

iC-HTG EVAL HTG1D

EVALUATION KIT DESCRIPTION

ORDERING INFORMATION

Type	Order Designation	Description
Evaluation Board	iC-HTG EVAL HTG1D	iC-HTG Evaluation Board Ready-to-operate, accessible by GUI using PC USB (not included)
Software	iC-HTG GUI	GUI software for Windows PC Device setup file generation, board configuration via USB For download link check www.ichaus.com/htg

BOARD HTG1D

(size 80 mm x 100 mm)

TERMINAL DESCRIPTION

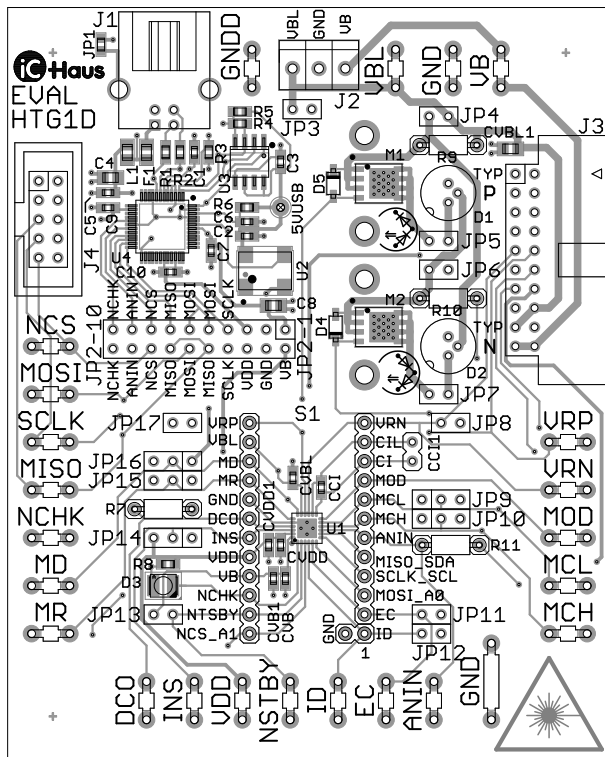


Figure 1: Component side

VB	Power Supply Voltage Input Connected to VDD_USB if jumper JP2-1 closed.
VBL	Channel Supply Voltage Input
VDD	+3.3 V Voltage Output
GND	0 V Ground
VRN	N Transistor Regulation Input
VRP	P Transistor Regulation Input
CI	Integration Capacitor high side
CIL	Integration Capacitor low side
MOD	Analog Modulation Input
MCH	Current Monitor Input high side
MCL	Current Monitor Input low side
ANIN	Signal Output / Analog Input for ADC
MD	Monitor Diode Input
MR	Monitor resistor Output
EC	Enable Channel Input
NCHK	Check Output, active low
NSTBY	Standby input, active low
DCO	DC/DC Converter Trimmer Output
ID	I ² C A2 Input
NCS/A1	Chip Select, active low / I ² C A1 Input
MOSI/A0	SPI Master Out Slave In / I ² C A0 Input
SCLK/SCL	SPI Clock / I ² C Clock Input
MISO/SDA	SPI Master In Slave OUT Output / I ² C Data Input / Output
INS	I ² C or SPI Selection Input
D1	Error LED (red) Connected to NCHK.
J1	4-pin USB-B Connector
J2	3-pin Power Supply Connector
J3	20-pin Mezzanine Connector
J4	10-pin Male Connector to SPI/I ² C

iC-HTG EVAL HTG1D

EVALUATION KIT DESCRIPTION

RELATED DOCUMENTS

- IC Documentation
→ <http://www.ichaus.de/htg>
- GUI software for Windows PC: check here for download links
→ <http://www.ichaus.de/htg>

PC USB CABLE



Figure 2: PC USB cable (A-B)

USB-B Connector

Pin	Slave	Function
1	VBUS	+5 V
2	D-	Data-
3	D+	Data+
4	GND	Ground

PINOUT OF CONNECTORS AND TERMINALS

J1: USB Interface (to PC USB)

10-pin connector - female

Pin	Name	Function
1	VBUS	+5 V
2	D-	Data-
3	D+	Data+
4	GND	Ground

J2: Supply Interface

(to laser and laser diode driver)

