MLX90614 Evaluation board

USER MANUAL

MLX90614 Single and Dual zone Infra-Red thermometer Evaluation Board
EVB90614
User Manual

Contents

1. Introduction

The EVB90614 is designed to support MLX90614 infrared thermometer sensors.
The communication between PC and the evaluation board is accomplished by USB. The Evaluation Kit contains the following items:

1. Full-speed USB demonstration board, pre-programmed with USB bootloader and demonstration firmware.
2. A standard USB cable for communication with the board.
3. 1 pc. MLX90614AAA (single zone 5V)
4. 1 pc. MLX90614BAA (single zone 3V)

The EVB90614 is designed to allow OEMs to configure the MLX90614 IR thermometer for virtually any application quickly. The user can experiment with temperature ranges, optics, etc. to find the best IR configuration to meet the application needs. Once the best configuration is established, low volume OEMs can easily configure IR sensors for their own use. For high volume OEMs, Melexis can supply specifically configured devices from the factory, ready to install into the customer's application.

2. Host computer requirements

To communicate with and program the EVB90614 evaluation board, the following hardware and software requirements must be met:

- PC-compatible system
- An available USB port
- Microsoft Windows 7 - 11

Note: The EVB90614 is a HID USB device and does not require drivers on PCs which support HID class USB devices. Check on www.melexis.com for the most recent release of the software.

3. Installing the software

As an USB device, the demonstration board can be easily installed. Most of the work is done by the operating system. The software is installed by running the file "MlxCIRT 90614 xxx.exe", where *xxx* is the version.

