

bq2022A Evaluation Software

The bq2022A is a 1 K-bit serial EPROM containing a factory-programmed, unique 48-bit identification number, 8-bit CRC generation, and an 8-bit family code. A 64-bit status register controls write protection and page redirection.

The purpose of the evaluation software is to demonstrate the functionality of the bq2022A. The bq2022A evaluation board can be used for one or two ICs.

The bq2022A 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. bq2022A, HPA125 revision-B board
2. CD-ROM including Windows®-based PC software and support documentation

NOTE: An EV2300 board is required to interface this EVM with the PC and can be purchased separately.

4 Circuit Module Physical Layouts

This section contains the board layout and assembly drawings for the bq2022AEVM circuit module.

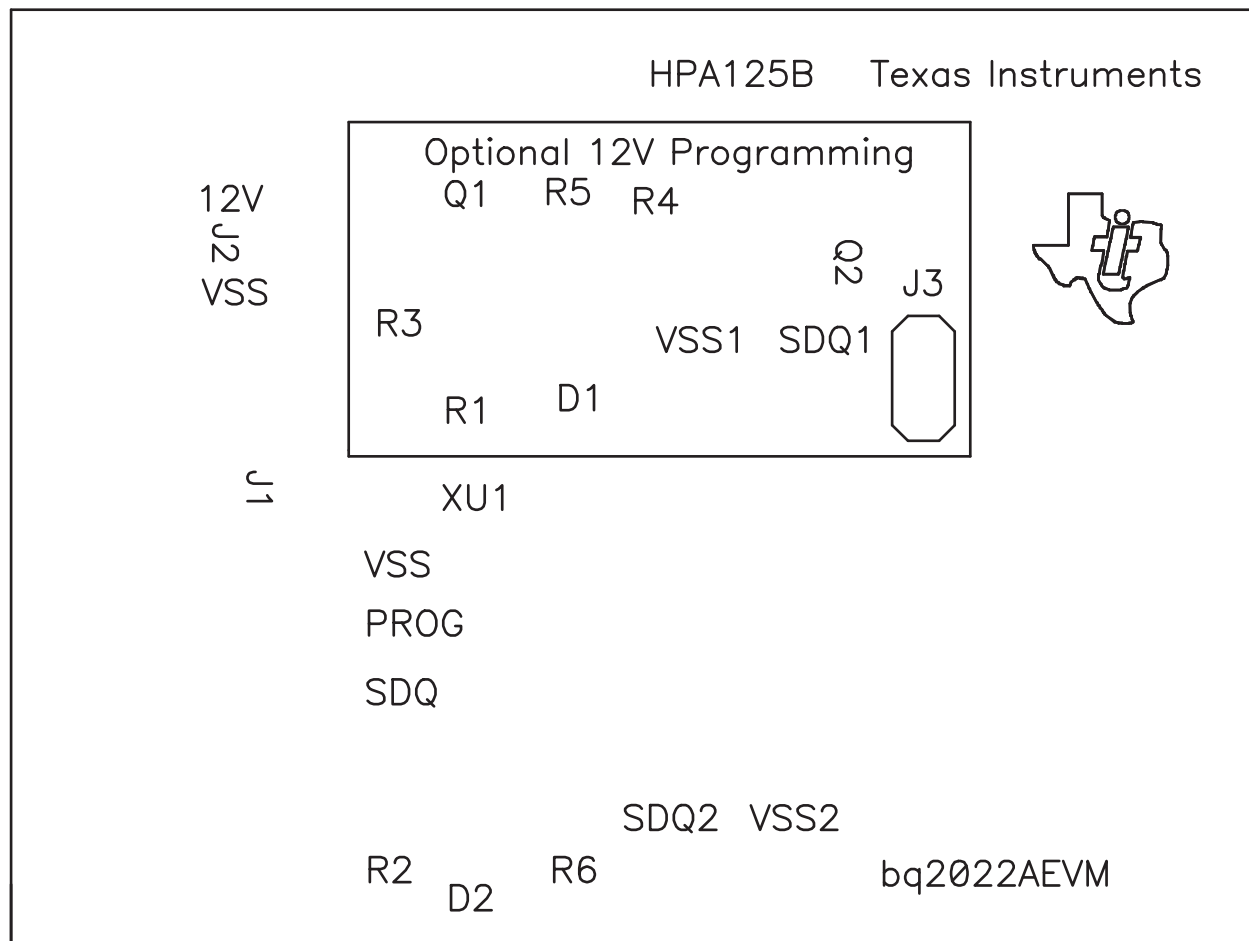


Figure 2. Silk Screen

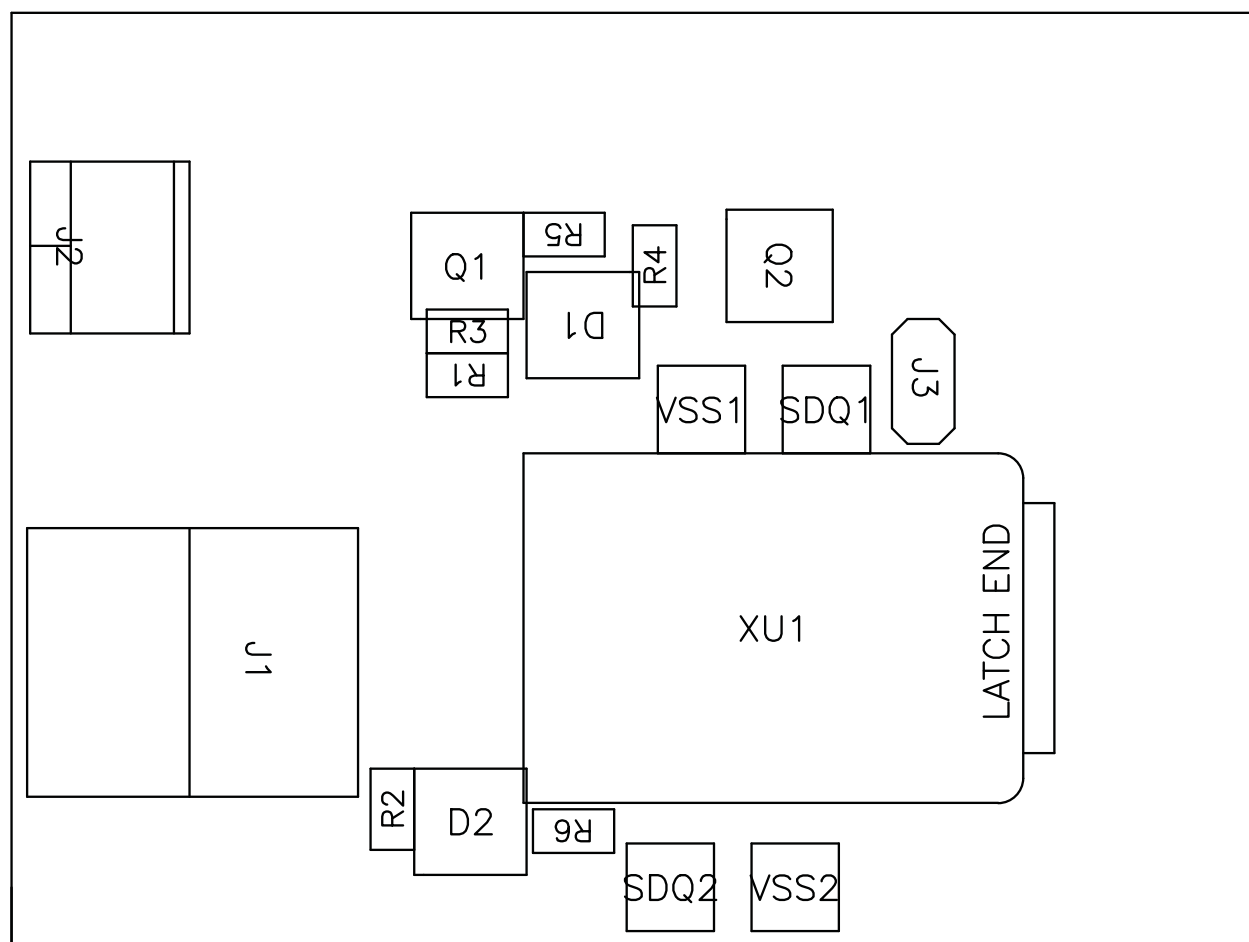


Figure 3. EVM Top Assembly

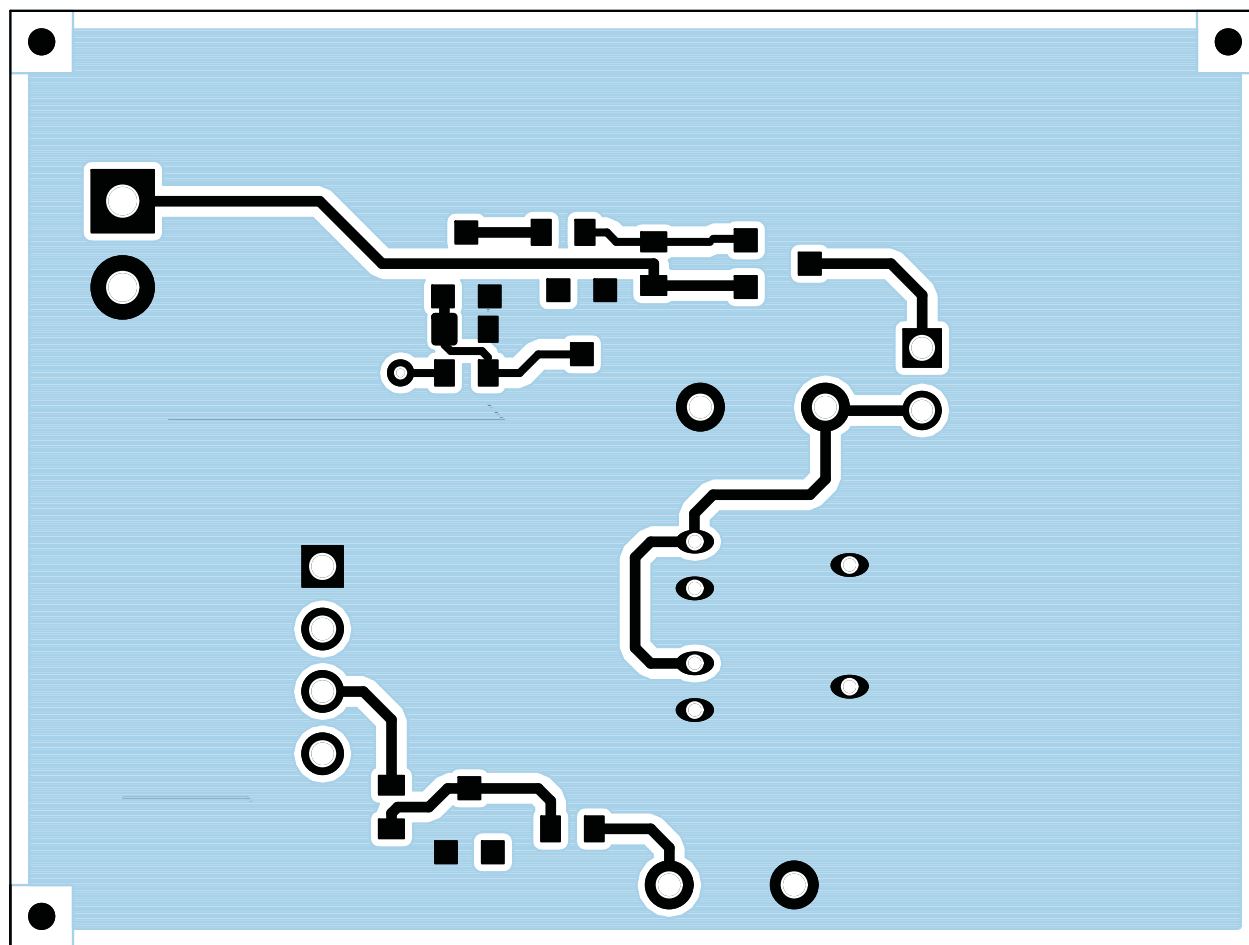


Figure 4. EVM Layer One

