

## ***bq76PL536PGM-1 Programming Board***

This document covers the initial connection and installation of the Texas Instruments bq76PL536 program (OTP) board, P/N bq76PL536PGM-1. For device details and setting up the secondary protection, see the bq76PL536 data sheet.

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## 1 Software and Hardware Requirements

### 1.1 Software Requirements

1. Install bq76PL536EVM-3 evaluation software, version 2.1.17 or higher.
2. Install bq76PL536PGM-1 OTP EPROM programming software.
3. Install Aardvark driver.

### 1.2 Hardware Requirements

1. bq76PL536PGM-1 programming board kit
2. bq76PL536EVM-3. See the bq76PL536EVM-3 user's guide for more details.
3. Aardvark Host Adapter

## 2 Software Installation

### 2.1 Installing the Aardvark Driver

#### CAUTION

The Aardvark driver must be installed before attaching the adapter for the first time.

The Aardvark driver must be installed prior to installing the TI-supplied bq76PL536 evaluation and bq76PL536 programming software.

From the CD-ROM, run the file /Tools/Aardvark/Drivers/TotalPhaseUSB-v2.xx.exe to install the drivers. If prompted to do so, plug the Aardvark adapter into an available USB port using the supplied cable. The port must be a powered port, typically direct from a personal computer (PC). Using a nonpowered USB hub may not provide sufficient operating current for the Aardvark adapter or EVM to operate correctly.

### 2.2 Installing the bq76PL536EVM-3 Evaluation Software

From the CD-ROM, run the file /Software/bq76PL536 Evaluation Software x\_x\_x.msi to install, where the "x\_x\_x" is replaced by the current build number. Installation is automatic. This installs the GUI (graphical user interface) software for the Windows™ operating system. As new versions are released, they may be installed over the existing version. See the bq76PL536EVM-3 ([SLUU437](#)) user's guide for detailed installation information.

### 2.3 Installing the bq76PL536PGM-1 Programming Software

From the CD-ROM, run the file /bq76PL536 programmer setup.msi. Installation is automatic. This installs the GUI software for Windows. As new versions are released, they may be installed over the existing version.

## 3 Connecting bq76PL536PGM and bq76PL536EVM Boards

### 3.1 Connecting bq76PL536EVM-3

See the bq76PL536EVM-3 ([SLUU437](#)) user's guide.

