iC-HTP EVAL HTP1D

EVALUATION BOARD DESCRIPTION

preliminary

ORDERING INFORMATION

Type	Order Designation	Description Options
Evaluation Board	iC-HTP EVAL HTP1D	iC-HTP Evaluation Board ready to operate, accessible through GUI via USB including USB A-B cable
Software	iC-HTP GUI	GUI software for Windows PC Device setup file generation, board configuration For download link check www.ichaus.com/htp

BOARD HTP1D

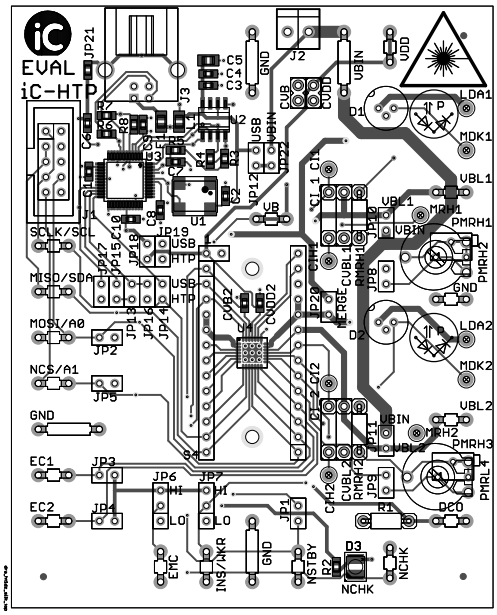

Figure 1: Component side (size 100 mm x 80 mm)

TERMINAL	DESCRIPTION
J1	SPI / I²C Interface
J2	VB Power Supply
J3	USB Interface
S4	iC-HTP
LDA1	Laser Diode Anode for channel 1
VBL1	VB Supply for channel 1
CI1	Integration capacitor for channel 1
CIH1	Integration capacitor high for channel 1
MDK1	Monitor Diode Cathode for channel 1
MRH1	Monitor Resistor High for channel 1
EC1	Enable Channel 1 Input
LDA2	Laser Diode Anode for channel 2
VBL2	VB Supply for channel 2
CI2	Integration capacitor for channel 2
CIH2	Integration capacitor high for channel 2
MDK2	Monitor Diode Cathode for channel 2
MRH2	Monitor Resistor High for channel 2
EC2	Enable Channel 2 Input
VBIN	Power Supply
VDD	3.3 V output Supply
GND	Ground
EMC	Enable Microcontroller Input
SCLK/SCL	SPI Clock / I²C Clock
MISO/SDA	SPI Master In Slave OUT / I²C data
MOSI/A0	SPI Master Out Slave In / I²C addr. bit 0
NCS/A1	Chip Select(low active) / I²C addr. bit 1
INS/WKR	I²C not SPI Input / WK Reference
DCO	Digital Current Out
NCHK	Check Output(low active)
NSTBY	Standby Input(low active)

RELATED DOCUMENTS

- iC Documentation
  → http://www.ichaus.de/HTP
- GUI software for Windows PC: check here for download links
  → http://www.ichaus.de/HTP

CONNECTOR AND TERMINAL PINOUT

J1: iC-HTP SPI / I²C signals
10-pin connector - male

PIN	Name	Function
J1_1	SCKL	SPI Clock
J1_2	GND	Digital Ground
J1_3	MISO	Master Input Slave Output
J1_4	n.c.	Reserved
J1_5	MISO	Master Input Slave Output
J1_6	n.c.	Reserved
J1_7	SCKL	SPI Clock
J1_8	MOSI	Master Output Slave Input
J1_9	NCS	SPI Chip Select
J1_10	GND	Digital Ground

J2: VDD Power Supply
2-pin connector - female

PIN	Name	Function
1	VB	Supply
2	GND	Ground

J3: USB signals
4-pin connector - male

PIN	Name	Function
1	VBUS	5 V USB power
2	D-	USB Data -
3	D+	USB Data +
4	GND	5 V USB ground
S1	SHIELD	USB cable shield

D1: P-Type Laser Diode Connector Channel 1
3-pin connector - female

PIN	Name	Function
1	LDA	Laser Diode Anode
2	LDC	Laser Diode Cathode
3	MDC	Monitor Diode Cathode

