

iC-HT EVAL HT1D

EVALUATION BOARD DESCRIPTION

ORDERING INFORMATION

Type	Order Designation	Description Options
Evaluation Board	iC-HT EVAL HT1D	iC-HT Evaluation Board ready to operate, accessible through GUI via USB including USB A-B cable
Software	iC-HT GUI	GUI software for Windows PC Device setup file generation, board configuration For download link check www.ichaus.com/ht

BOARD HT1D

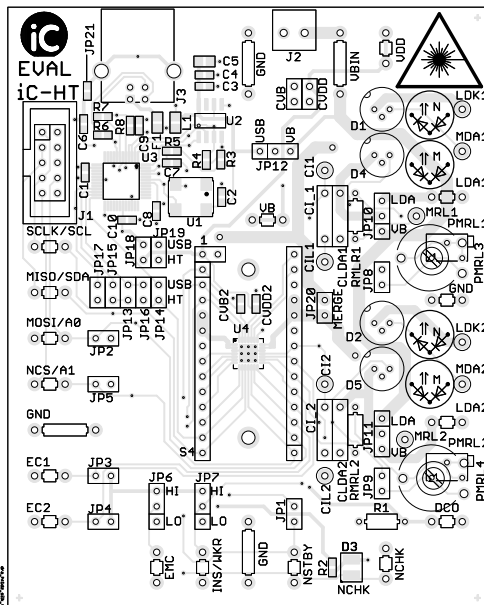


Figure 1: Component side (size 100 mm x 80 mm)

TERMINAL DESCRIPTION

J1	SPI / I ² C Interface
J2	VB Power Supply
J3	USB Interface
S4	iC-HT
LDK1	Laser Diode Cathode for channel 1
C11	Integration capacitor for Channel 1
CIL1	Integration capacitor low for Channel 1
MDA1	Monitor Diode Anode for Channel 1
MRL1	Monitor Resistor Low for channel 1
EC1	Enable Channel 1 Input
LDK2	Laser Diode Cathode for channel 2
C12	Integration capacitor for Channel 2
CIL2	Integration capacitor low for Channel 2
MDA2	Monitor Diode Anode for Channel 2
MRL2	Monitor Resistor Low 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 / I ² C Clock
MISO/SDA	SPI Master In Slave OUT / I ² C Data
MOSI/A0	SPI Master Out Slave In / I ² C Address Bit 0
NCS/A1	Chip Select(low active) / I ² C Address bit 1
INS/WKR	I ² C 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/HT>
- GUI software for Windows PC: check here for download links
→ <http://www.ichaus.de/HT>

iC-HT EVAL HT1D

EVALUATION BOARD DESCRIPTION



Rev A2, Page 2/12

CONNECTOR AND TERMINAL PINOUT

J1: iC-HT 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: N-Type Laser Diode Connector Channel 1

3-pin connector - female

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

D2: N-Type Laser Diode Connector Channel 2

3-pin connector - female

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

D4: M-Type Laser Diode Connector Channel 1

3-pin connector - female

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

D5: M-Type Laser Diode Connector Channel 2

3-pin connector - female

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

S4: iC-HT 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	MRL2	
S4_1_6	MDA2	
S4_1_7	CIL2	
S4_1_8	CI2	
S4_1_9	ANGD2	Connected to GND
S4_1_10	LDK2	Connected to S4_1_11
S4_1_11	LDK2	Connected to S4_1_10
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	LDK1	Connected to S4_2_5
S4_2_5	LDK1	Connected to S4_2_4
S4_2_6	AGND1	Connected to GND
S4_2_7	CI1	
S4_2_8	CIL1	
S4_2_9	MDA1	
S4_2_10	MRL1	
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

