

iC-MH/iC-MH8 EVAL MH2D

EVALUATION BOARD DESCRIPTION



Rev A1, Page 1/12

ORDERING INFORMATION

Depending on order designation, the MH2D evaluation board DIP28 socket is equipped with an 28pin PCB adapter board containing either

iC-MH ("iC-MH EVAL MH2D") or iC-MH8 ("iC-MH8 EVAL MH2D").

The 28pin PCB adapter boards are also available separately under order designation "iC-MH iCSY MH2M" or "iC-MH8 iCSY MH2M" as supplement.

| Type | Order Designation | Description Options |
|-------------------|-------------------|---|
| Evaluation Boards | iC-MH EVAL MH2D | iC-MH Evaluation Board ready to operate, accessible through GUI via PC adapter |
| | iC-MH8 EVAL MH2D | iC-MH8 Evaluation Board ready to operate, accessible through GUI via PC adapter |
| Software | iC-MH GUI | iC-MH GUI software for Windows PC stores setup to file, communication to iC-MH |
| | iC-MH8 GUI | iC-MH8 GUI software for Windows PC stores setup to file, communication to iC-MH8 please see www.ichaus.com for download information |
| PC Adapter | iC-MB3 iCSY MB3U | PC-USB Adapter |
| | iC-MB4 iCSY MB4U | PC-USB Adapter |
| Accessory | iC-MH iCSY MH2M | DIL-28 PCB Adapterboard with mounted iC-MH |
| | iC-MH8 iCSY MH2M | DIL-28 PCB Adapterboard with mounted iC-MH8 |

iC-MH/iC-MH8 EVAL MH2D EVALUATION BOARD DESCRIPTION

BOARD MH2D

(size 100 mm x 80 mm)

TERMINAL DESCRIPTION

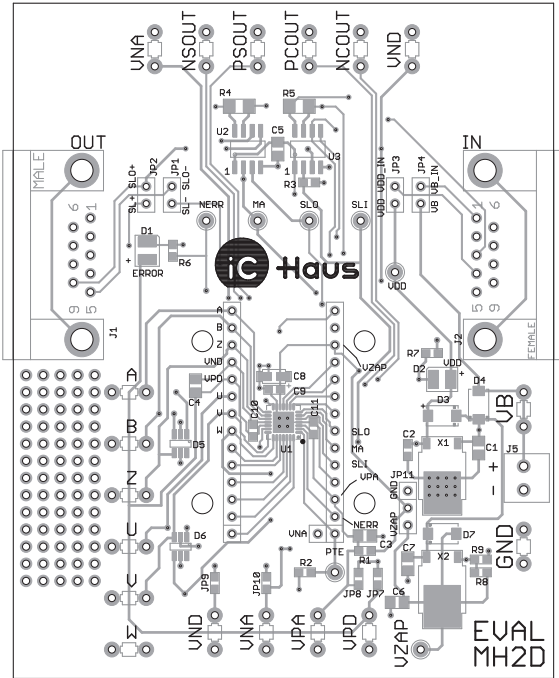


Figure 1: Component side

| | |
|------|-----------------------------------|
| VB | +10 to +20 V Supply Voltage |
| GND | 0 V Ground |
| A | Incremental A (+NU) |
| B | Incremental B (+NV) |
| Z | Index Z (+NW) |
| U | Commutation U (+NA) |
| V | Commutation V (+NB) |
| W | Commutation W (+NZ) |
| VND | Ground (digital) |
| VNA | Ground (analog) |
| VPA | +5 V Supply Voltage (analog) |
| VPD | +5 V Supply Voltage (digital) |
| VZAP | Zener Zapping Programming Voltage |
| NERR | Error Output (active low) |
| MA | Clock Input Interface/SSI |
| SLO | Data Output Interface/SSI |
| SLI | Data Input Interface/SSI |