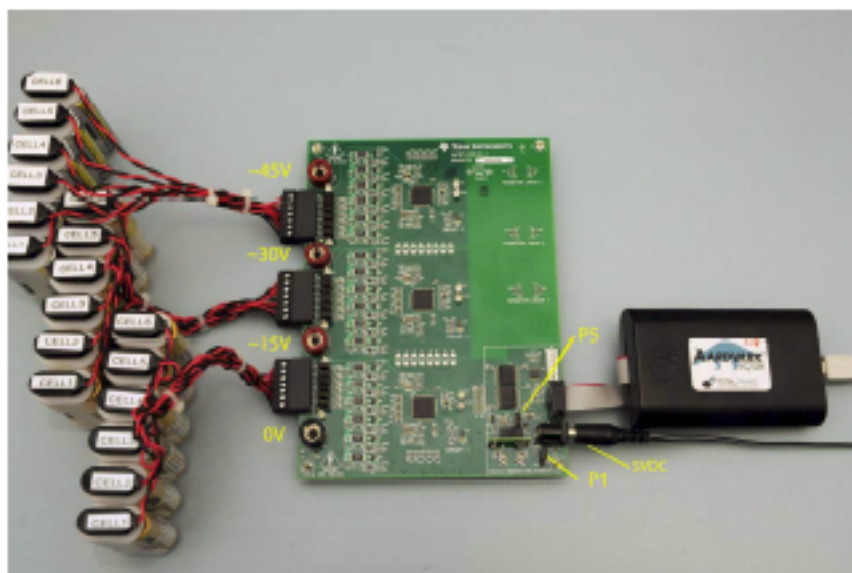


Figure 1. bq76PL536EVM-3

### 3.2 Connecting bq76PL536PGM

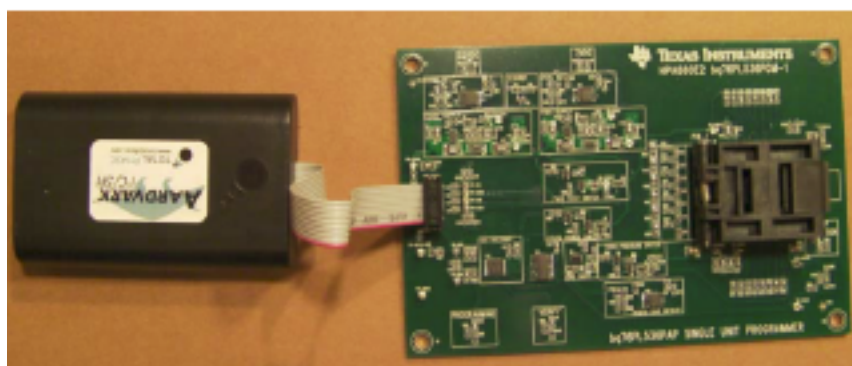


Figure 2. bq76PL536PGM-1

1. Connect the USB cable to the Aardvark adapter and your PC.
2. Connect the Aardvark ribbon cable to the 10-pin header on the bq76PL536PGM programmer board.
3. Run the bq76PL536 OTP EPROM programmer software on your PC.
4. Check for 22-V and 7-V LEDs on the board and GUI. See [Figure 9](#).
5. If all of the LEDs are not ON, select Connect to Dongle (F2), or repeat the preceding steps.

## 4 EPROM Programming Procedures

1. Set EPROM trimming values.
  - (a) Set up bq76PL536EVM-3. See [Section 3](#) or the bq76PL536EVM-3 user's guide.
  - (b) Set trimming values. See [Figure 3](#).
2. Create programmable image.
  - (a) Create program image ( [Figure 4](#)).
  - (b) Enter information on optional product data ( [Figure 5](#)).
  - (c) Save image file in YYYYYY.xml format ( [Figure 6](#)).
  - (d) Save the YYYYYY.xml file to a directory.
3. Connect the Aardvark adapter to the bq76PL536PGM-1 programming board. See [Section 3](#).

4. Run bq76PL536 OTP EPROM Programmer Software.
5. Load the image created with bq76PL536EVM ( [Figure 7](#) and [Figure 8](#)).
6. Insert the integrated circuit (IC) into the socket. Check for pin 1 orientation. See [Figure 10](#). The 22V and 7V LEDs must be on. If not, press the F2 function key, "Connect to Dongle". See [Figure 21](#).
7. Test the IC. Click the Click to Detect selection.
8. Separate pass and fail IC.
9. Insert a new IC, and repeat from step 5.
10. See [Figure 9](#) to [Figure 13](#) for complete sequence of EPROM programming.

