

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.

Contents

1	Kit Contents.....	2
2	bq2022A-Based Circuit Module.....	2
3	bq2022A Circuit Module Schematic.....	3
4	Circuit Module Physical Layouts.....	4
5	bq2022A Circuit Module List of Materials.....	8
6	bq2022AEVM Circuit Module Performance Specification Summary.....	8
7	EVM Hardware and Software Setup.....	8
8	Software Operation.....	9

List of Figures

1	EVM Schematic.....	3
2	Silk Screen.....	4
3	EVM Top Assembly.....	5
4	EVM Layer One.....	6
5	EVM Layer Two.....	7
6	ROM CMD Page.....	11
7	DATA Page.....	12

List of Tables

1	Test Points.....	2
2	List of Materials.....	8
3	Performance Specification Summary.....	8
4	Wire Connection.....	9

1 Kit Contents

1. bq2022A, HPA125 revision-B board
2. PC interface board EV2300
3. CD-ROM including Windows™-based PC software and support documentation
4. USB Cable (Type A-B)

2 bq2022A-Based Circuit Module

The bq2022A-based circuit module is ideal for programming the 1 K-bit EPROM and the STATUS bytes of the bq2022A IC. The circuit module includes a 3-pin SOT23 dual socket, a bq2022A 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 bq2022A 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