4. Getting started with MLX90614 evaluation board

1.1. MLX90614 evaluation board overview

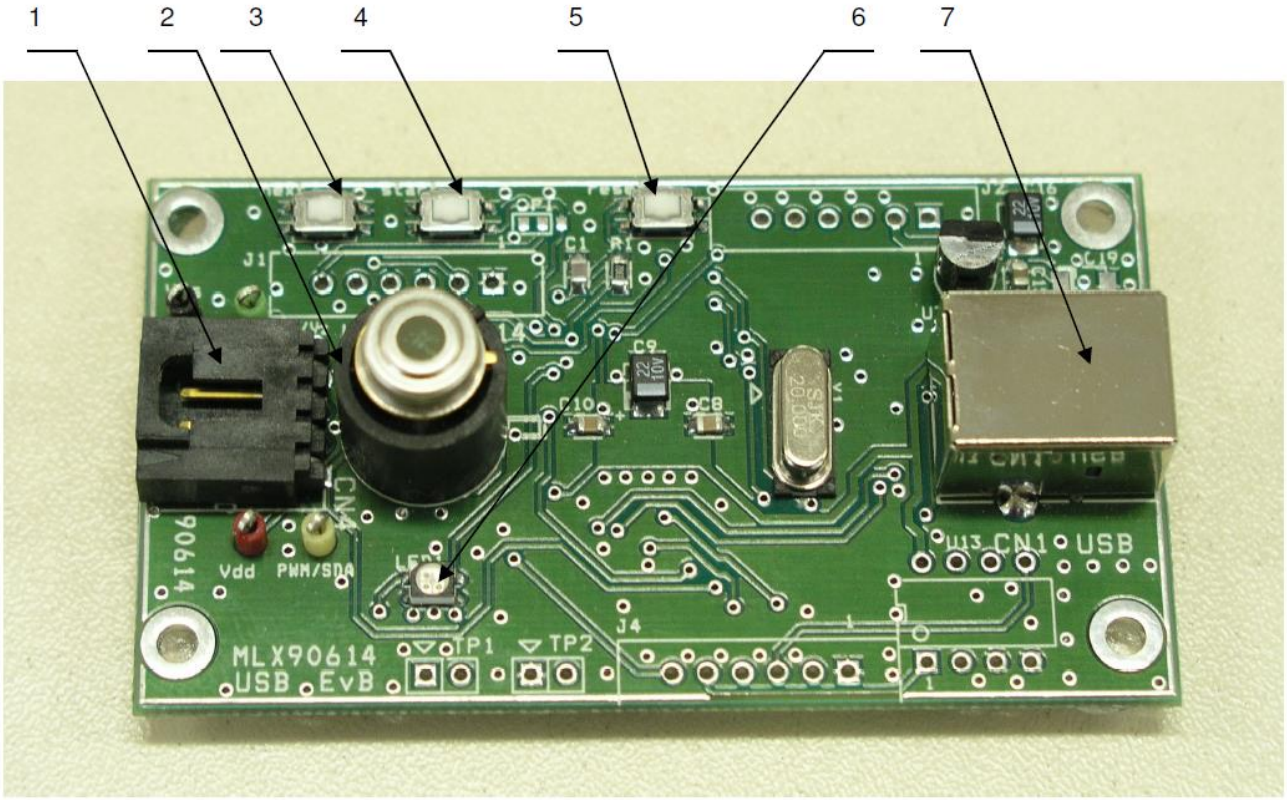

Figure 1: Evaluation board – top view. The metallic can with the window is the MLX90614. The plastic that is seen in the photograph underneath the metal can is the ZIF socket.

The main elements of the evaluation board are:

1. Extension connector (70553-0003 from www.molex.com) allowing additional MLX90614 modules to be connected to the PCB SMBus.

   Connector pin description:

   pin1 - SCL/Vz (pin 1 is marked on the plastic body of the connector)
   pin2 - PWM/SDA
   pin3 - Vdd
   pin4 - Vss
2. ZIF socket for the MLX90614
3. Button “next”
4. Button “start”
5. Button “reset”
6. RGB status LED
7. USB "B" Receptacle

The EVB90614 board receives its power supply only from the USB cable (Bus-Powered Device). An external power supply is not needed.

1.2. Connecting the EVB90614 evaluation board

To connect the evaluation board:

1. Unbox and unwrap the board, and set it on a non-conductive surface near the host system.
2. Connect the USB cable (supplied in the kit) to an open USB port on the host system or a USB hub connected to the host system, and to the USB connector on the board. The LED will shine in BLUE.
3. The EVB90614 evaluation board is a HID compliant device. Therefore, a special USB device driver is not needed.
4. Check the board connection. This can be done in the Device Manager - a new *USB Input device* and a new *HID-compliant vendor-defined-device* are added to the list under *Human Interface devices*
5. Start the EVB software

The system will automatically search for any connected evaluation boards and MLX90614 samples.
If there is a problem connecting to either the evaluation board or the sensor, the user will be notified:

- No EVB90614 board is discovered – there is a problem connecting to the EVB90614
  Make sure that the EVB90614 is connected to a functional USB port

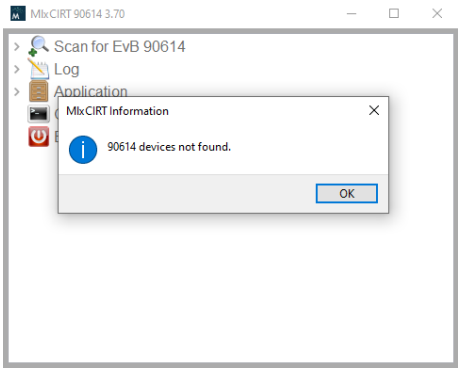

Figure 2: Main window when EVB90614 is not found or connected

- No MLX90614 is discovered – a connection to the EVB90614 is established, but no MLX90614 sensor is present on the ZIF socket (2) or the extension connector (1)
  Make sure that the MLX90614 sensor is properly connected. When using the ZIF socket (2) apply the proper orientation and when using the extension connector (1) make sure to use the correct wiring.

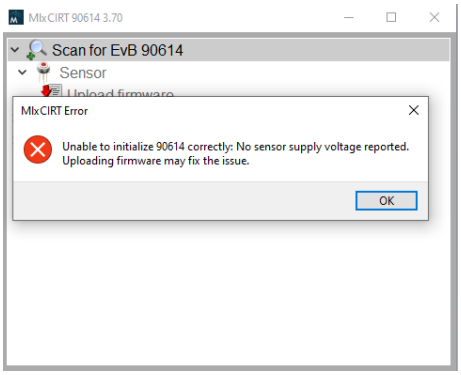

Figure 3: Main window when no MLX90614 sensor is discovered

- Possible misplacement of the sensor – there is connection to the EV90614, but the sensor is most likely not placed properly.

