

MB3U, MB3U-I2C

BiSS, SSI, PC-USB ADAPTER



Rev C3, Page 1/16

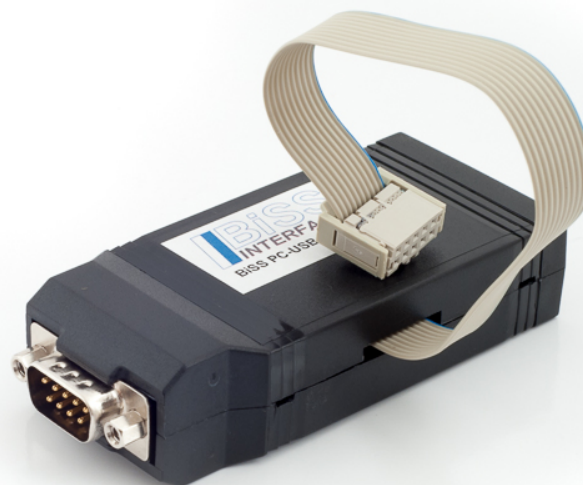
FEATURES

- ◆ USB 2.0 compatible PC interface
- ◆ iC-MB3 TSSOP24 based BiSS master
- ◆ Hardware implemented interface protocols
- ◆ Fast realtime data communication (10 MHz BiSS; 4 MHz SSI)
- ◆ API for Windows®: BiSS-Interface DLL
- ◆ Field capable design: plastic box, field interfaces, USB bus providing power
- ◆ USB powered 5 V and 12 V supplies for external applications
- ◆ Supported interface and protocols: BiSS C / BiSS B / SSI
- ◆ Additionally supported interfaces (MB3U-I2C): SPI / I2C / 2wire

APPLICATIONS

- ◆ BiSS / BiSS Safety / SSI application development
- ◆ Flexible interface configuration
- ◆ Encoder calibration
- ◆ Portable applications
- ◆ Interfacing iC-Haus evaluation boards with serial protocols

SYSTEM VIEW



DESCRIPTION

The MB3U and MB3U-I2C adapters are USB based Windows® PC adapters. The BiSS to PC-USB adapters enables BiSS or SSI sensors to be connected to a PC easily and at low cost. Only one BiSS to PC-USB adapters is accessible per PC system. The USB port supplies the adapter as well as the connected sensor, for which the 5V (up to 100 mA, through Pin 4)* and 12 V (up to 100 mA, through Pin 1)* as galvanically isolated voltages are available. An optional external wall power supply can also be connected to deliver other voltages or higher currents. The BiSS/SSI communication is accomplished by differential RS422 wires with separate potentials and cycle rates of up to 10 Mbit/sec.

The BiSS and I2C to PC-USB Adapter has an additional plug for I2C or SPI communication. The USB port supplies the sensors via the I2C plug with 5 V (up to 100 mA, through Pin 4 - no galvanic isolation). If there is load applied to the BiSS connector, the maximum current supplied via the I2C plug is decreased. For more power, an additional external power supply is recommended (the wall power supply does not supply the I2C plug, see Figure 3). I2C multi-master capability is not provided.

The SPI and I2C master of MB3U-I2C are only supported by product specific APIs and software for iC-Haus product evaluation and programming.

9 Pin SUB-D Male BiSS Interface Connector Functions and Features:

- Up to 3 BiSS slaves
- RS422 10 MBit/s maximum data transfer rate
- BiSS C unidirectional and BiSS B/C master
- SSI master
- I2C and SPI master (MB3U-I2C only)
- BiSS master BiSS iC-MB3 TSSOP24 based
- USB 2.0 compatible with up to 12 MBit/s data transfer
- USB bus provides power adapter and optionally to devices
- Galvanic encoder signal isolation and isolated sensor supply sourced from the USB port (+12 V and +5 V / 150 mA together)*
- Plug-in power supply can be connected for sensors with higher power needs(+12 V / 500 mA, +5 V / 250 mA)*
- Available 32 and 64 bit drivers for Windows®10, 8, 7, Vista, XP, 2000

The MB3U is a PC-USB interface BiSS / SSI master based on iC-MB3 TSSOP24 system design.

* 150 mA for +5 V and +12 V available starting from 2008

10 Pin Pigtail 5x2 Female SPI and I2C Interface Connector Functions and Features:

- SPI or I2C capable by pin connection
- Up to 6 MBit/s maximum data transfer rate with SPI
- 100 kBit/s maximum data transfer rate with I2C
- Single master systems
- Master operation based on FTDI™USB dual serial bridging device
- USB 2.0 compatible with up to 12 MBit/s data transfer
- USB bus provides power adapter and optionally to devices
- No galvanic isolation, Sensor supply sourced from the USB port (5 V up to 200 mA)
- Available 32 and 64 bit FTDI™drivers for Windows 10, 8, 7, Vista, XP, 2000

The device offered here is a multifunctional device that contains integrated BiSS C interface components. The BiSS C process is protected by patent DE 10310622 B4 owned by iC-Haus GmbH. Users benefit from the open BiSS C protocol with a free license which is necessary when using the BiSS C protocol in conjunction with this iC.