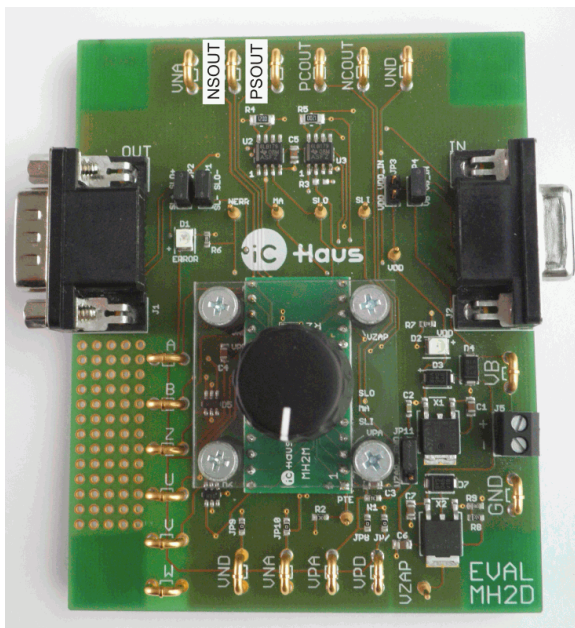


Figure 2: Top view

| | |
|-------|---|
| VNA | Ground (analog) |
| NSOUT | Negative Sine Output (iC-MH8 only) |
| PSOUT | Positive Sine Output (iC-MH8 only) |
| PCOUT | Positive Cosine Output (iC-MH8 only) |
| NCOUT | Negative Cosine Output (iC-MH8 only) |
| VND | Ground (digital) |
| D1 | Error Indicator LED (red) Illuminates red to indicate errors Connected to NERR pin of iC-MH |
| D2 | Voltage Supply Indicator LED (green) Illuminates green to indicate voltage supply Connected to VPD pin of iC-MH |

iC-MH/iC-MH8 EVAL MH2D

EVALUATION BOARD DESCRIPTION



Rev A1, Page 3/12

RELATED DOCUMENTS

- iC-MH Data Sheet - Specification -
- iC-MH GUI - GUI software for Windows PC -
→ <http://www.ichaus.de/product/iC-MH>

- iC-MH8 Data Sheet - Specification -
- iC-MH8 GUI - GUI software for Windows PC -
→ <http://www.ichaus.de/product/iC-MH8>

- iC-MB3 iCSY MB3U - PC-USB ADAPTER -
- iC-MB4 iCSY MB4U - PC-USB ADAPTER -
→ <http://www.ichaus.de/product/MB3U>
→ <http://www.ichaus.de/product/MB4U>

