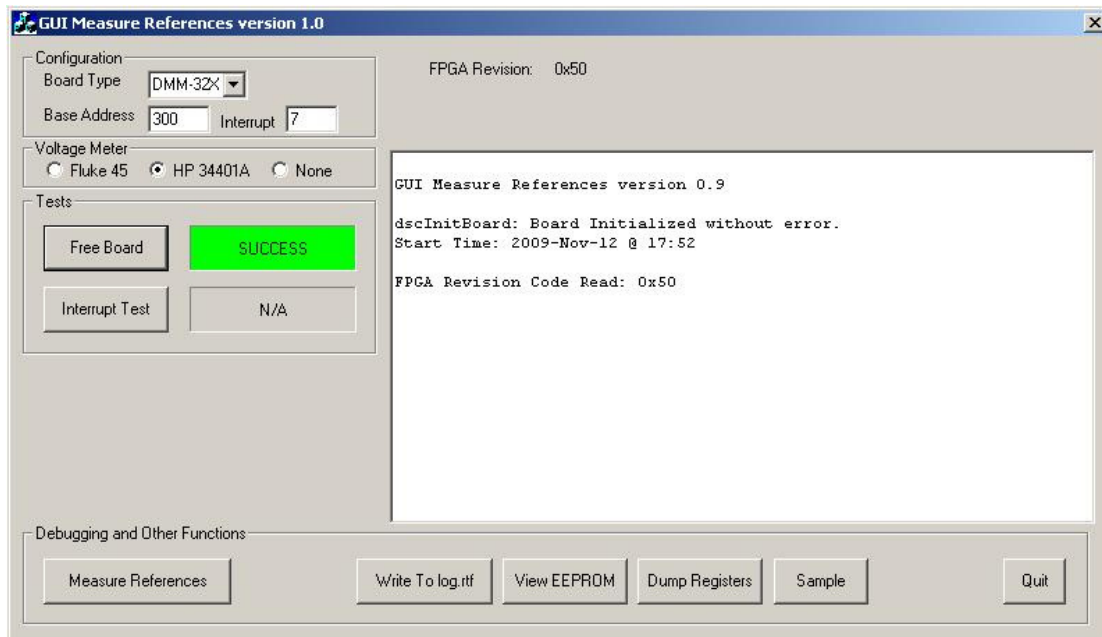- DMM-32X
- DMM-32DX
- Athena II
- Hercules II
- Poseidon
- Neptune
- DMM-16-AT
- DMM-AT
- DMM-32

Operating steps:

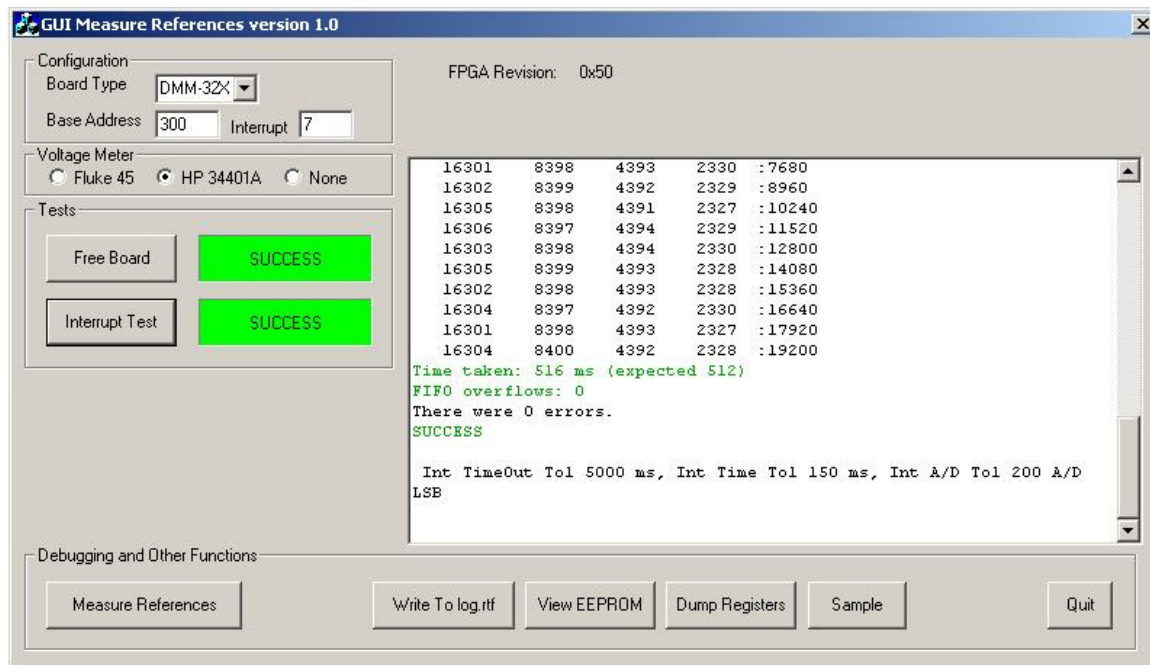Each board can be selected from a drop-down menu labeled 'Board Type'.