  Make sure that the MLX90614 sensor is properly connected – if using the ZIF socket (2) apply the proper orientation and if using the extension connector (1) make sure to use the correct wiring.

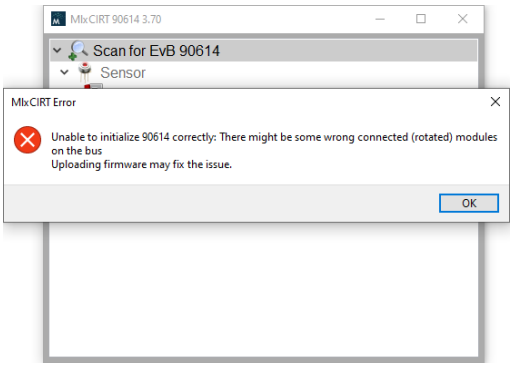

Figure 4: Main window when the MLX90614 sensor is possibly misplaced

If a proper connection to an EVB90614 evaluation board and a MLX90614 device is established, the sensor menu will be displayed.

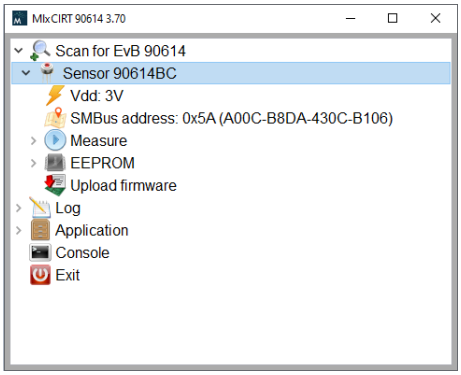

Figure 5: Main window when successfully connected to a MLX90614 sensor

1.3. Working with the GUI

There are 5 items in the main menu:

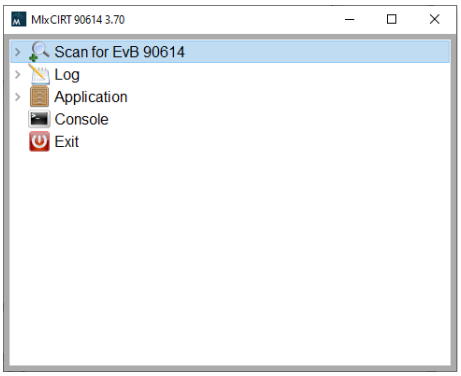

Figure 6: Main menu

1.3.1. MLX90614 menu

Double-clicking ***Scan for EvB90614*** will initiate a new scan for connected EVB90614 as well as refreshing the details for the MLX90614 sensor connected to the EVB. While scanning, there is an indicator next to the menu.

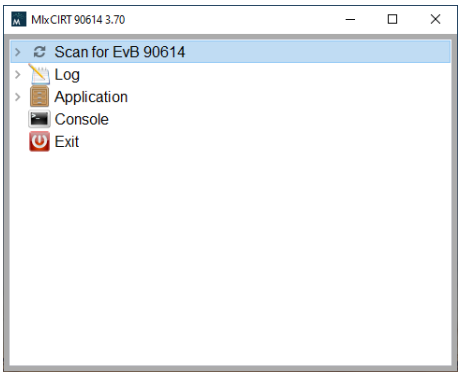

Figure 7: Scanning for connected EVB90614 and MLX90614 sensor

After the sensor is detected, details about it are being displayed as well as two submenus that allow performing different operations with the sensor.

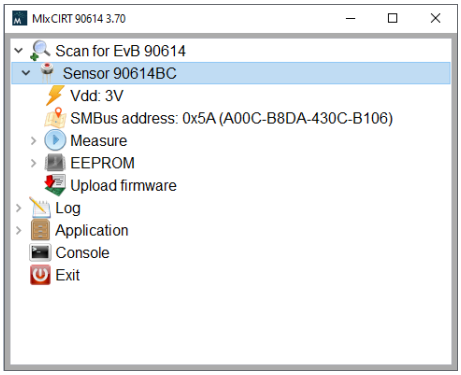

Figure 8: MLX90614 sensor submenu

1.3.1.1. Sensor type – displays the type of the detected sensor

1.3.1.1.1. Vdd – displays the supply voltage of the detected sensor

Double-clicking on the Vdd open a menu to choose the supply voltage for the sensor – 0, 3 or 5V. It is recommended to use the default supply voltage for the MLX90614 sensor type. This voltage is automatically set during the sensor scanning

