

## ***bq2026 Evaluation Software***

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The purpose of the bq2026 evaluation board and the bq2026EVM evaluation software is to demonstrate the functionality of the bq2026. The bq2026 evaluation board supports both the bq2026DBZR (SOT23-3) and bq2026LPR (TO-92) packages but only one package can be evaluated/programmed at any time.

The bq2026 is a 1.5K-bit serial EPROM containing a factory-programmed, unique 48-bit identification number, 8-bit family code, and a 64-bit status register.

The bq2026 is ideal for applications such as battery pack configuration parameters, record maintenance, asset tracking, product revision status, and access-code security.

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# 1 Kit Contents

1. bq2026EVM REVA board

# 2 bq2026-Based Circuit Module

The bq2026-based circuit module is ideal for programming the 1.5K-bit EPROM and the STATUS bytes of the bq2026 IC. The circuit module includes a SOT23 single socket, a bq2026 IC, a Zener diode for host protection during EPROM programming, and a programming circuit that generates a 12-V pulse when used with a power supply and a control signal. In a typical application, only the bq2026 IC and a pullup resistor is required.

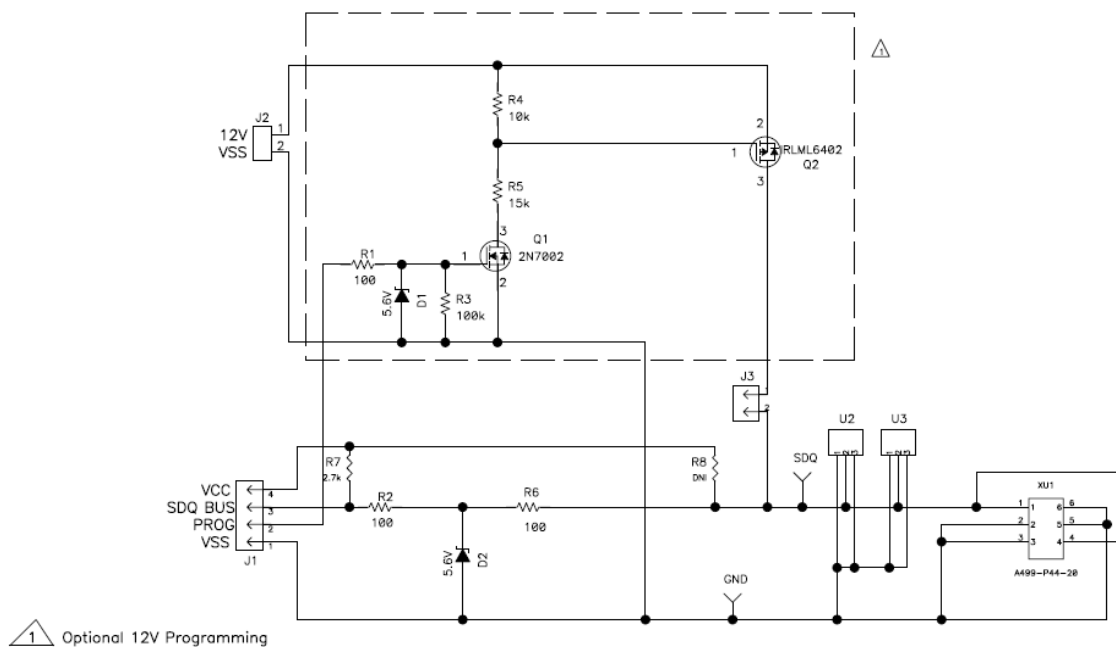
## 2.1 Test Points

**Table 1. Test Points**

Test Point	Signal Name	Description
J1-1	VSS	Device ground
J1-2	PROG	Input for timing of EPROM programming pulse
J1-3	SDQ	SDQ single-wire communication bus
J2-1	12V	High voltage for EPROM programming
J2-2	VSS	Programming ground
J3		Connect for EPROM programming

# 3 bq2026EVM Circuit Module Schematic

The schematic shows the circuit for the bq2026 implementation.



