

iC-NQ, iC-NQC EVAL NQ6D

EVALUATION BOARD DESCRIPTION



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ORDERING INFORMATION

Type	Order Designation	Description Options
Evaluation Board	iC-NQ EVAL NQ6D iC-NQC EVAL NQ6D	iC-NQ Evaluation Board iC-NQC Evaluation Board ready to operate, accessible through GUI via PC adapter
Evaluation Software	iC-NQ GUI iC-NQC GUI	GUI software for Windows PC GUI software for Windows PC stores setup to file, communication to the IC see chapter EVALUATION SOFTWARE on page 6 for more information
To be ordered separately		
PC Adapter	iC-MB3 iCSY MB3U iC-MB4 iCSY MB4U	PC-USB Adapter PC-USB Adapter (supported by iC-NQC GUI only)

BOARD NQ6D

(size 100 mm x 80 mm)

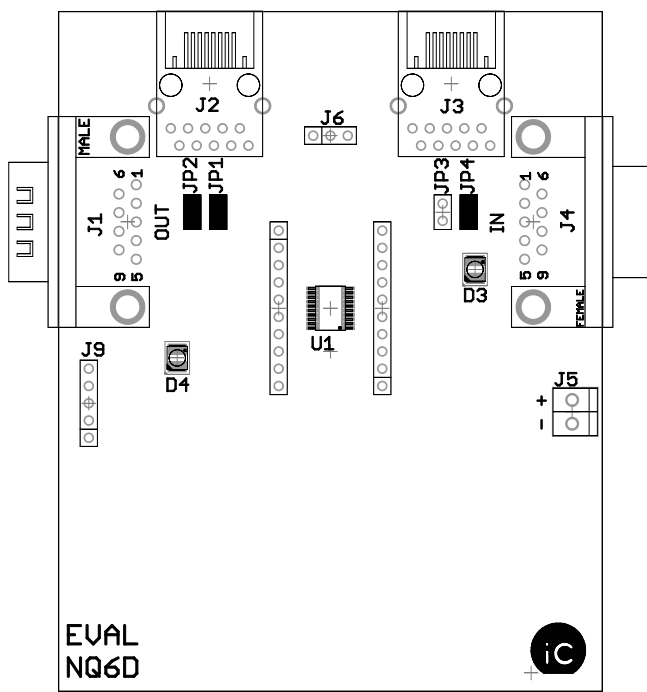


Figure 1: Evaluation board NQ6D

Connections

- J1 BiSS Interface Output (D-Sub, RS422)
(to another board)
- J4 BiSS Interface Input (D-Sub, RS422)
(to BiSS-PC adapter or previous board)
- (J2) BiSS Interface Output (RJ45)
(to another board)
- (J3) BiSS Interface Input (RJ45)
(to BiSS-PC adapter or previous board)
- J5 Board Supply VB (+8 V...+15 V)
(jumpers J3 and J4 removed)
- J6 BiSS Line Signals of iC-NQ(C)
- J9 Test/Error/I²C signals of iC-NQ(C)
- JP1 Signal Return Jumper (SLO- to SL-)
- JP2 Signal Return Jumper (SLO+ to SL+)
- JP3 VDD Jumper (adapter +5 V to VDD)
- JP4 VB Jumper (adapter +12 V to VB)
- U1 iC-NQ(C) Interpolation IC
- D3 Power-On LED (green)
- D4 Error LED (red)

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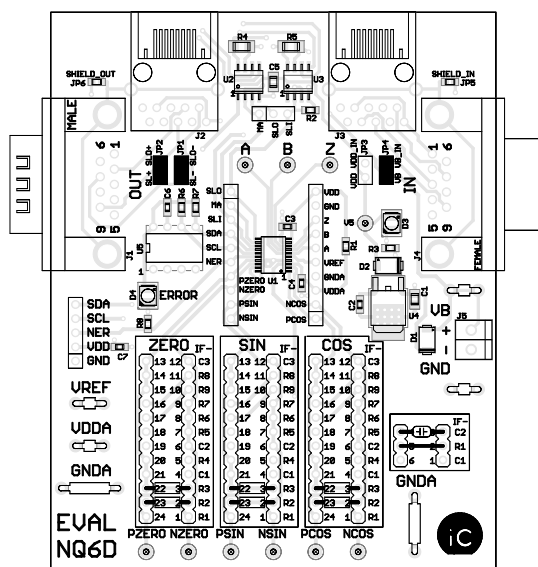


