EVB90642
User manual

1. Introduction

The EVB90642 is designed to support MLX90642 infrared thermometer array module.
The communication between PC and the evaluation board is accomplished by USB. The Demonstration 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. MLX90642BCB (narrow FOV)

The EVB90642 is designed to allow OEMs to configure the MLX90642 IR thermometer for virtually any application quickly. OEMs can quickly experiment with Emissivity settings, refresh rate, Temperature vs normalized raw data, do logs, etc... Once the best configuration is established, low volume OEMs can easily configure IR modules 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 EVB90642 evaluation board, the following hardware and software requirements must be met:

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

Note 1: The EVB90642 is a HID USB device and will require no drivers on PCs that support HID class USB devices. Check www.melexis.com/EVB90642 for the most recent release of the software.

3. Installing the software

As a USB device, the demonstration board can be easily installed. Most of the work is done by the operating system. The software is installed simply by running the file "MlxCIRT 90642 xxx.exe", where *xxx* is the version.

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4. Getting started with MLX90642 evaluation board

4.1. MLX90642 evaluation board overview

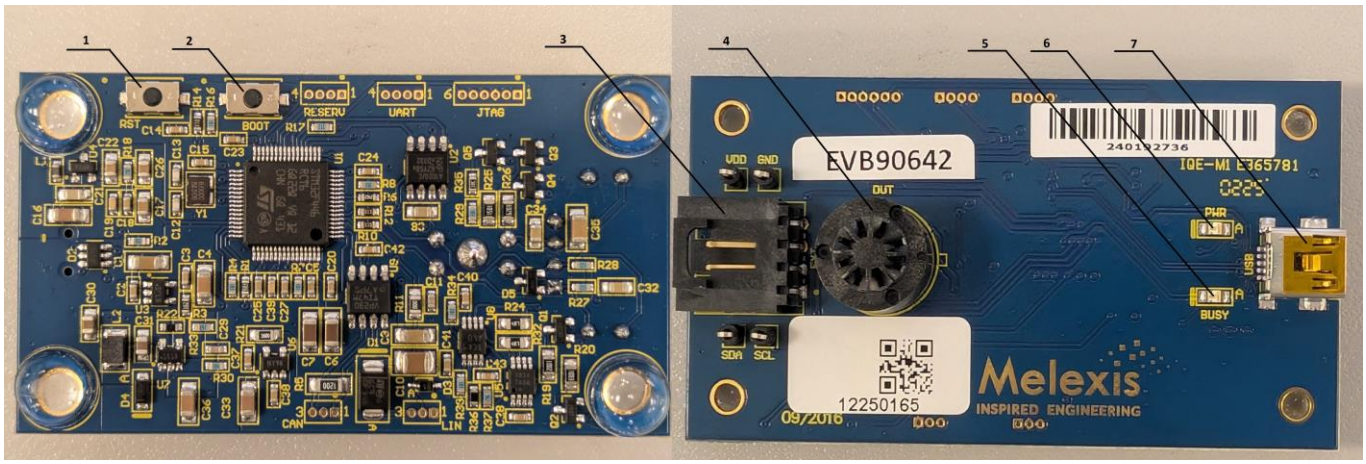

Figure 1: Evaluation board – bottom view (left) and top view (right)

The main elements of the evaluation board are:

1. Button “reset”
2. Button “boot”
3. Extension connector (70553-0003 from www.molex.com) allowing extension cable with MLX90642 to be connected to the PCB I^2C bus.

   Connector pin description:

   pin1 - SCL (pin 1 is marked on the plastic body of the connector)
   pin2 - SDA
   pin3 - Vdd
   pin4 - Vss
4. ZIF socket for the MLX90642
5. “BUSY” LED – flashes when the EVB and PC communicate
6. “POWER” LED – ON when EVB connected to the ESB port
7. USB "Mini" Receptacle

The EVB90642 board receives its power supply only from the USB cable (Bus-Powered Device). No external power supply source is required.