Download the license at www.biss-interface.com/BUA

MB3U, MB3U-I2C

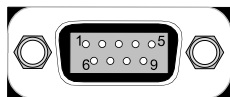
BiSS, SSI, PC-USB ADAPTER



Rev C3, Page 3/16

CONNECTORS

PIN CONFIGURATION BiSS / SSI (SUB-D9 male)

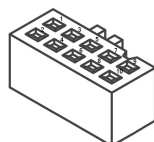


PIN FUNCTIONS

No. Name Function

1	VB	12 V field power supply
2	MA+	Clock output P
3	MA-	Clock output N
4	VDD	5 V logic power supply
5	MO-	Master data output N (constant high)
6	GND	Ground (0 V)
7	SL+	Device data input P
8	SL-	Device data input N
9	MO+	Master data output P (constant low)

PIN CONFIGURATION I2C, MB3U-I2C only (RM2.54 2x5 female)

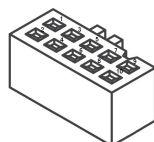


PIN FUNCTIONS

No. Name Function

1	SCL	Serial Clock Line
2	GND	Ground
3	n.a.	Reserved5
4	VDD	5 V logic power supply
5	n.a.	Reserved
6	n.a.	Reserved
7	SDA	Serial Data Line Output, short to pin 9
8	n.a.	Reserved
9	SDA	Serial Data Line Input
10	GND	Ground

PIN CONFIGURATION SPI, MB3U-I2C only (RM2.54 2x5 female)



PIN FUNCTIONS

No. Name Function

1	SCL	Serial Clock Line
2	GND	Ground
3	n.a.	Reserved
4	VDD	5 V logic power supply
5	n.a.	Reserved
6	n.a.	Reserved
7	MOSI	Serial Data Line Output
8	NCS	Chip Select (low active)
9	MISO	Serial Data Line Input
10	GND	Ground

PIN CONFIGURATION External Power Supply (DIN 45323)



PIN FUNCTIONS

No. Name Function

1	Inner Contact	GND pole of external supply
2	Outer Contact	12 V positive pole of external supply (9 to 15 V DC, 500 mA _{max})

MB3U, MB3U-I2C

BiSS, SSI, PC-USB ADAPTER



Rev C3, Page 4/16

ABSOLUTE MAXIMUM RATINGS

These ratings do not imply operating conditions; functional operation is not guaranteed. Beyond these ratings device damage may occur.

Item No.	Symbol	Parameter	Conditions	Min. Max.		Unit
				Min.	Max.	
G001	Vext	External Power Supply Input			20	V
G002	I(Vext)	Power Supply Input Current			1	A
G003	V()	Voltage at input signals SL+, SL-		-7	+7	V
G004	I()	Output Current at output signals MA+, MA-, MO+, MO-,	high low (according to SN65LBC179 or compatible)	60	-60	mA mA
G005	P(VB)	Load at VB			6	W
G006	P(VDD)	Load at VDD			1	W
G007	GI	Galvanic Isolation	For BiSS and external power supply connector only		500	V
G008	V()	Input Voltage	Extension cable (model MB3U-I2C only), SDA (according to FT2232)	-0.5	V_USB +0.5	V
G009	I()	Output Current	Extension cable (model MB3U-I2C only), SCL, SCLK, SDA, NCS (according to FT2232D or compatible)		24	mA

THERMAL DATA

Item No.	Symbol	Parameter	Conditions	Min. Typ. Max.			Unit
				Min.	Typ.	Max.	
T01	Ta	Operating Temperature		0		30	°C
T02	RH	Relative Humidity	Non condensing	5		95	%

All voltages are referenced to ground unless otherwise stated.

All currents flowing into the device pins are positive; all currents flowing out of the device pins are negative.