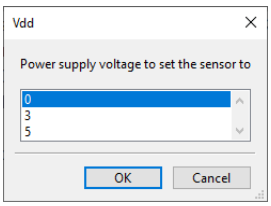

Figure 9: Supply voltage pop-up menu

1.3.1.2. SMBus address – displays the SMBus address of the detected sensor

Double clicking on the SMBus address line allows the user to change the SMBus address of the MLX90614 sensor. Note that the new SMBus address is also stored in the device EEPROM.

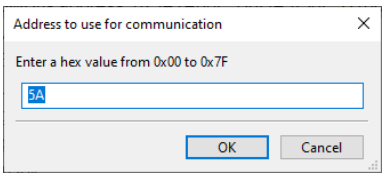

Figure 10: SMBus address change pop-up menu

1.3.1.3. Measure menu – controls measurements with the sensor

The measure menu starts and stops the MLX90614 measurements display. Double clicking on the *Measure* line opens the temperature graph and displays the temperatures measured by the MLX90614 sensor.

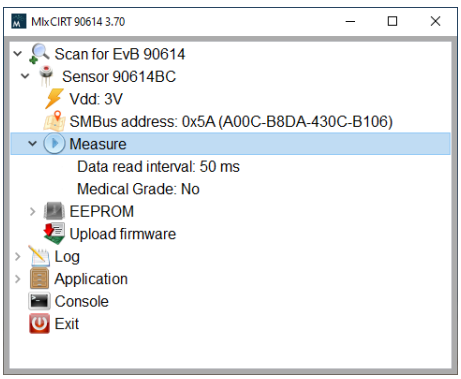

Figure 11: Measure menu

There are two options in the measure menu that control the measurement data

1.3.1.3.1. Data read interval

Double clicking opens an input box that allows changing the interval between the data readouts

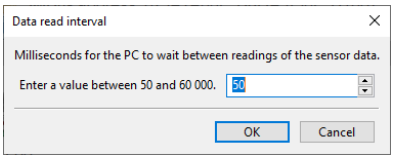

Figure 12: Data readout interval input

1.3.1.3.2. Medical Grade

Double clicking toggles the medical grade on/off. When medical grade is ON, the body core temperature is displayed alongside the ambient ant the object temperature.

Note: the medical grade ON should only be used for medical grade devices.

Note: the displayed body core temperature is for demonstration purposes only and is not to be used as medical data

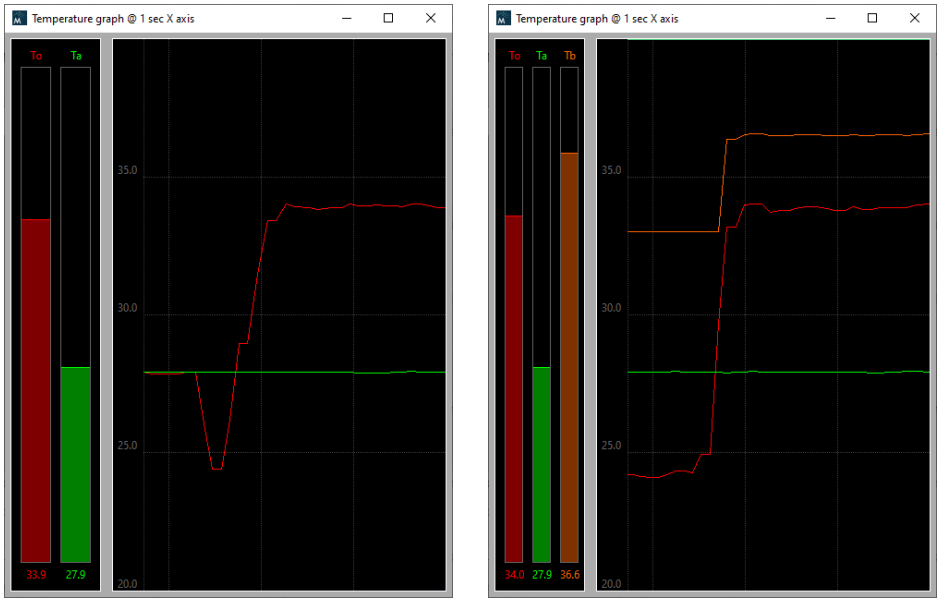

Figure 13: Non-medical grade display (left) vs medical grade display(right)

1.3.1.4. EEPROM menu – options for working with the sensor EEPROM

This menu includes all options necessary for reading data from the sensor EEPROM as well as writing data to it. The sensor parameters available to modify are grouped in a dedicated submenu.