**Figure 1. bq2026EVM Schematic**

## 4 bq2026EVM Circuit Module Physical Layouts

This section contains the board layout and assembly drawings for the bq2026EVM circuit module.

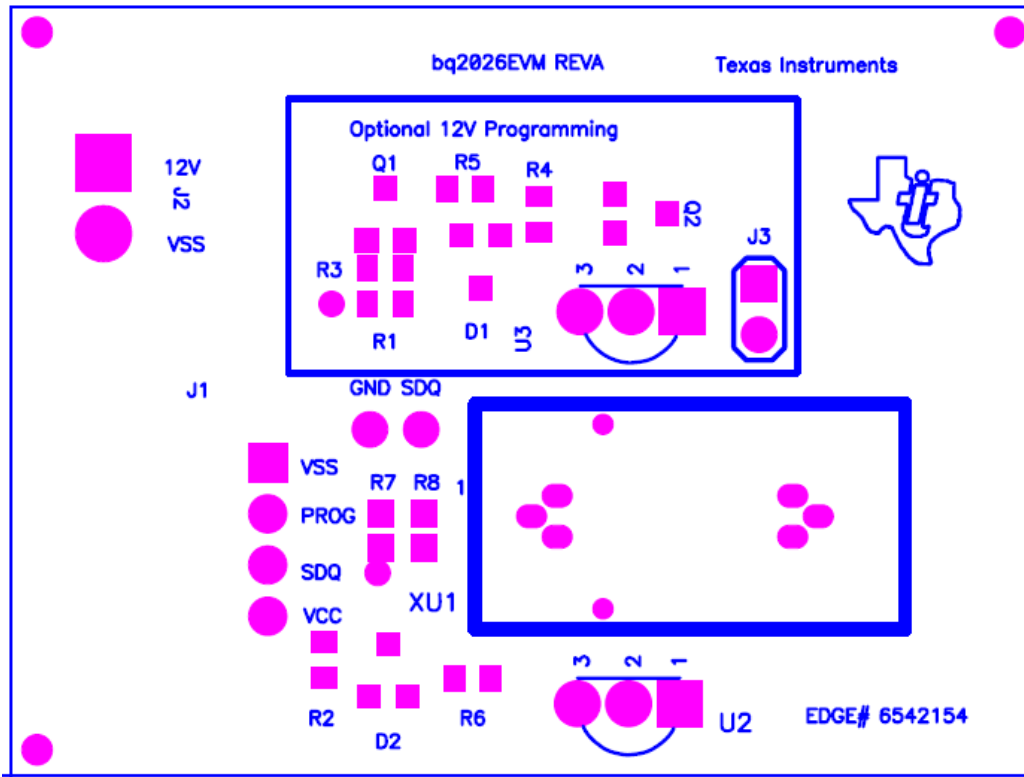