MB3U, MB3U-I2C

BiSS, SSI, PC-USB ADAPTER



Rev C3, Page 5/16

ELECTRICAL CHARACTERISTICS

Operating conditions: USB 2.0, port maximum 500 mA, Ta = 0..30 °C

Item No.	Symbol	Parameter	Conditions				Unit
				Min.	Typ.	Max.	
Supply							
001	Vusb	Supply Voltage	By USB port	4.5	5.0	5.5	V
002	Iusb	Current Consumption	From USB port			500	mA
003	Vext	Permissible External Supply	By wall adapter Plug disconnects internal VB when plugged	9	12	15	V
004	VB	VB Supply Output	USB powered	9	12	13	V
005	VB	VB Supply Output	With wall adapter (Vext = 12 V, 500 mA)		Vext		V
006	I(VB)	Permissible VB Load Current	USB powered; load at VB of 9 pin BiSS/SSI connector; no other load at 9 pin BiSS/SSI connector (VDD, MA±, MO±); no load at 10 pin pigtail SPI/I2C			150	mA
007	I(VB)	Permissible VB Load Current	wall adapter (12 V, 500 mA) powered; load at VB of 9 pin BiSS/SSI connector; no load at 9 pin BiSS/SSI connector (VDD, MA±, MO±); no load at 10 pin pigtail SPI/I2C			500	mA
008	VDD	VDD Supply Output	At 10 pin pigtail SPI/I2C and 9 pin BiSS/SSI	4.5	5	5.5	V
009	I(VDD)	Permissible VDD Load Current at 10 pin pigtail SPI/I2C	USB powered; load at VDD of 10 pin pigtail SPI/I2C; no other load 10 pin pigtail SPI/I2C (MOSI, SCL, NCS); no load at 9 pin BiSS/SSI connector			200	mA
010	I(VDD)	Permissible VDD Load Current at 9 pin BiSS/SSI connector	USB powered; load at VDD of 9 pin BiSS/SSI connector; no load at 9 pin BiSS/SSI connector (VDD, MA±, MO±); no load 10 pin pigtail SPI/I2C			150	mA
011	I(VDD)	Permissible VDD Load Current at 9 pin BiSS/SSI connector;	With wall adapter (12 V, 500 mA); load at VDD of 9 pin BiSS/SSI connector; no load at 9 pin BiSS/SSI connector (VDD, MA±, MO±); no load 10 pin pigtail SPI/I2C			250	mA
BiSS/SSI Communication Lines							
101	Vout()	Diff. Clock Output at MA+, MA-	RL = 54Ω (according to RS422 driver 65LBC179)	1.1	2.2	5	V
102	fclock()	Clock Frequency at MA+, MA-	iC-MB3 BiSS master oscillator external oscillator		10 10		MHz MHz
103	Vout()	Diff. Data Output at MO+, MO-	RL = 54Ω (according to RS422 driver 65LBC179)	1.1	2.2	5	V
104	fddata()	Data Frequency at MO+, MO-	iC-MB3 BiSS master oscillator external oscillator		10 10		MHz MHz
105	VIT(+)	Positive going input threshold voltage at SL+ vs. SL-	according to RS422 (transceiver 65LBC179)			0.2	V
106	VIT(-)	Negative going input threshold voltage at SL+ vs. SL-	according to RS422 (transceiver 65LBC179)	-0.2			V
107	VHYST	Hysteresis voltage	according to RS422 (transceiver 65LBC179)		45		mV
108	Rin()	Input Termination at SL+ vs. SL-			120		Ω

MB3U, MB3U-I2C

BiSS, SSI, PC-USB ADAPTER



Rev C3, Page 6/16

ELECTRICAL CHARACTERISTICS

Operating conditions: USB 2.0, port maximum 500 mA, Ta = 0..30 °C

Item No.	Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Extension Cable (MB3U-I2C pigtail cable only)							
201	Vin()	Input Switching Threshold Voltage at SDA (MISO)	Standard level (according to FT2232)	1.2	1.3	1.5	V
202	Vhyst()	Input Switching Hysteresis Voltage at SDA	Standard level (according to FT2232)	50	30	25	mV
203	Vo()hi	Output Voltage high at SCL, SCLK, SDA	I(source) = -2 mA, standard level (according to FT2232)	3.2	4.1	4.9	V
204	Vo()lo	Output Voltage high at SCL, SCLK, SDA	I(sink) = 2 mA, standard level (according to FT2232)	0.3	0.4	0.6	V