4 Circuit Module Physical Layouts

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

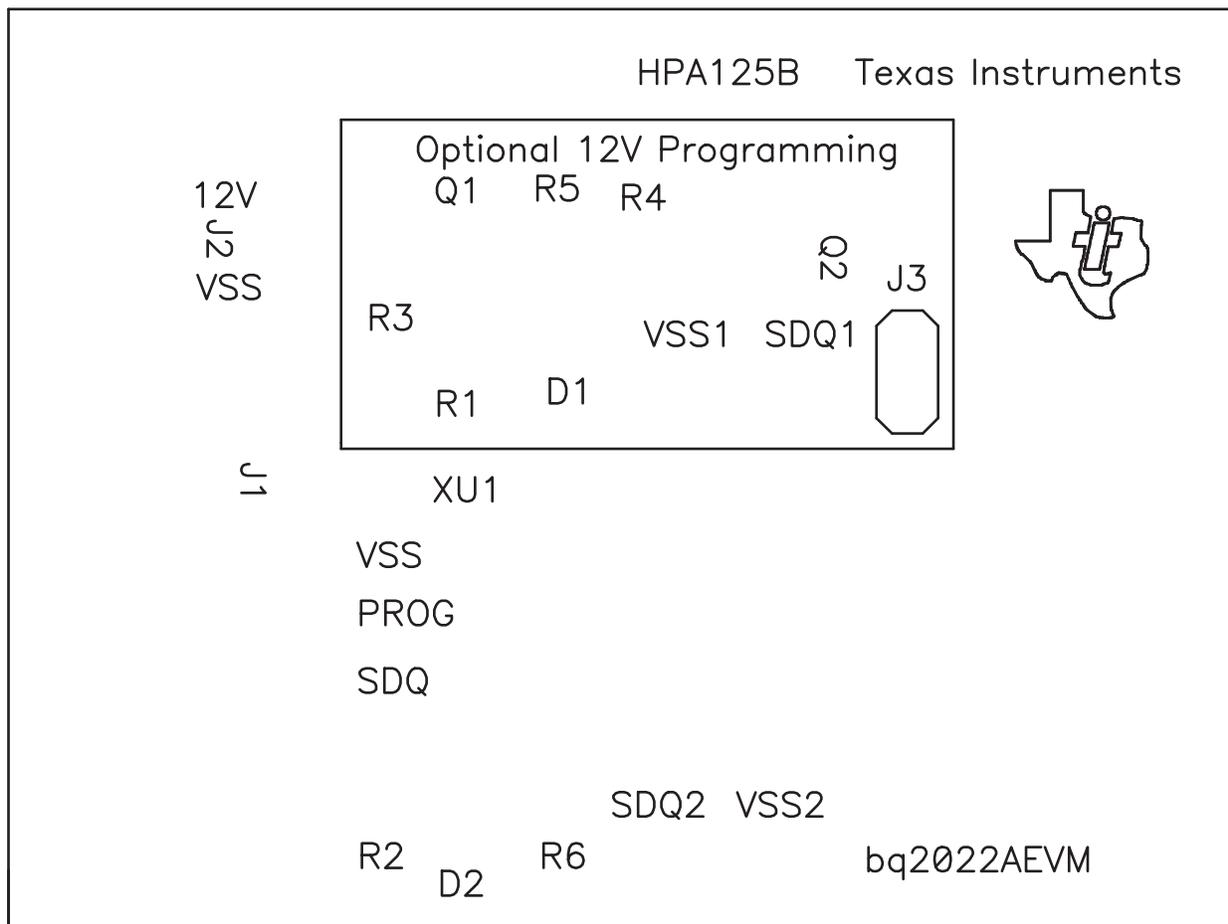


Figure 2. Silk Screen