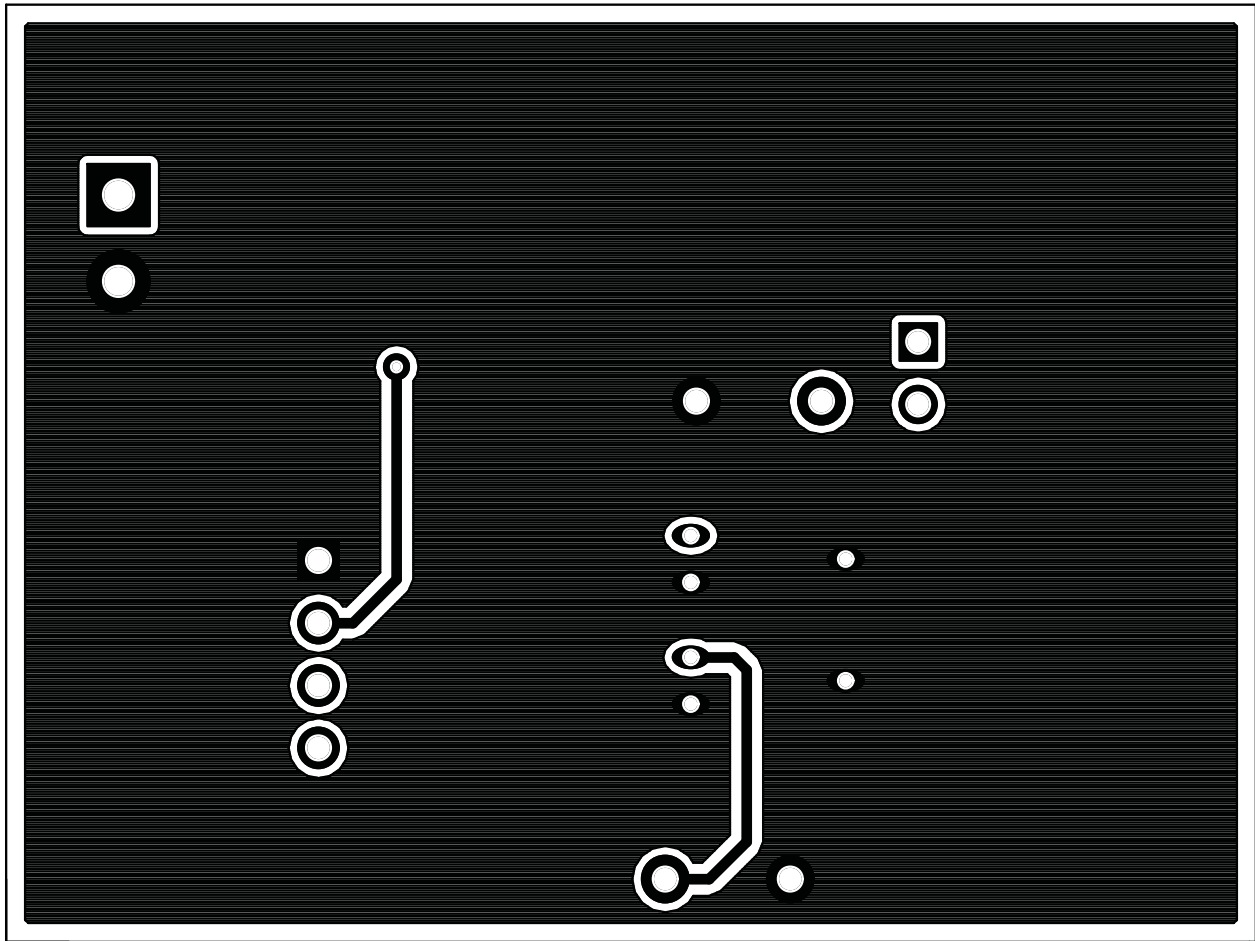


Figure 5. EVM Layer Two

5 bq2022A Circuit Module List of Materials

List of materials required for the bq2022AEVM circuit module.

Table 2. List of Materials

REF DES	QTY	DESCRIPTION	MFR	PART NUMBER
D1, D2	1	Diode, Zener, 5.6-V, 350-mW	Diodes, Inc.	BZX84C5V6
J3	1	Header, 2-pin, 100-mil spacing, (36-pin strip)	Sullins	PTC36SAAN
R1, R2, R6	3	Resistor, Chip, 100-Ω, 1/16-W	Std	Std
R3	1	Resistor, Chip, 100-kΩ, 1/16-W	Std	Std
R4	1	Resistor, Chip, 10-kΩ, 1/16-W	Std	Std
XU1	1	Socket, Double 3P SOT-23	Loranger	13293 121 X218A
J1	1	Header, Friction Lock Ass'y, 4-pin Right Angle	Molex	22-05-3041
J2	1	Terminal Block, 2-pin, 6-A, 3.5-mm	OST	ED1514
VSS1, VSS2	2	Test Point, Black, 1-mm	Keystone	5001
SDQ1, SDQ2	2	Test Point, Red, 1-mm	Keystone	5000
Q1	1	MOSFET, N-ch, 60-V, 115-mA, 1.2-Ω	Vishay-Liteon	2N7002DICT
Q2	1	MOSFET, Pch, -20V, 3.7A, 65 mΩ	IR	IRLML6402
U1	1	IC, 1 K Serial EPROM With SDQ Interface	TI	bq2022ADBZR
–	1	PCB, 2 In x 1.25 In x .125 In	Any	HPA125 Rev. B Board
N/A	1	Shunt, 100-mil, Black	3M	929950-00