4.2. Connecting the EVB90642 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 PWR LED will shine.
3. EVB90642 evaluation board is HID compliant device so 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 connected evaluation boards and MLX90642 device.
If there is a problem connecting to either the evaluation board or the sensor, the user will be notified:

- No EVB90642 board is discovered – there is a problem connecting to the EVB90642
  Make sure that the EVB90642 is connected to a functional USB port

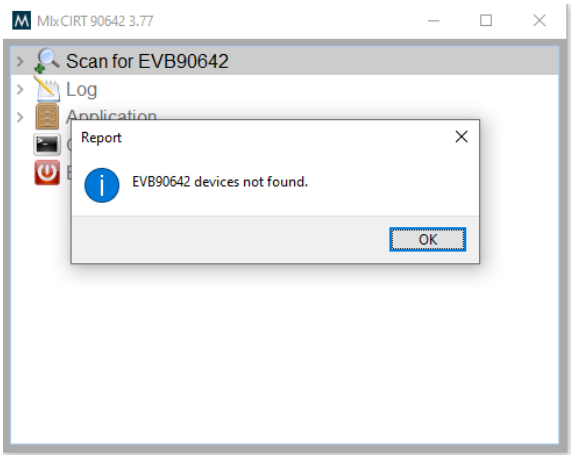

Figure 2: Main window when EVB90642 is not found or connected

Next pop-up window in case the EVB90642 is not detected would be:

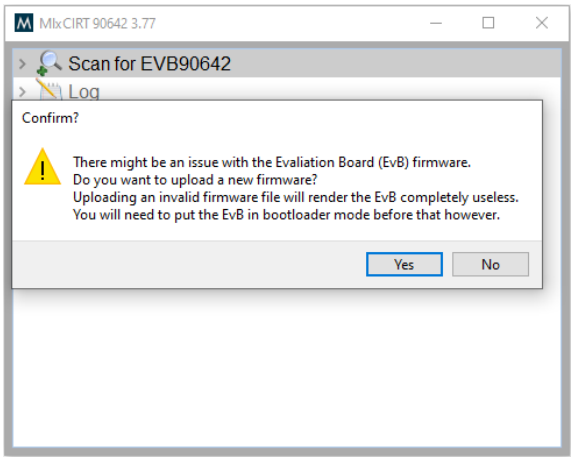

Figure 3: Main window when EVB90642 is not found or connected

- No MLX90642 is discovered – connection to the EV90642 is established, but no MLX90642 is present in the ZIF socket (4) or the extension connector (3)

  Make sure that the MLX90642 sensor is properly connected – if using the ZIF socket (4) apply the proper orientation and if using the extension connector (1) make sure to use the correct wiring.

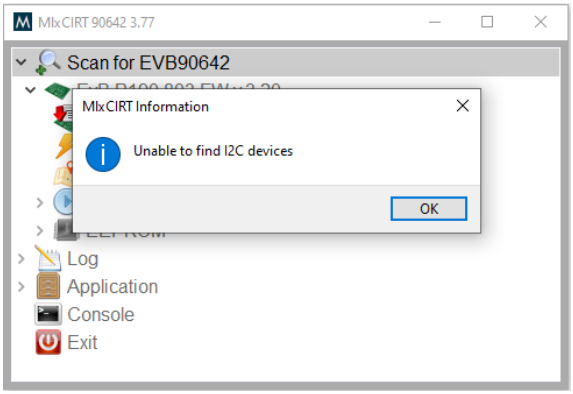

Figure 4: Main window when EVB90642 detected and connection is established but no MLX90642 device is detected

Note: The EVB will check first the default SA=0x66 and if no response from device is detected will scan all possible addressed from 0x01…0x7F.

If a proper connection to an EVB90642 evaluation board and a MLX90642 device is established, the sensor menu will be displayed

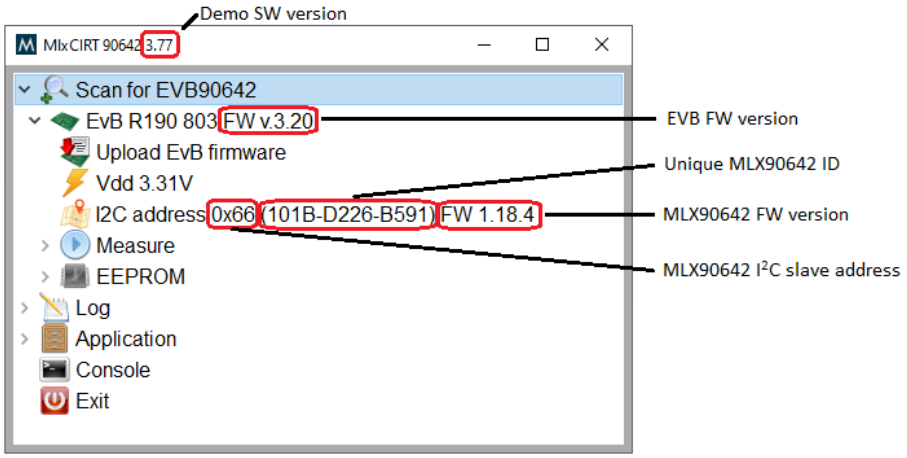

Figure 5: Main window when successfully connected to a MLX90642 sensor (various information is displayed)