MB3U, MB3U-I2C

BiSS, SSI, PC-USB ADAPTER



Rev C3, Page 7/16

MB3U OVERVIEW

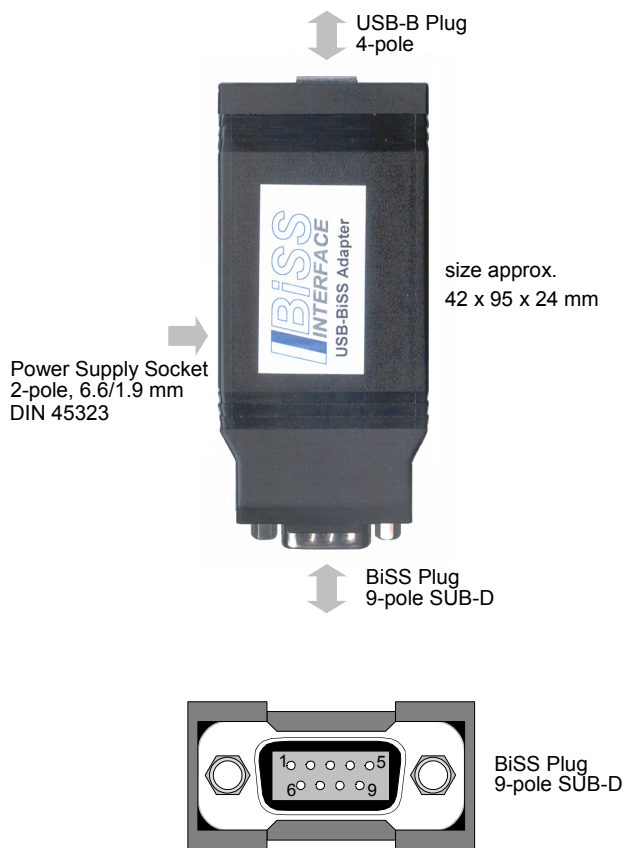


Figure 1: iC-MB3 iCSY MB3U

MB3U-I2C OVERVIEW

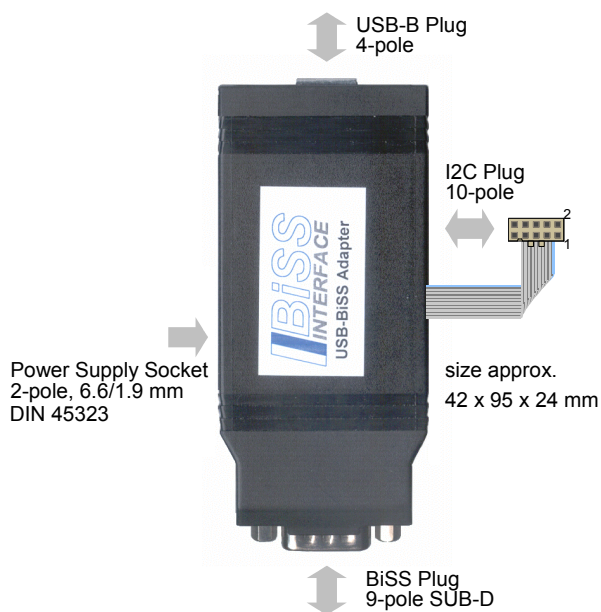


Figure 2: iC-MB3 iCSY MB3U-I2C

MB3U, MB3U-I2C

BiSS, SSI, PC-USB ADAPTER



Rev C3, Page 8/16

SCHEMATIC

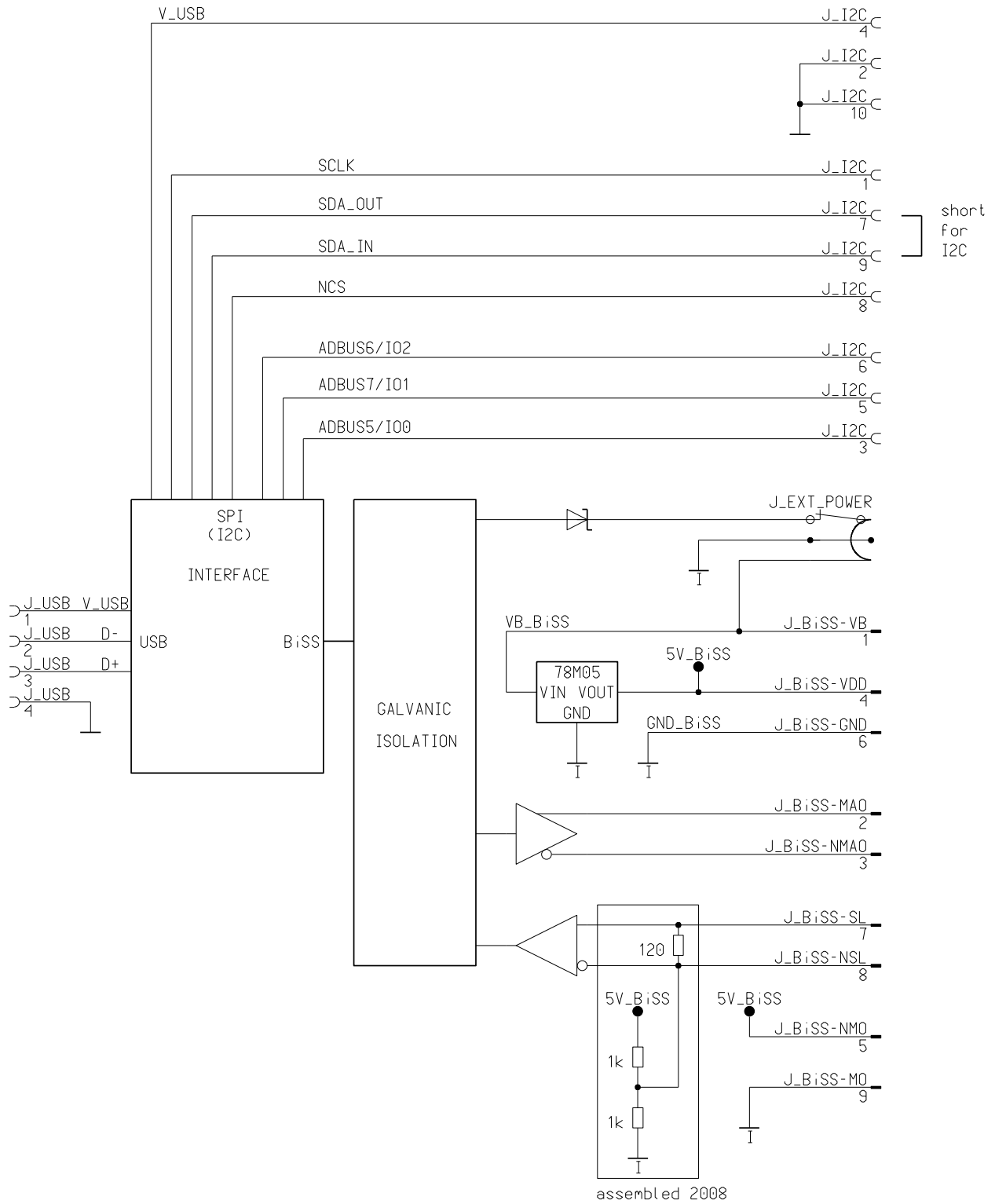


Figure 3: Power supply routing of MB3U-I2C

APPLICATION SOFTWARE

The BiSS reader software is a good and generic tool to access position and register data of BiSS devices. The BiSS reader software can be used on PCs with Windows operating systems, as well as the BiSS interface DLL and the required USB driver for available adapters. Installers for the BiSS reader software software, the BiSS Interface DLL and USB drivers for the adapters are available as a downloadable ZIP file.