6 bq2022AEVM Circuit Module Performance Specification Summary

Table 3. Performance Specification Summary

SPECIFICATION	MIN	TYP	MAX	UNITS
Voltage Pullup (V_{UP})	2.65		5.5	V
Programming Voltage(V_{PP})	11.5		12	V

7 EVM Hardware and Software Setup

7.1 Drivers and Software Installation

This section describes how to install the bq2022AEVM PC software, and how to connect the different components of the EVM.

Use the following steps to install the bq2022A 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 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 subdirectory TIUSBWin2K-XP-1.
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 procedure above, but point to subdirectory TIUSBWin2K-XP-2.
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/bq2022A 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 bq2022AEVM has three hardware components. :

1. The bq2022AEVM circuit module
2. The PC interface board, (EV2300 – purchased separately)
3. The PC

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

1. Connect the HPA125 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 bq2022AEVM is now set up for normal operation.

Table 4. Wire Connection

bq2022AEVM (HPA125 Rev. B)	EV2300
SDQ	HDQ
VSS	GND
PROG	VOUT

To program the EPROM of bq2022AEVM, a 12-V pulse must be generated on the SDQ line. The HPA125 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 must be connected to the HPA125 board at the 12-V input terminal of the HPA125 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 K-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 after sending the code 0x5A during a write command. See the bq2022A data sheet ([SLUS724](#)) 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 HPA125 board.
- Power supply set to 12 V is connected across the 12 V and VSS inputs of HPA125 board.

8 Software Operation

Run the program from the Start|Programs|Texas Instruments|bq2022A Evaluation Software menu sequence.

8.1 Evaluation Software Pages

This section describes the function of each page of the EVSW.

8.2 ROM CMD

This page provides all the ROM commands for bq2022A (see [Figure 6](#)).

8.2.1 Sections Within the ROM CMD Page

Application — This section determines the number of bq2022A devices that are on the SDQ bus. If only one device is used, then select *Single Device*. This option sends the *SKIP ROM* command before any communication attempt is made with the device. If more than one device is used, then select *Multiple Devices*. This option sends the *MATCH ROM* command before any communication attempt is made with the desired device

Search ROM — This section demonstrates the *SEARCH ROM* command. When multiple devices are on the SDQ bus, the ROM ID of the devices that share the bus is listed.

Match ROM — This section is only available when the *Multiple Devices* option is selected in the Application section. To use the *MATCH ROM*, enter the ROM ID of the device of interest in the text box, and then click on the *Select Device* button. This causes the *MATCH ROM* commands with the desired ROM ID to be sent whenever communication is attempted with the desired device. If *SEARCH ROM* is used, the desired ID can be copied from the *SEARCH ROM* list, and then pasted into the *MATCH ROM* text box. Ensure that only the ID numbers are pasted into the text box and not the whole line referring to the device.

Read ROM — This section is only available when the *Single Device* option is selected in the Application section. The ID ROM of the device on the SDQ communication line is displayed.