CONNECTOR AND TERMINAL PINOUT

9-pin Sub D Connector J1 - male

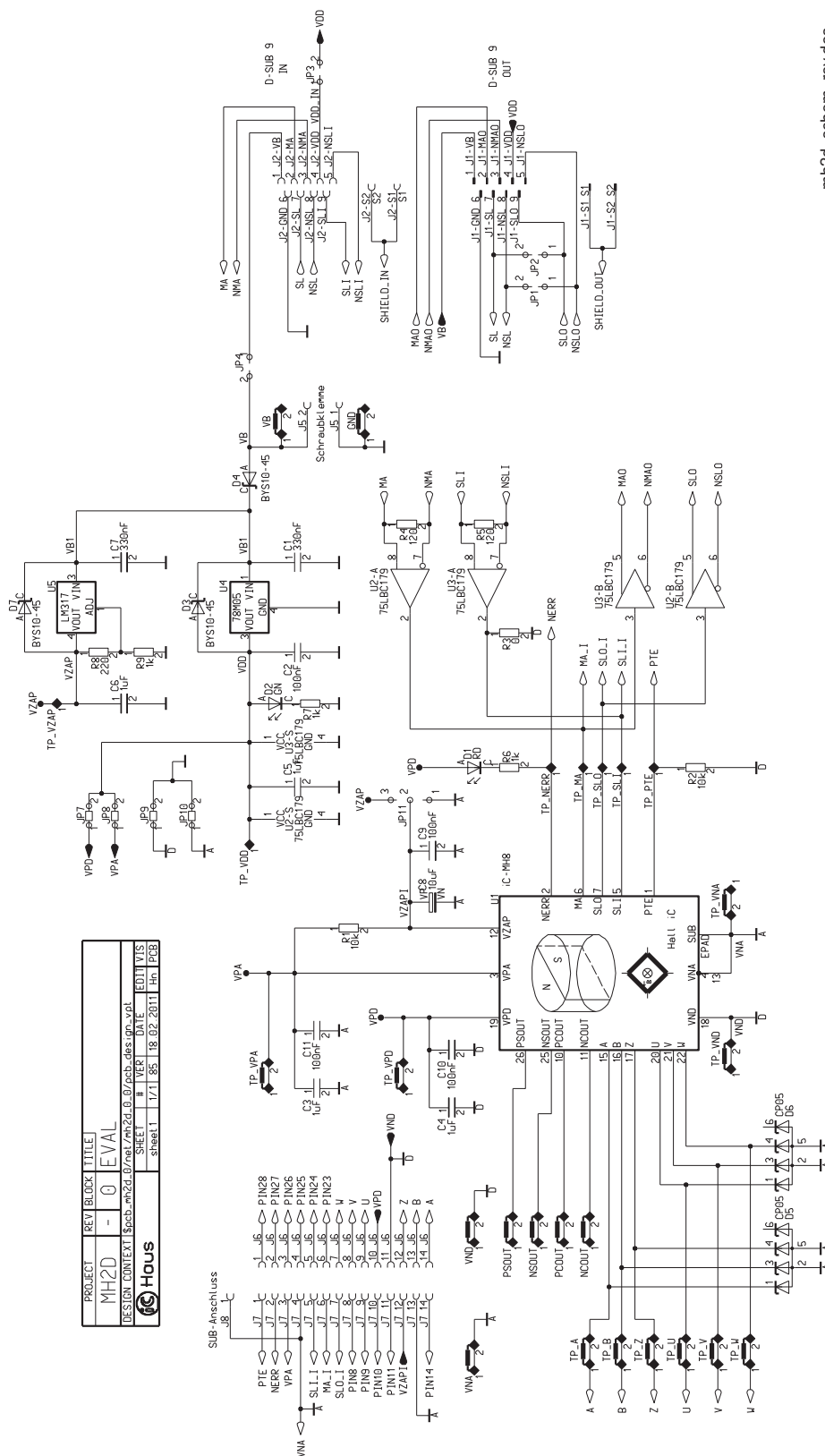
| PIN | Name | Function |
|-----|------|--------------------------------|
| 1 | VB | +12 V Supply Voltage |
| 2 | MAO+ | Master clock output |
| 3 | MAO- | Master clock output (inverted) |
| 4 | VDD | +5 V Supply Voltage |
| 5 | SLO- | Data output (inverted) |
| 6 | GND | 0 V Ground |
| 7 | SL+ | Slave data |
| 8 | SL- | Slave data (inverted) |
| 9 | SLO+ | Data output |

9-pin Sub D Connector J2 - female

| PIN | Name | Function |
|-----|------|-------------------------------|
| 1 | VB | +12 V Supply Voltage |
| 2 | MA+ | Master clock input |
| 3 | MA- | Master clock input (inverted) |
| 4 | VDD | +5 V Supply Voltage |
| 5 | SLI- | Data input line (inverted) |
| 6 | GND | 0 V Ground |
| 7 | SL+ | Slave data |
| 8 | SL- | Slave data (inverted) |
| 9 | SLI+ | Data input line |

iC-MH/iC-MH8 EVAL MH2D EVALUATION BOARD DESCRIPTION

CIRCUIT DESCRIPTION



mh2d_schem_rev.des

Figure 3: Circuit diagram including optional components

iC-MH/iC-MH8 EVAL MH2D EVALUATION BOARD DESCRIPTION

Setup ("MH2D connected via USB Adapter - MB3U")

The MH2D board features two 9-pin SUB-D connectors for serial communication. The PC-USB Adapter enables the evaluation board to be connected to a common Windows PC. Figure 4 shows the setup for a single board connected via the **IN** junction (J4).

