iC-MD EVAL MD1D

EVALUATION BOARD DESCRIPTION

preliminary

ORDERING INFORMATION

Type	Order Designation	Description Options
Evaluation Board	iC-MD EVAL MD1D	iC-MD Evaluation Board ready to operate, accessible through GUI via PC adapter
Software	iC-MD GUI	GUI software for Windows PC stores setup to file, communication to iC-MD please see www.ichaus.com for download information
PC Adapter	iC-MB3 iCSY MB3U-I2C	PC-USB Adapter with SPI pigtail (Software A1 only for SPI use)

BOARD MD1D

(size 100 mm x 80 mm)

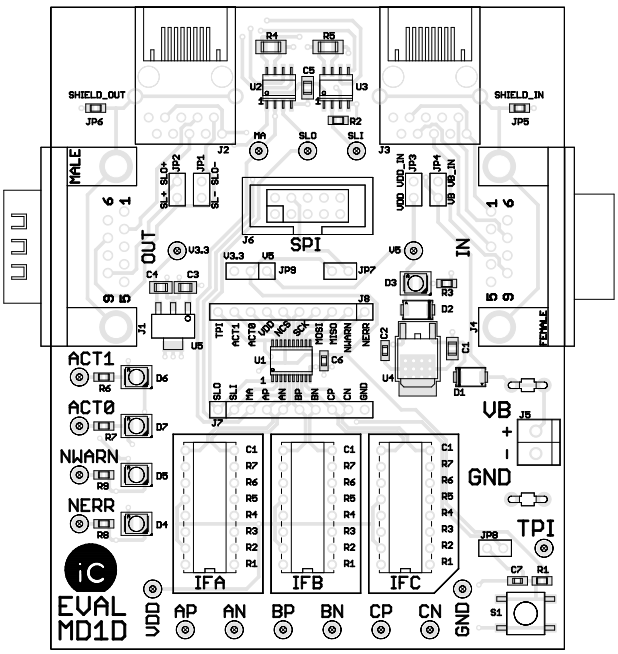

Figure 1: Component side

TERMINAL	DESCRIPTION
VB	+10 to +20 V Supply Voltage
V3.3	+3.3 V Supply Voltage
V5	+5 V Supply Voltage
VDD	Selected iC-MD Supply Voltage
GND	0 V Ground
AP	Incremental Input AP
AN	Incremental Input AN
BP	Incremental Input BP
BN	Incremental Input BN
CP	Incremental Input CP
CN	Incremental Input CN
TPI	Touch Probe Input
ACT1	Actuator 1 Output
ACT2	Actuator 2 Output
NERR	Error Input/Output (active low)
NWARN	Warning Input/Output (active low)
SPI	SPI Interface Connector
MA	Clock Input Interface *BiSS*/SSI
SLO	Data Output Interface *BiSS*/SSI
SLI	Data Input Interface *BiSS*/SSI
D3	Supply Indicator LED

RELATED DOCUMENTS

- iC-MD Data Sheet - Specification
- iC-MD GUI - GUI software for Windows PC

→ http://www.ichaus.de/product.php?prod=iC-MD

- iC-MB3 iCSY MB3U-I2C - PC-USB ADAPTER with SPI pigtail

→ http://www.ichaus.de/product.php?prod=MB3A/MB3U

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 J4 - 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

10-pin Adapter Connector J6 - male (to SPI Master)

PIN	Name	Function
1	SCL	Serial Clock Line
2	GND	0 V Ground
3	Reserved	-
4	+5V	+5 V Supply Voltage
5	Reserved	-
6	Reserved	-
7	MOSI	Serial Data Line
8	Reserved	-
9	MISO	Serial Data Line
10	GND	0 V Ground