Figure 2. bq2026EVM Silk Screen

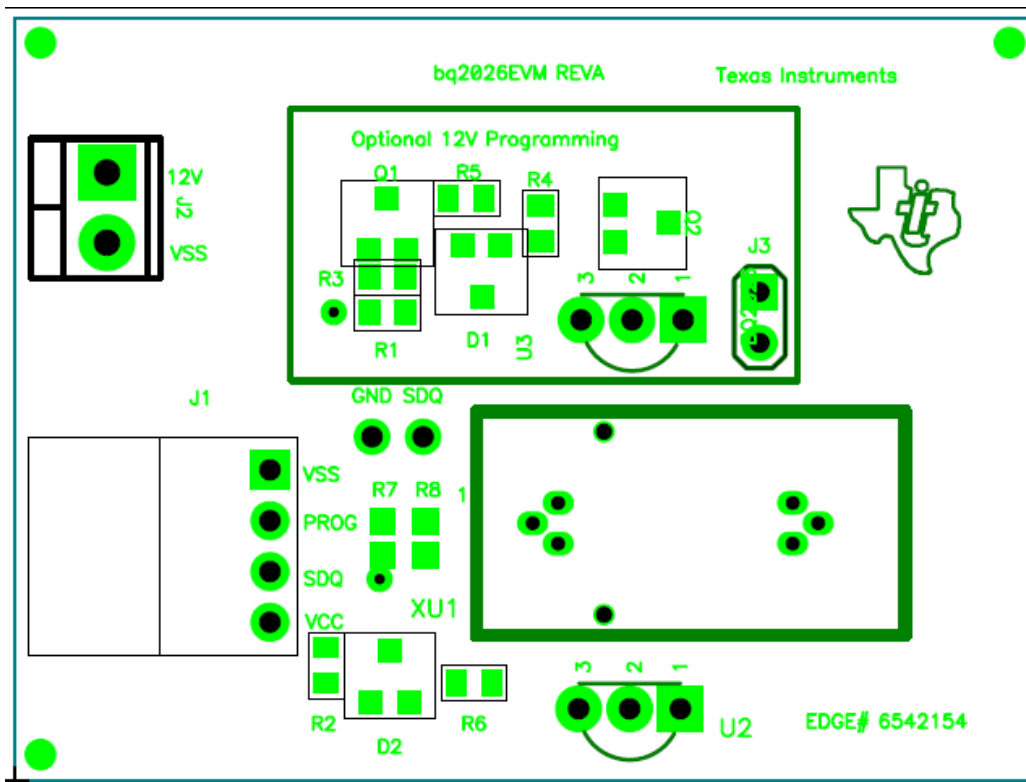


Figure 3. bq2026EVM Top Assembly

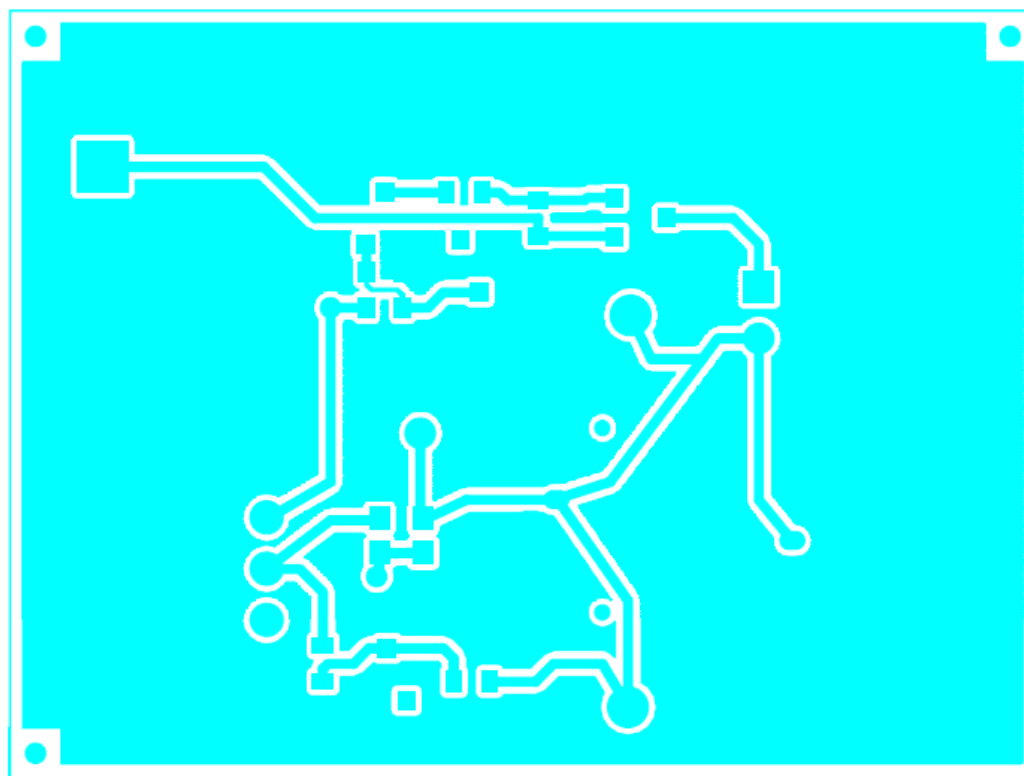
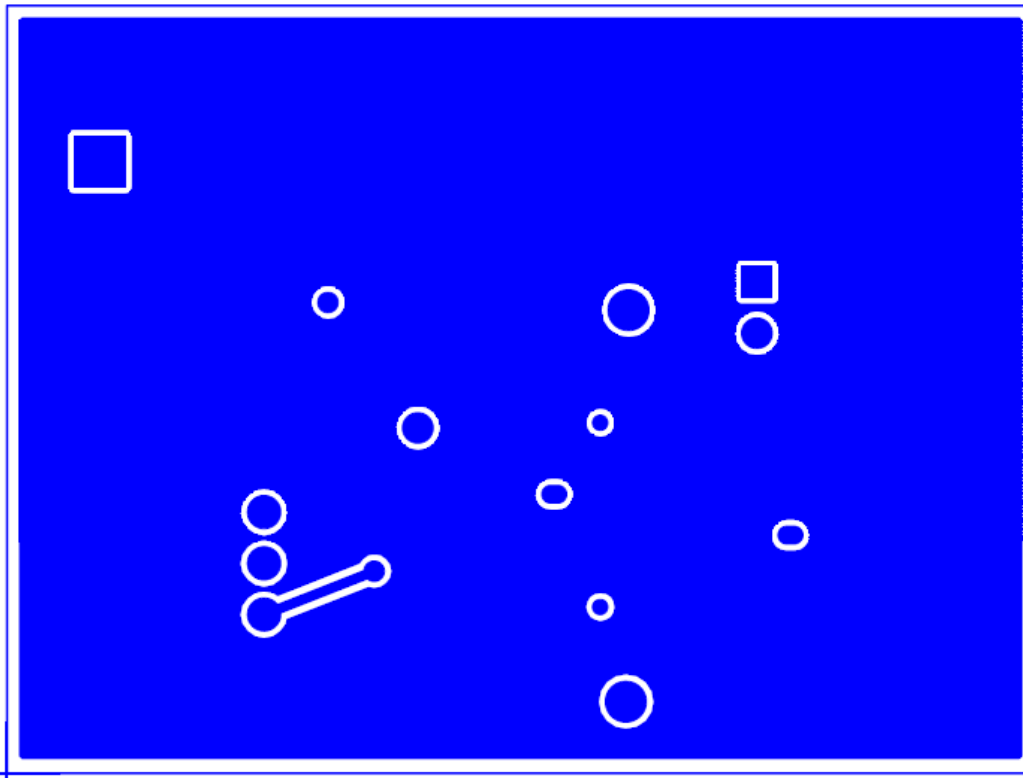


Figure 4. bq2026EVM Top Layer



**Figure 5. bq2026EVM Bottom Layer**

## 5 bq2026EVM Circuit Module Bill of Materials

Table 2 presents the bill of materials required for the bq2026EVM circuit module.