After the board type is selected, the board must be initialized, by clicking 'Initialize Board'.

If the board/computer is correctly configured to perform interrupt-based data acquisition, and Universal Driver is installed, clicking 'Interrupt Test' will take A/D samples via an interrupt routine and display the results.
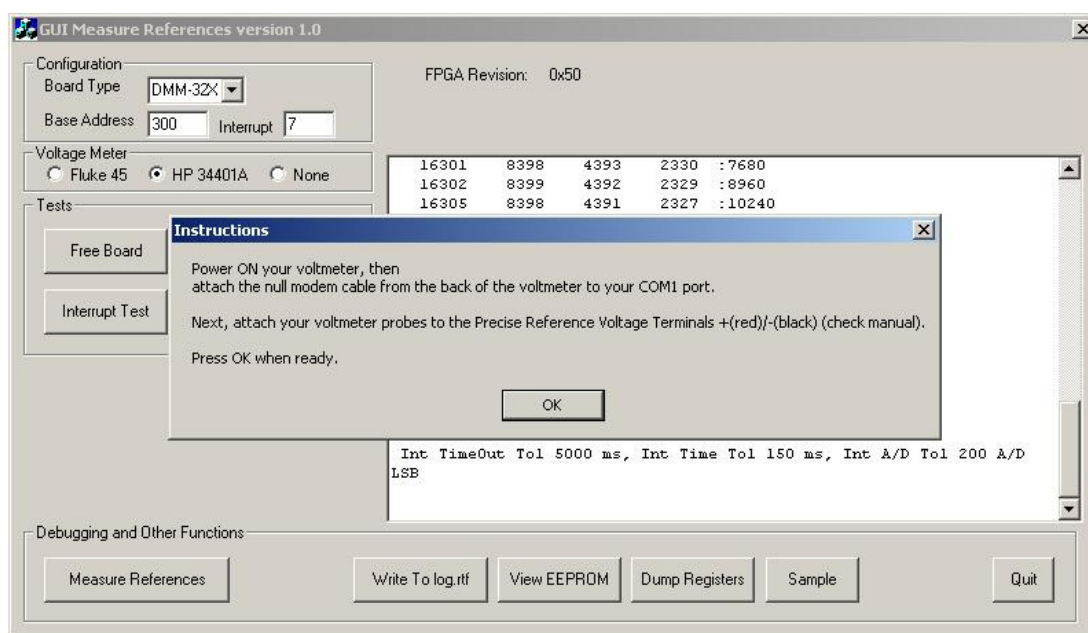
NOTE: If the interrupt test fails, check the interrupt number assigned for the board by checking the board user manual and matching it with the number in the application. Also make sure that the interrupt is not used by any other device in the system.

Reading/Writing Calibration References:

GUI Measure References application has a main purpose of enabling users to easily view and update or restore the precise reference voltages that are used to calibrate the A/D circuitry. Without these references being set correctly, the A/D auto-calibration will not succeed. If using a multi-meter, the serial port COM1 of your desktop PC (or SBC) can be used to acquire these voltages quickly and easily, reducing typographical errors.
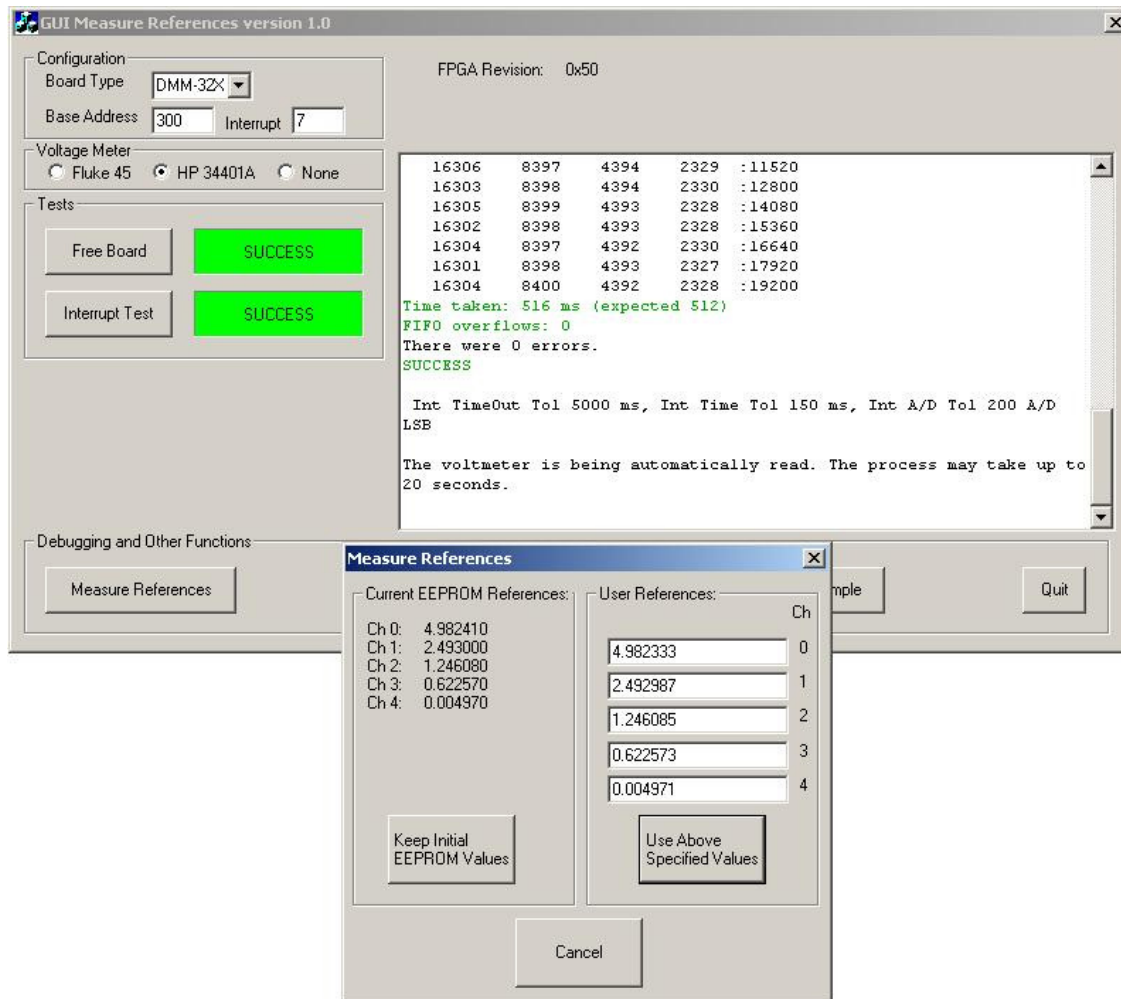
Follow on-screen instructions on how to connect the multi-meter. IT MUST BE NOTED THAT ONLY THE HP 34401A and Fluke 45 multi-meters are supported by this application.

As can be seen there are three radio buttons under the "Voltage Meter" section of the application. When 'None' is selected, the reference voltages need to be entered manually by the user when the next screen appears.
Upon selecting either of the radio buttons for Fluke 45 or HP 34401A, the application uses the RS-232 serial protocol of the respective meter to acquire the various reference voltages.

If using a Fluke 45 or HP34401A and a null-modem serial cable, the values will then be automatically obtained. Alternatively, one may click in each of the text fields on the right-hand side of the window, and each associated CalMux channel will automatically have its voltage displayed on the multi-meter, for the user to type in that text field.
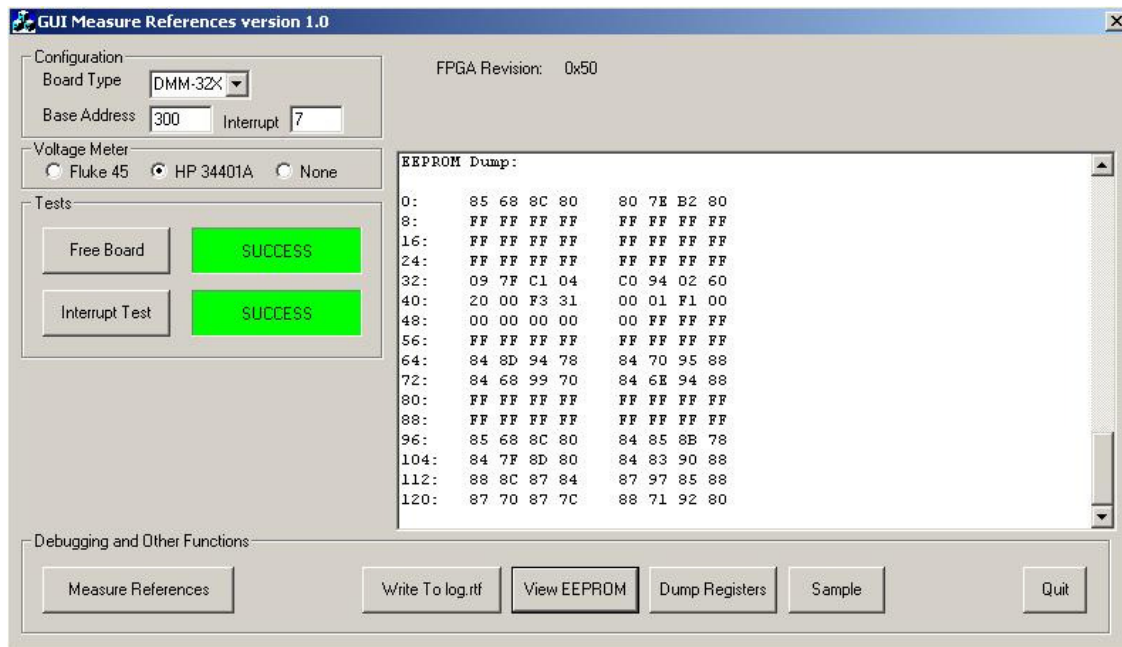
The application reads the existing reference voltage values from the EEPROM and displays the same on the left of the Measure References dialog window as shown in the picture above. If the values seem close to what the ideal values should be, they can be used as described below. If these values are incorrect, the following procedure can be followed to enter the values in manual mode.

