

Manual BrainCube Connect with Modbus Master





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1 Modification service







2 Installation of Modbus Master Software

- Please download and install the Modbus monitoring program Modbus Master from <u>https://kent.dl.sourceforge.net/project/qmodmaster/qModMaster-Win32-exe-0.4.8.zip</u>
- Modbus Master is an open source program and supports RTU and TCP communications

3 System requirements

- For Modbus RTU you will need a RS485 to USB adapter. A solution from FTDI is recommended.
- For Modbus TCP a ethernet connection has to be established between the computer and the network having BrainCube2 communication.

4 Modbus Master operation

4.1 Modbus Master interfae overview

- With default settings the program shows the following screen:



- Line 1 shows the Modbus Mode. RTU or TCP is applicable. The Slave Addr is used to set the BrainCube's Modbus address. The Scan Rate specifies the interval how often the data should be polled.
- Line 2 shows the Function Code and the format of the values in the communication area below.

Function Code 03: Read Holding Registers and 06: Write Single Register are advised.

- Line 3 shows the start address of the first register and the number of register to be read





4.2 Additional watch windows

To Monitor and log the communication you can enable a bus monitor and a log file.

	Modbus Master
	File Options Commands View Language Help
	🚳 🕛 😒 🖳 🔍 🤍 🖸 🌜
	Modbus Mode RTU 👻 Slave Addr 1 🚔 Scan Rate (ms) 1000 🚔
Log	Function Code Read Coils (0x01) Format Decimal
Monitor	Start Address 0 🗣 Number of Coils 1 🜩
	-/-
	RTU : COM4: 19200,8,1,Even Packets : 0 Errors : 0

5 ModBus RTU Setup

5.1 Parameter settings in BrainCube2

The RS485 communication has to be enabled at Parameter/Interface-Communication/RS485 ⇔ BMS ⇔ TecBoxes

- Activate RS485 (marked)
- RS485 protocol has to be Modbus RTU
 In this screen you can also set BrainCube's address and baud rate.
- At BrainCube the implemented protocol uses 8bit with even parity and one stop bit (8E1)

5.2 4.2 Modbus Master communication settings: READ

Select RTU for Modbus Mode and type the BrainCube's RS485 address in the Slave Addr field. To get the address please have a look in the menu at

Parameter/Interface-Communication/RS485 ⇔ BMS ⇔ TecBoxes

Set 03: Read Holding Registers in the drop down bar as function code.

BrainCube's register addresses start from 0200h or in decimal 512.

Please set 512 to the start address field.

The number of registers should be set to a value equal or less than the allowed maximum. The screenshot below shows example settings.





Version: 1711

a N	lodbus	Maste	er		7	-						
File	Opti	ons	Com	mands	Vie	w L	angua	ige	Help			
	••••• ••••	5	*	Ċ	,	Þ) 4		2	2 🚺 🔘		
M	Modbus Mode RTU Slave Addr 32 Scan Rate (ms) 1000											
F	Function Code Read Holding Registers (0x03) ▼ Format Decimal ▼											
s	Start Address 512 Number of Registers 23											
x	x	-	-	-	-	-	-	-	-			
-	-	-	-	-	-	-	-	-	-			
-	-	-	-	-	x	x	x	x	x			
			10000									
	(IU:C	OM4:	19200	1,8,1,Ev	en	Packe	ets:0			Errors: 0		

5.3 Modbus Master connection settings: RTU

To setup a connection please press on the top menu bar options > Modbus RTU -

🥑 Modbus RTU Set	ttings ? X
Serial port	COM4: -
Baud	19200 💌
Data Bits	8 🔻
Stop Bits	1 •
Parity	Even 🔻
RTS	Disable 🔻
ОК	Cancel

- Please select the COM-Port at which your RS485 to USB adapter is mounted. -
- At BrainCube the implemented protocol uses 8bit with even parity and one stop bit (8E1) -
- Baud rate is by default 19200 baud. This can be adjusted in BrainCube's parameter menu. -
- There is no hardware flow control available. _
- Press the Connect button to enable the communication. _





Version: 1711

Image: Start Address 512 Image: Start Address 513 Image: Start Address 514 Image: Start Address 515 Image: Start Address 512 Image: Start Address 1mage:	Image: Start Address Image:	File	Optio	ns (Comm	ands	Vie	w L	angua	ige	Help						
Modbus Mode RTU Slave Addr 32 Scan Rate (ms) 1000 Function Code Read Holding Registers (0x03) Format Decimal Start Address 512 Number of Registers 23 X X - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -	Modbus Mode RTU Slave Addr 32 Scan Rate (ms) 1000 Function Code Read Holding Registers (0x03) Format Decimal Start Address 512 Number of Registers 23 X X	1		14	*	Ç	9	ŀ) 4			1 🖸	1	0			
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Start Address 512 Number of Registers 23 x x -	Start Address 512 Number of Registers 23 x x -	Fun	ction C	ode F	Read H	olding	Regist	ters (0	x03)	•		Form	at De	cimal	•	 	
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		-	-	-	-	-	x	x	x	x	x						

- Press the Scan button to start reading cyclic with the specified scan rate.