2-pin Terminal J2- Power Supply Input

PIN	Name	Function
1	VDD	+3.3 . . . +5 V Supply Voltage
2	GND	0 V Ground

CIRCUIT DESCRIPTION

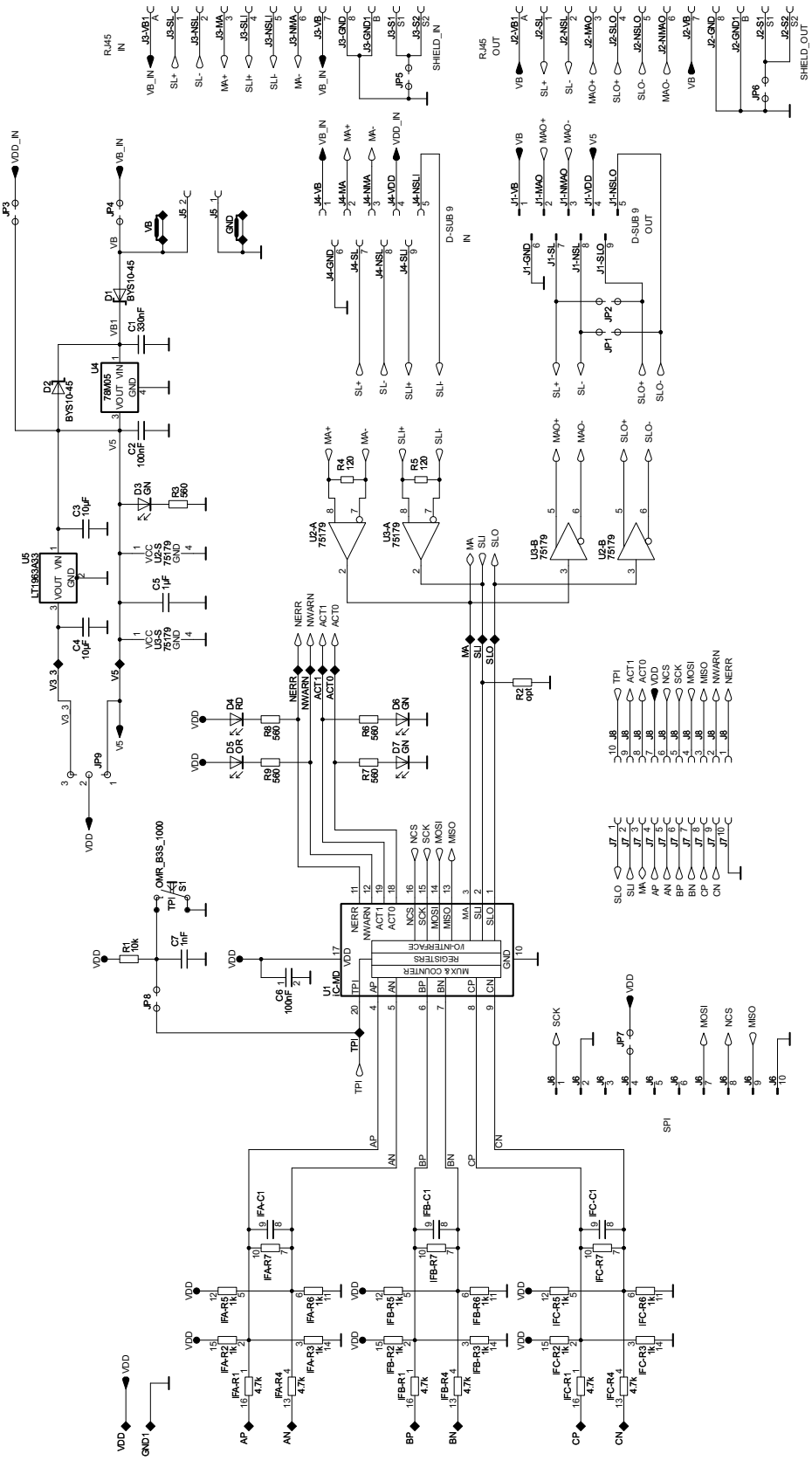

Figure 2: Circuit diagram including optional components

Setup ("MD1D connected via USB Adapter - MB3U-I2C")
The board features one 10-pin connectors for serial SPI communication. The PC-USB Adapter iC-MB3 iC-SY MB3U-I2C enables the evaluation board to be connected to a common Windows PC via SPI interface. iC-MD 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.

JUMPER DESCRIPTION

JP1, JP2: BiSS Onboard Loopback
2-pin jumper terminal male

PIN	Name	Function
-	BiSS Bus Structure	BiSS IN to BiSS OUT
X	BiSS Start of Bus, Point-To-Point	Loopback of SLO to SL

JP3: 5 V Power Supply
2-pin jumper terminal male

PIN	Name	Function
-	No Direct 5 V	
X	5 V Direct Supply	+5 V Direct Board Supply

JP4: VB Power Supply
2-pin jumper terminal male

PIN	Name	Function
-	No VB Supply	
X	VB Supply	Supply of +10 to +20 V Required to Board Terminals VB and GND

JP5, JP6: RJ45 Shield to GND
2-pin jumper terminal male

PIN	Name	Function
-	No RJ45 Shield to GND	
X	RJ45 Shield to GND	RJ45 BiSS Connector IN / OUT Shield to GND

JP7: 5 V Adapter Power Supply
2-pin jumper terminal male

PIN	Name	Function
-	No 5 V Adapter Supply	No direct +5 V Adapter Supply
X	5V Adapter Supply	+5V Direct

JP8: Enable TPI Button + Buffer
2-pin jumper terminal male

PIN	Name	Function
-	TPI Button + Buffer Disabled	External TPI Operation
X	TPI Button + Buffer Enabled	Manual TPI Operation Possible