- Click on the text box to the left of Ch 0 and observe the voltage on the multi-meter. Enter the voltage in units of VOLTS in the text box.
- Press TAB or click on the next text box labeled Ch 1 and repeat the above step.
- Repeat the procedure for all the available text boxes.

Clicking on 'Keep Initial EEPROM values' will leave the values as they were read on the EEPROM and close the dialog. The 'Cancel' button will cancel and close the window. The 'Use Above Specified Values' button will use the user/multi-meter values entered into the textual fields, and close the dialog.
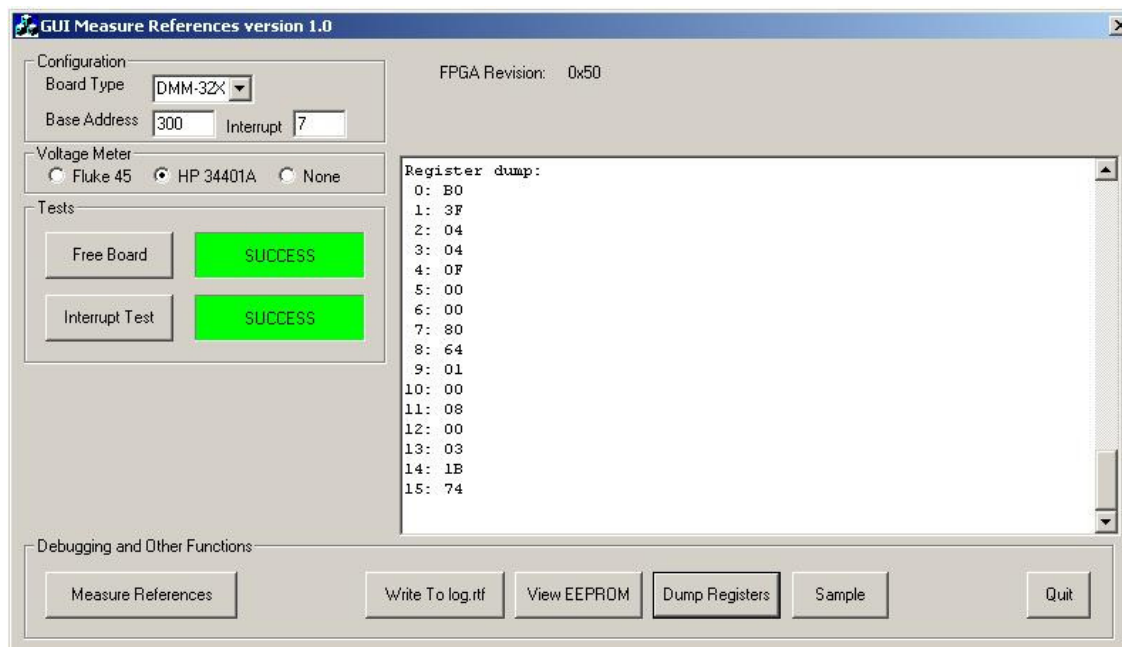
View EEProm Button:

Clicking 'View EEPROM' will display each EEPROM value in hexadecimal.

Dump Registers Button:

The 'Dump Registers' button will read the FPGA Page 0, registers 0 through 15.

Sample Button:

The button labeled 'Sample' will set the board's A/D section to 10V bipolar mode and initiate an individual A/D sample for the maximum number of channels for the selected board type, and send out known values to each D/A channel in case the user wants to re-direct the D/A to the A/D for testing.