Download from <http://www.ichaus.de/software>

For iC-Haus iC devices easy to use product specific evaluation software is also available and can be used to access, configure and calibrate. Installers for product specific evaluation software, the product specific DLLs and USB drivers for the adapters are available as a downloadable ZIP file.

Download from <http://www.ichaus.de/software>

Download from http://www.ichaus.de/MB3U_driver

Installation

After unzipping the Driver ZIP, the driver executable file(s) are located in the selected directory.

Note: Administrator rights are required to run installation.

The BiSS software for PCs running on Windows operating systems is available as an installer. Download from http://www.ichaus.de/BiSS_gui_rte

See also the iC-Haus software overview <http://www.ichaus.de/software>

1. USB driver need to be installed to access the BiSS PC Adapter. Execute the executable in the driver installation package and follow the on-screen instructions. This process can take a few minutes.
2. The installation of the BiSS software starts by executing the installer. Follow the on-screen instructions to finish the installation procedure.
3. Installation will make the BiSS software available in the selected working directory. The execution of this file will start the software. Figure 4 shows a screenshot of the start up window.

Connection

Before connecting the BiSS adapter to the PC please make sure you have installed the latest USB driver!

Connect the adapter via the USB AB cable and start the BiSS software executable. Select the interface operating mode to the dedicated adapter e.g. "iC-Interface ↔ USB(MB3U) Ctrl-U" for both MB3U and also MB3U-I2C. The interface display should show "Connected" - the adapter is now ready to operate.

Top Button and Check Box Description

Button	Description
Disconnected/Connected	Indicates and allocates/disallocates the adapter hardware
Read SCD	Reads in sensor data
Check Box	Description
Continuous	Reads in sensor data continuously and read data is displayed in the SCD content
Save	Saves sensor data to file with reading SCD data continuously

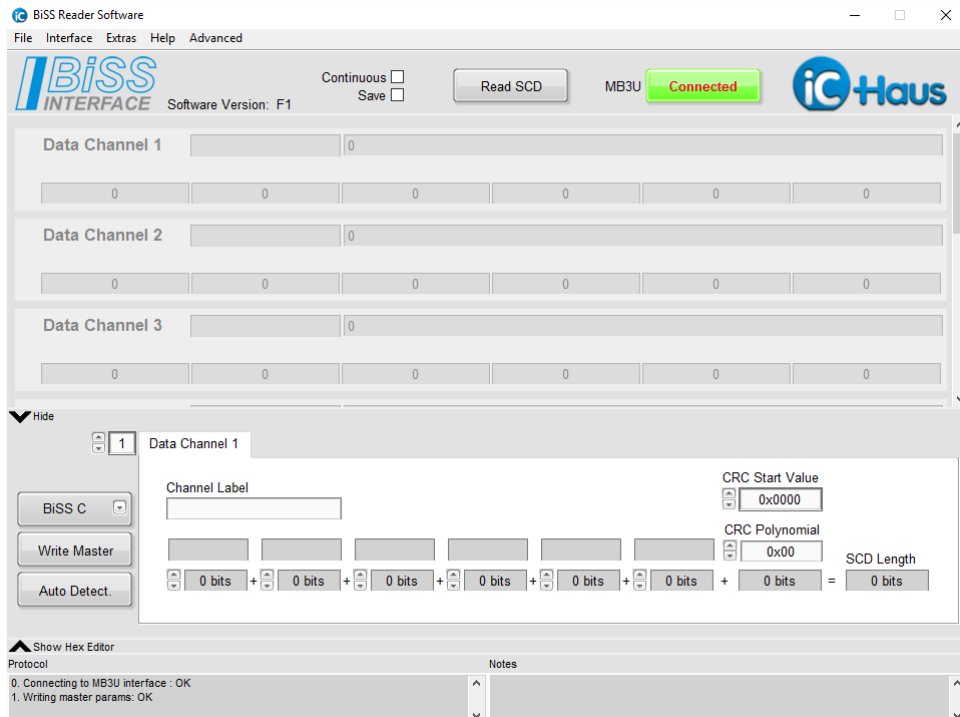


Figure 4: Start screen with connected adapter

Configuration

To set the BiSS Master for the sensor(s) connected to it, select **Config Slaves** and manually configure the BiSS parameters (data lengths, CRC polynomials, etc.) according to the sensor's data sheet.

Auto Detection of the Connected Device Configuration

BiSS permits different possibilities and detail levels for an automatic detection of the connected device configuration.