D2: P-Type Laser Diode Connector Channel 2
3-pin connector - female

PIN	Name	Function
1	LDA	Laser Diode Anode
2	LDC	Laser Diode Cathode
3	MDC	Monitor Diode Cathode

S4: iC-HTP signals + thermal pad
20-pin connector - male

PIN	Name	Function
S4_1_1	MOSI	
S4_1_2	NCS	
S4_1_3	EC1	
S4_1_4	EC2	
S4_1_5	MRH2	
S4_1_6	MDK2	
S4_1_7	CIH2	
S4_1_8	CI2	
S4_1_9	VBL2	
S4_1_10	LDA2	
S4_1_11	LDA2	
S4_1_12	GND	
S4_1_13	DCO	
S4_1_14	INS	
S4_2_1	VB	
S4_2_2	NCHK	
S4_2_3	NSTBY	
S4_2_4	LDA1	
S4_2_5	LDA1	
S4_2_6	VBL1	
S4_2_7	CI1	
S4_2_8	CIH1	
S4_2_9	MDK1	
S4_2_10	MRH1	
S4_2_11	EMC	
S4_2_12	SCLK	
S4_2_13	MISO	
S4_3_1	VDD	
S4_3_2	TP	Thermal pad connected to GND

JUMPER DESCRIPTION

Jumper	Pin 1	Pin 2	Default Setting
JP1	VB	iC-HTP NSTBY	JP1 connects NSTBY to VB for operation
JP2	VDD	iC-HTP MOSI	VDD Pull-up MOSI/A0
JP3	VDD	iC-HTP EC1	VDD Pull-up EC1
JP4	VDD	iC-HTP EC2	VDD Pull-up EC2
JP5	GND	iC-HTP NCS	GND Pull-down NCS/A1
JP8	MDA1	PMRH3, PMRH1	Enable external resistor (potentiometers coarse/fine + MRH min) channel 1
JP9	MDA2	PMRH4, PMRH2	Enable external resistor (potentiometers coarse/fine + MRH min) channel 2
JP10	VB_IN	iC-HTP VBL1	VB Supply for LDA1
JP11	VB_IN	iC-HTP VBL2	VB Supply for LDA2
JP12	V5_USB	iC-HTP VB	5VB_USB = VB for iC-HTP
JP13	ADBUS1	iC-HTP MISO	Enable MOSI A0 USB = MISO/SDA USB
JP14	ADBUS0	iC-HTP SCLK	Enable SCLK/SCL USB
JP15	ADBUS2	iC-HTP MISO	Enable MISO/SDA USB
JP16	ADBUS1	iC-HTP MOSI	Enable MOSI/A0 USB
JP17	ADBUS3	iC-HTP NCS	Enable NCS/A1 USB
JP18	VCCIO	VDD	Serial communication port of FT2223D supplied by VDD iC-HTP
JP19	GNDD_USB	iC-HTP GND	Serial communication port of FT2223D GND(FTDI) = GND(iC-HTP)
JP20	iC-HTP LDA1	iC-HTP LDA2	Connection LDA1 and LDA2
JP21	Shield J3	GNDD_USB	USB Connector J3 shield to GND
JP22	VBIN	iC-HTP VB	VB_IN = VB for iC-HTP

Jumper	Pin 1	Pin 2	Pin 3	Default Setting
JP6	GND	iC-HTP EMC	VDD	VDD Pull-up/open/GND pull-down (tri-state) EMC
JP7	GND	iC-HTP INS	VDD	VDD Pull-up/open/GND pull-down (tri-state) INS/WKR

INTERFACE SELECTION

The iC-HTP evaluation board can be operated with SPI or I²C protocol using the board USB-to-serial interface.

Default CI
The default devices of the iC-HTP evaluation board placed for an optional operation are:

- CI1 = 10 nF
- CI2 = 10 nF
- R1 = 10k Ω
- RMRH1 = 2k Ω
- RMRH2 = 2k Ω

Default Jumper Setting
The default jumper setting of the iC-HTP evaluation board is set to be operated with the on board USB-to-serial interface and SPI setup. The channel 1 and channel 2 are directly enabled. No channel merge. Standby is disabled. No on board resistors/potentiometer in the feedback path. The laser diodes are VB supplied.

***Attention: External power supply on VB_IN and GND required!**
The default jumper configuration requires a VB power supply at "VB_IN" and "GND" for operation.

