

1. Installation

Before connecting the EVB to the PC, first install the EVB software. The EVB software can be downloaded from the Melexis website:

<https://www.melexis.com/en/product/EVB90640-41/Evaluation-Board-MLX90640-MLX90641>

The EVB90640-41 comes with 2 sensors, 1 MLX90640ESF-BAB and 1 MLX90641ESF-BCB. Mechanically, the parts are identical, but they can be identified by the first number of the marking on the sensors: “0” for the MLX90640, “1” for the MLX90641.



Insert the sensor in the ZIF socket on the PCB. Take care to align the notch with the silk screen on the PCB.

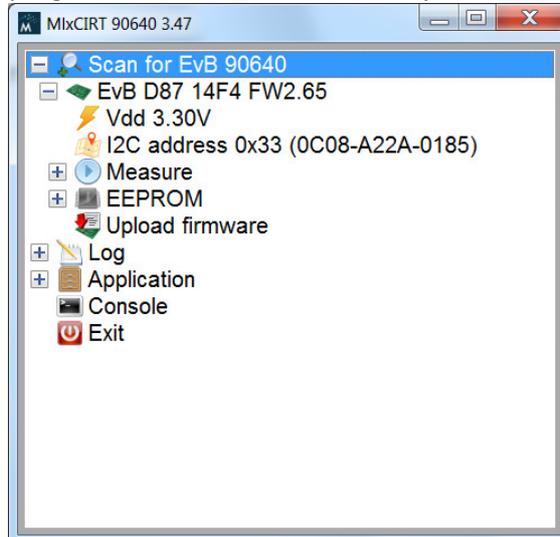


Next, connect the PCB with the USB port of the computer. The computer should indicate that a new USB device is being installed and indicate after a while it has been installed successfully. This installation normally happens only once. The pwr LED on the PCB should be on.



2. Operation

Now start the EVB program. The program will scan for the EVB and you should see a screen as below:

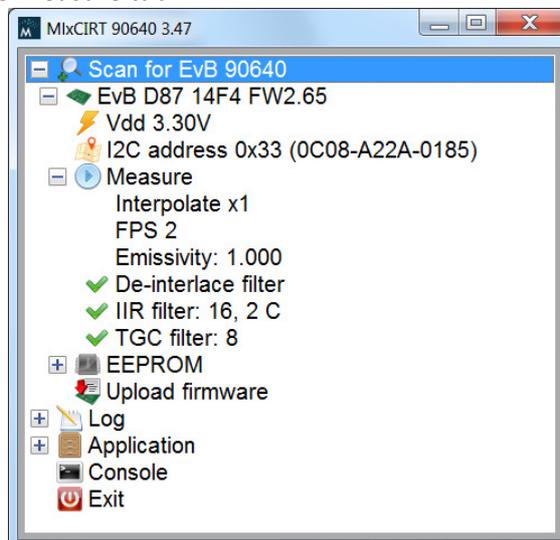


The EVB has been recognized and a sensor has been found on the PCB. The EVB detects by itself if MLX90640 or a MLX90641 has been inserted in the ZIF socket.

The I2C address of the sensor is shown and its factory ID.

The sensor is powered when the EVB starts. If needed, one can turn off the supply voltage by pressing the Vdd button  Vdd 3.30V.

Now, click on the + in front of the Measure tab.

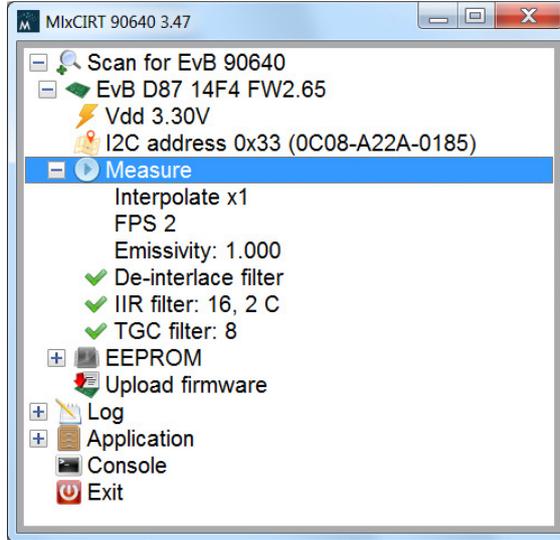


Here one can control by clicking on the item:

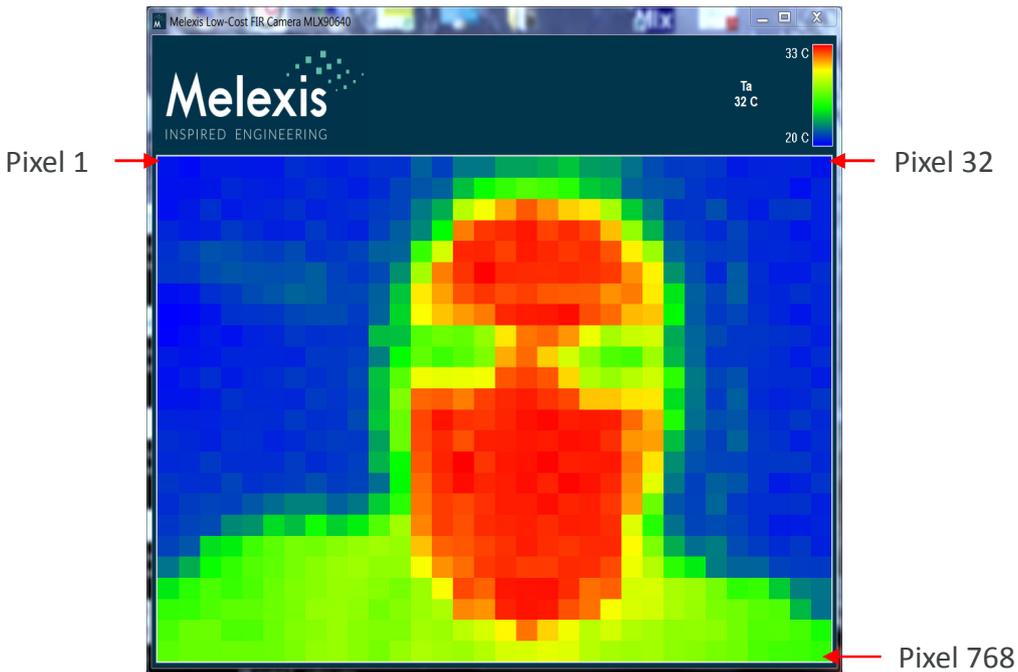
- The external bilinear interpolation of the thermal image (x1, x2 or x4);
- The (sub-)frame rate of the sensor: 0.5Hz, 1Hz, 2Hz, 4Hz ... 64Hz. Initially, the software reads the frame rate as set in the EEPROM of the sensor. The factory default is 2Hz;
- The emissivity of the object, to be entered by the user. Standard setting E=1;
- Enable or disable the external de-interlace filter;
- Enable and configure the external IIR small signal filter. There is a value for the depth of the filter (a higher value reduces noise) and a threshold value, which controls at which object temperature jump the filter is reset;

- Set the depth of the averaging filter applied on the TGC signal used for thermal gradient compensation on the MLX90641. This has no effect on the MLX90640 as the TGC coefficient is set to 0 for that device.

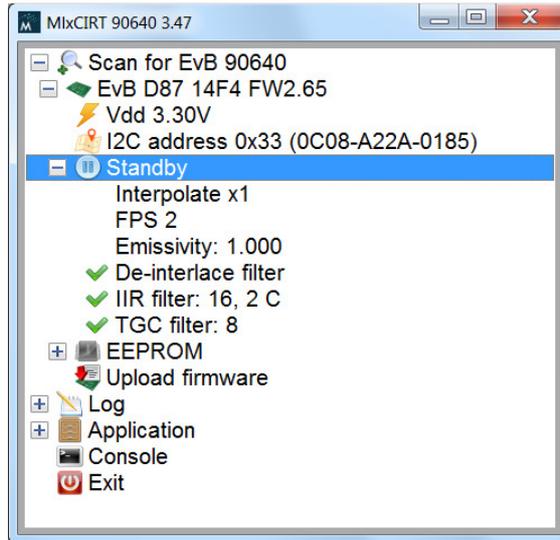
Now double click the measure tab:



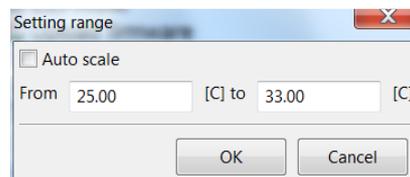
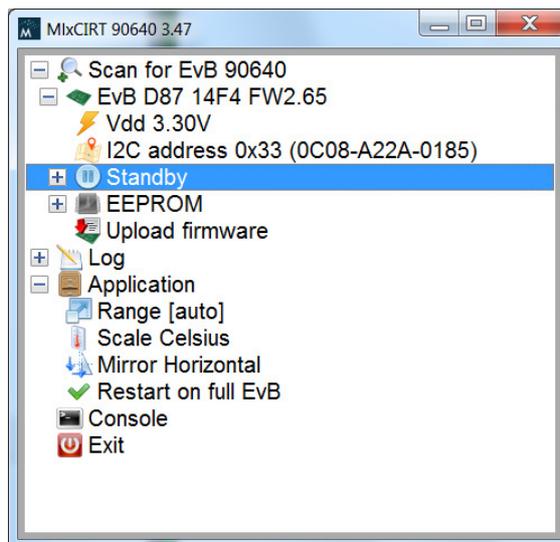
The measurement starts and the resulting thermal image (below example with MLX90640) is shown in a new screen.



In the top right corner one can see the maximum and minimum temperature of the temperature scale, the sensor temperature T_a and the temperature T_o of the pixel at the pointer location. Note that the button “measure” has changed to “standby”. By clicking this, one can halt the imager.