3-pin connector - female

Pin	Name	Function
1	VB	Power supply
2	GND	Ground
3	VBL	Channel supply

J4: SPI/I2C Interface

10-pin connector - male

Pin	Name	Function
1	SCLK	SPI Clock
2	GND	Ground
3	MISO	SPI MISO / I2C SDA /SDA
4	n.c.	
5	MISO	SPI MISO / I2C SDA /SDA
6	n.c.	
7	SCLK	SPI Clock
8	MOSI	SPI MOSI / I2C address 0 /A0
9	NCS	SPI NCS (low active) / I2C address 1 /A1
10	GND	Ground

J3: Mezzanine Interface

(to analog signals and supplies)

20-pin connector - male

Pin	Name	Function
1	GND	Ground
2	GND	Ground
3	MD	Monitor diode
4	GND	Ground
5	MR	Monitor resistor
6	MCL	Current monitor low side
7	MCH	Current monitor high side
8	GND	Ground
9	VRN	N transistor regulation
10	VRP	P transistor regulation
11	GND	Ground
12	ANIN	Analog input for ADC
13	DCO	DC/DC converter trimmer output
14	VDD	Analog Ground
15	GND	Ground
16	VBL	Channel supply
17	VBL	Channel supply
18	GND	Ground
19	VB	Power supply
20	VB	Power supply

Notes:

n.c. = not connected

iC-HTG EVAL HTG1D

EVALUATION KIT DESCRIPTION



Rev A1, Page 3/13

DESCRIPTION OF JUMPERS

Jumper JP1	Function
Closed	Shield USB to GND grounded
Open	Shield USB to GND not grounded (recommended, default).

Jumper JP2-1	Function
Closed	5V_USB supplies VB by USB connector J1.
Open	Keeps separate USB 5 V and VB (recommended, default).

Jumper JP2-2	Function
Closed	GNDD to GND grounded (recommended, default).
Open	GNDD to GND not grounded.

Jumper JP2-3	Function
Closed	VDD supplies VDD_IO of USB device U4.
Open	USB device U4 uses default VDD_IO of 5 V (recommended, default).

Jumper JP2-4	Function
Closed	SCLK_U of USB device U4 connected to SCLK (recommended, default).
Open	Keeps SCLK input open.

Jumper JP2-5	Function
Closed	MOSI_U of USB device U4 connected to MISO_SDA.
Open	Keeps MISO_SDA input open (recommended, default).

Jumper JP2-6	Function
Closed	MOSI_U of USB device U4 connected to MOSI_A0 (recommended, default).
Open	Keeps MOSI_A0 input open.

Jumper JP2-7	Function
Closed	MISO_U of USB device U4 connected to MISO_SDA (recommended, default).
Open	Keeps MISO_SDA input open.

Jumper JP2-8	Function
Closed	NCS_U of USB device U4 connected to NCS_A1 (recommended, default).
Open	Keeps NCS_A1 input open.

Jumper JP2-9	Function
Closed	ANIN_U of USB device U4 connected to ANIN.
Open	Keeps ANIN input open (recommended, default).

Jumper JP2-4	Function
Closed	NCHK_U of USB device U4 connected to NCHK.
Open	Keeps NCHK input open (recommended, default).

Jumper JP3	Function
Closed	VB supplies VBL (recommended, default).
Open	Keeps individual VB and VBL.

Jumper JP4	Function
Closed	Disables R9 shunt (recommended, default).
Open	Enables R9 shunt.

Jumper JP5	Function
Closed	enables LDAP path.
Open	Keeps LDAP path open (recommended, default).

Jumper JP6	Function
Closed	Disables R10 shunt.
Open	Enables R10 shunt (recommended, default).

Jumper JP7	Function
Closed	Enables LDCN path.
Open	Keeps LDCN path open (recommended, default).

Jumper JP8	Function
Closed	Enables VRN path.
Open	Keeps VRN input open (recommended, default).

iC-HTG EVAL HTG1D

EVALUATION KIT DESCRIPTION

Jumper JP9	Function
1-2 Closed left-middle	Connects low side of R10 to MCL input (recommended, default).
2-3 Closed middle-right	Connects low side of R9 to MCL input.
Open	Keeps MCL input open.