4.3. Working with the GUI

There are 5 items in the main menu:

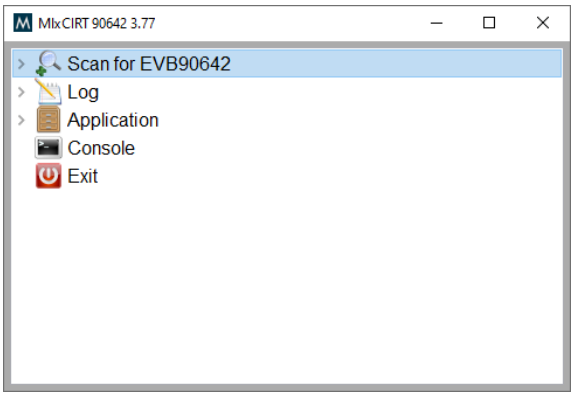

Figure 6: Main menu

4.3.1. MLX90642 menu

Double-clicking "***Scan for EvB 90642"*** will initiate a new scan for connected EVB90642 as well as refreshing the details for the MLX90642 sensor connected to the EVB. While scanning, there is an indicator next to the menu.

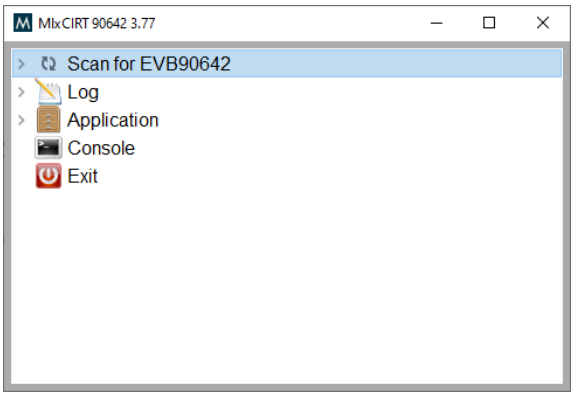

Figure 7: Scanning for connected EVB90642 and MLX90642 sensor

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

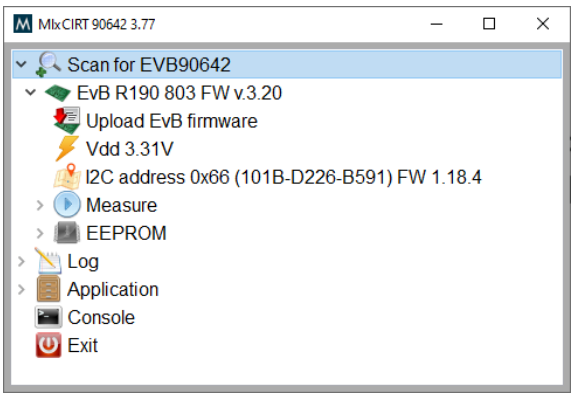

Figure 8: MLX90642 sensor submenu

4.3.1.1. EvB displays the information regarding the EvB itself

4.3.1.1.1. Upload EvB firmware

Double-clicking on the "***Upload EvB firmware***" opens a pop-up window for confirmation.