Figure 2: Component side

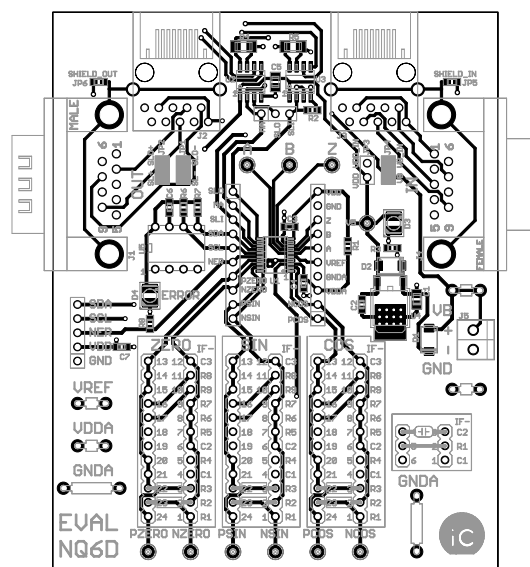


Figure 3: Component side (conducting paths)

TERMINAL DESCRIPTION

J5+*	+8 V... +15 V Board Supply VB
J5-*	Ground
VB*	+8 V... +15 V Board Supply VB
V5*	+5 V Board Supply VDD
GND	Ground
VREF	Reference Voltage Output (+2.4 V)
VDDA	Analog Supply Voltage IC (+5 V)
GND A	Analog Supply Ground IC (0 V)
A	Incremental Output A
B	Incremental Output B
Z	Index Output Z
(J6) MA	Clock Input iC-NQ(C)
(J6) SLO	Serial Data Output iC-NQ(C)
(J6) SLI	Serial Data Input iC-NQ(C)

TERMINAL DESCRIPTION

PZERO	Input Zero Signal +
NZERO	Input Zero Signal -
PSIN	Input Sine +
NSIN	Input Sine -
PCOS	Input Cosine +
NCOS	Input Cosine -
D3	Power-On LED (green)
D4	Error LED (red)
(J9) SDA	I ² C Data / Test Signal SIN+ of iC-NQ(C)
(J9) SCL	I ² C Clock / Test Signal SIN- of iC-NQ(C)
(J9) NER	Error Input/Output of iC-NQ(C)
(J9) VDD	IC Supply (digital)
(J9) GND	IC Ground (digital)

Notes: *) When connecting an external supply voltage jumpers JP3 and JP4 must be removed.

RELATED DOCUMENTS

- iC-NQ Data Sheet -Specification-
- iC-NQ GUI -Evaluation Software for Windows PCs-
- <http://www.ichaus.de/iC-NQ>
- iC-NQC Data Sheet -Specification-
- iC-NQC GUI -Evaluation Software for Windows PCs-
- <http://www.ichaus.de/iC-NQC>
- iC-MB3 iCSY MB3U - PC-USB ADAPTER -
- <http://www.ichaus.de/MB3U>
- iC-MB4 iCSY MB4U - PC-USB ADAPTER -
- <http://www.ichaus.de/MB4U>

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ASSEMBLY PART LIST

Device	Value (typical)	Comment
Board	NQ6D	
R1	0 Ω	
R3, R8	562 Ω	
R4, R5	120 Ω	
C1	330 nF	
C2-C4, C6, C7	100 nF	
C5	1 μ F	
D1, D2	BYS10-45	
D3	SMD LED green	
D4	SMD LED red	
U1	iC-NQC or iC-NQ	
U2, U3	65LBC179	
U4	7805	
U5	24C08B	
S1-S6	MK0112G	
S7, S8	MK013G	
J1	D-Sub 9-pole, male	
J4	D-Sub 9-pole, female	
J5	AKL059-02	
J9	Pin bar 5-pole, single-in-line	
JP1-JP4	Pin bar 2-pole, single-in-line	
IFA-R2, IFA-R3 IFB-R2, IFB-R3 IFZ-R2, IFZ-R3	1 k Ω	serial resistors for input protection (assembled when shipped)
IFV-C2	47 nF	assembled
IFV-R1	0 Ω	assembled