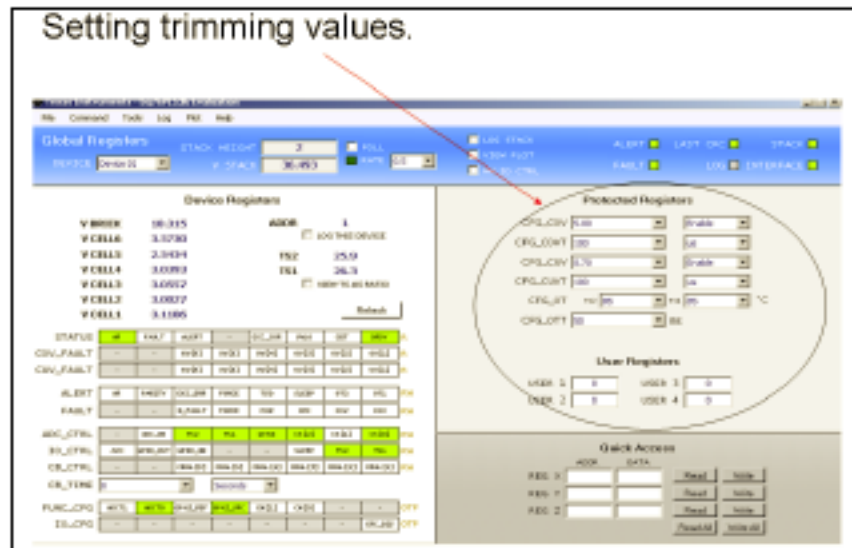


Figure 3. Setting Trimming Value

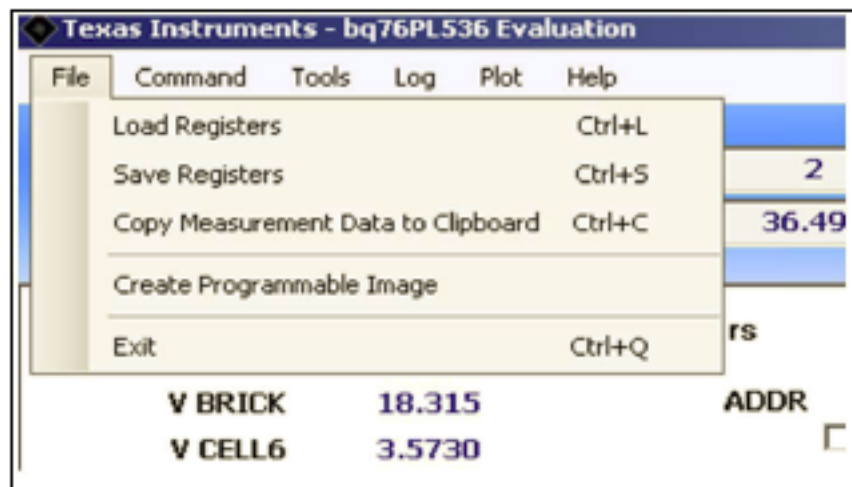
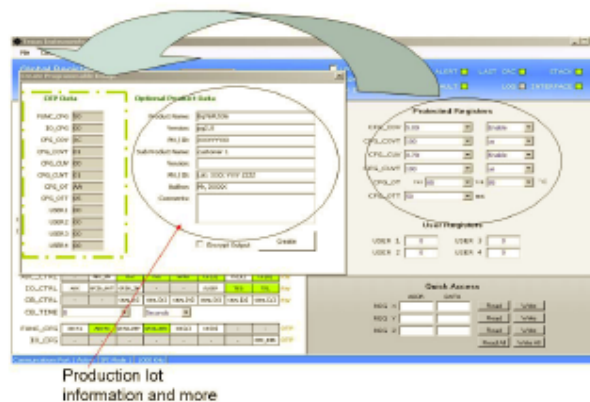
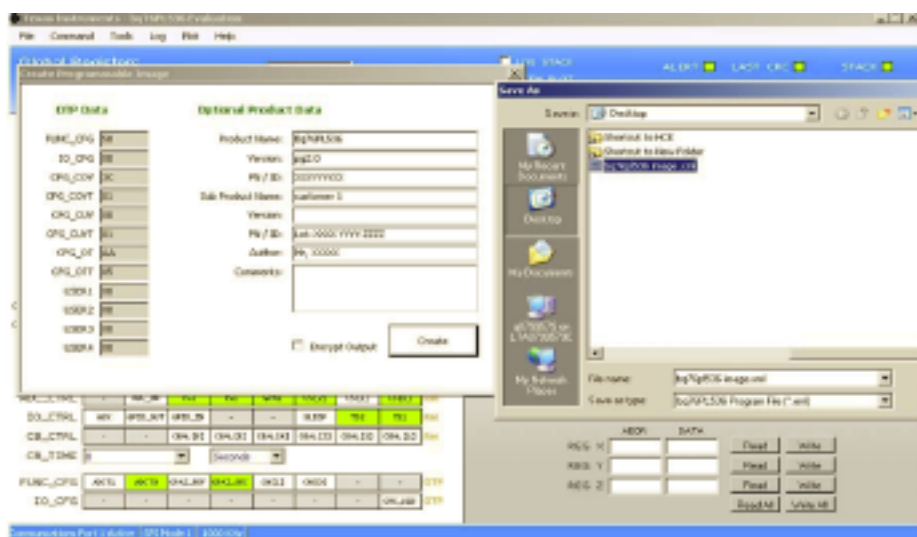