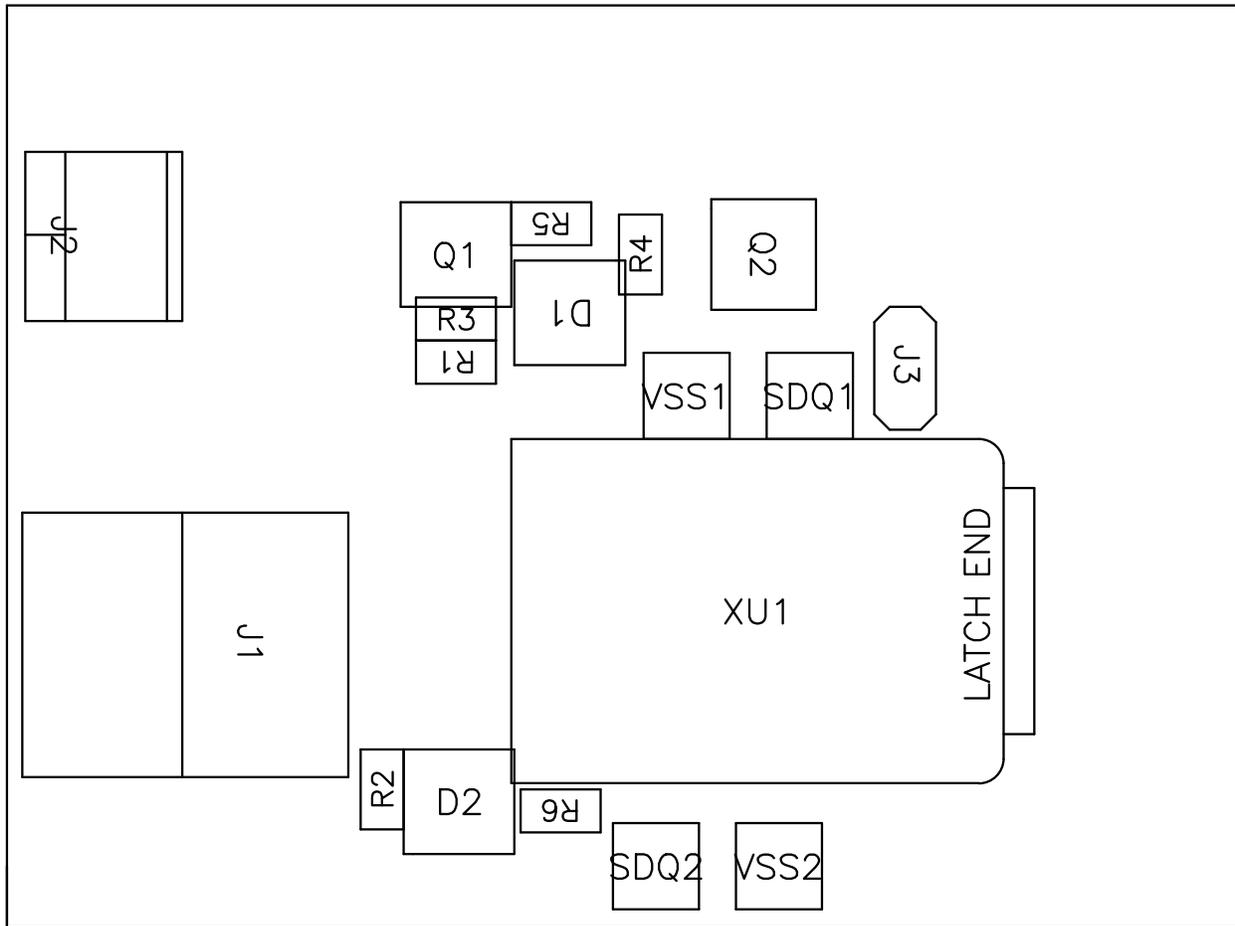


Figure 3. EVM Top Assembly

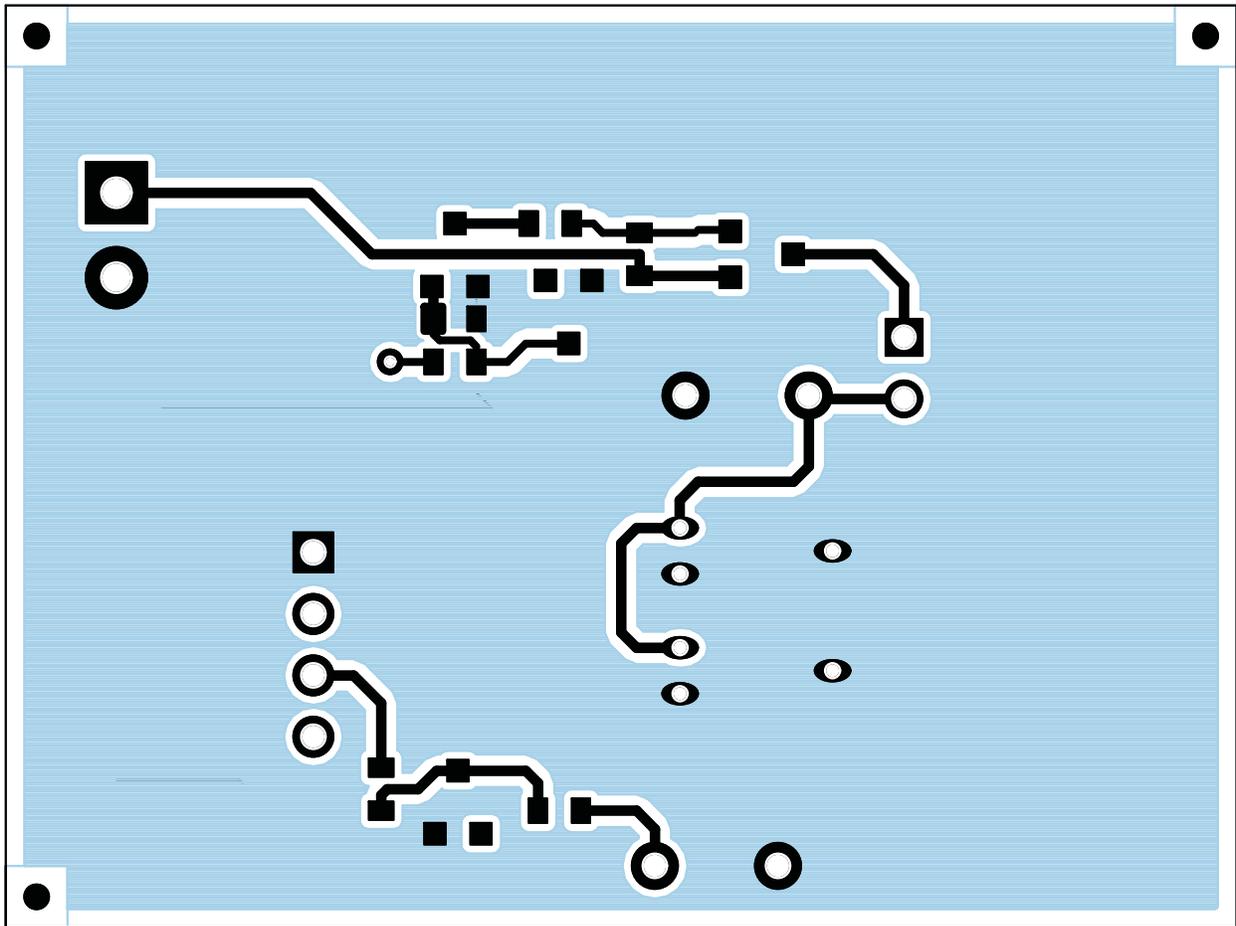


Figure 4. EVM Layer One