iC-HT EVAL HT1D

EVALUATION BOARD DESCRIPTION



Rev A2, Page 3/12

JUMPER DESCRIPTION

Jumper	Pin 1	Pin 2	Default Setting
JP1	VB	iC-HT NSTBY	JP1 connects NSTBY to VB for operation
JP2	VDD	iC-HT MOSI	Pull-up MOSI/A0
JP3	VDD	iC-HT EC1	Pull-up EC1
JP4	VDD	iC-HT EC2	Pull-up EC2
JP5	GND	iC-HT NCS	Pull-down NCS/A1
JP8	MDA1	PMRL3, PMRL1	Enable external resistor (potentiometers coarse/fine + MRL min) channel 1
JP9	MDA2	PMRL4, PMRL2	Enable external resistor (potentiometers coarse/fine + MRL min) channel 2
JP13	ADBUS1	iC-HT MISO	Enable MOSI A0 USB = MISO/SDA USB
JP14	ADBUS0	iC-HT SCLK	Enable SCLK/SCL USB
JP15	ADBUS2	iC-HT MISO	Enable MISO/SDA USB
JP16	ADBUS1	iC-HT MOSI	Enable MOSI/A0 USB
JP17	ADBUS3	iC-HT NCS	Enable NCS/A1 USB
JP18	VCCIO	VDD	Serial communication port of FT2223D supplied by VDD iC-HT
JP19	GNDD_USB	iC-HT GND	Serial communication port of FT2223D GND(FTDI) = GND(iC-HT)
JP20	iC-HT LDK1	iC-HT LDK2	Connection LDK1 and LDK2
JP21	Shield J3	GNDD_USB	USB Connector J3 shield to GND

Jumper	Pin 1	Pin 2	Pin 3	Default Setting
JP6	GND	iC-HT EMC	VDD	Pull-up/open/pull-down (tri-state) EMC
JP7	GND	iC-HT INS	VDD	Pull-up/open/pull-down (tri-state) INS/WKR
JP10	VB_IN	iC-HT LDA D1/D4	LDA1	LDA1 for D1 / D4 supply
JP11	VB_IN	iC-HT LDA D2/D5	LDA2	LDA2 for D2 / D5 supply
JP12	V5_USB	iC-HT VB	VB_IN external VB	VB_IN = VB for iC-HT

iC-HT EVAL HT1D

EVALUATION BOARD DESCRIPTION



Rev A2, Page 4/12

INTERFACE SELECTION

The iC-HT 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-HT evaluation board placed for an optional operation are:

- CI1 = 10 nF
- CI2 = 10 nF
- R1 = 10k Ω
- RMRL1 = 2k Ω
- RMRL2 = 2k Ω

Default Jumper Setting

The default jumper setting of the iC-HT 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.

*Attention to JP11: Error on PCB Top Text of JP11

The PCB text "VB" and "LDA" of Jumper JP11 has a wrong pin mapping and text meaning need to be swapped for correct jumpering.

- JP10 1=2 for "VB", 2=3 for "LDA1".
- JP11 1=2 for "VB", 2=3 for "LDA2".

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	"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	"VB": 2=3 Closed "VB": 1=2 Closed	Using VB supply, not USB supply Using USB supply, not VB supply
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-HT
JP19	Closed	Serial communication port FT2223D GND = GND iC-HT
JP20	Open	LDK1 and LDK2 are not connected
JP21	Open(not present)	USB connector J3 shield to GND, solderable jumper/resistor

iC-HT EVAL HT1D

EVALUATION BOARD DESCRIPTION



Rev A2, Page 5/12

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 I ² C Setting
JP1	Closed	Operation, no standby: NSTBY connected to VB
JP2	Open: A0 = 0	MOSI/A0 opne, 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 I ² C: 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	"VB": 2=3 Closed "USB": 1=2 Closed	Using VB supply, not USB supply Using USB supply, not VB supply
JP13	Closed	Enable SDA USB output
JP14	Closed	Enable SCL USB output
JP15	Closed	Enable SDA USB input
JP16	Open	Control of I ² C address bit A0 by jumper JP2
JP17	Open	Control of I ² C address bit A1 by jumper JP5
JP18	Closed	Serial communication port FT2223D is supplied by VDD of iC-HT
JP19	Closed	Serial communication port FT2223D GND = GND iC-HT
JP20	Open	LDK1 and LDK2 are not connected
JP21	Open(not present)	USB connector J3 shield to GND, solderable jumper/resistor

*Attention to JP11: Error on PCB Top Text of JP11

The PCB text "VB" and "LDA" of Jumper JP11 has a wrong pin mapping and text meaning need to be swapped for correct jumpering.