Figure 4. Creating Programmable Image

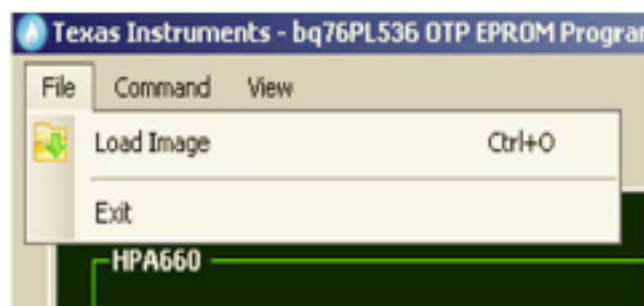
Protected registers values are automatically saved in OTP Data. Enter OTP data values to the Protected registers.



### Figure 5. Entering Optional Product Data



### Figure 6. Saving Image File



### Figure 7. Loading Image to bq76PL536 OTP EPROM Programmer

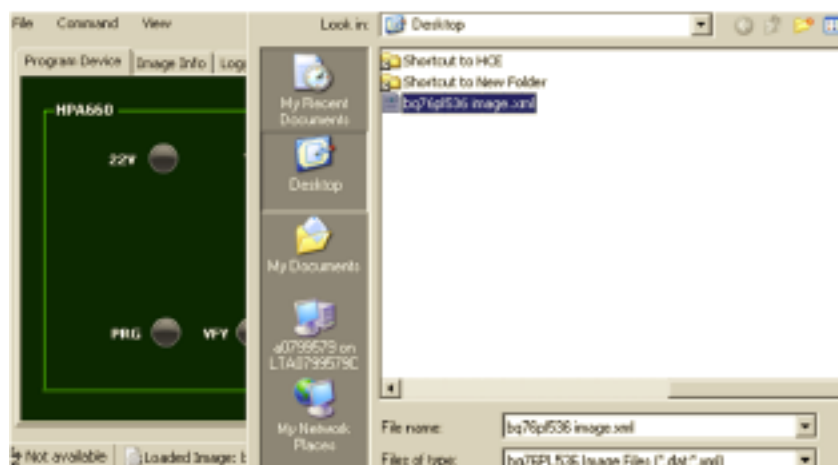


Figure 8. Loading Image to bq76PL536 OTP EPROM Programmer