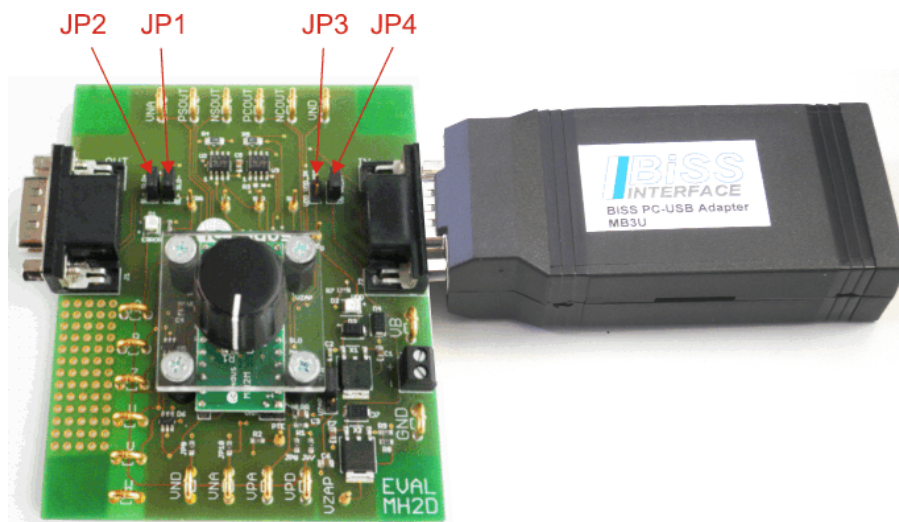


Figure 4: Connection of one MH2D evaluation board to MB3U adapter

Settings of the jumpers are shown in detail in 5

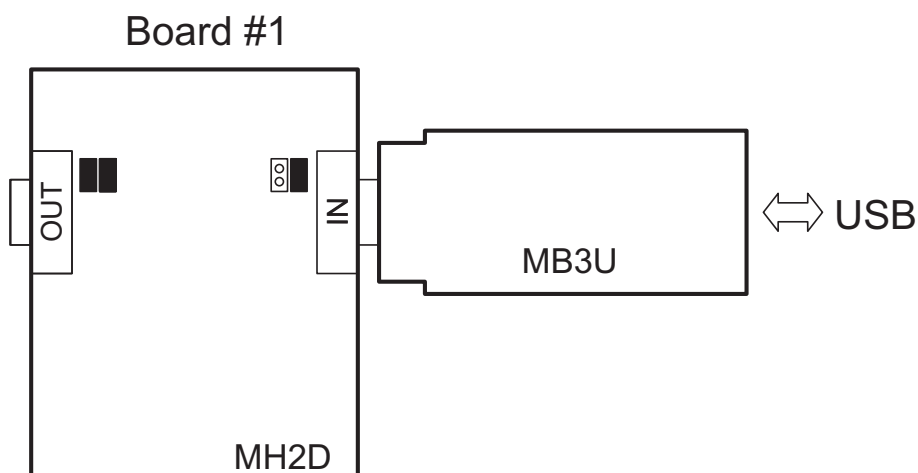


Figure 5: Connection and jumper settings of one MH2D evaluation board to MB3U adapter

Figure 6 shows another example how to use two MH2D evaluation boards at the same time. Here the **IN** junction (J4) of the second board is plugged on the **OUT** junction. An external power supply (12 V - inner contact: negative pole - outer contact: positive pole) is required in case of connecting two boards. iC-MH/iC-MH8 software can be used to access the board from a Windows PC (see section "APPLICATION SOFTWARE" for more details).

Note : Please install the latest USB driver before you attach the PC Adapter to the PC.