SPI Jumper Setting

To use the board with the SPI interface and the USB port the following interface related settings are required:

Jumper	Jumper State	Default Setting
JP1	Closed	Operation, no standby: NSTBY connected to VB
JP2	Open	No pull-up MOSI/A0: USB-SPI defines NCS
JP3	Closed	Enable Channel 1: channel 1 enabled
JP4	Closed	Enable Channel 2: channel 2 enabled
JP5	Open	No pull-up NCS/A1: USB-SPI defines NCS
JP6	"HI": 2=3 Closed	Enable microcontroller: EMC high
JP7	"LO": 1=2 Closed	Enable SPI: INS low
JP8	Open	Disable potentiometers channel 1
JP9	Open	Disable potentiometers channel 1
JP10	Closed	Use VB supply for LDA1, not LDA2 (states "VB")
JP11	Closed	Use VB supply for LDA2, not LDA2 (states "LDA")*
JP12	"VB": 1=2 Closed	Using USB supply, not supplied by VB
JP13	Open	Enable MOSI A0 USB = MISO/SDA USB
JP14	Closed	Enable SCLK/SCL USB
JP15	Closed	Enable MISO/SDA USB
JP16	Closed	Enable MOSI/A0 USB
JP17	Closed	Enable NCS/A1 USB
JP18	Closed	Serial communication port FT2223D is supplied by VDD of iC-HTP
JP19	Closed	Serial communication port FT2223D GND = GND iC-HTP
JP20	Open	LDK1 and LDK2 are not connected
JP21	Open(not present)	USB connector J3 shield to GND, solderable jumper/resistor
JP22	Open	Using VBIN supply the laser diodes only

I²C Jumper Setting

To use the board with the I²C interface and the USB port the following interface related settings are required:

Jumper	Jumper State	USB I²C Setting
JP1	Closed	Operation, no standby: NSTBY connected to VB
JP2	Open: A0 = 0	MOSI/A0 open, A0 not to VDD
JP3	Closed	Enable Channel 1: channel 1 enabled
JP4	Closed	Enable Channel 2: channel 2 enabled
JP5	Close: A1 = 0	NCS/A1 to GND on A1
JP6	"HI": 2=3 Closed	Enable microcontroller: EMC high
JP7	"Hi": 2=3 Closed	Enable I²C: INS high
JP8	Open	Disable potentiometers channel 1
JP9	Open	Disable potentiometers channel 1
JP10	"VB": 1=2 Closed	Use VB supply for LDA1, not LDA2 (states "VB")
JP11	"LDA": 1=2 Closed *	Use VB supply for LDA2, not LDA2 (states "LDA")*
JP12	"USB": 1=2 Closed	Using USB supply, not supplied by VB
JP13	Closed	Enable SDA USB output
JP14	Closed	Enable SCL USB output
JP15	Closed	Enable SDA USB input
JP16	Open	Control of I²C address bit A0 by jumper JP2
JP17	Open	Control of I²C address bit A1 by jumper JP5
JP18	Closed	Serial communication port FT2223D is supplied by VDD of iC-HTP
JP19	Closed	Serial communication port FT2223D GND = GND iC-HTP
JP20	Open	LDA1 and LDA2 are not connected
JP21	Open(not present)	USB connector J3 shield to GND, solderable jumper/resistor
JP22	Open	Using VBIN supply the laser diodes only

USB supply considerations
As JP12 provides to possibility to supply VB (pin 1 = pin 2 of JP12) from USB. As JP22 provides to possibility to supply VB (pin 2 = pin 3 of JP22) from VB_IN. You need to close jumper JP12 and JP22 to operate HTP1D by USB power supply only.

Using the USB supply may limit the eval board operating current due to USB port current limitations.

External power supply considerations
As JP12 and JP22 provide the possibility to supply VB (pin 1 = pin 2 of JP12) from USB or (pin 1 = pin 2 of JP22) from VBIN. You may not supply through USB and VB externally at the same time. Using an external power supply for VB and VB_IN You need to remove JP12 if JP22 is closed.

We recommend to use an external power supply to supply VB and also to supply the laser diode on VB_IN

Wrong jumper setting and/or external power supplies can damage the eval board and all connected devices!