Jumper JP10	Function
1-2 Closed left-middle	Connects high side of R10 to MCH input (recommended, default).
2-3 Closed middle-right	Connects high side of R9 to MCH input.
Open	Keeps MCH input open.

Jumper JP11	Function
Closed	Connects VDD to EC input (recommended, default).
Open	Keeps EC input open.

Jumper JP12	Function
Closed	Connects VDD to ID input.
Open	Keeps ID input open (recommended, default).

Jumper JP13	Function
Closed	Connects VB to NCHK input (recommended, default).
Open	Keeps NCHK input open.

Jumper JP14	Function
1-2 Closed middle-right	Connects GND to INS/WKR input (recommended, default).
2-3 Closed left-middle	Connects VDD to INS/WKR input.
Open	Keeps INS/WKR input open.

Jumper JP15	Function
1-2 Closed middle-right	Connects GND to MR input.
2-3 Closed left-middle	Connects VDD to MR input.
Open	Keeps MR input open (recommended, default).

Jumper JP16	Function
1-2 Closed middle-right	Connects MDAN to MD input.
2-3 Closed left-middle	Connects MDCP to MD input.
Open	Keeps MD input open (recommended, default).

Jumper JP17	Function
Closed	Enables VRP path.
Open	Disables VRP path (recommended, default).

DEFAULT JUMPER SETTING

The default jumper setting is not instantly usable and the iC-HTG is not accessible without an external supply. Before any use a dedicated jumper setting and a device connection (shunt and emitting diode) is mandatory.

SPI Interface

The default jumper setting provides an SPI based communication with the USB serial bridge device on board. The SPI interface is the default interface option of the iC-HTG eval board software. The iC-HTG eval board software supports SPI and I²C for interface selection. With I²C there are 8 addresses selectable from slave 0 ... slave 7 defined by the A0, A1 and A2 address bits input pin states.

Jumper JP2-4	Function
Closed	SCLK_U of USB device U4 connected to SCLK (recommended, default). Required to use the on board USB SPI master.

Jumper JP2-5	Function
Open	Keeps MISO_SDA input open (recommended, default). Required to use the on board USB SPI master and no connection between MOSI_U of USB device U4 and MISO_SDA.

Jumper JP2-6	Function
Closed	MOSI_U of USB device U4 connected to MOSI_A0 (recommended, default). Required to use the on board USB SPI master and no connection between MOSI_U of USB device U4 and MOSI_A0.

Jumper JP2-7	Function
Closed	MISO_U of USB device U4 connected to MISO_SDA (recommended, default). Required to use the on board USB SPI master and no connection between MISO_U of USB device U4 and MISO_SDA

Jumper JP2-8	Function
Closed	NCS_U of USB device U4 connected to NCS_A1 (recommended, default). Required to use the on board USB SPI master and no connection between NCS_U of USB device U4 and NCS_A1.

Power Supply and GND

It is recommended to define the supply structure via schematic to ensure the right jumper settings before any supply of the devices.

Jumper JP2-1	Function
Open	Keeps separate USB 5V and VB (recommended, default). An external VB power supply is required.

Jumper JP2-2	Function
Closed	GNDD to GND grounded (recommended, default). The GND connection is required.

Jumper JP2-3	Function
Open	USB device U4 uses default VDD_IO of 5V (recommended, default).

Jumper JP3	Function
Closed	VB supplies VBL (recommended, default). VB and VBL are not connected for individual voltages.

Load path

It is recommended to define the load path via schematic to ensure the right jumper settings before any supply or parameter control.

Jumper JP4	Function
Closed	Disables R9 shunt (recommended, default). R9 shunt is not used.

iC-HTG EVAL HTG1D

EVALUATION KIT DESCRIPTION

Jumper JP5	Function
Open	Keeps LDAP path open (recommended, default). LDAP (laser diode anode p-type) is not connected to M1 p-type transistor.

For ACC or APC control JP5 or JP7 one needs to be jumpered to connect to one of the transistors M1 or M2.

Jumper JP6	Function
Open	Enables R10 shunt (recommended, default). R10 shunt is usable.

Jumper JP7	Function
Open	Keeps LDCN path open (recommended, default). LDCN (laser diode catode n-type) is not connected to M2 n-type transistor.

For ACC or APC control JP7 or JP5 one needs to be jumpered to connect to one of the transistors M2 or M1.