JP9: 5 V Adapter Power Supply
3-pin jumper terminal male

PIN	Name	Function
12	5 V Voltage Regulator Selection	On Board +5 V Supply
23	3.3 V Voltage Regulator Selection	On Board 3.3 V Regulator Supply

ASSEMBLY PART LIST

Device	Value (typical)	Comment
C1	330nF	Supply backup capacitor
C2, C6	100nF	Supply backup capacitor
C3, C4	10uF	Supply backup capacitor
C7, C5	1uF	Supply backup capacitor
J1	D-SUB9-M 90°	BiSS interface connector
J2, J3	RJ45_10 YAMAICHI_RJ45_10_Y-CONJACK-21	BiSS interface connector (not mounted)
J4	D-SUB9-F 90°	BiSS interface connector
J5	AKL59 02	Supply connector
J6	WSL10	SPI interface connector
U1	iC-MD TSSOP20	iC-MD or mounted DIL PCB with iC-MD
U2, U3	75LBC179 SO8	RS422 transceiver
U4	78M05 DPAK	5 V supply
U5	LT1963A33 SOT223-4	3.3 V supply
JP1, JP2, JP3, JP4	SLLP1097 2G	2-pin jumper terminal
JP5, JP6, JP7, JP8, JP9	SLLP1097 3G	2-pin/3-pin jumper terminal
GND, VB	LBS02	Supply connector
D1, D2	BYS10-45	Protective diodes
D3	LS-T670 green	LED 5 V
D4	LS-T670 red	LED NERR
D5	LO-T67K orange	LED NWARN
D6, D7	LS-T670 green	LED ACT1 + 2
R1, R2	10k	TPI resistor
R4, R5	120	RS422 terminator
R3, R6, R7, R8, R9	562	LED resistor
IFA, IFB, IFC	DIL16	Input filter system
ACT0, ACT1, AN, AP, BN, BP, CN, CP, GND1, MA, NERR, NWARN, SLI, SLO, TPI, V3_3, V5, VDD	S1-F	Pin
S1	OMR_B3S_1000 OMRON_B3S_1000	TPI button switch
J7, J8	MK0110G	Connection to DIL28 iC-MD adapter
RF1, RF2, RF3, RF4	Rubber foot	

APPLICATION SOFTWARE

iC-MD software for PCs running on Windows operating systems, as well as the required USB driver are available as a ZIP file. Download from http://www.ichaus.de/product.php?prod=iC-MD

Installation
After unzipping the "iC-MD_xx.zip", the following files are located in the selected directory.
(xx is a placeholder for revisions)

→ **iC-MD_xx.msi**
→ **mb3u_usb_driver.exe**
→ **MD1d_qig_a4es.pdf**
→ **readme.txt**

Note : Administrator rights are required to run installations.

1. The installation of the software starts by executing the iC-MD_xx.msi installation package.
→ Follow the on-screen instructions to finish the installation procedure.

2. USB driver need to be installed to access the evaluation board via the PC Adapter.
→ Execute the mb3u_usb_dirver.exe installation package and follow the on-screen instructions. This process can take a few minutes.

3. Installation will make the software "iC-MD_xx.exe" available in the selected working directory. The execution of this file will start the software. Figure 3 shows a screenshot of the start up window.