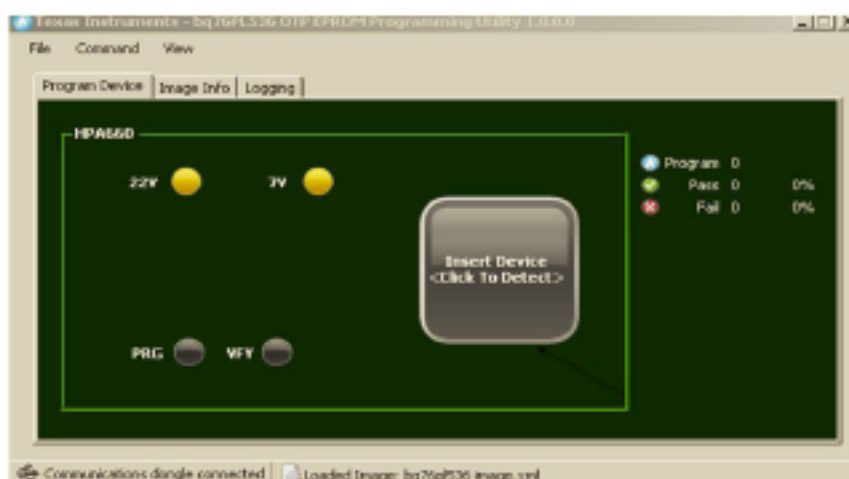


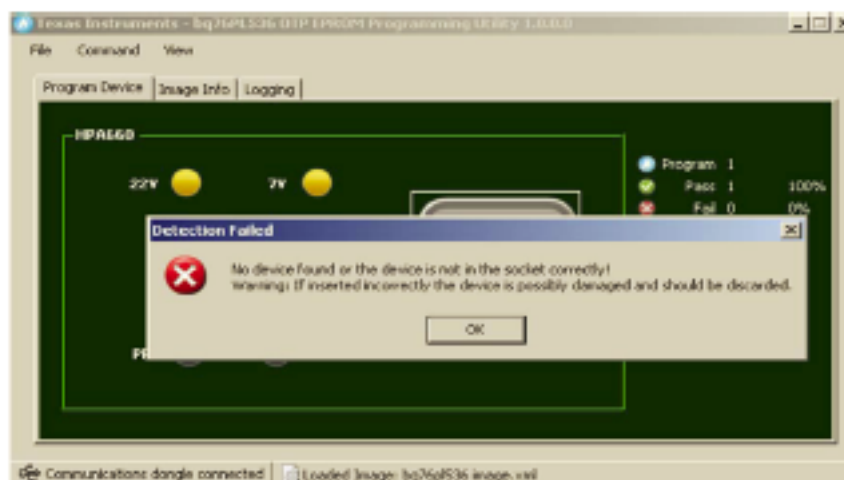
Figure 9. Check Hardware Setup



Figure 10. Detecting IC



**Figure 11. IC Detected. IC Inserted Correctly**



**Figure 12. Warning for NO IC or Inserting Incorrectly**

**Discard this IC if inserted incorrectly.**

**NOTE:** GO Back to Step 5

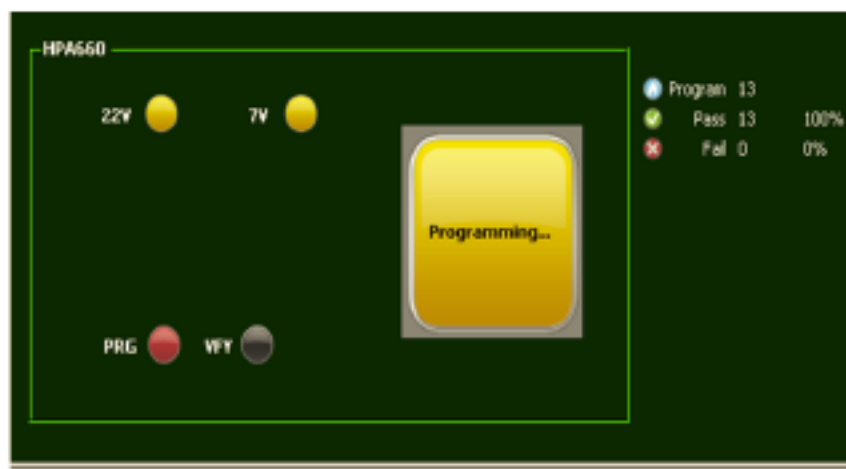


Figure 13. Programming IC

Passing count will increase by 1.