Jumper JP8	Function
Open	Keeps VRN input open (recommended, default). VRN is not connected to M2 n-type transistors gate.

For ACC or APC control JP8 or JP17 one needs to be jumpered to control one of the transistors M2 or M1.

Jumper JP17	Function
Open	Disables VRP path (recommended, default). VRP is not connected to M1 p-type transistors gate.

For ACC or APC control JP17 or JP8 one needs to be jumpered to control one of the transistors M1 or M2.

Monitoring photodiodes current path

The optional monitor diodes photo current can be used for APC in combination with the internal programmable logarithmic monitoring resistor.

Jumper JP16	Function
Open	Keeps MD input open (recommended, default). MD is not connected to the laser diode D1 MDCP nor to the laser diode D2 MDNP.

For APC control JP16 needs to be jumpered to 1-2 or 2-3 to provide a current from a photodiode.

Shunt monitoring path

The monitoring shunt position may vary due to configured and jumpered current path.

Jumper JP9	Function
1-2 Closed left-middle	Connects low side of R10 to MCL input (recommended, default). To monitors R10 lower voltage.

Jumper JP10	Function
1-2 Closed left-middle	Connects high side of R10 to MCH input (recommended, default). Monitors R10 higher voltage.

Default Enable Channel state

The drivers channel is controlled by the external EC signal and the internal state and parameter.

Jumper JP11	Function
Closed	Connects VDD to EC input (recommended, default). Provides an Enable Channel state (VDD) at the EC input.

For external channel control remove JP11 and provide a high signal for enable channel.

ID Control

With I²C there are 3 ID bits to select 1 of 8 addresses for this device. With SPI there is no ID use possible.

Jumper JP12	Function
Open	Keeps ID input open (recommended, default). Optional ID definition with I ² C interface operation only.

Default Standby state

The default state on an open NSTBY pin is low and keeps the iC-HTG device in a standby state. To leave the standby state actively You need to provide a high signal at the NSTBY pin.

Jumper JP13	Function
Closed	Connects VB to NCHK input (recommended, default). Device is not in STANDBY and for ready for operation.

For external standby control remove JP13 and provide a high signal for no standby.

Interface selection SPI

The serial interface can be selected by pin and jumper or signal.

iC-HTG EVAL HTG1D

EVALUATION KIT DESCRIPTION

Jumper JP14	Function
1-2 Closed middle-right	Connects GND to INS/WKR input (recommended, default). SPI interface mode is selected for default interface.

Jumper JP2-4	Function
Open	Keeps NCHK input open (recommended, default). The NCHK_U of USB device U4 not connected to NCHK.

MISC I/O of USB to serial device

Optional I/O pins of the USB to serial device are prepared to be used by PC software.

USB shield to GNDD

The USB-B connectors shield can be connected to GND.

Jumper JP2-9	Function
Open	Keeps ANIN input open (recommended, default). The ANIN_U of USB device U4 is not connected to ANIN.

The ANIN I/O pin is free to be used.

Jumper JP1	Function
Open	Shield USB to GND not grounded (recommended, default). This jumper is a solderable bridging option.

Jumper position and pin 1-2-3 position on the HTG1D evaluation board

On a 3 pin jumper the pin 1 is separated by a line.

