

iC-MHM EVAL MHM4M

EVALUATION KIT DESCRIPTION



FUNCTIONAL MODEL; EVAL-BOARD:

This device is for laboratory use only. Due to limited testing and lack of qualification for use under all conditions, long-term performance is not guaranteed. Malfunctions and operating errors may damage the device and the connected circuit; such damage may result in personal injury to the user. Safety goggles are mandatory. All liability and option of return are terminated upon activation of the device.

ORDERING INFORMATION

Type	Order Designation	Description Options
Evaluation kit	iC-MHM EVAL MHM4M	Evaluation kit includes the PCB module MHM4M Ready-to-operate, supplied with magnet and adapter cable
Evaluation Software	iC-MHM GUI	GUI Software for Windows PC Device setup file generation, board configuration via adapter
Related parts	(to be ordered separately)	
PC adapter	iC-MB3 iCSY MB3U-I2C iC-MB4 iCSY MB4U iC-MB5 iCSY MB5U	PC-USB adapter for BiSS/SSI w. I2C/SPI extension cable High-Performance PC-USB adapter for BiSS C High-Performance isolated PC-USB adapter for BiSS C

iC-MHM EVAL MHM4M

EVALUATION KIT DESCRIPTION

MHM4M PCB



Figure 1: PCB Module MHM4M top side

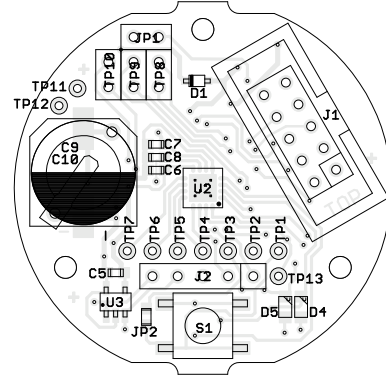


Figure 3: PCB Module MHM4M top side

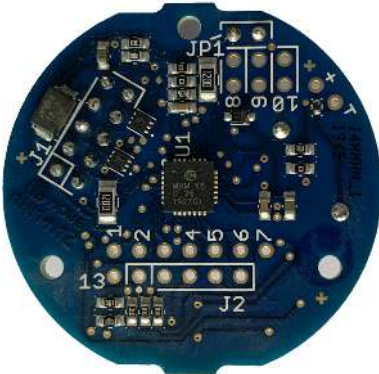


Figure 2: PCB Module MHM4M bottom side

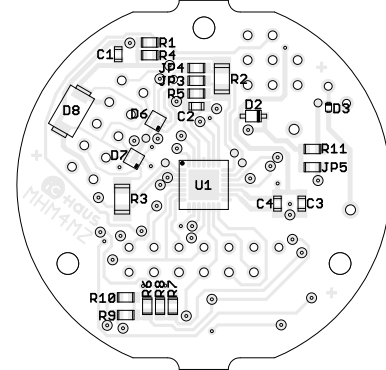


Figure 4: PCB Module MHM4M bottom side

CONNECTOR AND TERMINAL CONFIGURATION

- J1 Serial interface and power supply connector
- J2 Optional test terminal

SENSOR COMPONENTS

- U1 iC-MHM
- U2 iC-PVL

PUSHBUTTON DESCRIPTION

- S1 Triggers iC-PVL Preset

iC-MHM EVAL MHM4M

EVALUATION KIT DESCRIPTION

RELATED PRODUCTS AND DOCUMENTATION

- IC Documentation
 - www.ichaus.de/PVL_datasheet_en
 - www.ichaus.de/MHM_datasheet_en
- GUI Software for Windows PC
 - http://www.ichaus.de/MHM_gui_rte
 - http://www.ichaus.de/MHM_gui
- BiSS-to-PC Adapter Descriptions
 - http://www.ichaus.de/MB3U-I2C_datasheet_en
 - http://www.ichaus.de/MB4U_datasheet_en
 - http://www.ichaus.de/MB5U_datasheet_en