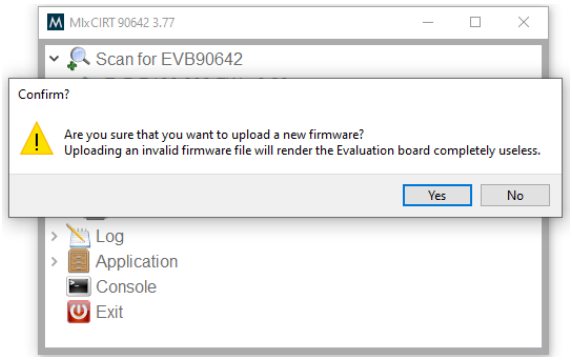

Figure 9: Upload new FW pop-up confirmation window

4.3.1.1.2. Vdd – displays the supply voltage

Double-clicking on the "***Vdd***" open a menu to enter desired supply voltage for the sensor (any value between 0…3.9V). For best results It is recommended to use the default supply voltage=3.3V. This voltage is automatically set during the sensor scanning

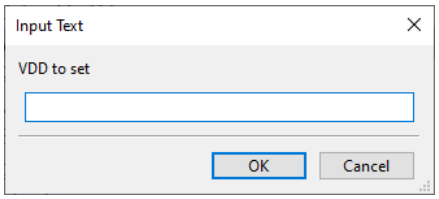

Figure 10: Supply voltage pop-up menu

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

Double clicking on the SMBus address line allows the user to change the "***I2C address***" of the MLX90642 sensor. Note that the new SMBus address in in decimal format and it is also stored in the device EEPROM.

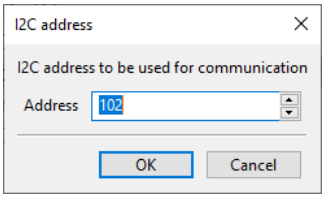

Figure 11: SMBus address change pop-up menu (102 = 0x66)

4.3.1.3. Measure menu – controls measurements with the sensor

The measure menu starts and stops the MLX90642 measurements display. Double clicking on the "***Measure***" line opens the temperatures display measured by the MLX90642 sensor in 32x24 array format.

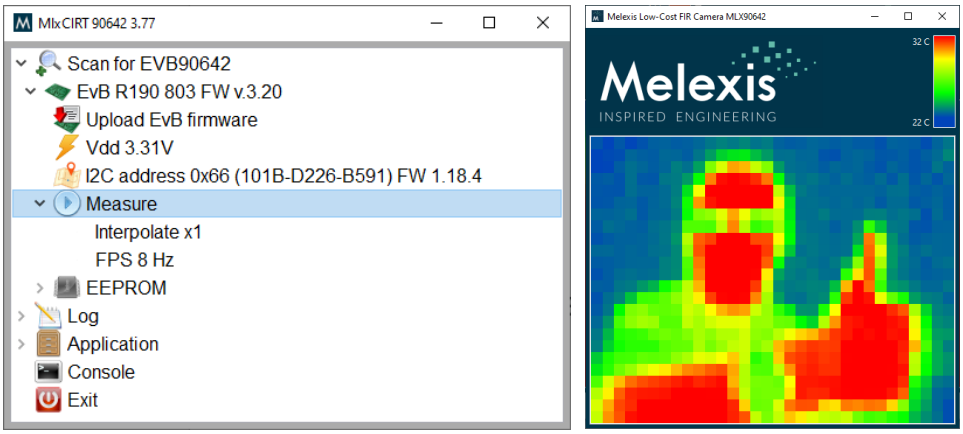

Figure 12: Measure menu and the measurement window (default interpolation = 1)

There are two options in the measure menu that control the measurement data and visualization of the measured data

4.3.1.3.1. Interpolation

Double clicking on the "***Interpolation***" opens a selection window that allows changing the interpolation of the measurement display

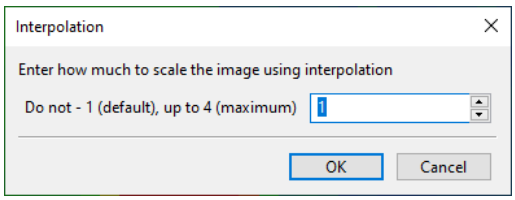

Figure 13: Interpolation selection window (effective only on the measurement display)