Important jumper settings are explained in-depth in section "JUMPER DESCRIPTION"

iC-MH/iC-MH8 EVAL MH2D

EVALUATION BOARD DESCRIPTION

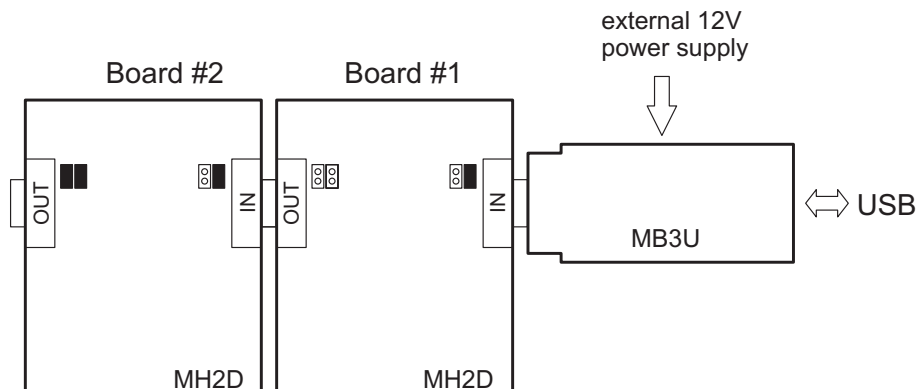


Figure 6: Connection and jumper settings of two MH1D evaluation boards to MB3U adapter

JUMPER DESCRIPTION

| Communication Chain | Board 1 | | Board 2 (optional) | | Comments |
|---|--------------------------|--------------------------|--------------------------|--------------------------|---|
| | Jumper Configuration JP1 | Jumper Configuration JP2 | Jumper Configuration JP1 | Jumper Configuration JP2 | |
| Set the board 1 as the last slave in the line | bridged | bridged | N/A | N/A | shipment setup (only one board) |
| Set the board 2 as the last slave in the line | open | open | bridged | bridged | Adapter → Board 1 (J4) Board 1 → Board 2 (J1) ¹ |
| | open | open | N/A | N/A | don't use |
| | open | open | open | open | don't use |
| | bridged | bridged | open | open | don't use |
| | bridged | bridged | bridged | bridged | don't use |

Notes ¹⁾ Connect the two boards as shown in figure 6.

Voltage Supply - Adapter "MB3U"

| Voltage Supply | | Component Supply | Jumper Configuration | | Comments |
|----------------------------------|--------------------------|----------------------------|--------------------------|--------------------------|--------------------------------------|
| via board terminals ² | via J4 plug ³ | iC-MH | JP3 (VDD) +5 V via J4 | JP4 (VB) +12 V via J4 | |
| - | X | via J4 (VDD) | bridged | open | shipment setup (no zapping possible) |
| - | X | via J4 (VB) | open | bridged | zapping possible |
| X | X | via board terminals | open | open | zapping possible |
| X | X | shortens VB terminal to J4 | bridged | don't care | don't use |
| X | X | shortens VB terminal to J4 | don't care | bridged | don't use |

iC-MH/iC-MH8 EVAL MH2D

EVALUATION BOARD DESCRIPTION

preliminary



Rev A1, Page 7/12

Voltage Supply - Adapter "MB3A"

| Voltage Supply | | Component Supply | | Jumper Configuration | | Comments |
|----------------------------------|--------------------------|---------------------|------|----------------------|------------|---|
| via board terminals ² | via J4 plug ⁴ | iC-MH | MB3A | JP3 (VDD) | JP4 (VB) | |
| - | none | no voltage supply | | bridged | open | shipment setup (no zapping possible) |
| X | none | via board terminals | | bridged | don't care | zapping possible |

Notes ²⁾ Supply of +10 to +20 V required to board terminals VB and GND.

³⁾ Supply voltage sourced from J4 plug out of PC adapter.

⁴⁾ MB3A needs to be externally supplied via the MH1D evaluation board

iC-MH/iC-MH8 EVAL MH2D

EVALUATION BOARD DESCRIPTION



Rev A1, Page 8/12

Zapping

| Information | Jumper Configuration JP8 | Comments |
|---|-----------------------------|---|
| VZAP to GND (0 V) | 1-2 | shipment setup (no zapping possible) |
| VZAP to VZAP (7 V) VZAP to VPD (5 V) | 2-3 open | zapping possible pseudo zapping ⁵ |

Notes ⁵) Zapping-command will be sent but voltage supply of 5 V isn't sufficient to write zapping ROM.
At least 6,5 V is required to successfully write zapping ROM.