OVERVIEW OF KIT ITEMS

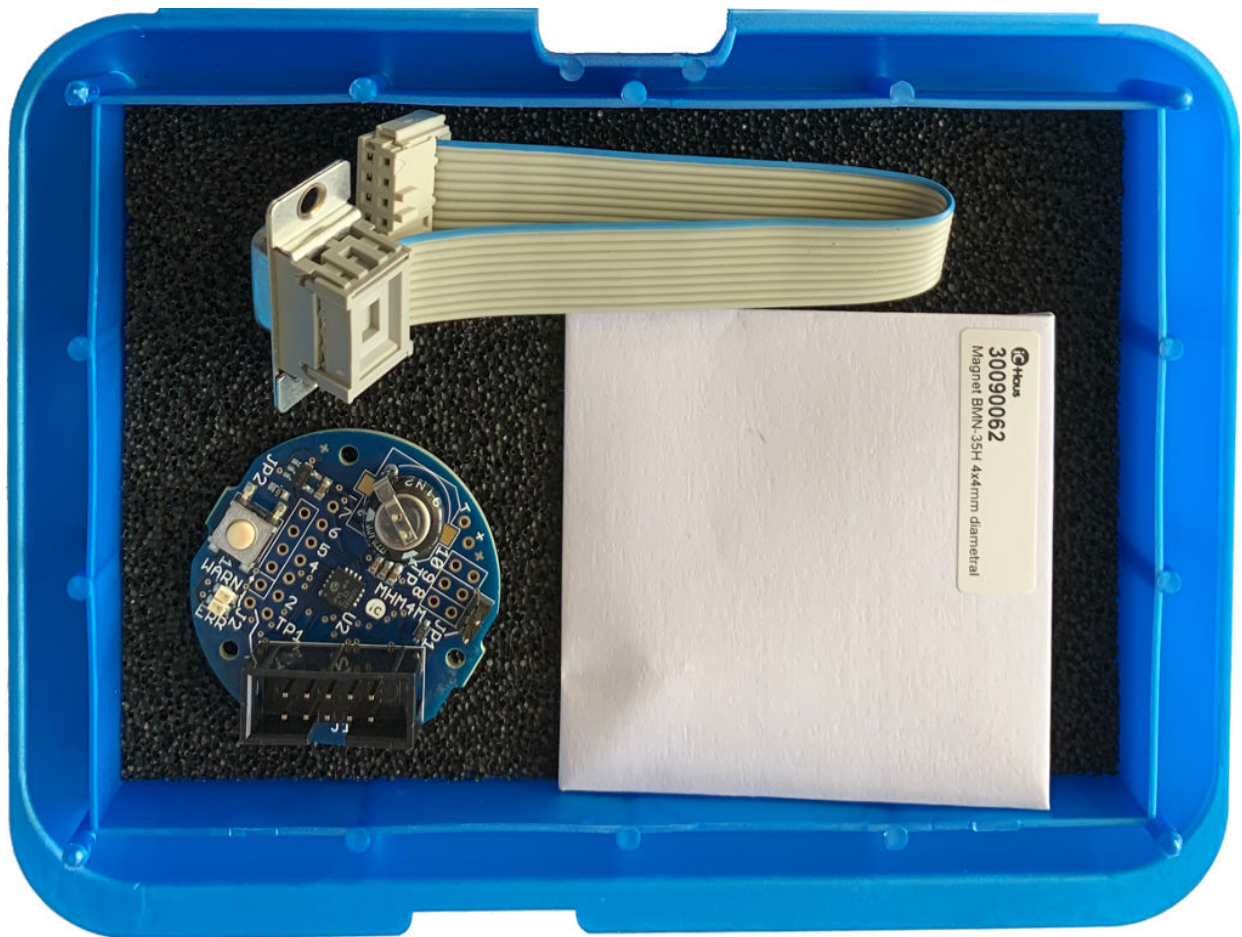


Figure 5: Evaluation kit scope of delivery: MHM4M module, diametric 4 mm NdFeB magnet, 10-pin to D-sub cable.