Implemented Auto Detection functions:

- Custom Auto Detection with selected XML file path
- Auto Detection via BiSS EDS
- Auto Detection via BiSS ID and standard BiSS XML file path
- Auto Detection via BiSS Profile ID

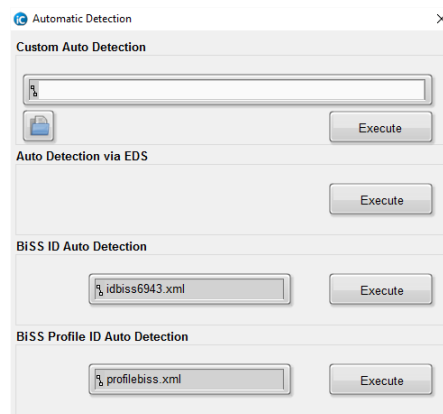


Figure 5: Automatic Detection

BiSS XML Files

The file "idbiss6943.xml" is a BiSS device description file for BiSS slave iCs of iC-Haus. Further XML files are integrated with the date of the software release. For possible updates and new XML files please contact the manufacturer of your sensor for an appropriate device description file or set the transmission parameters yourself later. See also at the BiSS website in the identifier section for published XML files <http://www.biss-interface.com>.

BiSS Reader Configuration Files

Transmission parameter settings can be stored to a *.cfg file for later use with the BiSS software. Those configuration files can be imported by API(DLL) functions.

Master Configuration Files

The "Save BiSS-Master-Config" writes an BiSS Master Chip configuration description into a *.txt file (e. g. setup of iC-MB3, MB100). Those BiSS master configuration files can be integrated into configuration code sets for programming BiSS master iC's or iP's to a dedicated BiSS setup.

BiSS Reader Software Menu Items Description of Menu Section

<p><File></p> <p><Interface></p> <p><Extras></p> <p><Help></p> <p><Advanced></p>	<p>Save Config File</p> <p>Load Config File</p> <p>Save Master Config</p> <p>Exit</p> <p>No Hardware</p> <p>iC-Interface ↔ USB(MB3U) Ctrl-U</p> <p>iC-Interface ↔ USB(MB4U) Ctrl-4</p> <p>iC-Interface ↔ USB(MB5U) Ctrl-5</p> <p>Generate Report</p> <p>Reset User Preferences</p> <p>BiSS homepage</p> <p>BiSS datasheet</p> <p>Fast Reader</p> <p>EDS Editor</p> <p>Math Analysis</p> <p>Initializes the BiSS bus communication</p>	<p>Writes BiSS transmission parameter settings to file</p> <p>Loads BiSS transmission parameter settings from file</p> <p>Writes an interface configuration description to file</p> <p>Quit software</p> <p>Switch to no hardware to deallocate an adapter</p> <p>For use with BiSS PC-USB adapter MB3U and MB3U-I2C</p> <p>For use with BiSS PC-USB adapter MB4U</p> <p>For use with BiSS PC-USB adapter MB5U</p> <p>Exports software screens, log book text and configuration into a single ZIP file for support purpose</p> <p>Reset all user preferences of the BiSS software</p> <p>Opens the link www.BiSS-Interface.com in Your browser</p> <p>Opens the BiSS protocol description link in Your browser</p> <p>Opens the Fast Reader sub window, only for use with BiSS PC-USB adapter MB4U or MB5U</p> <p>Opens the BiSS EDS viewer and editor sub window</p> <p>Opens the BiSS math analysis sub window</p> <p>Initializes the BiSS Interface channel</p>
--	---	--

SCD Configuration Button and Selector Button Description

Write Master	Transfers configuration updates to the allocated adapter
Auto Detect.	Automatic detection and identification of connected BiSS sensor(s) SCD configuration
BiSS C/B/SSI	Selects the required protocol