**Table 2. Bill of Materials**

Count	RefDes	Description	Size	MFR	Part Number
2	D1, D2	Diode, Zener, 5.6-V, 350-mW	SOT-23	Diodes, Inc.	BZX84C5V6
1	J3	Header, 2-pin, 100-mil spacing, (36-pin strip)	0.100 x 2	Sullins	PTC36SAAN
3	R1, R2, R6	Resistor, Chip, 100-Ω, 1/16-W, 5%	603	Std	Std
1	R3	Resistor, Chip, 100-kΩ, 1/16-W, 5%	603	Std	Std
1	R4	Resistor, Chip, 10-kΩ, 1/16-W, 5%	603	Std	Std
1	R5	Resistor, Chip, 15-kΩ, 1/16-W, 5%	603	Std	Std
0	R7*, R8*	Resistor, Chip, 2.7-kΩ, 1/16-W, 5%	603	Std	Std
1	XU1	Socket, SOT-23, 6P	SOT-23-6	WELLS-CTI	499-P44-20
1	J1	Header, Friction Lock Ass'y, 4-pin Right Angle	0.400 x 0.500	Molex	22-05-3041
1	J2	Terminal Block, 2-pin, 6-A, 3.5-mm	0.27 x 0.25 inch	OST	ED1514
0	GND*	Test Point, Black, 1-mm	0.038	Keystone	5001
0	SDQ*	Test Point, Red, 1-mm	0.038	Keystone	5000
2	U2,U3*	Socket Pin - Install First	DIA_038, PIN_013-020, EXP_146, B125	Tyco	50935
1	Q1	MOSFET, N-ch, 60-V, 115-mA, 1.2-Ω	SOT23	Vishay-Liteon	2N7002-7-F
1	Q2	MOSFET, Pch, -20-V, 3.7-A, 65 mΩ	SOT23	IR	IRLML6402
1	--	PCB, 2 In x 1.25 In x 0.125 In		Any	bq2026EVM Board
1	N/A	Shunt, 100-mil, Black	0.1	3M	929950-00
1	U1	bq2026, IC, 1.5K Serial EPROM With SDQ Interface	SOT-23	TI	bq2026DBZR

## 6 bq2026EVM Circuit Module Performance Specification Summary

**Table 3. Performance Specification Summary**

Specification	Min	Typ	Max	Unit
Voltage Pullup ( $V_{UP}$ )	2.65		5.5	V
Programming Voltage( $V_{PP}$ )	11.5		12	V

## 7 bq2026EVM Hardware and Software Setup

### 7.1 Drivers and Software Installation`

This section describes how to install the bq2026EVM PC software and how to connect the different components of the EVM.

Perform the following steps to install the bq2026 evaluation software:

1. Insert the CD ROM into a CD ROM drive.
2. Select the CD ROM drive using *My Computer or File Manager*.
3. Select the ReadMeFirst.txt file.
4. Select the Software/EV2300 Drivers directory of the CD, and run SETUP.EXE.
5. Plug the EV2300 into a USB port.
6. Wait until system prompt *new hardware found* appears. Choose *select location manually*, and use the browse button to point to C:\WINDOWS\TI\USB1.
7. Answer *continue* to the warning that drivers are not certified with Microsoft.
8. After installation finishes, another system prompt *new hardware found* appears. Repeat preceding procedure, but point to C:\WINDOWS\TI\USB2.
9. Answer *continue* to the warning that drivers are not certified with Microsoft. Installation of drivers is now finished.
10. For Windows 98, point to directory TIUSBWin98.
11. After installing the USB drivers for EV2300, double-click on the Setup.exe icon that is under the Software/bq2026 Evaluation Software folder.
12. Follow the instructions on screen during the installation of evaluation software.
13. The setup program installs a Windows application group.

### 7.2 Hardware Connection

The bq2026EVM has three hardware components:

1. The bq2026EVM circuit module
2. The PC interface board, (EV2300)
3. The PC

Perform the following steps to configure the hardware for interface to the PC:

1. Connect the bq2026EVM board with the EV2300 PC interface board using [Table 4](#) as a pin connection guide.
2. Connect the USB cable to the EV2300 and the PC USB port.

The bq2026EVM is now set up for normal operation.

**Table 4. Wire Connection**

<b>bq2026EVM REVA</b>	<b>EV2300</b>
SDQ	HDQ
VSS	GND
PROG	VOUT

To program the EPROM of bq2026EVM, a 12-V pulse must be generated on the SDQ line. The bq2026EVM board has an additional circuit included that permits generating this pulse when using a power supply set to 12 V and the VOUT output of the EV2300. The evaluation software controls this pulse for EPROM programming.