ASSEMBLY PART LIST

| Device | Value (typical) | Comment |
|------------------|-----------------|---|
| C1, C7 | 330 nF | Supply backup capacitor |
| C2, C9, C10, C11 | 100 nF | Supply backup capacitor |
| C3, C4, C5, C6 | 1 μ F | Supply backup capacitor |
| C8 | 10 μ F | |
| D1 | LS-T670 | Indicator LED (red) for error message |
| D2 | LG-T670 | Indicator LED (green) for power supply |
| D3, D4, D7 | BYS10-45 | Revers protection diodes |
| D5, D6 | CP05 | Line protection diodes |
| J1 | D-SUB9 M | Serial output connector |
| J2 | D-SUB9 F | Serial input connector |
| J5 | AKL059-02 | Screwing terminal for power supply VB |
| J6, J7 | MK 01 14 G | Connection to DIL28 iC-MH/iC-MH8-Adapter |
| J8 | MK 01 2 G | Connection to DIL28 iC-MH/iC-MH8-Adapter (Substrate) |
| JP1 - JP4 | SL LP1/097 2G | Jumper |
| JP1 - JP4 | | Jumper CAB |
| JP7, JP9 | 0 Ω | |
| JP8 | SL LP1/097 3G | Jumper for zapping voltage supply |
| R1, R2 | 10 k Ω | Pull-up Vzap / Pull-down PTE |
| R4, R5 | 120 Ω | Line termination resistors |
| R6, R7, R9 | 1 k Ω | |
| R8 | 220 Ω | |
| U2, U3 | 75LBC179 | Line driver for serial interface |
| U4 | 78M05 | Voltage regululator (5V) |
| U5 | LM317 | Voltage regulator (adj. to 7V) |

APPLICATION SOFTWARE

iC-MH / iC-MH8 software for PCs running on Windows operating systems, as well as the required USB driver are available as a ZIP file.

Download package:

http://www.ichaus.de/MH_gui

http://www.ichaus.de/MH8_gui

Software overview online: <http://www.ichaus.de/software>

Features

- Reducing evaluation and design-in time and cost
- Manually setting up parameters of iC-MH/iC-MH8
- Saving parameter configuration into ROM
- Saving parameter configuration to Hex files
- Loading predefined configurations from Hex files
- Reading and displaying of sensor data

Installation

After unzipping the iC-MH/iC-MH8 software package MH1SO_gui_xx resp. MH1SO_gui_xxрте, the following files are located in the selected working directory.

xx is a placeholder for revisions

- Subfolder MH1SO_gui_xx including the executable setup.exe which starts the installation routine.
- Driver packages for USB or other adapter devices.
- Evaluation board description.

Note: Administrator rights are required to run installations.

1. To access the iC-MH / iC-MH8 evaluation board, interface adapter drivers for USB or other adapter devices need to be installed. Before connecting the adapter to your PC the driver installation must be completed successfully.

→ Execute the USB_xx.exe installation package and follow the on-screen instructions. This can take a few minutes.

1.1 When using an iC-Haus USB adapter, it must be connected to the PC after the driver installation, to complete the whole driver installation procedure.

2. Install the evaluation software MH1SO by executing the setup.exe located in the subfolder MH1SO_gui_xx.
→ Follow the on-screen instructions to finish the installation.

3. After installation the executable MH1SO_gui_xx.exe will be available in the selected working directory. Figure 7 shows a screenshot of the evaluation software.