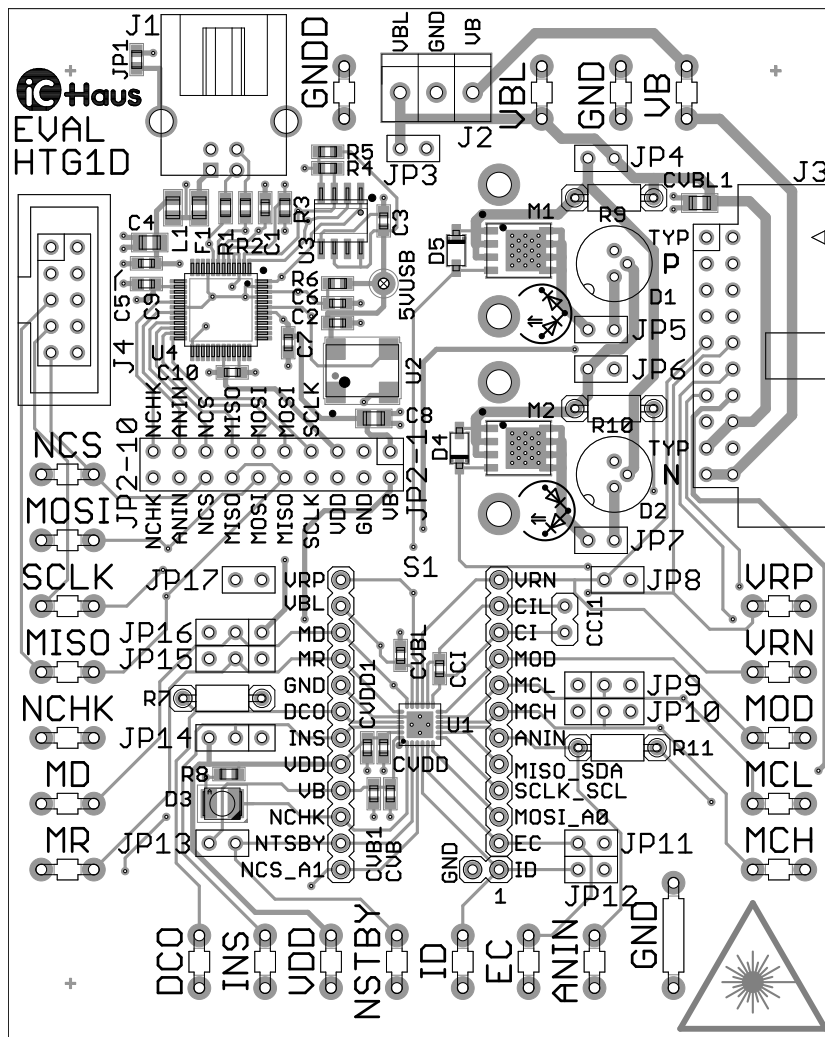


Figure 3: Component side with jumpers

iC-HTG EVAL HTG1D EVALUATION KIT DESCRIPTION

CIRCUIT SCHEMATIC

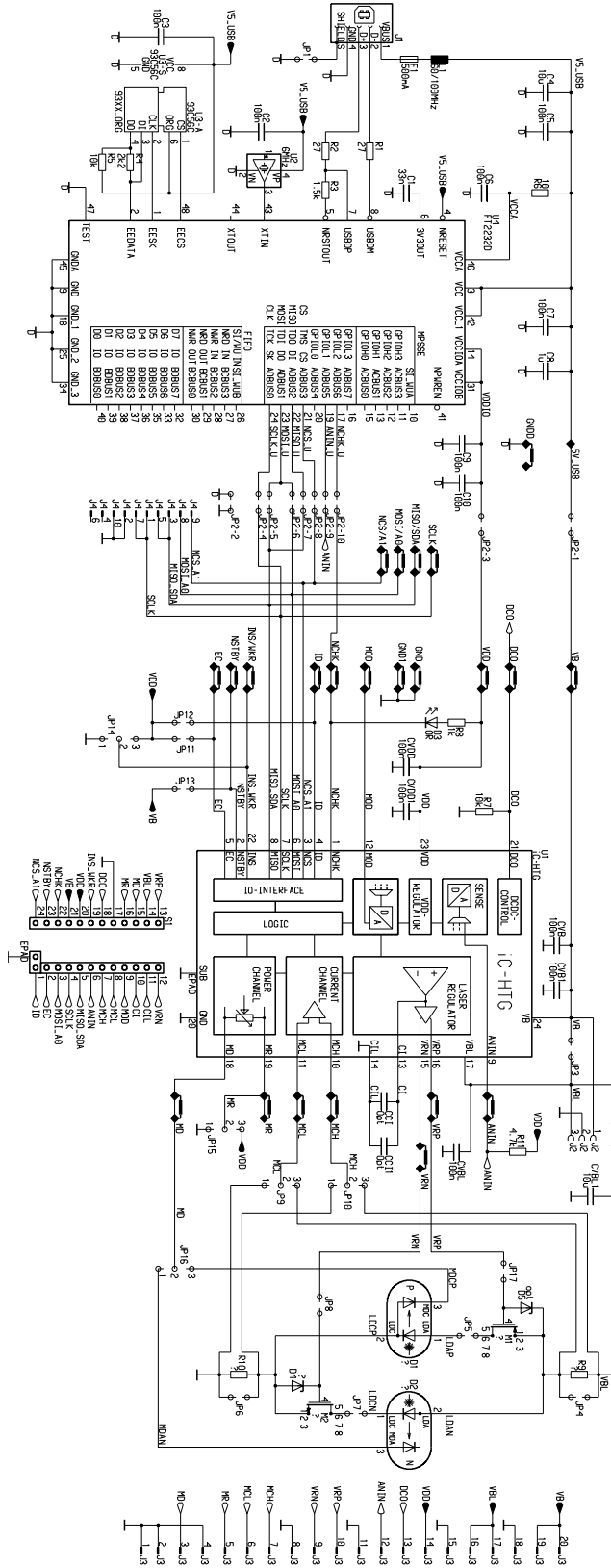


Figure 4: Circuit diagram

iC-HTG EVAL HTG1D

EVALUATION KIT DESCRIPTION

ASSEMBLY PART LIST

Component (top)	Typical Value	Comment
C1	33 nF	
CVDD, CVDD1	100 nF	
C8	1 μ F	
C4, CVBL1	10 μ F	
R8	1k Ω	
R4	2k2 Ω	
R11	4.7k Ω	
R5, R7	10k Ω	
F1	500 mA	RSMD0805
L1	60/100 MHz	LSMD0805
U2	6 MHz	OSC4_SMD_7X5
U3	93C56C	SO8_3.9_1.27
J2	AKL059-3	RIACON_AKL059_03
U4	FT2232D	QFP48
U1	iC-HTG	iC-HAUS_QFN24-1_4X4X0.9_0.5
CCI	Opt	CSMD0603
CCI1	Opt	FISCHER_MKLP41_2
D5	Opt	SOD123
D3	ORANGE	LED_PLCC2
5V_USB	S1-F	PIN_10
S1	S2X1_S11X1_S12X1	DIL24_EP_PIN1
JP3, JP4, JP5, JP6, JP7, JP8, JP11, JP12, JP13, JP17	SLLP10972G	W2X1
JP9, JP10, JP14, JP15, JP16	SLLP10973G	W3X1
JP2	SLLP209720G	W10X2
J1	TYPE_B	CONN_USB_FEMALE_B
D1, D2	SOCKET_TO18_3	
D4	SOD123	
J3	CONN_WSL_20_MALE_R	
J4	CONN_WSL_10_MALE	
M1	VISHAY_PPAK_SO8_1.27	Si7143DP Vishay P-Channel 30V D-S MOSFET
M2	VISHAY_PPAK_SO8_1.27	SiR466DP Vishay N-Channel 30V D-S MOSFET
R10, R9	Opt, user defined shunt	R0207

Component (bottom)	Typical Value	Comment
RF1, RF2, RF3, RF4		Rubber foot
HS1, HS2	Opt	Heat sink

EVALUATION SOFTWARE

iC-HTG 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-HTG:

without RTE (small size)

http://www.ichaus.de/HTG_gui

including RTE (big size)

http://www.ichaus.de/HTG_gui_rte

Features

- IC configuration made easy by parameter tables and tool tips
- Editing of application-specific default setups (*.hex) with CRC calculation
- Access to DUT and transfer of setup data to RAM and/or EEPROM
- Storage of IC setups as intel® hex file for programming devices

Installation

After unzipping the iC-HTG software package HTG1SO_gui_xx resp. HTG1SO_gui_xxрте, the following files are located in the selected working directory (xx is a placeholder for revisions):

- Subfolder HTG1SO_gui_xx including the executable setup.exe which starts the installation routine.
- Driver package for eval board.

Notice: Administrator rights are required to run installations.

1. To access the iC-HTG evaluation board, interface eval board drivers for USB needs to be installed. The driver installation must be completed successfully before connecting the eval board to your PC.

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

1.1 To complete the driver installation procedure, the eval board must be connected to USB finally, after driver installation (only required if the USB interface of the eval board will be used).