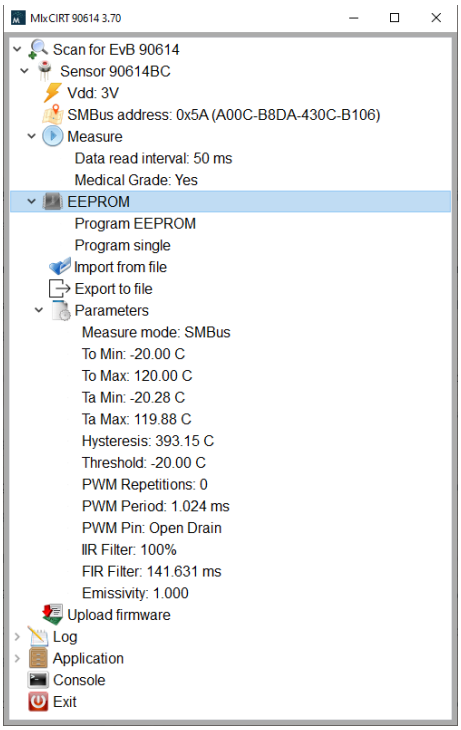

Figure 14: EEPROM menu

Double clicking the *EEPROM* menu reads the EEPROM of MLX90614 and displays the whole content.

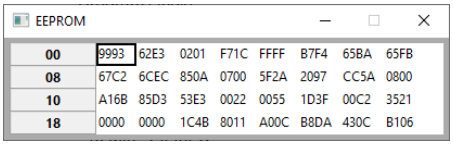

Figure 15: EEPROM content window

1.3.1.4.1. Program EEPROM – writes all the changes in the sensor EEPROM

When changing the parameters, those changes are not automatically saved into the sensor EEPROM. Double clicking this option will store all parameter changes into the EEPROM.

Note that when there is a parameter change that has not been stored into EEPROM there is a question mark in front of the Program EEPROM option as an indicator.

1.3.1.4.2. Program single – writes a single cell of the sensor EEPROM

Double clicking this option, opens an input box to select any of the EEPROM cells available for writing and the hexadecimal value to write to it.

Note that this option will overwrite all the bits at the selected address. Thus, it is important to fill in proper values.

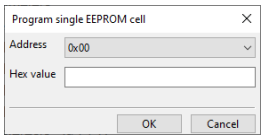

Figure 16: Program single EEPROM cell window

1.3.1.4.3. Import from file – imports all EEPROM parameters from a file

Only binary or text files with the proper format must be used.

1.3.1.4.4. Export to file – exports a full EEPROM dump to a file

The EERPOM content of the MLX90614 sensor is exported to a binary or text file

1.3.1.4.5. Parameters – contains different EEPROM parameters that can be changed

Double clicking on any of the listed parameters opens a dialog to input data or an options menu to select from.

Note: Changing any of the parameters value does not take effect until it is programmed in the EEPROM

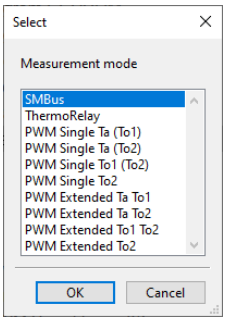

Figure 17: Options menu for Measure mode

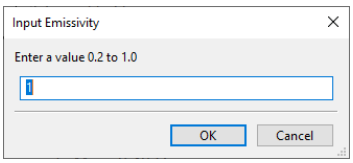

Figure 18: Input dialog for emissivity

When any of the parameters is changed it must also be programmed in the EEPROM in order to the change to take effect. This is indicated by an icon next to the *Program EEPROM* menu option.