iC-MHM EVAL MHM4M

EVALUATION KIT DESCRIPTION

CONNECTOR AND TERMINAL PINOUT

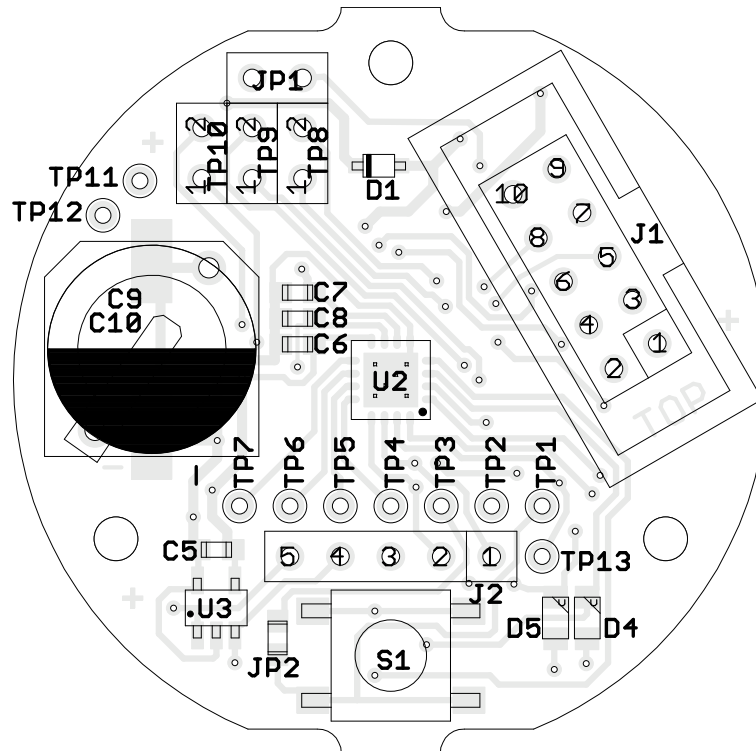


Figure 6: MHM4M top view

J1: Serial interface and power supply

(Use included 10-pin to D-sub cable to connect to BiSS adapter)

Pin	Name	Function
J1-1	n.c.	Not connected
J1-2	GND	Ground
J1-3	MA	Clock
J1-4	SL	Slave Out
J1-5	NMA	Clock (inverted)
J1-6	NSL	Slave Out (inverted)
J1-7	VDD	+5V Supply
J1-8	SLI	Slave In
J1-9	NSLI	Slave In (inverted)
J1-10	NCS	Optional Not Chip Select (SPI)

J2: Test connector

Pin	Name	Function
J2-1	MCL	Multiturn Interface Clock Line
J2-2	MDI	Multiturn Interface Data Line
J2-3	NERR	Error Output (low active)
J2-4	SDA	I2C Data Line
J2-5	SCL	I2C Clock Line

TPx: Test terminals

TP1	PRE	iC-PVL Preset pin
TP2	P1	iC-MHM digital I/O port 1
TP3	P3	iC-MHM digital I/O port 3 - iC-PVL pin PRE
TP4	P2	iC-MHM digital I/O port 2 - iC-PVL pin NWRN
TP5	N0	iC-PVL pin N0
TP6	P2	iC-PVL pin P2
TP7	N2	iC-PVL pin N2
TP8-1	MAO	iC-MHM BiSS clock output
TP8-2	NMAO	iC-MHM BiSS clock output (inverted)
TP9-1	PSIN	iC-MHM analog sine output
TP9-2	NSIN	iC-MHM analog sine output (inverted)
TP10-1	PCOS	iC-MHM analog cosine output
TP10-2	NCOS	iC-MHM analog cosine output (inverted)
TP11	VBAT2	Option to connect external battery
TP12	GND	GND connection for external battery
TP13	DI_P1	iC-PVL DI_P1 pin

iC-MHM EVAL MHM4M

EVALUATION KIT DESCRIPTION



Rev A2, Page 5/11

JUMPER DESCRIPTION

Jumper	Description	Jumper Configuration	Information
JP1	iC-MHM SPI NCS routing	open (default)	iC-MHM SPI NCS not connected to J1-10
		closed	iC-MHM SPI NCS connected to J1-10 - use for iC-MHM SPI communication mode
JP2	iC-MHM pin P3 to iC-PVL pin PRE	open	iC-MHM GPIO pin P3 not connected to iC-PVL pin PRE
		closed (default)	iC-MHM GPIO pin P3 connected to iC-PVL pin PRE - iC-PVL preset can be triggered via iC-MHM GPIO pin P3
JP3	iC-MHM pin SLI to J1-SLI	open	iC-MHM pin SLI not connected to J1-SLI
		closed (default)	iC-MHM pin SLI connected to J1-SLI
JP4	iC-MHM pin NSLI to J1-NSLI	open	iC-MHM pin NSLI not connected to J1-NSLI
		closed (default)	iC-MHM pin NSLI connected to J1-NSLI
JP5	iC-PVL pin VBAT to supercap C9	open	iC-PVL pin VBAT not connected to supercap C9 (use if external battery is connected)
		closed (default)	iC-PVL pin VBAT connected to supercap C9