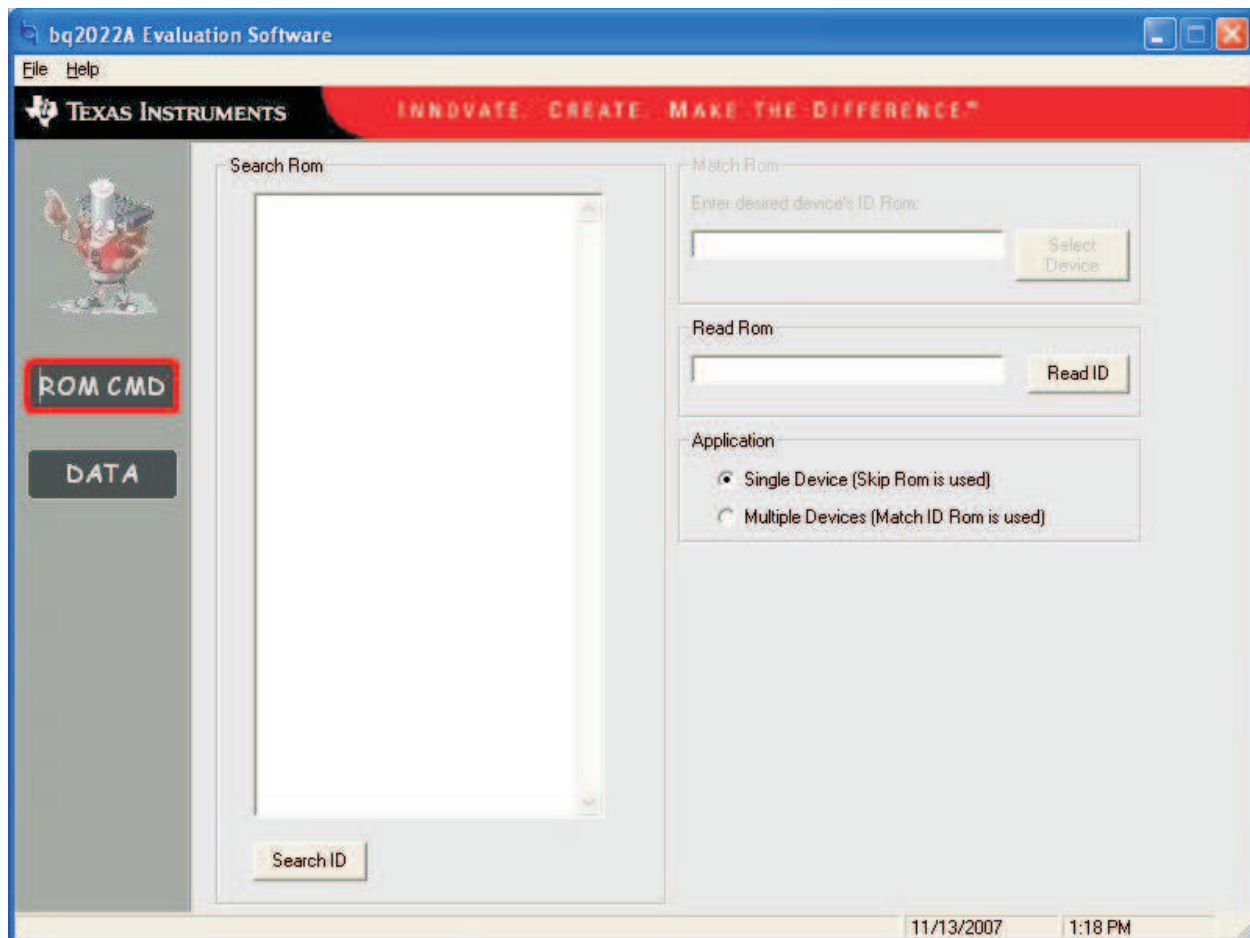


Figure 6. ROM CMD Page

8.3 DATA

This page (see [Figure 7](#)) allows the user to program the 1 K-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 K-Bit EPROM

The EPROM memory map is organized in four 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 EVSW 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 EVSW. 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 bq2022A. The registers are programmed by clicking on the appropriate grid, entering the desired value, and pressing ENTER.

Buttons are provided for the user to select specific pages for write protection. By selecting any of the *Write Protection Bits* button, register 0x00 of status registers is written automatically so that the corresponding bit is cleared.