- JP10 1=2 for "VB", 2=3 for "LDA1".
- JP11 1=2 for "VB", 2=3 for "LDA2".

USB supply considerations

As JP12 provides to possibility to supply VB (pin 1 = pin 2 of JP12) from USB **or** VB_IN (pin 2 = pin 3 of JP12) You need a 3-pin wide jumper or an additional cable to operate HT1D by USB power supply only. Using USB power supply and a USB supply of VB (pin 1 = pin 2 of JP12), You need to supply VB_IN e.g. by an additional linking cable from VB to VB_IN (or an additional external supply at VB_IN).

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

External power supply considerations

As JP12 provides to possibility to supply VB (pin 1 = pin 2 of JP12) from USB **or** VB_IN (pin 2 = pin 3 of JP12) 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 place JP12 on pin 2 = pin 3.

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

Wrong jumpering and external power supplies can damage the eval board and it's all devices!

iC-HT EVAL HT1D

EVALUATION BOARD DESCRIPTION

CIRCUIT DESCRIPTION

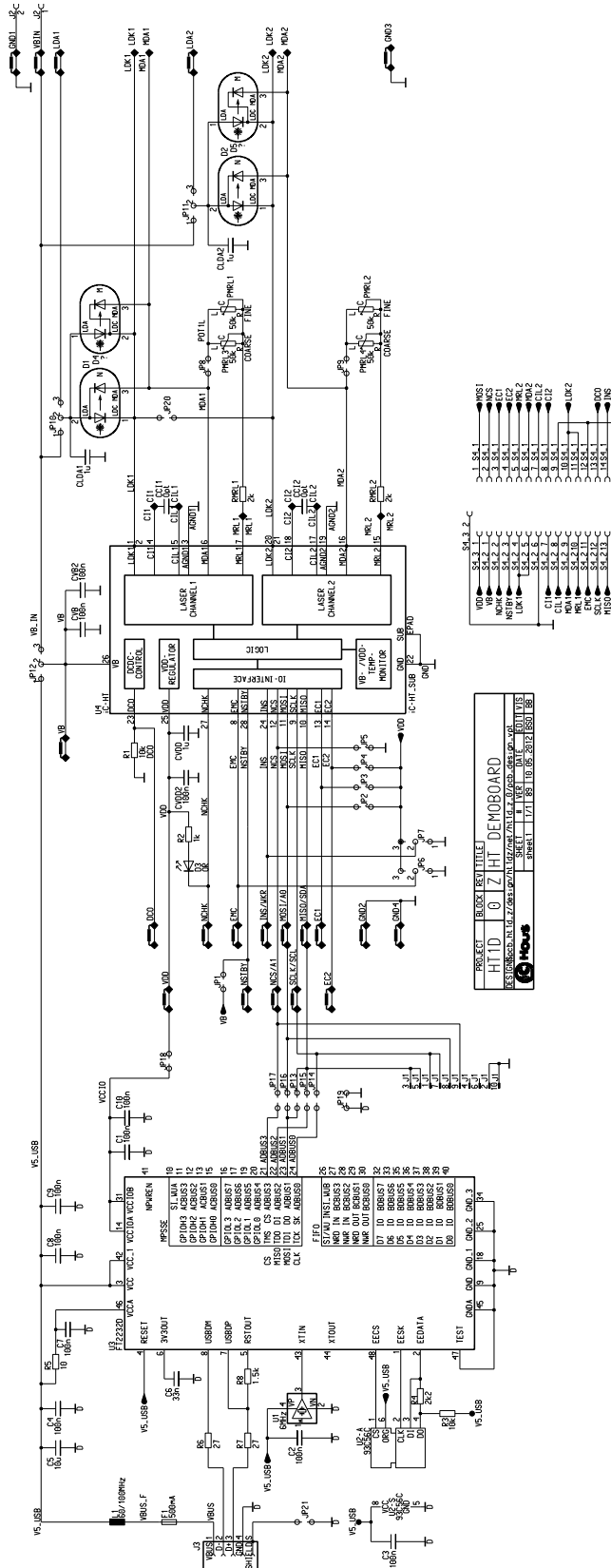


Figure 2: Circuit diagram

iC-HT EVAL HT1D

EVALUATION BOARD DESCRIPTION

ASSEMBLY PART LIST

Device	Value (typical)	Comment
C5,	10 μ F	Tantal 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 %
CLDA1, CLDA2, CVDD,	1 μ F	X7R 10 V, tolerance 10 %
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, JP9, JP13...21	SLLP10972G	Jumper 2 pins
JP6, JP7, JP10...12	SLLP10976G	Jumper 3 pins