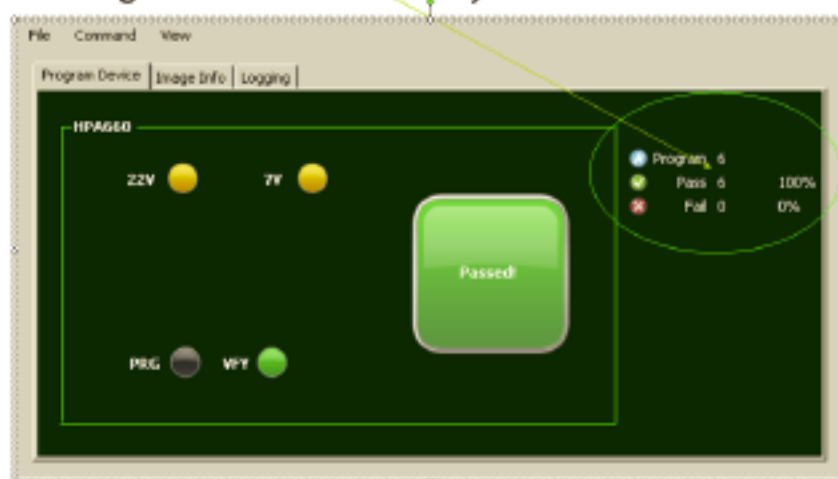


Figure 14. Passing or Failing. IC is Programmed Correctly

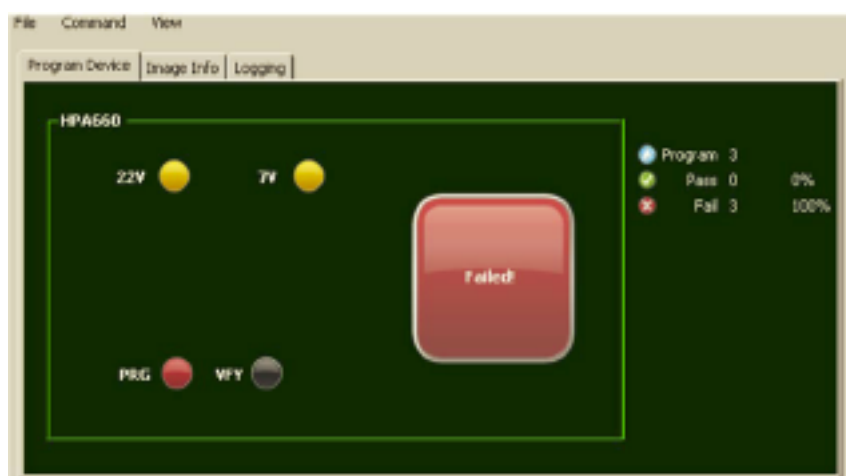


Figure 15. Passing/Failing. IC Failed to Program Fail Count Increases by 1





Figure 16. Completed EPROM Programming. Insert a New IC and Repeat From Step 5.

## 5 Warnings and Troubleshooting

### 5.1 No IC or IC Inserted Incorrectly

1. See [Figure 17](#). Error message pops up.
2. Discard the IC if IC is inserted incorrectly

### 5.2 Reprogramming Trimmed (Programmed) IC

EPROM (OTP) is a one-time-only programmable memory. ICs must not be programmed more than one time. It is possible to damage the device if programmed twice.

- (a) [Figure 18](#) error message pops up.
- (b) Go to [Section 6.4](#). If OTP matches, then the IC is already programmed to proper trim value. If OTP does not match, then IC is a failed IC and must be disregarded.
- (c) Go to [Section 6.5](#). Verify Blank Check feature. Request that TI send blank ICs.

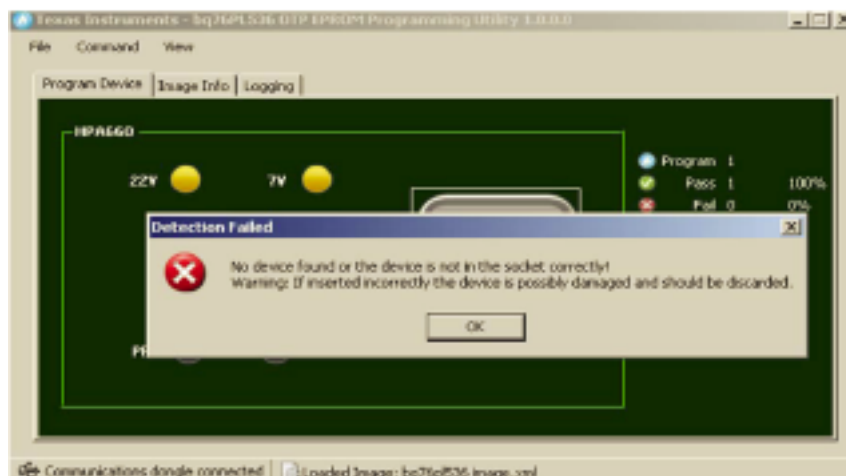
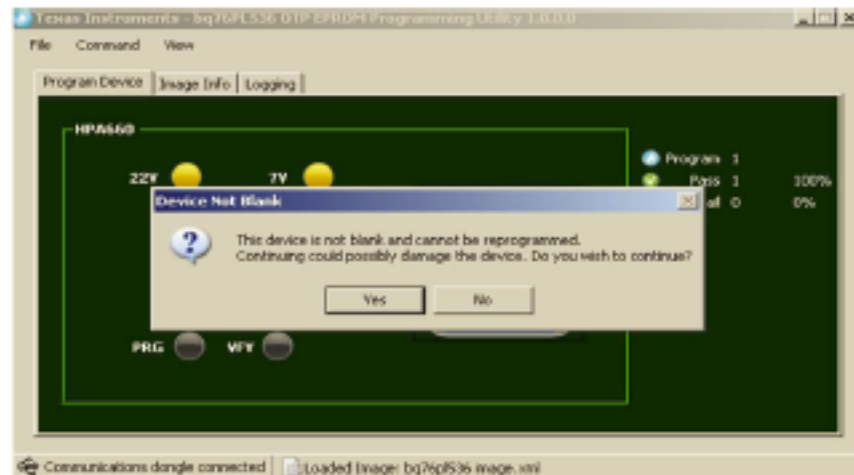