JUMPER AND PLUG DESCRIPTION

J1: BiSS Interface Output

9-pin Sub D Connector - male

PIN	Name	Function
1	VB	+12 V supply voltage
2	MAO +	Clock output
3	MAO -	Clock output (inverted)
4	VDD	+5 V supply voltage
5	SLO -	Data output (inverted)
6	GND	0 V ground
7	SL +	Data line
8	SL -	Data line (inverted)
9	SLO +	Data output

J4: BiSS Interface Input

9-pin Sub D Connector - female

PIN	Name	Function
1	VB	+12 V supply voltage
2	MA +	Clock input
3	MA -	Clock input (inverted)
4	VDD	+5 V supply voltage
5	SLI -	Data input (inverted)
6	GND	0 V ground
7	SL +	Data line
8	SL -	Data line (inverted)
9	SLI +	Data input

Voltage Supply - Adapter MB3U

Voltage Supply		Component Supply	Jumper Configuration	
via board terminals ¹	via J4 plug ²	iC-NQ(C)	JP3 (VDD) +5 V via J4	JP4 (VB) +12 V via J4
-	X	via J4 (VDD)	bridged	open
-	X	via J4 (VB)	open	bridged
X	X	via board terminals	open	open
X	X	shortens VB terminal to J4	bridged	don't care
X	X	shortens VB terminal to J4	don't care	bridged

Voltage Supply - Adapter MB3A

Voltage Supply		Component Supply	Jumper Configuration	
via board terminals ¹	via J4 plug ³	iC-NQ(C) MB3A	JP3 (VDD)	JP4 (VB)
-	none	no voltage supply	don't care	don't care
X	none	via board terminals	bridged	don't care

Communication Chain	Board 1		Board 2		Comments
	Jumper configuration JP1	Jumper configuration JP2	Jumper configuration JP1	Jumper configuration JP2	
Single-Board connection	bridged	bridged	N/A	N/A	shipment setup
Board-to-Board connection.	open	open	bridged	bridged	Adapter → Board 1 (J1) Board 1 (J2) → Board 2 (J1)

Notes ¹⁾ Supply of +8 V to +15 V required to board terminals VB and GND

²⁾ Supply voltage sourced from J4 plug out of PC adapter

³⁾ MB3A needs to be externally supplied via the NQ6D evaluation board

EVALUATION SOFTWARE

iC-NQ(C) software for PCs running on Windows operating systems as well as the required USB and/or LPT 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-NQ:

iC-NQC:

without RTE (small size)

http://www.ichaus.de/NQ_gui

http://www.ichaus.de/NQC_gui

including RTE (big size)

http://www.ichaus.de/NQ_gui_rte

http://www.ichaus.de/NQC_gui_rte

Features

- Reducing evaluation and design-in time and cost
- Manually setting up parameters of iC-NQ(C)
- Saving parameter configuration into EEPROM
- Saving parameter configuration to HEX files
- Loading predefined configurations from HEX files
- Reading and displaying of sensor data

Installation

After unzipping the iC-NQ(C) software package NQ(C)1SO_gui_xx resp. NQ(C)1SO_gui_xxrte, the following files are located in the selected working directory.

xx is a placeholder for revisions

- Subfolder NQ(C)1SO_gui_xx including the executable setup.exe which starts the installation routine.
- Driver packages for USB, LPT and/or other adapter devices.
- Evaluation board description.

Note: Administrator rights are required to run installations.

1. To access the iC-NQ(C) evaluation board, interface adapter drivers for USB, LPT and/or other adapter devices need to be installed. Before connecting the adapter to your PC the driver installation must be completed successfully.

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

1.1 When using an iC-Haus USB adapter, it must be connected to the PC after the driver installation, to complete the whole driver installation procedure.

2. Install the evaluation software NQ(C)1SO by executing the setup.exe located in the subfolder NQ(C)1SO_gui_xx.

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

3. After installation the executable NQ(C)1SO_gui_xx.exe will be available in the selected working directory. Figures 5 and 6 show a screenshot of the evaluation software.