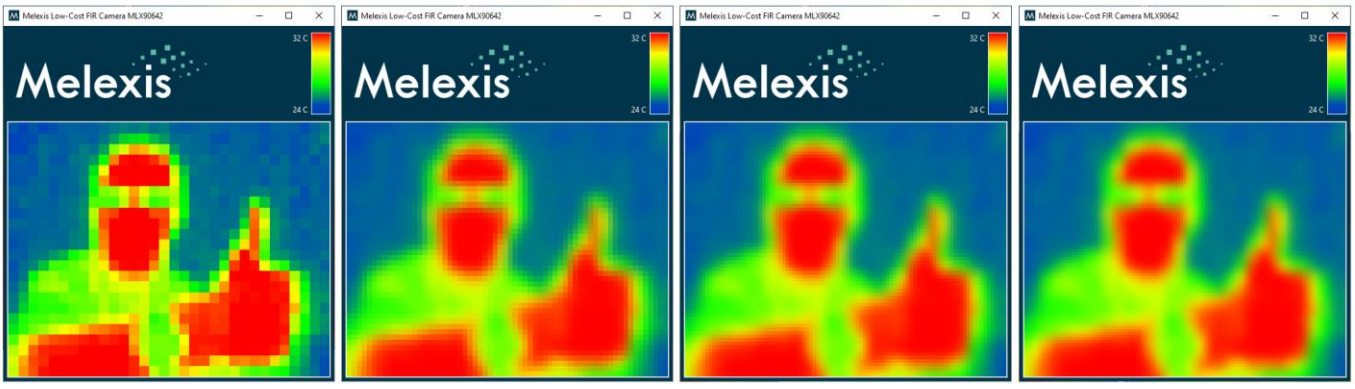

Figure 14: Interpolation effect: x1 – most left, x2, x3 and x4 – most right (effective only on the measurement display)

4.3.1.3.2. FPS (Frames Per Second)

Double clicking on the "***FPS***" opens a selection window for the refresh rate of the array measurement allowing the OEMs to change the refresh rate of the measurement.

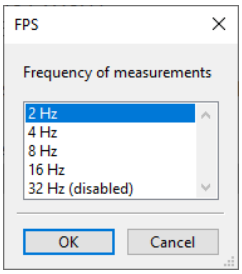

Figure 15: FPS selection window – double click to active desired selection

Note1: If measurement is ongoing the FPS menu is "greyed" and inactive.
Note2: The selected FPS setting take effect immediately and is also stored in the device EEPROM

4.3.1.4. 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.

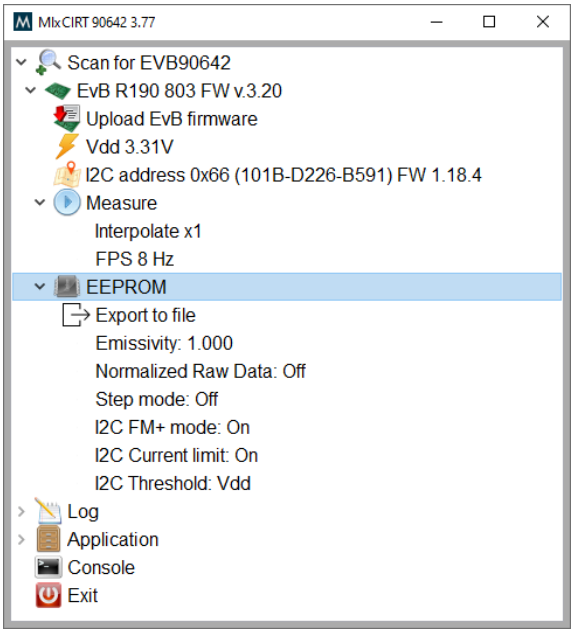

Figure 16: EEPROM menu

Double clicking the "***EEPROM***" menu reads the EEPROM of MLX90642 and displays the whole content.

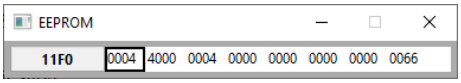

Figure 17: EEPROM content window

Export to file

The EERPOM content of the MLX90642 sensor is exported to a binary or text file

4.3.1.4.1. Emissivity

Double clicking the "***Emissivity***" opens an input window, where the customer can input the desired emissivity factor. Accepted values ate in the range of 0.1…1.0.

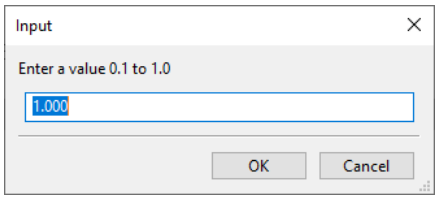

Figure 18: Emissivity input window

4.3.1.4.2. Normalized Raw Data

Double clicking the "***Normalized Raw Data***" toggles the way the data is processed, visualized and logged. Default mode of MLX90642 is to calculate and report the absolute temperature of the objects. By configuring MLX90642 to report the raw normalized data only the sensor performs the minimum required calculations such that to generate an image only, while saving processing time. The resulting frame data is in LSB.