L1	40 Ω /100 MHz	Ferrit bead
R5	10 Ω	tolerance 5 %
R6, R7	27 Ω	tolerance 5 %
R2	1 k Ω	tolerance 5 %
R8	1.5 k Ω	tolerance 5 %
RMRL1, RMRL2	2.0 k Ω	tolerance 5 %
R4	2.2 k Ω	tolerance 5 %
R1, R3	10 k Ω	tolerance 5 %
R	470 k Ω	tolerance 5 %
U1	6 MHz	Crystal oscillator
U2	93C56C	2K microwire EEPROM
U3	FT2232	USB interface device
U4	iC-HT	Dual CW laser diode driver

EVALUATION SOFTWARE

iC-HT 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

iC-HT:

without RTE (small size)

http://www.ichaus.de/HT_gui

including RTE (big size)

http://www.ichaus.de/HT_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-HT
- Export and import of iC-HT 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-HT software package HT1SO_gui_xx resp. HT1SO_gui_xxрте, the following files are located in the selected working directory.

xx is a placeholder for revisions

- Subfolder HT1SO_gui_xx including the executable setup.exe which starts the installation routine.
- Driver packages for iC-HT 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-HT evaluation board to the PC USB.

1. To access the iC-HT evaluation board, interface drivers for USB need to be installed. Before connecting the iC-HT 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-HT evaluation board to the PC USB.

2. Install the evaluation software HT1SO by executing the setup.exe located in the subfolder HT1SO_gui_xx.

→ Follow the on-screen instructions to finish the installation.

