1 Scope

The scope of this document is to highlight the differences in the temperature (in concrete ambient temperature Ta and object temperature To) calculations between MLX90620 and MLX90621 and enable a smooth replacement of MLX90620 by MLX90621.

2 Pin-out

The pin-outs of the two modules are identical, thus each could be a drop-in replacement for the other. No hardware needs to be changed if one is to replace the MLX90620 with the MLX90621 or vice versa, only a change in the software is required.

3 Configuration

Configuration register bits	MLX90620	MLX90621
[15]	NA	‘0’ – Melexis reserved
[13]	Ta refresh rate	‘0’ – Melexis reserved
[12]	Ta refresh rate	EEPROM enable
[8]	Ta measurement running flag	NA
[5:4]	NA	Resolution

Table 1 Configuration differences

For the MLX90621, it is necessary to write the correct setting in the configuration register [12] in order to read the EEPROM data. In this way it is possible for the user to protect the EEPROM data from inadvertent erasing the data. It is also necessary to set the measurement resolution in register [5:4] (see datasheet for more information). This resolution also has an influence on the calculations of the Ta and To (see below). In MLX90621 the Ta refresh rate cannot be set independently from the To refresh rate.

4 Data readouts

Measurement data	MLX90620 RAM address	MLX90621 RAM address
PTAT	0x90	0x40
Compensation pixel	0x91	0x41

Table 2 Data readout differences

As described in the table, in the MLX90621 the PTAT and compensation pixel data can be found at different RAM addresses compared to MLX90620.

5 Ta calculation

Coefficient	MLX90620	MLX90621
K_{T1}_scale	10 - fixed	EEPROM address 0xD2[7:4]
K_{T2}_scale	20 - fixed	EEPROM address 0xD2[3:0] + 10
$V_{TH}(25)$	$V_{TH}(25) = V_{TH}(25)_{EEPROM}$	$V_{TH}(25) = \frac{V_{TH}(25)_{EEPROM}}{2^{3-ConfigReg[5:4]}}$
K_{T1}	$K_{T1} = \frac{K_{T1EEPROM}}{2^{10}}$	$K_{T1} = \frac{K_{T1EEPROM}}{2^{K_{T1scale}} * 2^{3-ConfigReg[5:4]}}$
K_{T2}	$K_{T2} = \frac{K_{T2EEPROM}}{2^{20}}$	$K_{T2} = \frac{K_{T2EEPROM}}{2^{K_{T2scale}} * 2^{3-ConfigReg[5:4]}}$

Table 3 Ta calculation differences

As described in the table, the calculation of the sub-parameters allowing calculation of Ta should be implemented in a different way.

6 To calculation

Coefficient	MLX90620	MLX90621
A_{common}	-	EEPROM address 0xD1:0xD0
ΔA_i	-	EEPROM address 0x00:0x3F
$\Delta A_{i_{scale}}$	-	EEPROM address 0xD9[7:4]
$A_{i(i,j)}$	EEPROM address 0x00:0x3F	$A_{i(i,j)} = \frac{A_{common} + \Delta A_{i(i,j)} * 2^{\Delta A_{i_{scale}}}}{2^{3-ConfigReg[5:4]}}$
$B_{i_{scale}}$	EEPROM address 0xD9[7:0]	EEPROM address 0xD9[3:0]
$B_{i(i,j)}$	$B_{i(i,j)} = \frac{B_{i(i,j)EEPROM}}{2^{B_{i_{scale}}}}$	$B_{i(i,j)} = \frac{B_{i(i,j)EEPROM}}{2^{B_{i_{scale}}} * 2^{3-ConfigReg[5:4]}}$
A_{CP}	$A_{CP} = A_{CP_{EEPROM}}$ A_{CP} is at EEPROM address 0xD4	$A_{CP} = \frac{A_{CP_{EEPROM}}}{2^{3-ConfigReg[5:4]}}$ A_{CP} is at EEPROM address 0xD4:0xD3
$\alpha_{(i,j)}$	$\alpha_{(i,j)} = \frac{256 * \alpha_{0_H} + \alpha_{0_L}}{2^{\alpha_{0_{scale}}}} + \frac{\Delta\alpha_{(i,j)}}{2^{\Delta\alpha_{scale}}}$	$\alpha_{(i,j)} = \frac{\frac{256 * \alpha_{0_H} + \alpha_{0_L}}{2^{\alpha_{0_{scale}}}} + \frac{\Delta\alpha_{(i,j)}}{2^{\Delta\alpha_{scale}}}}{2^{3-ConfigReg[5:4]}}$
α_{CP}	$\alpha_{CP} = \frac{256 * \alpha_{CP_H} + \alpha_{CP_L}}{2^{\alpha_{0_{scale}}}}$	$\alpha_{CP} = \frac{256 * \alpha_{CP_H} + \alpha_{CP_L}}{2^{\alpha_{0_{scale}}} * 2^{3-ConfigReg[5:4]}}$

Table 4 To calculation differences

As described in the table, the calculation of the sub-parameters allowing calculation of To should be implemented in a different way.