BISS ADAPTER CABLE



Figure 7: BiSS adapter cable

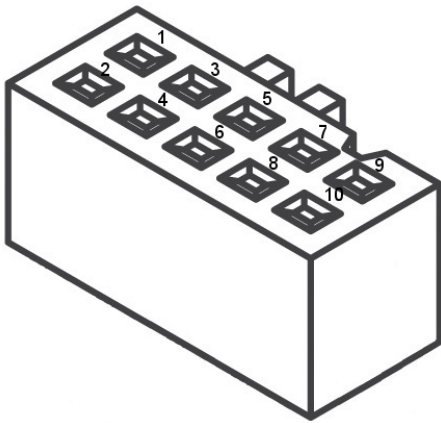


Figure 8: 10-pole connector (to board)

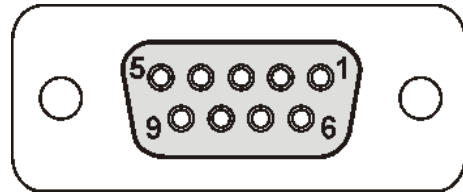


Figure 9: BiSS D-sub 9-pole connector (to PC-USB adapter)

(10-pole ribbon)

Pin Name Function

1	n.c.	(not connected)
2	GND	Ground
3	MA+	Clock Input
4	SLO+	Slave Data Output
5	MA-	Clock Input, inverted
6	SLO-	Slave Data Output, inverted
7	VDD	+5 V Sensor Supply
8	SLI+	Opt. Data In
9	SLI-	Opt. Data In, inverted
10	NCS	Opt. Not Chip Select (SPI)

(D-sub 9-pole)

Pin Slave Master Function

1	n.c.	(VB)	(12 V Sensor Supply Output)
2	MA+	MA+	Clock Line
3	MA-	MA-	Clock Line, inverted
4	VDD	VDD	+5 V Sensor Supply Output
5	SLI-	MO-	Master Data Output, inverted to Slave Data Input, inverted
6	GND	GND	Ground
7	SLO+	SL+	Data Line
8	SLO-	SL-	Data Line, inverted
9	SLI+	MO+	Master Data Output to Slave Data Input