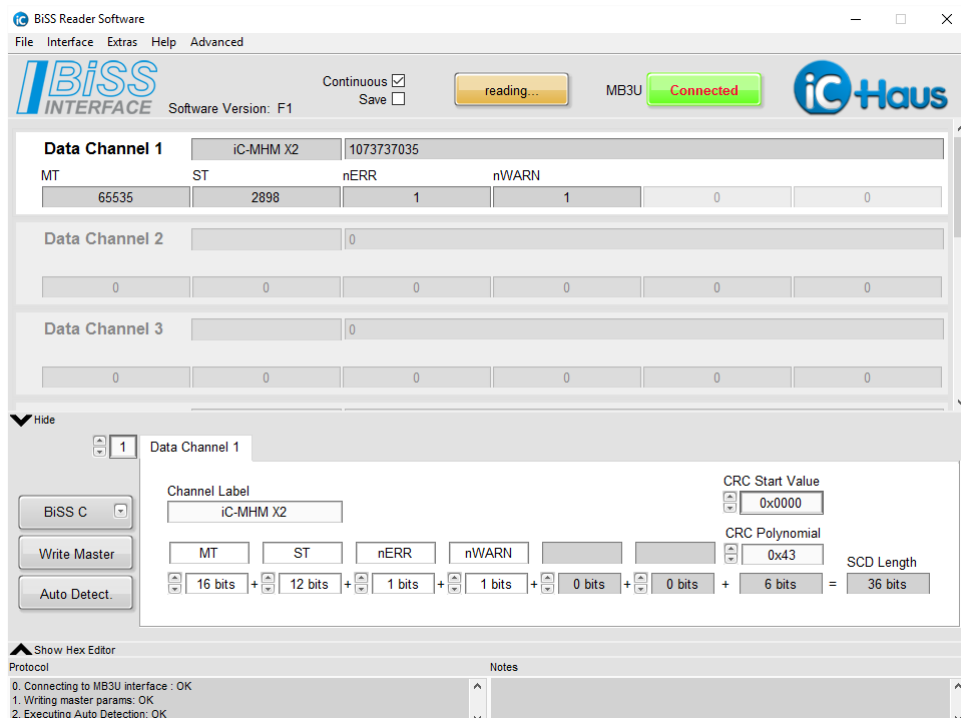


Figure 6: Single Cycle Data Screen

Hex Editor Button and Selector Button Description

Area Select	Reads in sensor data
Read Register	Transfers configuration updates from the selected slave ID
Write Register	Transfers configuration updates to the selected slave ID
Save Reg. File	Saves sensor data to PC file
Load Reg. File	Loads sensor data from PC file
Fill	Fills all registers in the selected area with selected content or symbol
CRC Calculation	Calculates the CRC of a dedicated area

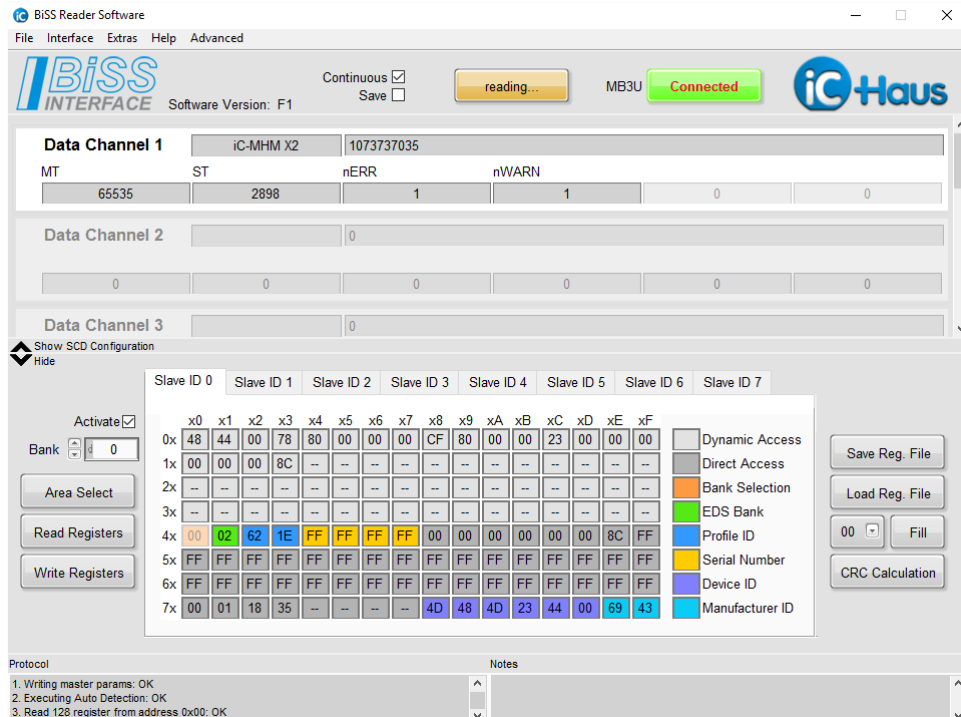


Figure 7: Register Access Screen (one tab each per slave ID)

Possible Errors

Main causes for errors:

- Using more than one software.
 - Please make sure that only one software is accessing the BiSS adapter at the same time.
- Insufficient power supply for all sensors attached.
 - The adapter will not respond if there is an overload due to the sensor(s) connected.
 - Please check wiring and use external or wall power supply.
- Invalid transmission parameter settings.
 - Please check the sensor specific BiSS slave parameters, such as CRC polynomial etc.
 - Please check wiring and use external or wall power supply.
- Invalid wiring
 - Please check wiring and use external or wall power supply.

MB3U, MB3U-I2C

BiSS, SSI, PC-USB ADAPTER



Rev C3, Page 14/16

REVISION HISTORY

Rel.	Rel. Date*	Chapter	Modification	Page
A1	2005-02-08		First release	

Rel.	Rel. Date*	Chapter	Modification	Page
A4	2007-10-05		Update	all

Rel.	Rel. Date*	Chapter	Modification	Page
A5	2007-10-08	FEATURES	Update of MB3U technical data, MB3U-I2C, software description	all

Rel.	Rel. Date*	Chapter	Modification	Page
A6	2009-11-09	FEATURES	Update of MB3U-I2C optional SPI interface functionality	all