CIRCUIT DESCRIPTION

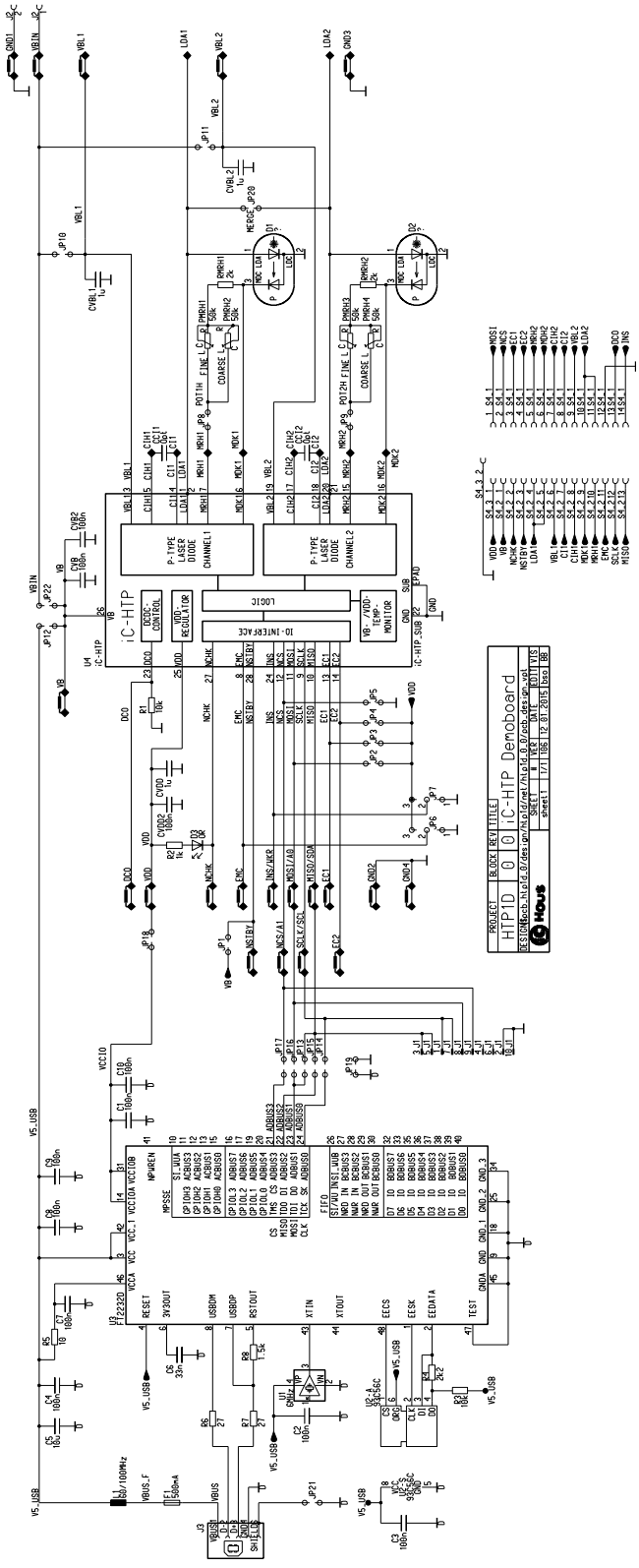

Figure 2: Circuit diagram

ASSEMBLY PART LIST

Device	Value (typical)	Comment
C5,	10 µF	Tantalum 10 V, tolerance 20 %
C1...4, C7...10, CVB, CVB2, CVDD2	100 nF	X7R 10 V, tolerance 10 %
C6	33 nF	X7R 10 V, tolerance 10 %
CVBL1, CVBL2, CVDD,	1 µF	X7R 10 V, tolerance 10 %
D1...2	LD socket	TO18 3 pin RM2.54 socket for LED/LD
D3	LED	Indicator LED (orange) for WARN pin
F1	500 mA / 6 V	Fuse
J1	WSL10	10 pin connector male
J2	AKL059-2	2 pin connector terminal screwable
J3	USB B	USB input connector
S4	WSL29	RM socket connector
JP1...5, JP8...20, JP22	SLLP10972G	Jumper 2 pins
JP6...7	SLLP10976G	Jumper 3 pins
L1	40Ω/100 MHz	Ferrite bead
R5	10 Ω	tolerance 5 %
R6, R7	27 Ω	tolerance 5 %
R2	1 kΩ	tolerance 5 %
R8	1.5 kΩ	tolerance 5 %
RMRH1, RMRH2	2.0 kΩ	tolerance 5 %
R4	2.2 kΩ	tolerance 5 %
R1, R3	10 kΩ	tolerance 5 %
U1	6 MHz	Crystal oscillator
U2	93C56C	2K microwire EEPROM
U3	FT2232	USB interface device
U4	iC-HTP	Dual CW P-type laser diode driver