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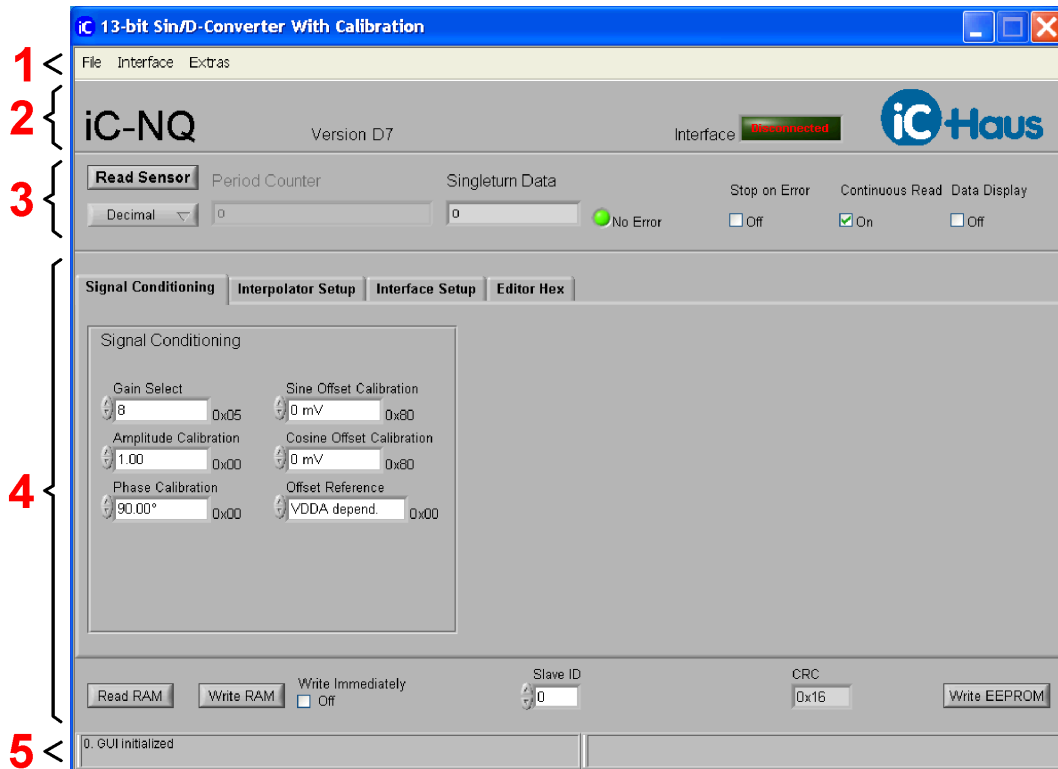