Figure 17. Warning for NO IC or IC Inserted Incorrectly



**Figure 18. Reprogramming Trimmed IC**

## 6 Advanced Mode View Detail

Advanced mode provides tools for users to get more detailed information for debugging purposes. This mode is not recommended for production operator.


### 6.1 Copy Measurement Data to Clipboard

- Copy current measurements (Brick, Cell voltage, Temperatures) to clipboard, and subsequently copy to a spreadsheet.

### 6.2 Connect to Dongle - F2

- Connect dongle to your PC ( [Figure 21](#)).

### 6.3 Program Image

- Program OTP trim value to IC ([Figure 22](#)).
- Click  icon or F5.

### 6.4 Compare OTP

- Compare IC OTP content ([Figure 23](#) and [Figure 24](#)).

### 6.5 Blank Check - F7

- Check whether OTP is blank or not ([Figure 25](#) and [Figure 26](#)).

## 6.6 Refresh



Figure 19. Advanced Mode Main View



Figure 20. Copying Measurements Data to Clipboard



Figure 21. Connect to Dongle



Figure 22. Program Image

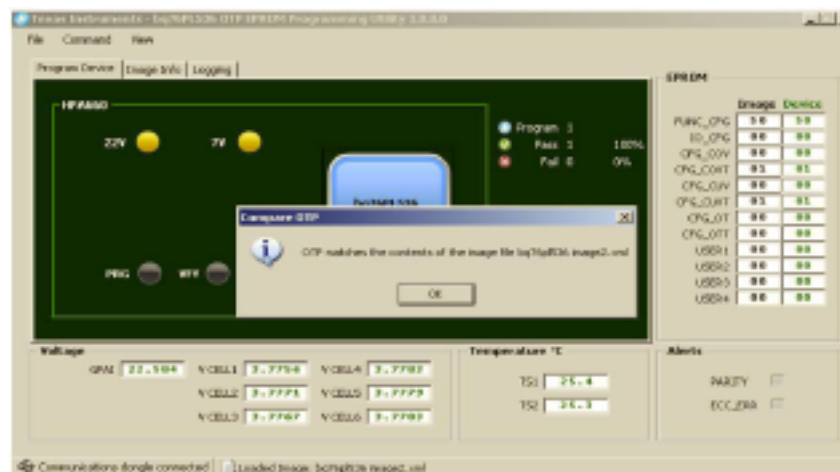


Figure 23. Comparing OTP. OTP Matches

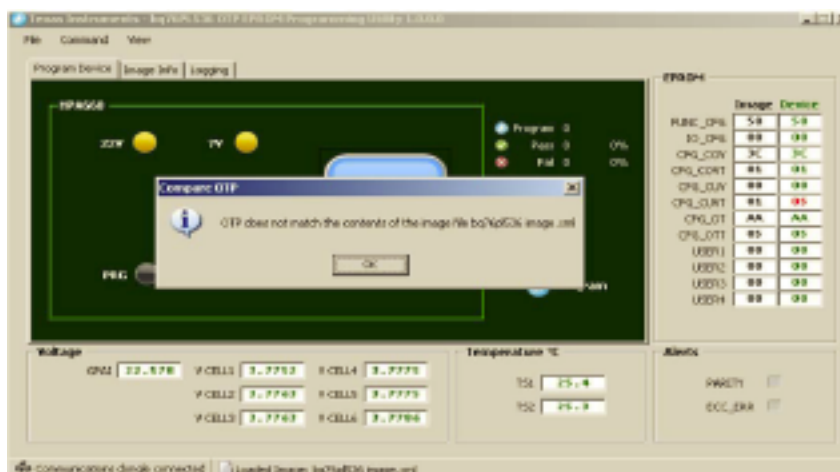


Figure 24. Comparing OTP. OTP Does not Match

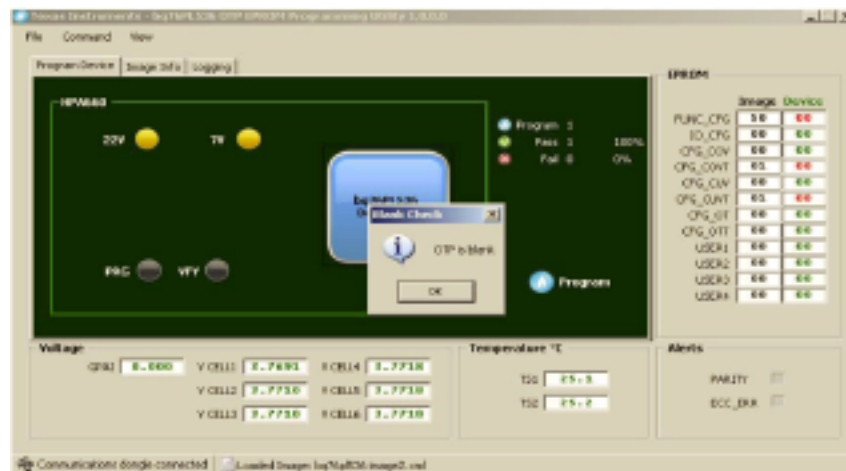


Figure 25. Checking for Blank OTP. OTP is Blank

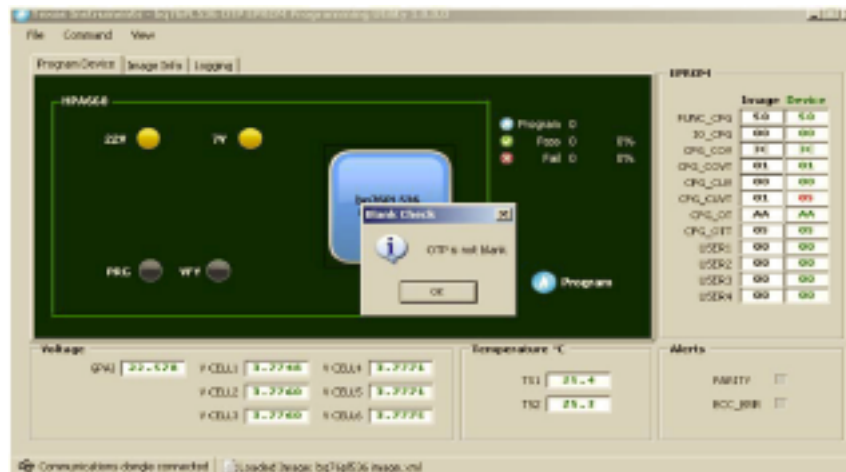


Figure 26. Checking for Blank OTP. OTP is not Blank

## 7 Support

Contact your local TI sales office for technical support. Support is also available through the TI E2E™ community forum at [http://e2e.ti.com/support/power\\_management/default.aspx](http://e2e.ti.com/support/power_management/default.aspx).

## 8 Packing List

Line	QTY	EA	P/N	Description
1	1	ea		Bq76PL536PGM PCB assembly (x = rev level)
2	1	ea		Aardvark adapter USB→SPI (FW Rev 3.41 or later required)
3	1	ea		CD-ROM containing software and documentation

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