LabView™ is a trademark of National Instruments.

iC-MH/iC-MH8 EVAL MH2D EVALUATION BOARD DESCRIPTION

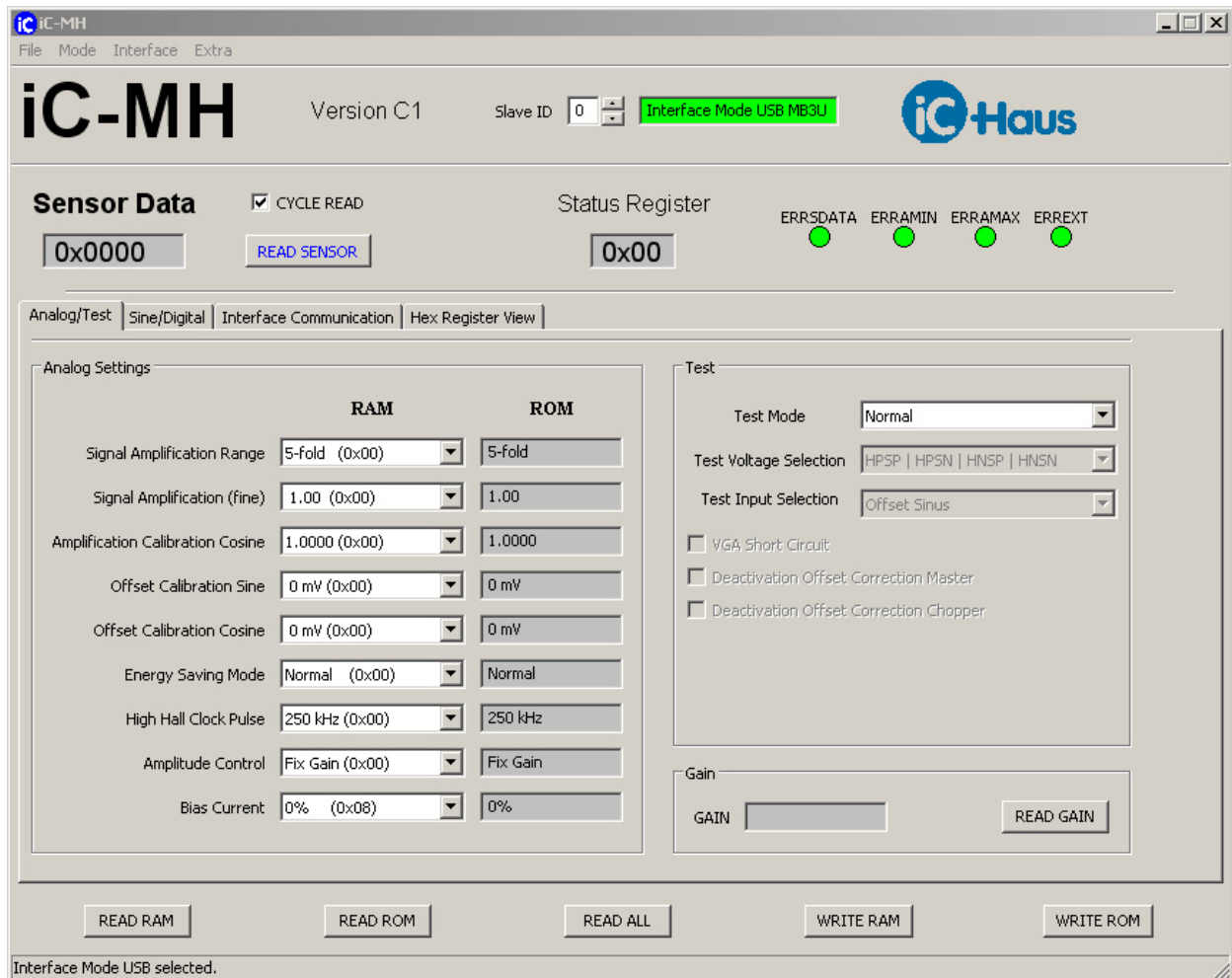


Figure 7: Evaluation software start-up window (shown for iC-MH)

Function Description

The iC-MH / iC-MH8 software starts in the 'No Hardware' mode. This state can be used to configure parameters without any hardware connected to save the configuration into a Hex file for later use (e. g. zapping ROM).