4.3.1.4.3. Step mode

Double clicking the "***Step mode***" toggles between continuous and step mode.

4.3.1.4.4. I²C FM+ mode

Double clicking the "***I2C FM+ mode***" toggles between FM and FM+ mode of the I²C interface. FM mode is usually used in low EMC requirement environment due to the limited driver capabilities resulting in smoother edges at the price of limited communication speed (max 400kHz).

4.3.1.4.5. I²C current limit

Double clicking the "***I2C Current limit***" toggles between "ON" and "OFF" of the current limiter of the SDA output driver.

4.3.1.4.6. I²C threshold

Double clicking the "***I2C Threshold***" toggles between two (VDD and 1.8V) different input threshold reference options of the SDA and SCL inputs.

4.3.2. 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.

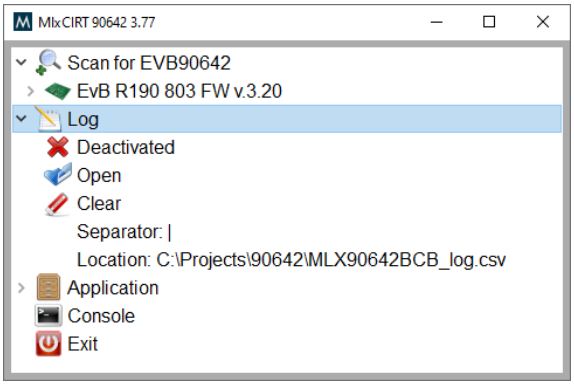

Figure 19: Data logging menu

The following options are available:

4.3.2.1.1. 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: *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.*

4.3.2.1.2. Open – opens the log file

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

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

The logging is always appending new data and this option allows the user to clear the data and have a fresh log

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

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

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

4.3.3. Application menu

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

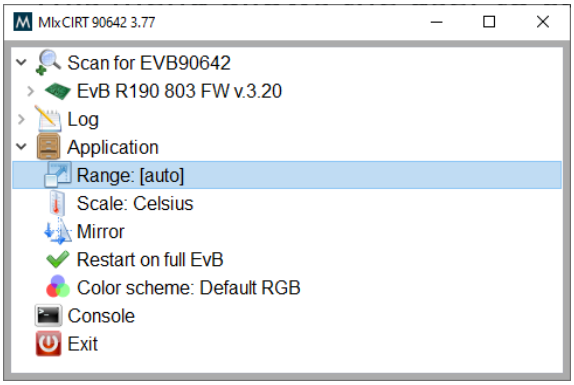

Figure 20: Application menu

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

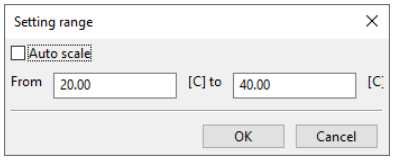

Figure 21: Range menu

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

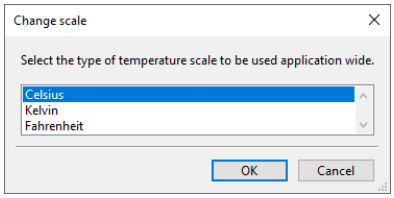

Figure 22: Scale selection menu

4.3.3.1.3. Mirror – allows the user to specify the orientation of the image

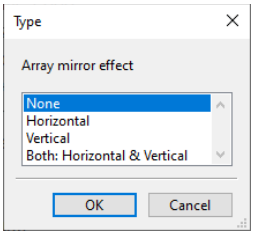

Figure 23: Mirror selection menu

4.3.3.1.4. Restart on full EVB

Double clicking on "***Restart on the full EVB***" will restart the EVB

4.3.3.1.5. Color scheme

Double clicking the "***Color scheme***" opens an input window for selection of the used colour scheme.

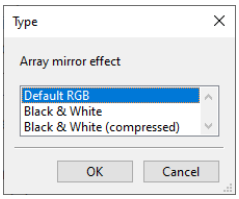

Figure 24: Colour scheme selection menu

4.3.4. Console button

This button opens the console window. At the moment there are no MLX90642 low level commands that can be executed in the console.

4.3.5. Exit button

Closes the MlxCIRT application

5. Table of figures

6. Disclaimer

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