EVALUATION SOFTWARE

iC-HTP software for PCs running on Windows operating systems, as well as the required USB driver are available as a ZIP file. iC-Haus software built with LabVIEW™ requires the installation of the LabVIEW™ Run-Time Engine (RTE). The RTE must be installed only once, hence there are two download links available.

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

Download package	**without RTE (small size)**	**including RTE (big size)**
iC-HTP:	http://www.ichaus.de/HTP_gui	http://www.ichaus.de/HTP_gui_rte

Features

- Reducing evaluation time and design-in time and cost
- Reading and displaying of parameter and status
- Manually setting up parameters of iC-HTP
- Export and import of iC-HTP parameters settings to/from files
- Export of software and user activity logbook to textfiles
- Export of automated report ZIP including windows and tabs content, logbook and device configuration

Installation

After unzipping the iC-HTP software package HTP1SO_gui_xx resp. HTP1SO_gui_xxrte, the following files are located in the selected working directory.
xx is a placeholder for revisions

→ Subfolder HTP1SO_gui_xx including the executable setup.exe which starts the installation routine.
→ Driver packages for iC-HTP evaluation board and/or other iC-Haus USB adapter devices.

Note: Administrator rights are required to run installations.
Note: Please install the latest USB driver **before** you connect the iC-HTP evaluation board to the PC USB.

1. To access the iC-HTP evaluation board, interface drivers for USB need to be installed.
Before connecting the iC-HTP evaluation board 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 The driver installation has to be done and finished completely before connecting the iC-HTP evaluation board to the PC USB.

2. Install the evaluation software HTP1SO by executing the setup.exe located in the subfolder HTP1SO_gui_xx.
→ Follow the on-screen instructions to finish the installation.

3. After installation the executable HTP1SO_gui_xx.exe will be available in the selected working directory.
Figure 3 shows a screenshot of the evaluation software.
LabVIEW™ is a trademark of National Instruments

GUI Description

The GUI is divided into four sections:

- 1: Menu section
- 2: Header section
- 3: Parameter tables, device status and control buttons
- 4: Status section with transcript window and online help window.