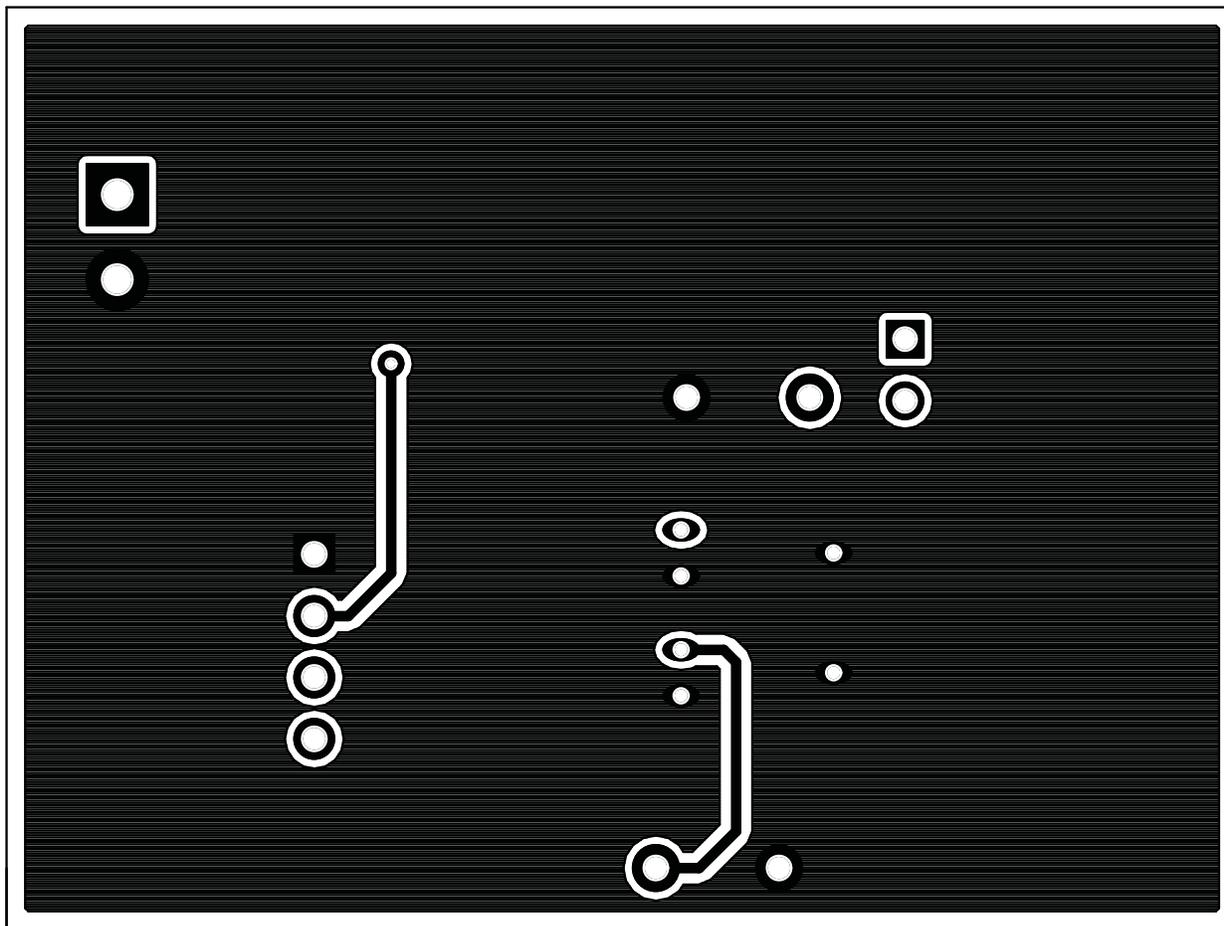


Figure 5. EVM Layer Two

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)
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.