When programming the EPROM, it is expected that a 12-V supply be connected to the bq2026EVM board at the 12-V input terminal of the bq2026EVM board. Ensure that the ground of the power supply is connected to VSS of the board.

A jumper (J3) must be connected when using the EPROM programming circuit.

### 7.2.1 Normal Operation

Normal operation includes performing any of the ROM commands, reading the 1.5K-bit EPROM and reading the EPROM Status Memory.

### 7.2.2 EPROM Programming

To program EPROM registers, a 12-V pulse must be sent across the SDQ line during a write command. See the bq2026 data sheet ([SLUS938](#)) for a specific description of EPROM programming requirements. When programming EPROM registers, the following must be ensured:

- J3 jumper is connected.
- VOUT output of EV2300 is connected to PROG input of bq2026EVM board.
- Power supply set to 12 V is connected across the 12-V and VSS inputs of bq2026EVM board.

## 8 Software Operation

Run the program from the Start → Programs → Texas Instruments → bq2026 Evaluation Software menu sequence.

### 8.1 Evaluation Software Pages

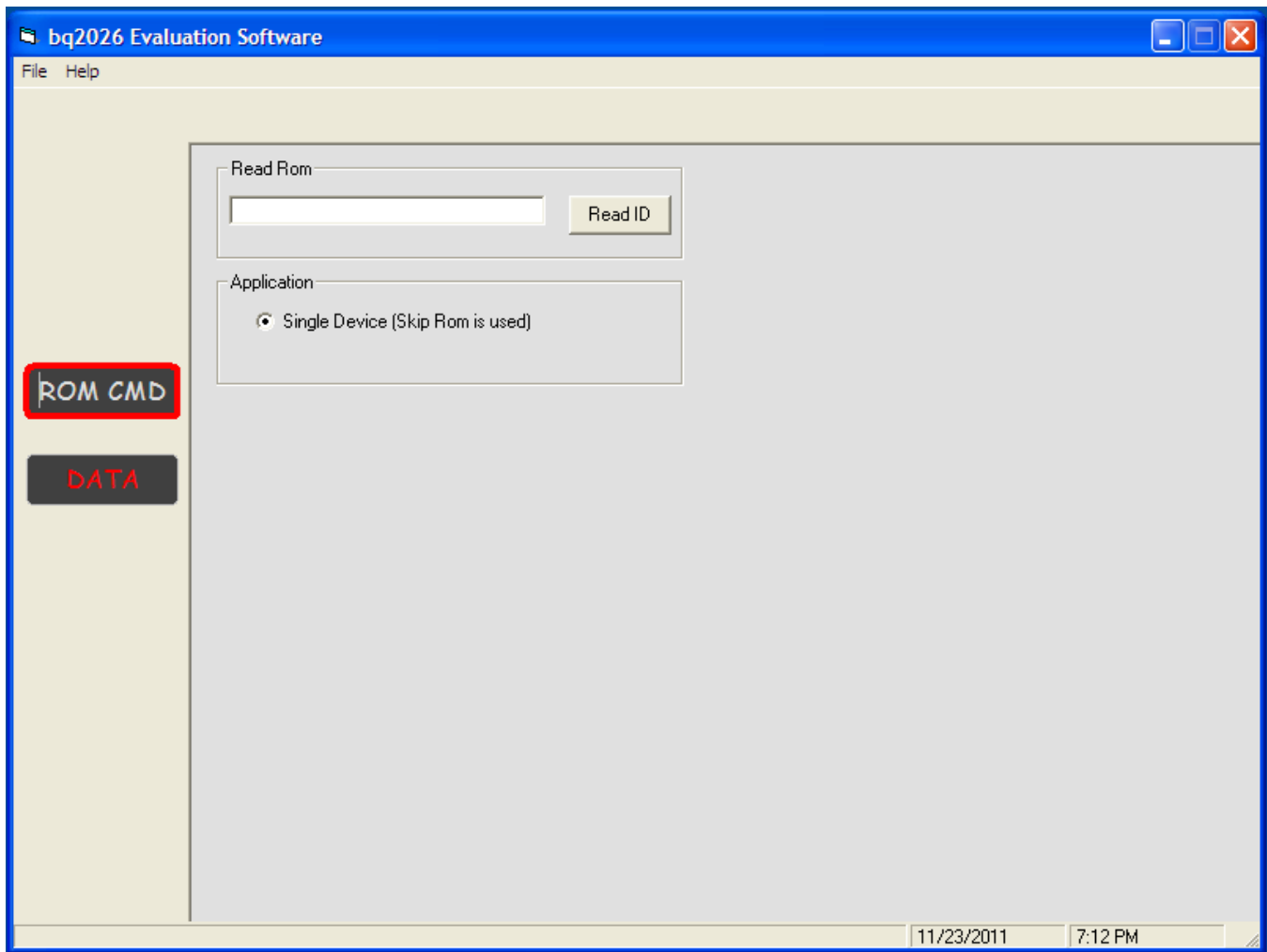
This section describes the function of each page of the evaluation program.