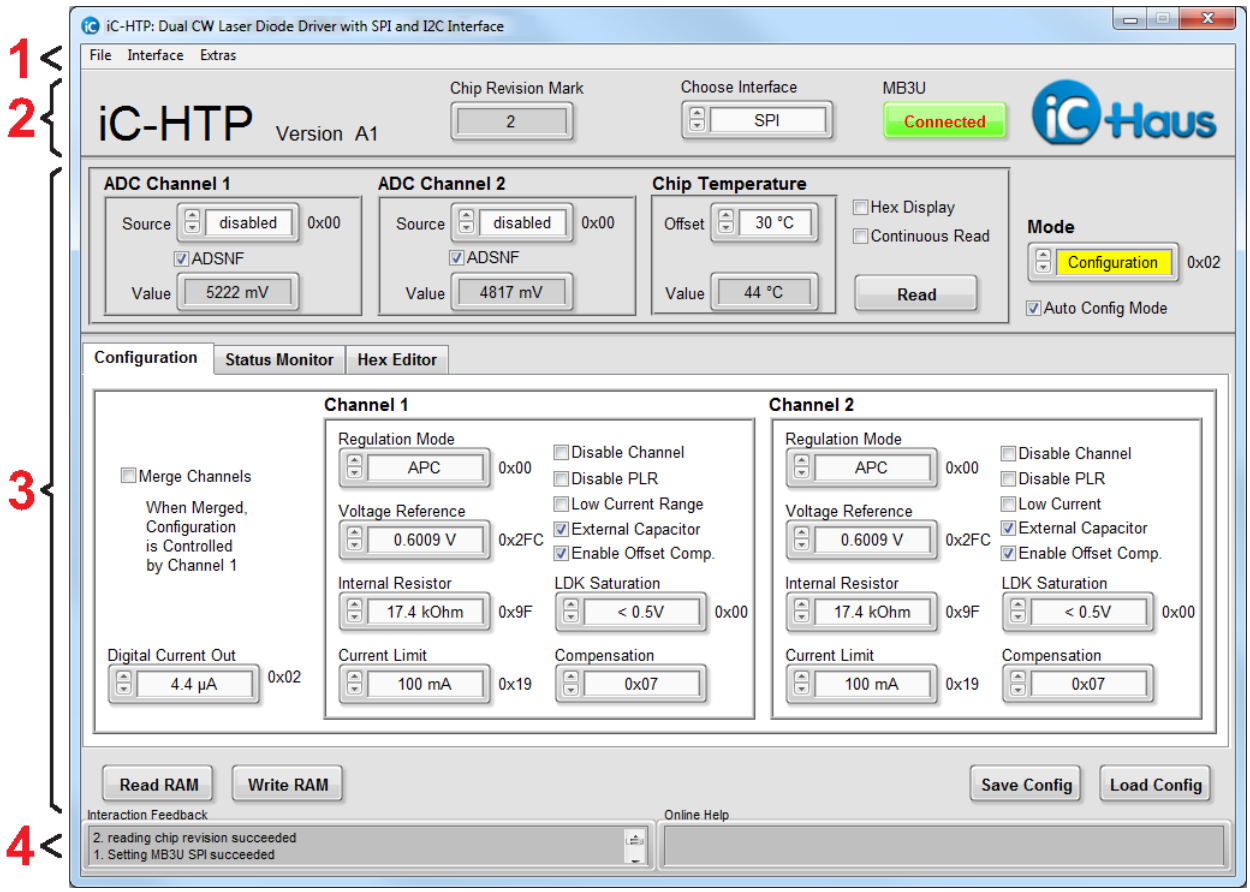

Figure 3: iC-HTP evaluation software

Menu	Button	Description
1 Menu Section		
<File>	Save Config File	Saves the configuration to a file, Intel Hex file format (*.hex)
	Load Config File	Loads the configuration to the iC, Intel Hex file format (*.hex)
	Exit	Quits the software
<Interface>	No Hardware	Disconnects the board and resets the communication between PC and adapter.
	SPI ↔ USB	Selection for SPI jumpered HTP1D eval board .
	I^2C ↔ USB	Selection for I^2C with slave address 0 jumpered HTP1D eval board .
	I^2C ↔ USB	Selection for I^2C with slave address 1 jumpered HTP1D eval board .
	I^2C ↔ USB	Selection for I^2C with slave address 2 jumpered HTP1D eval board .
	I^2C ↔ USB	Selection for I^2C with slave address 3 jumpered HTP1D eval board .
	Interface Options	
	→ Connect & Read	Checked: connects the eval board HTP1D and reads the iC registers. Unchecked: connects the eval board HTP1D without reading the iC registers.
<Extras>	Parameter Search	Enables a search field to locate a parameter's control field. If a name match is found, the corresponding control field will be highlighted and focused.
	Generate Report	Generates a *report.zip archive reporting the current software status. This report eases debugging software issues by the iC-Haus' support team.
	About	GUI release information
2 Header Section		Project title, chip version, software version and connection state
3 Parameter Section		Parameter configuration, read/write access to iC.
<Tabs>	Configuration	Refer to iC datasheet.
	Status Monitor	Refer to iC datasheet.
	Hex Editor	This tab is a different view of the iC's register content in HEX format. Changes made are not automatically updated to the other tabs. Push <Read RAM> to update the parameter tabs. **To edit registers with the HEX Editor You need to be in the "Configuration Mode"!** **In the "Operation Mode" registers changes are not possible with the HEX Editor!**
<Parameter>	Read RAM	Reads all parameters from the iC and refreshes the display.
	Write RAM	Writes all parameters from GUI to iC RAM.
	Save Config	Saves the configuration to a file, Intel Hex file format (*.hex)
	Load Config	Loads the configuration to the iC, Intel Hex file format (*.hex)

4 Status Section

Transcript and feedback messages of user actions.

The GUI software starts with <Interface> *Disconnected*.
When moving the mouse cursor across an input box, a tooltip comes up and displays the real parameter name according to this box. If a functional parameter description is required, please refer to the iC datasheet.

REVISION HISTORY

Rel.	Rel. Date	Chapter	Modification	Page
A1	2015-06-19		Initial release	all