Menu Section

| | Button | Description |
|--------------|---|--|
| <File> | Open | Chip configuration I/O, Intel Hex file format (*.hex) |
| | Save | Transfer configuration to file, Intel Hex file format (*.hex) |
| | Exit | Quit software |
| <Mode> | No Hardware | Switch to no hardware to reset PC to adapter communication |
| | MB3U | for use with PC-USB adapter MB3U |
| | MB4U | for use with PC-USB adapter MB4U |
| | Lpt-Spi | for use with PC-LPT adapter MB3A, eval board MB3D-S |
| <Interface> | Config Interface | Serial interface settings (use AUTODETECT for slave detection) |
| | Read RAM | Reads in iC-MH's current configuration (RAM to PC) |
| | Read ROM | Reads in ROM's current configuration (ROM to PC) |
| | Read ALL | Reads the whole content (RAM, ROM, ID, Profile to PC) |
| | Write RAM | Transfers the displayed configuration to iC-MH RAM |
| | Write ROM | Transfers the displayed configuration to ROM |
| | Read ID | Reads in iC-MH's ID (address: 0x78-0x7F) |
| Read Profile | Reads in iC-MH's Profile (address: 0x42-0x43) | |
| <Extra> | Enable Output Window | Displays sensor data (optical, hexadecimal, decimal, binary, degree) |
| | About | Additional informations |

Upper Section

| Button | Description |
|---------------|---|
| Slave ID | Switches between slaves |
| CYCLE READ | Activates continuous sensor data read in |
| READ SENSOR | Reads in sensor data (continuously with CYCLE READ activated) |

Middle Section

Parameter settings. See iC-MH Data Sheet for detailed description

Bottom Section

| Button | Description |
|---------------|---------------------------------|
| READ RAM | See description of Menu section |
| READ ROM | See description of Menu section |
| READ ALL | See description of Menu section |
| WRITE RAM | See description of Menu section |
| WRITE ROM | See description of Menu section |

For a detailed description of the parameter settings please refer to iC-MH / iC-MH8's Data Sheet. When moving the mouse cursor to a parameter input box, a tool tip is displayed identifying the corresponding parameter name as described in the specification.

iC-MH/iC-MH8 EVAL MH2D

EVALUATION BOARD DESCRIPTION



Rev A1, Page 12/12

REVISION HISTORY

| Rev | Notes | Pages affected |
|-----|-----------------|----------------|
| A1 | Initial version | |

iC-Haus expressly reserves the right to change its products and/or specifications. An info letter gives details as to any amendments and additions made to the relevant current specifications on our internet website www.ichaus.de/infoletter; this letter is generated automatically and shall be sent to registered users by email.

Copying – even as an excerpt – is only permitted with iC-Haus' approval in writing and precise reference to source.

iC-Haus does not warrant the accuracy, completeness or timeliness of the specification and does not assume liability for any errors or omissions in these materials.

The data specified is intended solely for the purpose of product description. No representations or warranties, either express or implied, of merchantability, fitness for a particular purpose or of any other nature are made hereunder with respect to information/specification or the products to which information refers and no guarantee with respect to compliance to the intended use is given. In particular, this also applies to the stated possible applications or areas of applications of the product.

iC-Haus conveys no patent, copyright, mask work right or other trade mark right to this product. iC-Haus assumes no liability for any patent and/or other trade mark rights of a third party resulting from processing or handling of the product and/or any other use of the product.

As a general rule our developments, IPs, principle circuitry and range of Integrated Circuits are suitable and specifically designed for appropriate use in technical applications, such as in devices, systems and any kind of technical equipment, in so far as they do not infringe existing patent rights. In principle the range of use is limitless in a technical sense and refers to the products listed in the inventory of goods compiled for the 2008 and following export trade statistics issued annually by the Bureau of Statistics in Wiesbaden, for example, or to any product in the product catalogue published for the 2007 and following exhibitions in Hanover (Hannover-Messe).

We understand suitable application of our published designs to be state-of-the-art technology which can no longer be classed as inventive under the stipulations of patent law. Our explicit application notes are to be treated only as mere examples of the many possible and extremely advantageous uses our products can be put to.