Rel.	Rel. Date*	Chapter	Modification	Page
B1	2010-01-21	ORDERING INFORMATION	iC-MB3 iCSY MB3U-PS230 and iC-MB3 iCSY MB3U-I2C-PS230 added	1
		ORDERING INFORMATION	Scope of delivery: wall power supply removed	1

Rel.	Rel. Date*	Chapter	Modification	Page
B2	2010-05-03	FEATURES	BiSS plug pin configuration table format updated	1
		FEATURES	I2C plug pin configuration For I2C header updated	2
		FEATURES	I2C plug pin configuration For SPI header updated	2
		FEATURES	100 mA for +5 V and +12 V available starting from 2008 added	2

Rel.	Rel. Date*	Chapter	Modification	Page
B3	2013-02-27	FEATURES	BUA info added	1

Rel.	Rel. Date*	Chapter	Modification	Page
B4	2013-12-05	FEATURES	Driver download updated	4
		APPLICATION SOFTWARE	BiSS software download updated	4
		APPLICATION SOFTWARE	Installation instructions updated	4 ... 5
		APPLICATION SOFTWARE	BiSS Software details updated to software revision D2	4 ... 5

Rel.	Rel. Date*	Chapter	Modification	Page
B5	2014-02-04	FEATURES	Figure 3: Power supply routing of MB3U-I2C updated	3
		FEATURES	More details on the I2C/SPI interface connector	4

Rel.	Rel. Date*	Chapter	Modification	Page
B6	2015-06-03	FEATURES	iC-MB3z no more relevance, removed	1
		FEATURES	BiSS B, BiSS C and SSI protocols added	1
		APPLICATION SOFTWARE	MB5U updated	4
		APPLICATION SOFTWARE	BiSS software details updated to software revision E8	6 ... 8
		APPLICATION SOFTWARE	iC-Interface ↔ LPT(MB3A) BiSS PC adapter MB3A no more relevance, removed	7

Rel.	Rel. Date*	Chapter	Modification	Page
C1	2017-03-07		Datasheet revised	all
		APPLICATION SOFTWARE	BiSS Reader details updated to the all new BiSS Reader F1 release	8 ... 12

Rel.	Rel. Date*	Chapter	Modification	Page
C2	2017-05-26	CONNECTORS	12V replaced by 5V logic power supply at I2C	3

Rel.	Rel. Date*	Chapter	Modification	Page
C3	2017-07-19	ORDERING INFORMATION	ORDERING INFORMATION retrieved	16

* Release Date format: YYYY-MM-DD

MB3U, MB3U-I2C

BiSS, SSI, PC-USB ADAPTER



Rev C3, Page 15/16

iC-Haus expressly reserves the right to change its products and/or specifications. An Infoletter gives details as to any amendments and additions made to the relevant current specifications on our internet website www.ichaus.com/infoletter and is automatically generated 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.

The data specified is intended solely for the purpose of product description and shall represent the usual quality of the product. In case the specifications contain obvious mistakes e.g. in writing or calculation, iC-Haus reserves the right to correct the specification and no liability arises insofar that the specification was from a third party view obviously not reliable. There shall be no claims based on defects as to quality in cases of insignificant deviations from the specifications or in case of only minor impairment of usability.

No representations or warranties, either expressed 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 products are not designed for and must not be used in connection with any applications where the failure of such products would reasonably be expected to result in significant personal injury or death (*Safety-Critical Applications*) without iC-Haus' specific written consent. Safety-Critical Applications include, without limitation, life support devices and systems. iC-Haus products are not designed nor intended for use in military or aerospace applications or environments or in automotive applications unless specifically designated for such use by iC-Haus.

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.

Software and its documentation is provided by iC-Haus GmbH or contributors "AS IS" and is subject to the ZVEI General Conditions for the Supply of Products and Services with iC-Haus amendments and the ZVEI Software clause with iC-Haus amendments (www.ichaus.com/EULA).

MB3U, MB3U-I2C

BiSS, SSI, PC-USB ADAPTER



Rev C3, Page 16/16

ORDERING INFORMATION

Type	Package	Options	Order Designation
MB3U	MB3U	no I2C pigtail	iC-MB3 iCSY MB3U
MB3U-I2C	MB3U-I2C	with I2C pigtail	iC-MB3 iCSY MB3U-I2C
MB3U + PS230	MB3U	no I2C pigtail, including euro wall power supply (230VAC to 12 V; 400 mA)	iC-MB3 iCSY MB3U-PS230
MB3U-I2C + PS230	MB3U-I2C	with I2C pigtail, including euro wall power supply (230VAC to 12 V; 400 mA)	iC-MB3 iCSY MB3U-I2C-PS230

Please send your purchase orders to our order handling team:

Fax: +49 (0) 61 35 - 92 92 - 692
E-Mail: dispo@ichaus.com

For technical support, information about prices and terms of delivery please contact:

iC-Haus GmbH
Am Kuemmerling 18
D-55294 Bodenheim
GERMANY

Tel.: +49 (0) 61 35 - 92 92 - 0
Fax: +49 (0) 61 35 - 92 92 - 192
Web: <http://www.ichaus.com>
E-Mail: sales@ichaus.com

Appointed local distributors: http://www.ichaus.com/sales_partners