### 8.2 ROM CMD

This page provides all the ROM commands for bq2026 (see [Figure 6](#)).

#### 8.2.1 Sections Within the ROM CMD Page

**Read ROM** — The ID ROM of the device on the SDQ communication line is displayed when READ ID is clicked.



**Figure 6. ROM CMD Page**

### 8.3 DATA

This page (see [Figure 7](#)) allows the user to program the 1.5K-bit EPROM with desired values and to program the STATUS bytes. It requires that the hardware is set up as described in the EPROM programming of this user's guide.

#### 8.3.1 1.5K-Bit EPROM

The EPROM memory map is organized in six pages of 32 bytes each. All registers can be read by clicking on the Read Memory button. As the registers of a specific page are being read, the page number is highlighted in red.

The two methods of programming the EPROM using the evaluation program follow.

1. Click on a specific grid that corresponds to the register that needs to be written. Write the hexadecimal value of the data that needs to be written, and then press ENTER.
2. The other method of programming the EPROM is by importing a data file that contains all the values to be programmed. The data file has the file extension **.epr**. An example of a data file is included with the evaluation program. To create additional data files, modify the example file so that the values on the right side of the file represent the desired values. Save the file with a different name ensuring that the extension **.epr** is used. To import a file into the grid, go to *File* → *Open Data File*, and select the appropriate file. Once the file is opened, the grid is filled in with the values contained in the data file.



Click on the *Write Memory* button so that the values are programmed into the EPROM.

A data file can also be saved by going to *File/Save Data File*. The data that is saved in the file is the data displayed on the grids representing the EPROM memory map.

### 8.3.2 Status Bytes

This section allows the user to read or write the EPROM Status bytes of the bq2026. The registers are programmed by clicking on the appropriate grid, entering the desired value, and pressing ENTER.

Note that the status registers are EPROM. Once a bit has been cleared, it cannot be set.