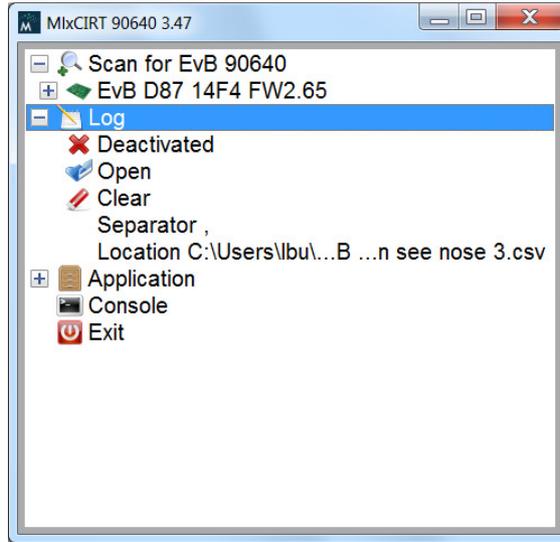


In the Application tab one can control the color range of the visualization. This does NOT influence the actual measurement range. One can also choose the desired temperature unit and mirror the image if needed for presentation purposes. The restart on full EVB assures that the EVB would restart by itself if the memory of the EVB would overflow.



In the “Range” tab one can choose between autoscale or set the minimum and maximum temperature manually.

In the log tab, one can control where and if the measured data is stored on the PC. The file can also be opened in Excel from here.



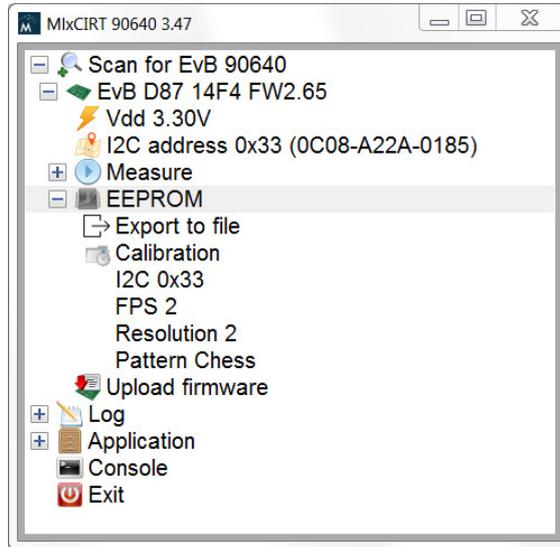
After measurement of each sub-frame, The data is stored with all measurements of one full frame (768 pixels) in one line. The next frame is stored on the next line.

Each line starts with a timestamp, followed by the temperature reading of each individual pixel, row by row. After 768 object temperature readings, follow internal parameters, among which the Ta, which is the sensor temperature.

The data that is stored is the measurement data AFTER application of the de-interlacing and IIR filter if selected, but without interpolation.

	A	B	C	D	E	F	ACM	ACN	ACO	ACP	ACQ	ACR	ACS	ACT	ACU
1	14:36:47	90640-D8	Emissivity:	1	Config reg:	'0000									
2	14:36:47	90640-D8	IR 1 [C]	IR 2 [C]	IR 3 [C]	IR 4 [C]	IR 765 [C]	IR 766 [C]	IR 767 [C]	IR 768 [C]		Private 1	Private 2	Ta [C]	Private 4
3	14:36:48	90640-D8	18.47	18.27	16.17	18.97	14.57	8.95	13.59	6.55		14818	6515	32.31	6515
4	14:36:48	90640-D8	18.83	22.23	19.61	21.89	22.37	16.83	21.59	6.67		19420	6517	32.41	6517
5	14:36:48	90640-D8	22.45	22.25	22.61	22.13	22.39	22.51	21.85	22.47		14974	6517	32.47	6517
6	14:36:49	90640-D8	22.45	22.43	22.61	22.33	22.55	22.51	22.21	22.47		19413	6517	32.47	6517
7	14:36:50	90640-D8	22.45	22.53	22.43	22.43	22.63	22.51	22.39	22.47		14982	6517	32.47	6517
8	14:36:50	90640-D8	22.41	22.55	22.41	22.51	22.61	22.47	22.47	22.43		19413	6515	32.37	6515
9	14:36:51	90640-D8	22.39	22.57	22.37	22.57	22.59	22.59	22.53	22.45		14976	6515	32.37	6515
10	14:36:51	90640-D8	22.37	22.59	22.33	22.53	22.57	22.67	22.49	22.47		19412	6514	32.37	6514

Clicking on the EEPROM tab will show you the EEPROM content. The program also shows what the current EEPROM content means for FPS, resolution setting and sub-frame pattern. This is the configuration the sensor will start in after POR.



Under the EEPROM tab there is also a tab to export the EEPROM information to file and a button to upload new firmware to the EVB if needed. Here is also a tab to point the program to the file directory where a special calibration file for a specific sensor is located – if available.

3. ESD Precautions

Electronic semiconductor products are sensitive to Electro Static Discharge (ESD). Always observe Electro Static Discharge control procedures whenever handling semiconductor products.

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