iC-MHM EVAL MHM4M

EVALUATION KIT DESCRIPTION

CIRCUIT SCHEMATIC

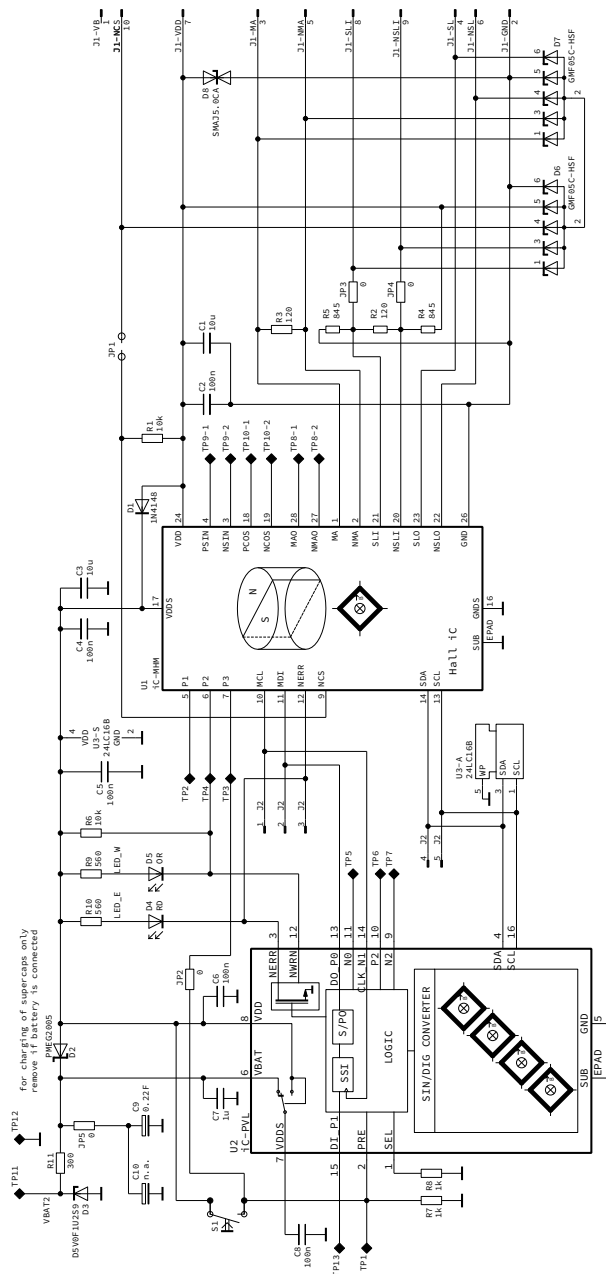


Figure 10: Circuit diagram MHM4M



WARNING: The circuitry at the iC-PVL VBAT pin is designed for use with a supercapacitor only. Do not install D2 when replacing the supercapacitor C9 with a battery or connecting an external battery to terminal VBAT2. Always use the appropriate manufacturer recommended battery protection circuitry when connecting a battery. Failure to do so may result in dangerous battery damage.

iC-MHM EVAL MHM4M

EVALUATION KIT DESCRIPTION

ASSEMBLY PART LIST

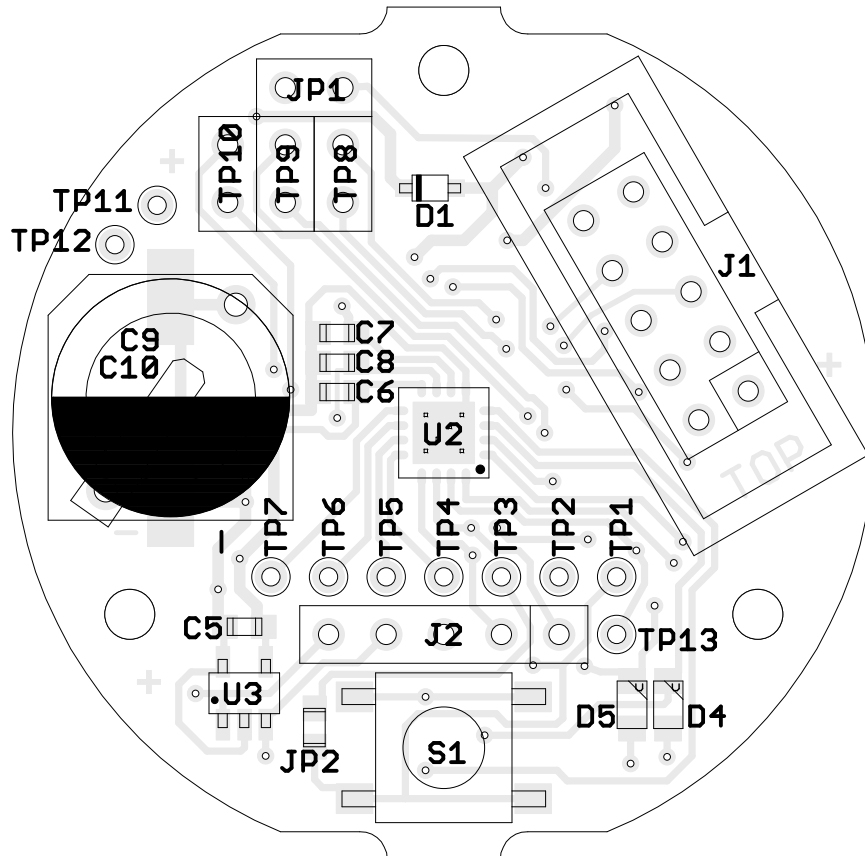


Figure 11: MHM4M top side

ASSEMBLY PART LISTING: Top Side		
Device	Value (typical)	Comment
C5, C6, C8	100 nF	SMD-C 100nF 10% X7R 16V Size 0603
C7	1 μ F	SMD-C 1uF 10% X7R 16V Size 0603
C9	220 mF	220mF -20/+80% ELKO 5,5V Size RM10
C10	n.a.	n.a.
D1	1N4148WS	SMD-D 1N4148WS SOD323
D4	RED	SMD-LED SUPER-RED LS-M67K
D5	ORANGE	SMD-LED ORANGE LO-M67K
J1	2x5-pole	Connector 2x5-pole male (WSL10G)
J2	n.a.	n.a.
JP1	2x1-pole	Connector 2x1-pole 2,54 mm
JP2	0 Ω	SMD-R 0R 5% 1A Size 0603
S1	Push Button	SMD-Switch B3S 6 mm x 6 mm
U2	iC-PVL	iC-PVL QFN16-4x4
U3	EEPROM	24LC16B SOT23-5
Note	n.a. = not assembled	