Figure 5: Evaluation software start-up window iC-NQ

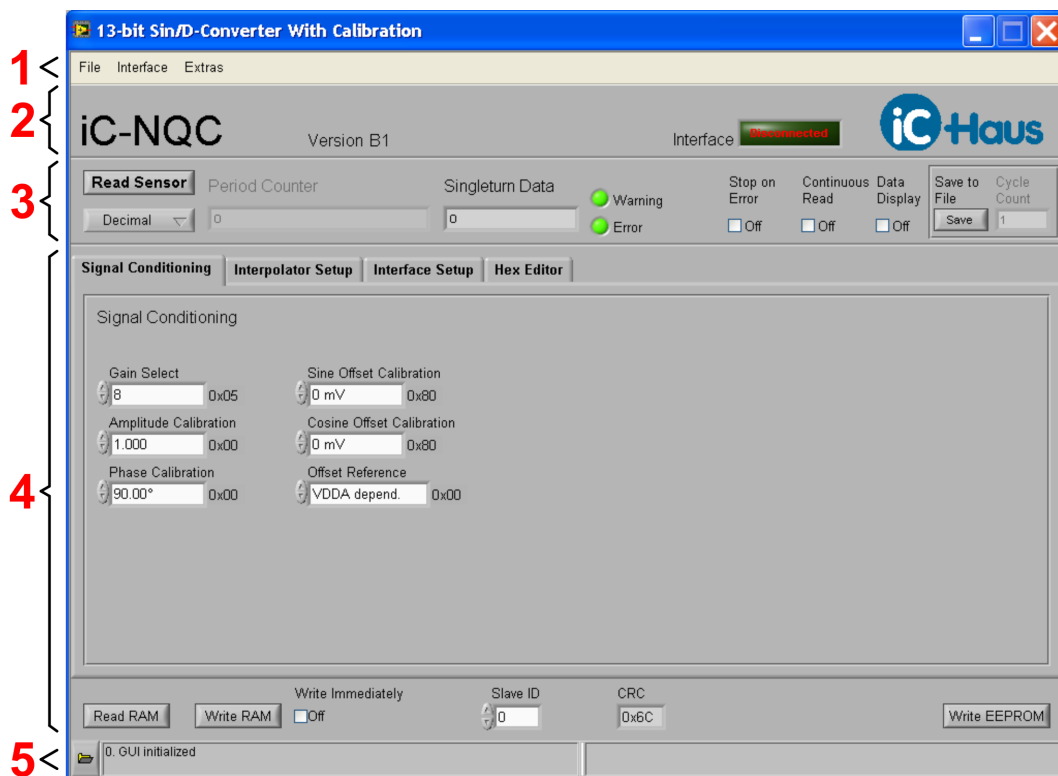


Figure 6: Evaluation software start-up window iC-NQC

Function Description

The iC-NQ(C) evaluation software starts in *No Hardware* mode (Interface disconnected). For a detailed description of the parameter settings please refer to iC-NQ(C)'s data sheet. When moving the mouse cursor to a parameter input box, a tooltip is displayed identifying the corresponding parameter name as described in the specification.

The software is divided into five sections.

- Menu
- Header
- Sensor
- Parameter
- Status

1 Menu Section

	Button	Description
<File>	Save File	Saves the configuration to a file, Intel HEX file format (*.hex).
	Load File	Loads the configuration to the IC, Intel HEX file format (*.hex).
	Save BiSS Master Config	Saves a *.cfg file with the current BiSS master configuration (for iC-MB3 only)
	Exit	Quits the software.
<Interface>	BiSS Setup	Opens a window for BiSS master clock configuration.
	Connect & Read	Checked: connects the PC adapter and reads the IC registers. Unchecked: connects the PC adapter without reading the IC registers.
	No Hardware	Switches to <i>No Hardware</i> mode to reset the communication between the PC and the adapter.
	iC-Interface ↔ LPT (MB3A)	for use with PC-LPT adapter MB3A ...
	iC-Interface ↔ USB (MB3U)	for use with PC-USB adapter MB3U resp. MB3U-I2C ...
	iC-Interface ↔ USB (MB4U)	for use with PC-USB adapter MB4U (supported by iC-NQC GUI only)enables communication between the PC and the iC-NQ(C) and reads all parameters from the iC to the evaluation software.
<Extras>	About	Additional software information.

2 Header Section

Project title, software version and connection state.

3 Sensor Section

Reading and displaying of sensor data.

	Button	Description
<Sensor>	Read Sensor	Reads one data frame from iC-NQ(C).
	Output	Displays sensor data in decimal, HEX or binary format.
	Stop on Error	Stops reading sensor data if an error occurs.
	Continuous Read	Continuously reads data frames.
	Data Display	Enables a window to visualize sensor data.
	Save to File	This function works in different ways, depending on the adapter used. MB3U: Saves to file while reading sensor data. MB4U: Reads the amount of cycles defined by Cycle Count and writes the array of data to the file afterwards. While reading the amount of cycles the software is not responding to user interaction. Only available when using adapter MB4U. Defines the amount of BiSS Frames (cycles) to read.
	Cycle Count	

4 Parameter Section

Reading and writing Parameter configuration.

	Button	Description
<Tabs>	Signal Conditioning	see iC-NQ(C) datasheet
	Interpolator Setup	see iC-NQ(C) datasheet
	Interface Setup	see iC-NQ(C) 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.
	<i>iC-NQC only</i>	The HEX Editor is divided into several tabs displaying the banks of the iC-NQC. By choosing a larger EEPROM type this HEX Editor will expand and more banks will be available.
<Parameter>	Read RAM	Reads all parameters from the iC-NQ(C) to the evaluation software.
	Write RAM	Writes all parameters from the software to the iC-NQ(C) RAM.
	Write Immediately	Writes changes to parameters immediately. Disable this to use the software without hardware.
	Write EEPROM	Writes all parameters and the BiSS ID to the EEPROM

(For parameter settings, please refer to iC-NQ(C) data sheet for a detailed description.)

5 Status Section

Displaying feedback of user interaction.

REVISION HISTORY

Rev	Notes	Pages affected
A1	Initial version	
A2	Chapter Evaluation Software revised	5-8
A3	Chapter Evaluation Software revised; Adapter MB4U added	1, 6-9

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