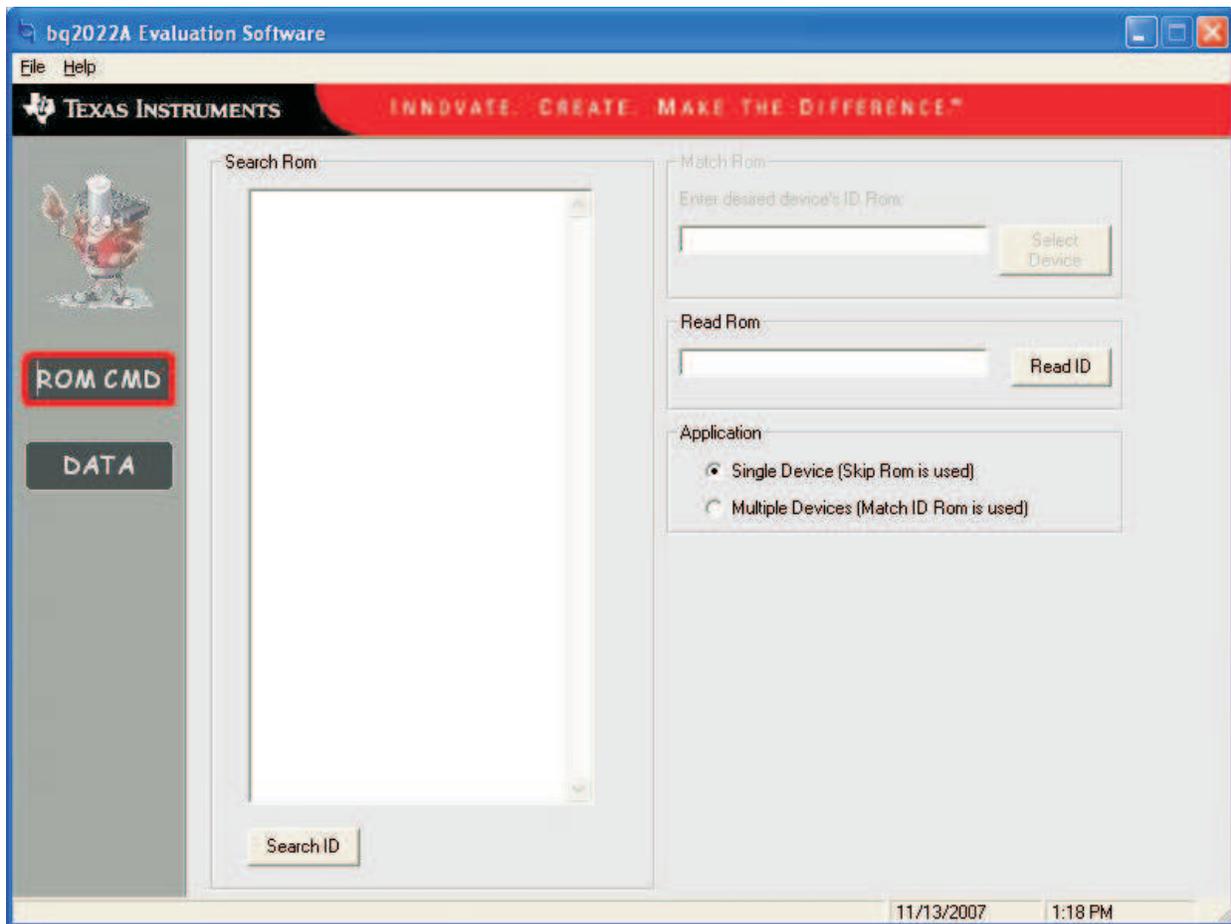


Figure 6. ROM CMD Page

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.