Table 1: Part listing top side

iC-MHM EVAL MHM4M

EVALUATION KIT DESCRIPTION

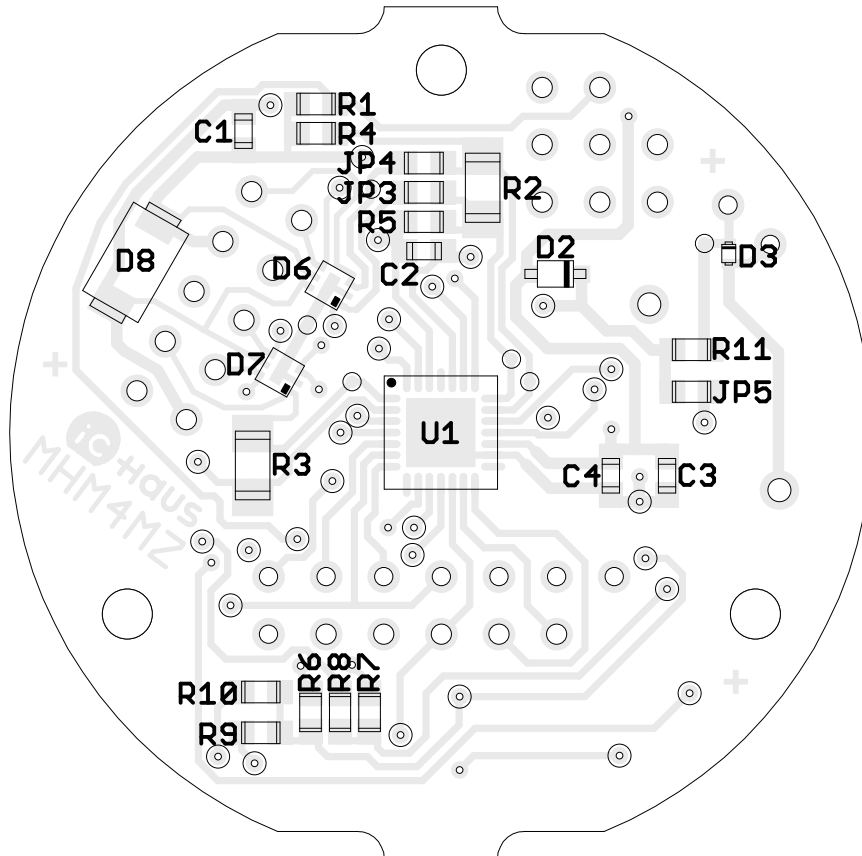
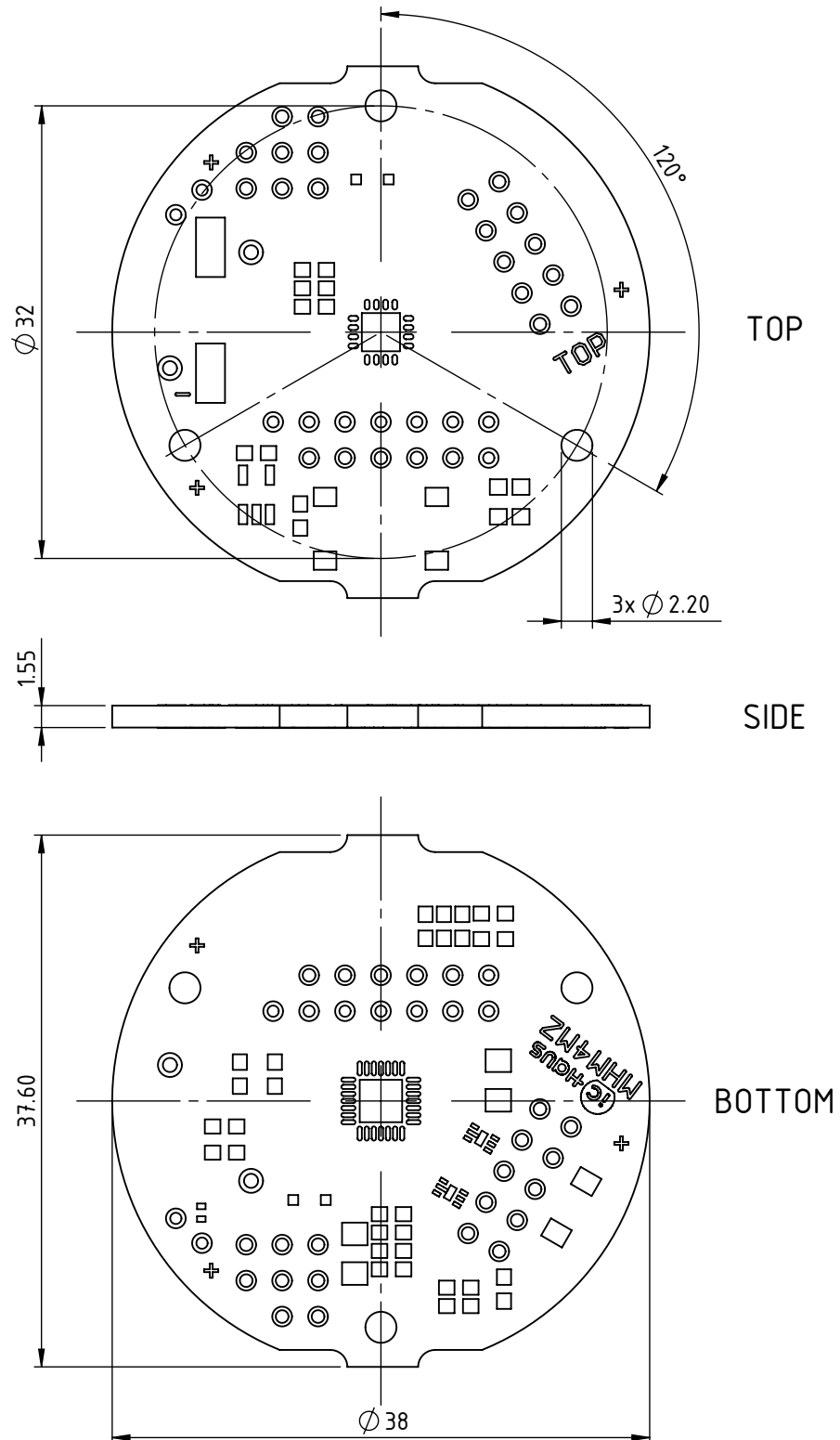