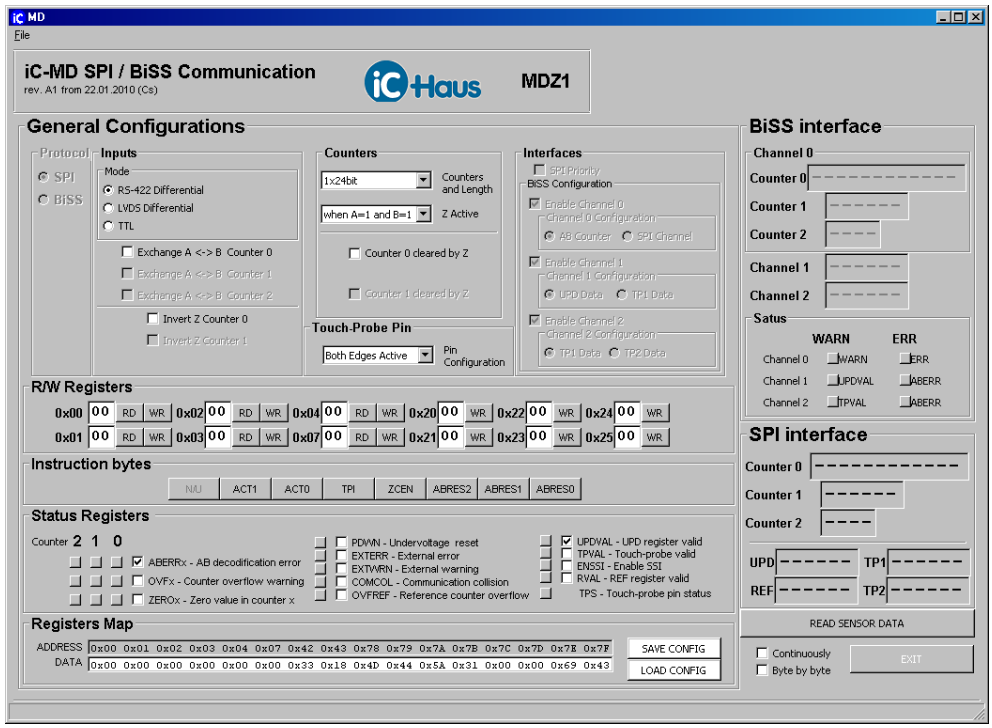

Figure 3: Screenshot of the software

Instruction
The iC-MD software features:

- **Manually setting up parameters of iC-MD**
- **Saving parameter configuration to HEX files**
- **Loading predefined configurations from HEX files**
- **Reading and displaying of sensor data**

The iC-MD software will start up and try to connect the adapter directly. If the adapter is not available it will be locked in a "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.

Menu Section

	Button	**Description**
<File>	Exit	Exit application

R/W Registers

Button	**Description**
RD	Reading the adressed byte
WR	Writing the adressed byte

Instruction Bytes

Button	**Description**
N/U	Disabled Function
ACT1	Set/Reset actuator 1
ACT0	Set/Reset actuator 0
TPI	Set/Reset touch probe input
ZCEN	Enable zero codification
ABRES2	Reset counter 2
ABRES1	Reset counter 1
ABRES0	Reset counter 0

Register Map Section

Button	**Description**
SAVE CONFIG	Write current configuration to HEX file
LOAD CONFIG	Read configuration from HEX file

Reading Sensor Data

Button	**Description**
READ SENSOR DATA	Read data (once or continuously)
Continuously	Check to read data continuously
Byte by Byte	Read data bytewise

Exit Application

Button	**Description**
EXIT	Exit application

For a detailed description of the parameter settings please refer to iC-MD data sheet.

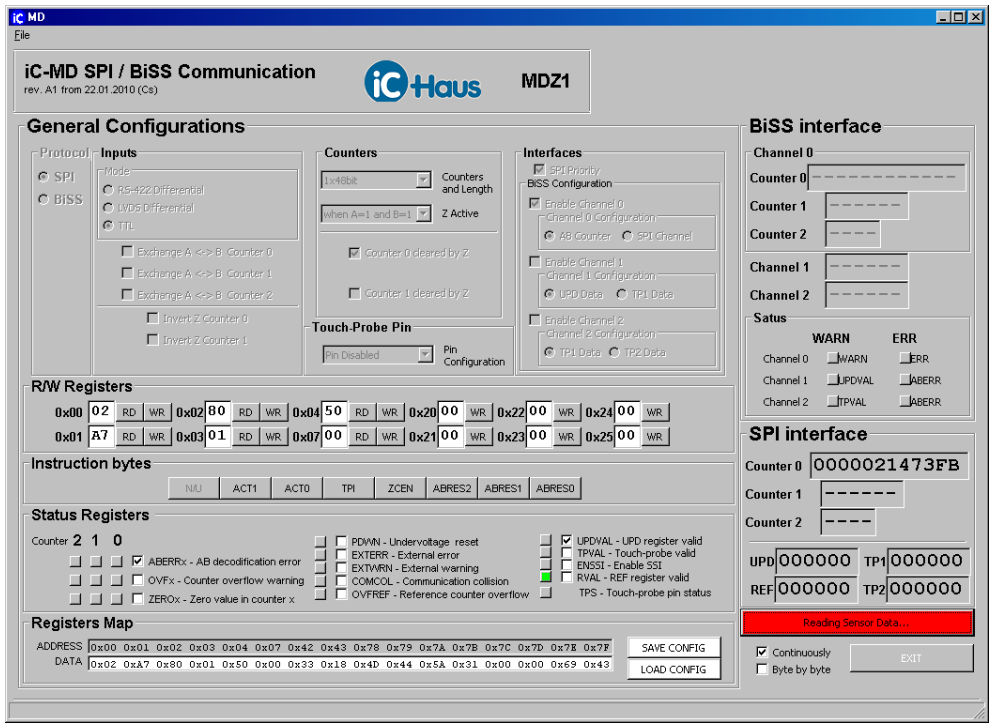

Figure 4: Screenshot of the running software

REVISION HISTORY

Rev	Notes	Pages affected
A1	Initial version	