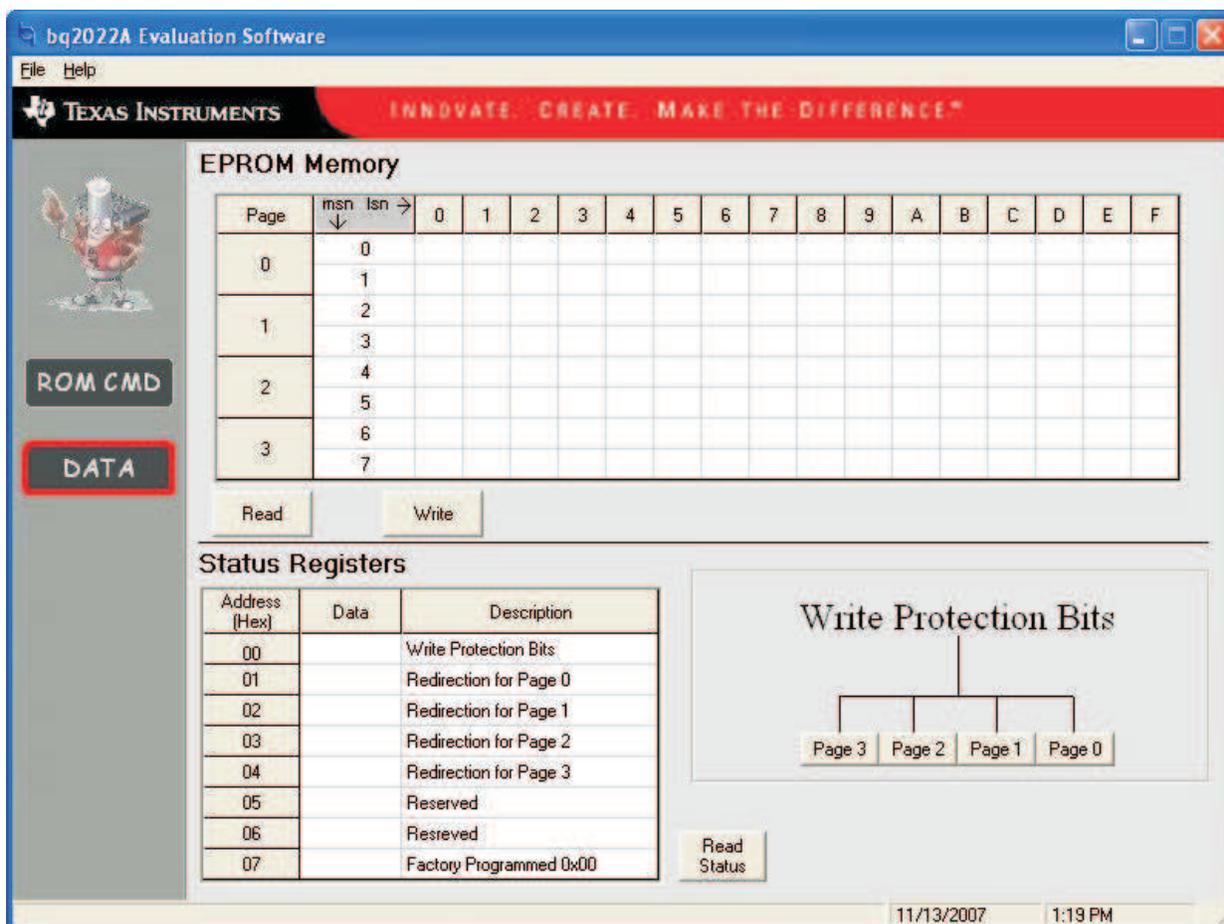


Figure 7. DATA Page

EVALUATION BOARD/KIT IMPORTANT NOTICE

Texas Instruments (TI) provides the enclosed product(s) under the following conditions:

This evaluation board/kit is intended for use for **ENGINEERING DEVELOPMENT, DEMONSTRATION, OR EVALUATION PURPOSES ONLY** and is not considered by TI to be a finished end-product fit for general consumer use. Persons handling the product(s) must have electronics training and observe good engineering practice standards. As such, the goods being provided are not intended to be complete in terms of required design-, marketing-, and/or manufacturing-related protective considerations, including product safety and environmental measures typically found in end products that incorporate such semiconductor components or circuit boards. This evaluation board/kit does not fall within the scope of the European Union directives regarding electromagnetic compatibility, restricted substances (RoHS), recycling (WEEE), FCC, CE or UL, and therefore may not meet the technical requirements of these directives or other related directives.

Should this evaluation board/kit not meet the specifications indicated in the User's Guide, the board/kit may be returned within 30 days from the date of delivery for a full refund. **THE FOREGOING WARRANTY IS THE EXCLUSIVE WARRANTY MADE BY SELLER TO BUYER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.**

The user assumes all responsibility and liability for proper and safe handling of the goods. Further, the user indemnifies TI from all claims arising from the handling or use of the goods. Due to the open construction of the product, it is the user's responsibility to take any and all appropriate precautions with regard to electrostatic discharge.

EXCEPT TO THE EXTENT OF THE INDEMNITY SET FORTH ABOVE, NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

TI currently deals with a variety of customers for products, and therefore our arrangement with the user **is not exclusive.**

TI assumes **no liability for applications assistance, customer product design, software performance, or infringement of patents or services described herein.**

Please read the User's Guide and, specifically, the Warnings and Restrictions notice in the User's Guide prior to handling the product. This notice contains important safety information about temperatures and voltages. For additional information on TI's environmental and/or safety programs, please contact the TI application engineer or visit www.ti.com/esh.

No license is granted under any patent right or other intellectual property right of TI covering or relating to any machine, process, or combination in which such TI products or services might be or are used.

FCC Warning

This evaluation board/kit is intended for use for **ENGINEERING DEVELOPMENT, DEMONSTRATION, OR EVALUATION PURPOSES ONLY** and is not considered by TI to be a finished end-product fit for general consumer use. It generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to part 15 of FCC rules, which are designed to provide reasonable protection against radio frequency interference. Operation of this equipment in other environments may cause interference with radio communications, in which case the user at his own expense will be required to take whatever measures may be required to correct this interference.

EVM WARNINGS AND RESTRICTIONS

It is important to operate this EVM within the input voltage range of 2.65 V to 5.5 V.

Exceeding the specified input range may cause unexpected operation and/or irreversible damage to the EVM. If there are questions concerning the input range, please contact a TI field representative prior to connecting the input power.

Applying loads outside of the specified output range may result in unintended operation and/or possible permanent damage to the EVM. Please consult the EVM User's Guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative.

During normal operation, some circuit components may have case temperatures greater than 70°C. The EVM is designed to operate properly with certain components above 70° C as long as the input and output ranges are maintained. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors. These types of devices can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during operation, please be aware that these devices may be very warm to the touch.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright 2007, Texas Instruments Incorporated

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products		Applications	
Amplifiers	amplifier.ti.com	Audio	www.ti.com/audio
Data Converters	dataconverter.ti.com	Automotive	www.ti.com/automotive
DSP	dsp.ti.com	Broadband	www.ti.com/broadband
Interface	interface.ti.com	Digital Control	www.ti.com/digitalcontrol
Logic	logic.ti.com	Military	www.ti.com/military
Power Mgmt	power.ti.com	Optical Networking	www.ti.com/opticalnetwork
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
RFID	www.ti-rfid.com	Telephony	www.ti.com/telephony
Low Power Wireless	www.ti.com/lpw	Video & Imaging	www.ti.com/video
		Wireless	www.ti.com/wireless

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2007, Texas Instruments Incorporated



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.