3. After installation the executable HT1SO_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.

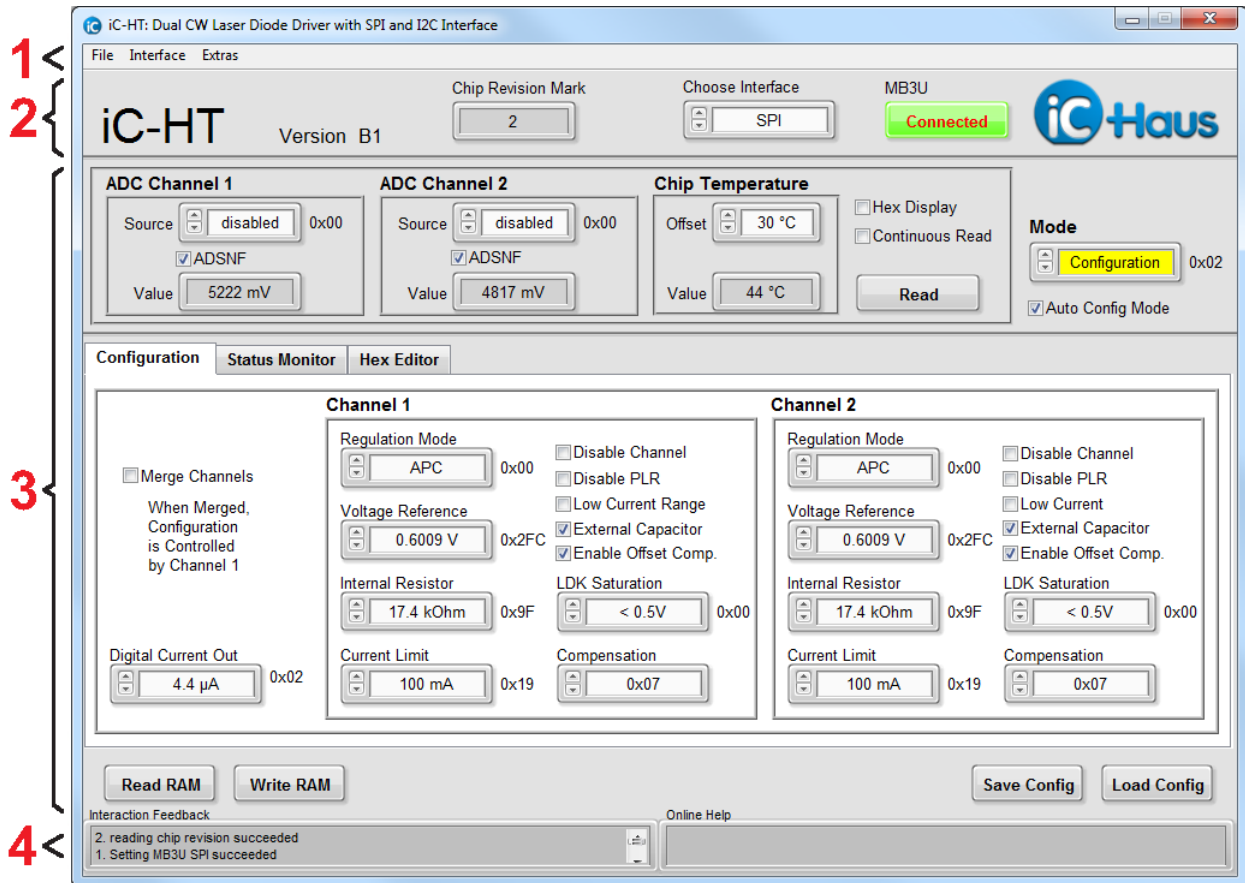


Figure 3: iC-HT evaluation software

iC-HT EVAL HT1D

EVALUATION BOARD DESCRIPTION



Rev A2, Page 10/12

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 HT1D eval board .
	I ² C ↔ USB	Selection for I ² C with slave address 0 jumpered HT1D eval board .
	I ² C ↔ USB	Selection for I ² C with slave address 1 jumpered HT1D eval board .
	I ² C ↔ USB	Selection for I ² C with slave address 2 jumpered HT1D eval board .
	I ² C ↔ USB	Selection for I ² C with slave address 3 jumpered HT1D eval board .
	Interface Options → Connect & Read	Checked: connects the eval board HT1D and reads the IC registers. Unchecked: connects the eval board HT1D 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 accross 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.

iC-HT EVAL HT1D

EVALUATION BOARD DESCRIPTION



Rev A2, Page 12/12

ERRATA

Attention to JP11: Error on PCB Top Text of JP11

The PCB text "VB" and "LDA" of Jumper JP11 has a wrong mapping and text meaning needs to be swapped.

REVISION HISTORY

Rev	Notes	Pages affected
A1	Initial version	
A2	Content rearranged	all
	Related Documents updated	1
	SPI Jumper Setting added	6
	I ² C Jumper Setting added	5
	Evaluation Software GUI description	7
	Required "Configuration Mode" for the HEX editor use	10

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 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.