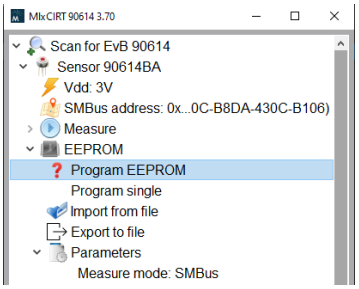

Figure 19: Parameters changed and need to be programmed in EEPROM

If measuring is started without the parameter changes being programmed in the EEPROM a warning will be displayed.

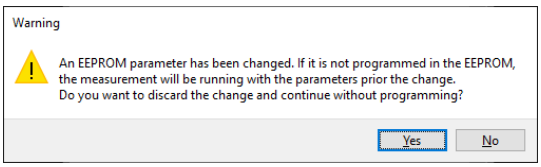

Figure 20: Parameters changes not programmed in the EERPOM warning

Selecting the *Yes* option will discard all changes and will start measuring.

1.3.1.5. Upload firmware – uploads new firmware to the EVB90614

Only firmware from official Melexis sources must be uploaded. In case the firmware needs to be re-programmed, there is a firmware file in the MlxCIRT installation folder. Note that this might not be the latest firmware version.

1.3.2. Log menu

The software can log the measurement data in a file. When the logging is activated, all measurement data is appended to the specified log file.

The following options are available:

1.3.2.1.1. Deactivated/Activated – shows the current status of the logging process and allows to change it

Double clicking on this option will activate logging if it is currently deactivated and deactivate it if it is currently active.

Note that while logging is activated the measurement data is being appended to the specified log file every time a measurement is running until the log is deactivated.

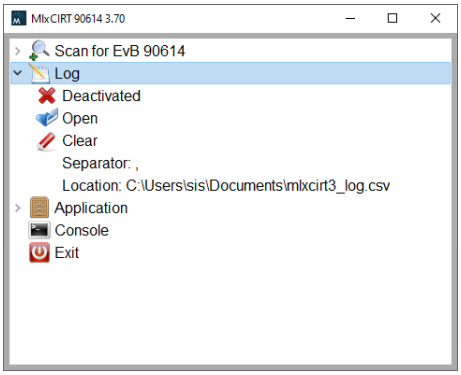

Figure 21: Data Log menu

1.3.2.1.2. Open – opens the log file

The log file is opened with the application associated with the file extension

1.3.2.1.3. Clear – clears all logged data in the specified log file

The logging is always appending new data. This option allows the user to have a fresh log

1.3.2.1.4. Separator – allows the user to change the separator in the log file

The default separator is comma for logging into a comma separated file.

1.3.2.1.5. Location – allows the user to specify the location and the name of the log file

1.3.3. Application menu

This menu allows the user to control some part of the sensor application

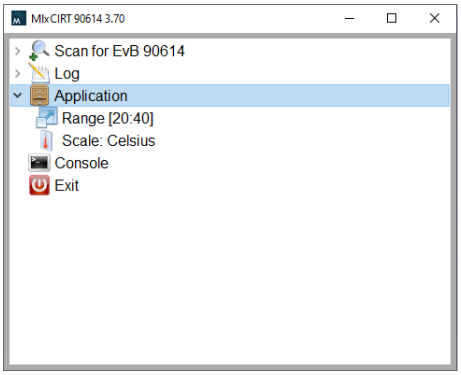

Figure 22: Application menu

1.3.3.1.1. Range – allows the user to specify the temperature range in the measurements display

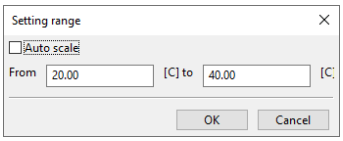

Figure 23: Range menu

1.3.3.1.2. Scale – allows the user to specify the temperature scale

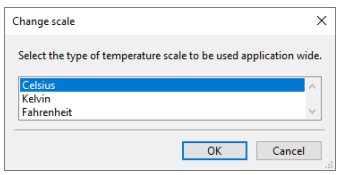

Figure 24: Scale selection menu

1.3.4. Console button

This button opens the console window. At the moment there are no MLX90614 commands that can be executed in the console.

1.3.5. Exit button

Closes the MlxCIRT application

5. Table of figures

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