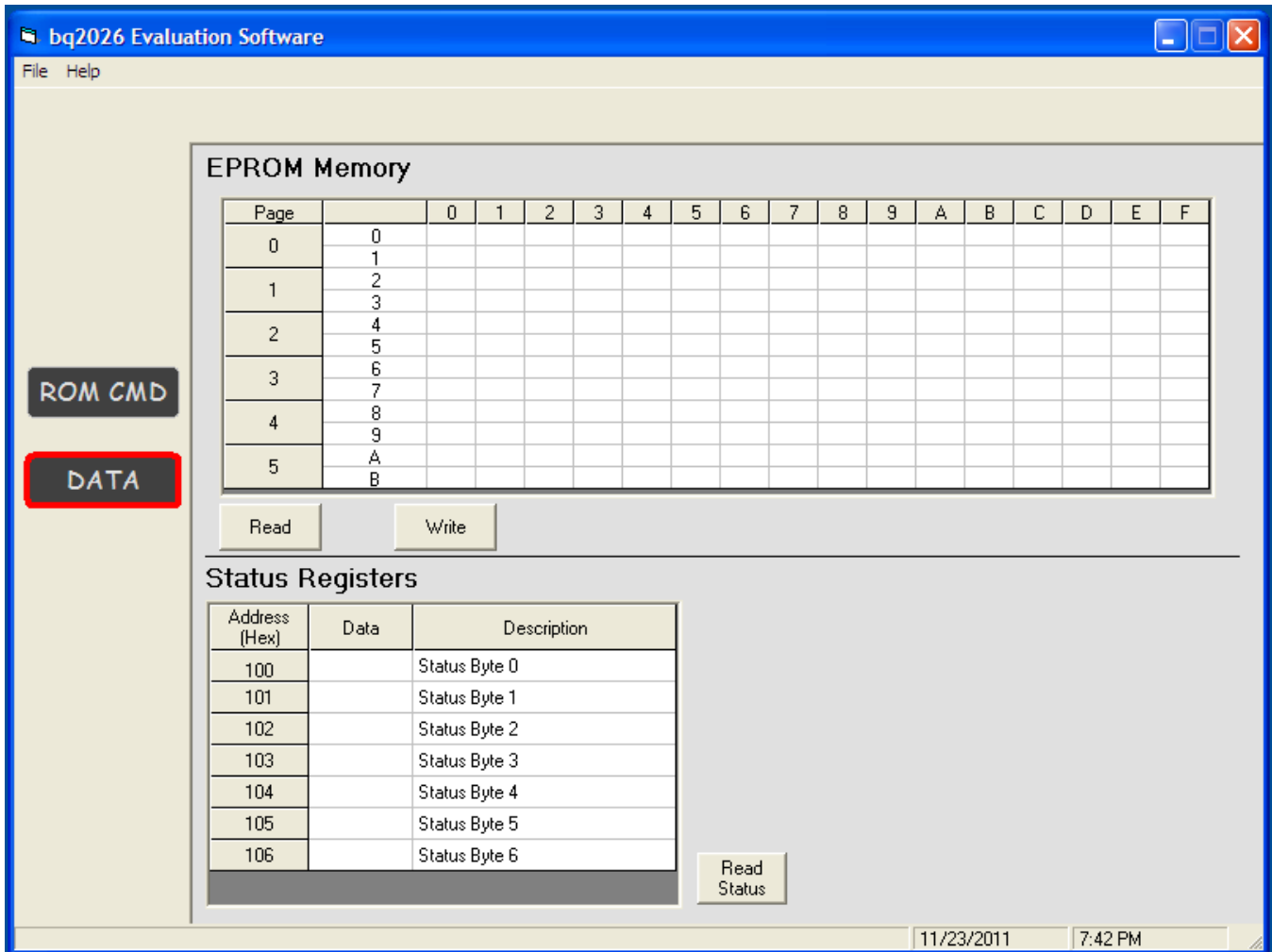


Figure 7. DATA Page

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## Revision History

### Changes from Original (December 2011) to A Revision

**Page**

- 
- Deleted list items 2: "Personal computer (PC) interface board EV2300" and 3: "USB cable (type A-B)" from [Section 1 ...](#) **2**

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NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

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This kit is designed to allow product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and software developers to write software applications for use with the end product. This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.
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### CAUTION

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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*NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:*

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### 3.2 Canada

3.2.1 For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210

#### Concerning EVMs Including Radio Transmitters:

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

#### Concernant les EVMs avec appareils radio:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

#### Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

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2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

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