2. Install the evaluation software HTG1SO by executing the setup.exe located in the subfolder HTG1SO_gui_xx.

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

3. After installation the executable HTG1SO_gui_xx.exe will be available in the selected working directory.

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GUI Description

The GUI is divided into four sections:

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

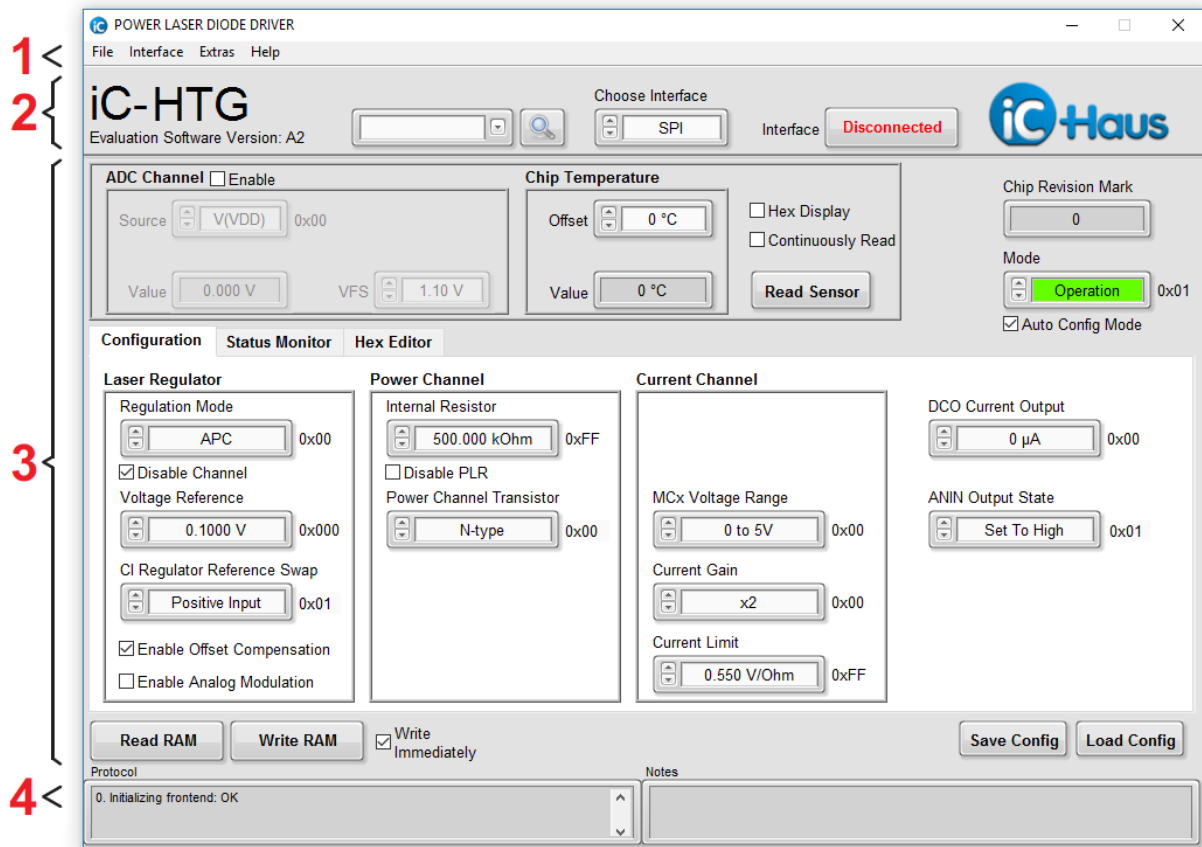


Figure 5: GUI start-up window.

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 eval board.
	iC-Interface ↔ SPI	Selection for SPI setup of HTG1D, SPI is the default jumpered interface.
	iC-Interface ↔ I ² C	Selection for I ² C setup of HTG1D, Slave range 0 . . . 7.
	Interface Options → Connect & Read	Checked: connects the eval board and reads the IC registers. Unchecked: connects the eval board 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 and DLL 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.
<Parameter>	Read RAM	Reads all parameters from the IC and refreshes the display.
	Write RAM	Writes all parameters from GUI to IC RAM.
	Write Immediately	If checked, any change to a parameter is transferred immediately. If disabled, the GUI can be used stand-alone without hardware.
	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)
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.

iC-HTG EVAL HTG1D

EVALUATION KIT DESCRIPTION



Rev A1, Page 13/13

REVISION HISTORY

Rel.	Rel. Date*	Chapter	Modification	Page
A1	2018-02-15	...	Initial release	

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* Release Date format: YYYY-MM-DD