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

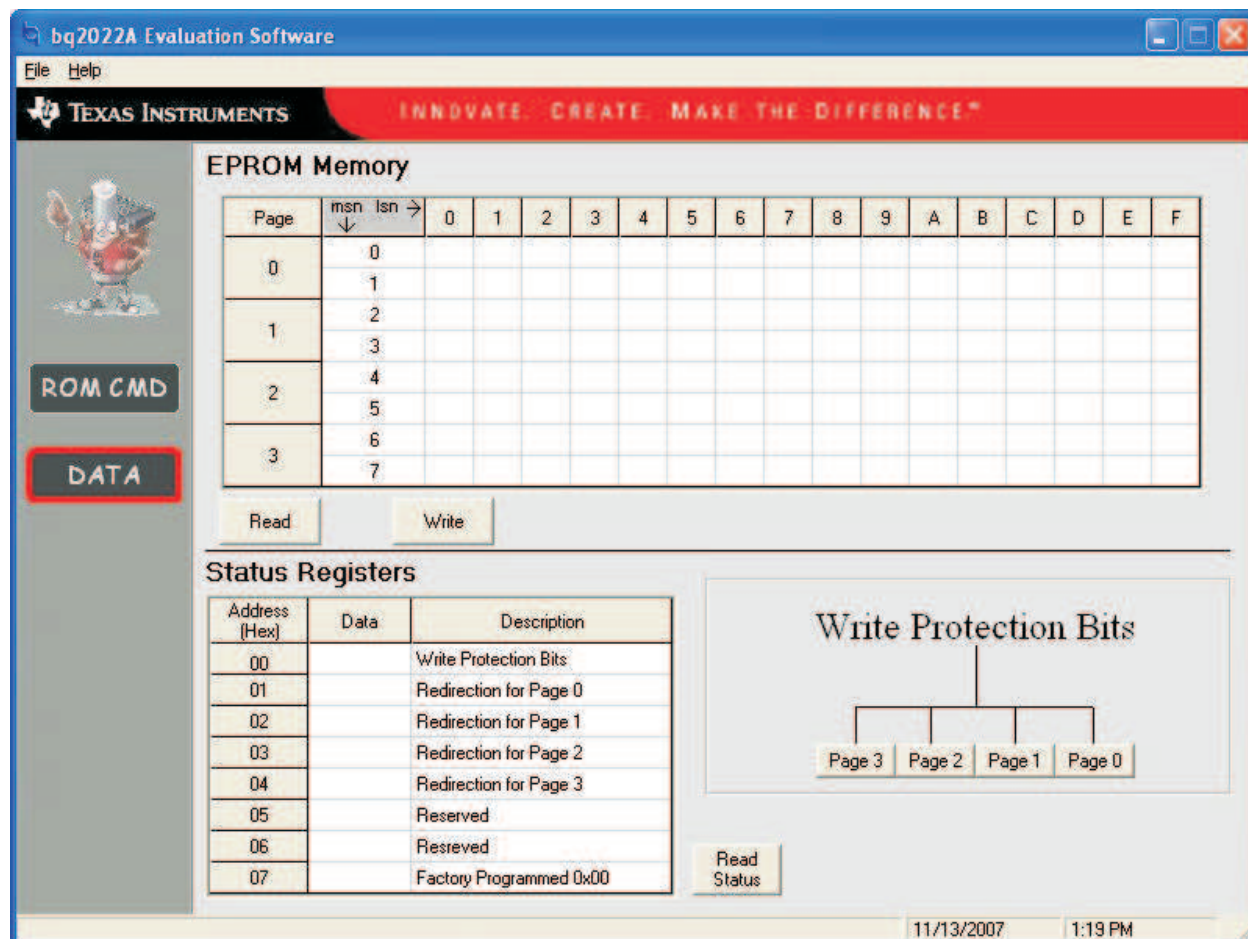


Figure 7. DATA Page

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User Power/Frequency Use Obligations: This radio is intended for development/professional use only in legally allocated frequency and power limits. Any use of radio frequencies and/or power availability of this EVM and its development application(s) must comply with local laws governing radio spectrum allocation and power limits for this evaluation module. It is the user's sole responsibility to only operate this radio in legally acceptable frequency space and within legally mandated power limitations. Any exceptions to this are strictly prohibited and unauthorized by Texas Instruments unless user has obtained appropriate experimental/development licenses from local regulatory authorities, which is responsibility of user including its acceptable authorization.

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Caution

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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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- 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.

For EVMs annotated as IC – INDUSTRY CANADA Compliant

This Class A or B digital apparatus complies with Canadian ICES-003.

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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This device complies with Industry Canada licence-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.

Concerning EVMs including detachable antennas

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.

Cet appareil numérique de la classe A ou B est conforme à la norme NMB-003 du Canada.

Les changements ou les modifications pas expressément approuvés par la partie responsable de la conformité ont pu vider l'autorité de l'utilisateur pour actionner l'équipement.

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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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.

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1. Use this product in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
2. Use this product only after you obtained the license of Test Radio Station as provided in Radio Law of Japan with respect to this product, or
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