Figure 12: MHM4M bottom side

ASSEMBLY PART LISTING: Top Side		
Device	Value (typical)	Comment
C1, C3	10 μ F	SMD-C 10uF 20% X5R 10V Size 0603
C2, C4	100 nF	SMD-C 100nF 10% X7R 16V Size 0603
D2	PMEG2005AEA	SMD-SD PMEG2005AEA SOD323
D3	D5V0F1U2S9	SMD-TVSD 5V UNI D5V0F1U2S9 SOD923
D6, D7	GMF05C-HSF	SMD-TVSD (5x) 5V BI GMF05C-HSF LLP75-6L
D8	SMAJ5.0CA	SMD-TVSD 5V BI SMAJ5.0CA DO214AC
JP3, JP4, JP5	0 Ω	SMD-R 0R 5% 1A Size 0603
R1, R6	10 k Ω	SMD-R 10K 1% Size 0603
R2, R3	120 Ω	SMD-R 120R 1% Size 1206
R4, R5	845 Ω	SMD-R 845R 1% Size 0603
R7, R8	1 k Ω	SMD-R 1k 1% Size 0603
R9, R10	560 Ω	SMD-R 560R 1% Size 0603
R11	300 Ω	SMD-R 300R 1% Size 0603
U1	iC-MHM	iC-MHM QFN28-5x5

Table 2: Part listing bottom side

PHYSICAL DIMENSIONS



All dimensions given in mm, typical values.

Figure 13: MHM4M physical dimensions

iC-MHM EVAL MHM4M

EVALUATION KIT DESCRIPTION



Rev A2, Page 11/11

REVISION HISTORY

Rel.	Rel. Date*	Chapter	Modification	Page
A1	2020-01-10	All	Initial Release	All

Rel.	Rel. Date*	Chapter	Modification	Page
A2	2021-09-01	CONNECTOR AND TERMINAL PINOUT	Added TP11-TP13 description	4
		CIRCUIT SCHEMATIC	Added battery safety remark	7

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* Release Date format: YYYY-MM-DD