Mor	dbus M	ode (RTU	Sla	ve Add	r 32	÷ S	can Ra	ite (ms) 1000 🗼	
Fur	nction C	Code	Read	Holding	g Regis	ters (0:	x03)	-		Format Decimal 🔻	
Start Address 512 Number of Registers 23											
x	x	2	0	0	4	298	103	0	32		
0	230	40	0	0	260	310	340	0	1		
	0	0	0	0	x	x	x	x	x		

Some register values are bit masked values. It might be useful to change the format to hexadecimal values.





6 Modbus TCP Setup

6.1 Parameter settings in BrainCube2

The RS485 communication has to be enabled at Parameter/Interface-Communication/RS485 ⇔ BMS ⇔ TecBoxes

- Activate RS485 marked
- RS485 protocol has to be Modbus RTU
- At BrainCube the implemented protocol uses 8bit with even parity and one stop bit (8E1)
- At Parameter/Interface-Communication/Ethernet \Leftrightarrow Server you have to decide if DHCP is available or if a static IP has to be assigned. If DHCP times out the device falls back to AutoIP.
- At Parameter/Interface-Communication/Ethernet Modbus TCP ⇔ GLT the TCP port is 502 by default

6.2 Modbus Master communication settings: READ

Select TCP for Modbus Mode and type the BrainCube´s RS485 address in the Unit ID field. To get the address please have a look in the menu at Parameter/Interface-Communication/RS485 ⇔ BMS ⇔ TecBoxes Set 03: Read Holding Registersin the drop down bar as function code. BrainCube´s register addresses start from 0200h or in decimal 512. Please set 512 to the start address field.

The number of registers should be set to a value equal or less than the allowed maximum. The screenshot below shows example settings.

Modbus Master											
File Options Commands View Language Help											
🚜 🖾 🏷 C 📄 🗉 🕸 🖬 🔕											
Modbus Mode TCP VINIT ID 32 Scan Rate (ms) 1000											
Function Code Read Holding Registers (0x03) ▼ Format Decimal ▼											
Start Address 512 Number of Registers 23											
x x											
x x x x x											
TCP: 169.254.007.002:502 Packets: 0 Errors: 0											





6.3 Modbus Master connection settings: TCP

- To setup a connection please press on the top menu bar options > Modbus TCP

🔝 Modbu	Is TCP Settings
Slave IP	169.254.007.002
TCP Port	502
	OK Cancel

- Please enter BrainCube's IP address in the Slave IP field.
- Press the Connect button to enable the communication.
- In this case AutoIP is used with DHCP off

	odbus N	1ode T		Unit ID	32 🖨	Scar	/ ≒	(ms) 1	.000	•	
F	unction	Code [F	Read Hol	ding Regis	sters (0	x03)	•		Format D	ecimal 🔻]
s	itart Ad	dress 5	512					umber o	f Registers 2	3 🌲	
x	x	-			-	-	-	-			
-	-	-		-	-	-	-	-			
-	-	-		×	x	x	x	x			





- Press the Scan button to start reading cyclic with the specified scan rate.

	Moo	dbus l	Maste	er								
	File	Optio	ns	Comn	nands	Vie	w L	angua	ige	Help		
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	Mod	bus Mo	ode 🛛	TCP 🔻	Unit	ID 3	2 *	Scan	Rate	(ms) 1	1000	
	Function Code Read Holding Registers (0x03) Tormat Decimal											
	Start Address 512 Number of Registers 23											
	x	x	2	0	0	4	334	103	0	32		
	0	230	40	0	0	260	310	340	0	1		
	300	0	0	0	0	x	x	x	x	x		
	тс	P:169).254.(007.00	2:502		Packe	ts : 14	ł		Errors : 0	

Some register values are bit masked values. It might be useful to change the format to hexadecimal values.





6.4 *Modbus TCP Write*

The following example describes how to set the operation mode to auto by writing a 1 to Register 43.

- Set the function code to Write Single Register 0x06
- Set the Start Address to 1067
- Set the value to 1

📑 Modbus Master	
File Options Commands View Language Help	
📝 📰 😳 🏷 C 📄 🗉 🦈 🖳 🗹 🚳	
Modbus Mode TCP 👻 Unit ID 11 🚔 Scan Rate (ms) 1000 荣	
Function Code Write Single Register (0x06) Format Decimal	
Start Address 1067 👻 Number of Registers 1 🚊	
TCP : 169.254.007.002:502 Packets : 1 Errors : 0	

