

Fieldbus Independent I/O Modules

Bluetooth[®] RF Transceiver 750-644



Quick Start

Version 1.0.1



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Every conceivable measure has been taken to ensure the correctness and completeness of this documentation. However, as errors can never be fully excluded, we would appreciate any information or ideas at any time.

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We wish to point out that the software and hardware terms as well as the trademarks of companies used and/or mentioned in the present manual are generally trademark or patent protected.



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1 Important Comments

To ensure fast installation and start-up of the units described in this manual, we strongly recommend that the following information and explanations are read carefully and followed.

1.1 Legal Principles

1.1.1 Copyright

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1.1.2 Personnel Qualification

The use of the product detailed in this manual is exclusively geared to specialists having qualifications in PLC programming, electrical specialists or persons instructed by electrical specialists who are also familiar with the valid standards. WAGO Kontakttechnik GmbH & Co. KG declines all liability resulting from improper action and damage to WAGO products and third party products due to non-observance of the information contained in this manual.

1.1.3 Intended Use

For each individual application, the components supplied are to work with a dedicated hardware and software configuration. Modifications are only permitted within the framework of the possibilities documented in the manuals. All other changes to the hardware and/or software and the non-conforming use of the components entail the exclusion of liability on part of WAGO Kontakttechnik GmbH & Co. KG.

Please direct any requirements pertaining to a modified and/or new hardware or software configuration directly to WAGO Kontakttechnik GmbH & Co. KG.



1.2 Symbols



Danger Always abide by this information to protect persons from injury.

Warning

Always abide by this information to prevent damage to the device.



Attention

Marginal conditions must always be observed to ensure smooth operation.



ESD (Electrostatic Discharge) Warning of damage to the components by electrostatic discharge. Observe precautionary measures for handling components at risk.



Note

Routines or advice for efficient use of the device and software optimization.

Additional Information

References for additional literature, manuals, data sheets and web pages.

1.3 Number Notation

Number Code	Example	Note		
Decimal	100	normal notation		
Hexadecimal	0x64	C notation		
Binary	'100' '0110.0100'	within inverted commas, nibble separated with dots		



1.4 Safety Notes



Warning

Switch-off the system prior to working on bus modules!

In the event of deformed contacts, the module in question is to be replaced, as its functionality can no longer be ensured on a long-term basis.

The components are not resistant against materials having seeping and insulating properties. Members of this group include: aerosols, silicones, triglycerides (found in some hand creams).

If it cannot determined that these materials appear in the component environment, then additional measures must be taken:

- install of the components in an appropriate enclosure

- handle components only with clean tools and materials.



Attention

Soiled contacts may only be cleaned with ethyl alcohol and leather cloths. This helps ensure compliance with ESD information.

Do not use any contact spray. The spray may impair the functioning of the contact area.

The WAGO-I/O-SYSTEM 750 and its components are an open system. As such, the system and its components must be installed in appropriate housings, cabinets, enclosures or in electrical operation rooms. Access must only be provided via key or tool to authorized, qualified personnel.

The relevant valid and applicable standards and guidelines concerning the installation of switch boxes are to be observed.



ESD (Electrostatic Discharge)

The modules are equipped with electronic components that may be destroyed by electrostatic discharge. When handling the modules, ensure that the environment (persons, workplace and packing) is well grounded. Avoid touching conductive components; e.g., gold contacts.

1.5 Scope

These quick start instructions describe the first steps for configuring two *Bluetooth*[®] RF Transceivers 750-644. The contents of the instructions are only valid in connection with the manual "*Bluetooth*[®] RF Transceiver 750-644" and the manual for the software WAGO-I/O-CHECK.

You will find these documents on the CD "AUTOMATION Tools & Docs" (item no.: 0888-0412) and online at <u>http://www.wago.com</u>.



2 Quick Start

These quick start instructions explain, by means of an example, how to startup and configure the *Bluetooth*[®] RF-Transceiver 750-644 (*Bluetooth*[®] module) via WAGO-I/O-CHECK.

The instructions demonstrate how to start the module up with minimal configuration, and therefore do not describe the entire range of functions. The objective of these instructions is to configure a simple peer-to-peer communication between two *Bluetooth*[®] modules. One module will function as a master, the other as a slave.

2.1 Network Structure

- 1. Construct two identical bus nodes as shown in Figure 1.
- 750-841 Ethernet Controller
- 750-644 *Bluetooth*[®] RF Transceiver
- 750-600 End Module
- 2. Connect one of the controllers to a free serial port of your PC using a WAGO communication cable (750-920).
- 3. Connect the second controller in the same manner to another PC serial port.



Attention

Do not form a fieldbus connection (e.g., by using an ETHERNET cable); otherwise, access to the process data within WAGO-I/O-CHECK is not possible.

- 4. Connect both nodes on the system and field sides with a 24-volt power supply.
- 5. Switch the power supply on.



Additional information

Each serial PC port is operated by its own WAGO-I/O-CHECK software. Depending on port availability, use one or two PCs for configuring the modules.

If you are using one PC with two ports, the WAGO-I/O-CHECK software can be started several times. You can select the proper COM ports using the "F8" key on your keyboard. If using only one port or one WAGO-I/O-CHECK, the configuration of master and slaves is rather time-consuming.





Figure 1: Hardware configuration

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2.2 Starting up the *Bluetooth*[®] Modules

- 1. Determine which *Bluetooth*[®] module will function as the master and which module will function as the slave.
- 2. Write down the MAC address of the slave: 0 0 : 0 6 : C 6 : ... : ...Write down the MAC address of the master: 0 0 : 0 6 : C 6 : ... : ... : ...

2.2.1 Configuration of the *Bluetooth*[®] Slave Using "Net Forming"

- 1. Start the WAGO-I/O-CHECK software (Version 3 or later).
- 2. Click on the [Identify] button.

Your node configuration is graphically displayed (see Figure 2).



Figure 2: Identify your node configuration

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3. Click with the right mouse button on the *Bluetooth*[®] module that you would like to configure as a slave.



4. In the module's context menu, choose **Settings.** This opens the *Bluetooth*[®]-specific parameterization dialog of the module (see Figure 3).

Pos. 4: Settings for 0750-0644 X 0750-0644, Bluetooth® RF-Transceiver Version 00.00.01(01) / 2008-05-21								
Image: Close Image: Discussion	<u>s</u>	ave <u>R</u> ead	Mite Default	Restart Flash III IIII IIII IIII IIII IIIII IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII				
Settings	Se	ttings						
Net Forming		Description	Input	Comment				
		MAC Address	00:06:C6:12:00:22	MAC address of the local device				
PI Mapping		Device Role	Slave	Role of local device (Bluetooth® master or slave)				
Block Transfer		Class of Device	WAGO-I/O-System 750	WAGO Class-of-Device				
		CoD Subclass	Bluetooth® RF-Transceiver	WAGO Class-of-Device Subclass				
		Encryption	On	Activate or deactivate encryption				
Device Role		Authorization	Password	Set type of authorization for connection establishment				
Slave		Name	WAGO-750-	Name of local module (Bluetooth® device name)				
·)		Password	0000	Password of local module				
Uperation Mode		Reconnect Time	30	Minimal reconnection time period				
		IP Address	192.168.0.2	The local TCP/IP address				
Configuration		IP Subclass	255.255.255.0	The local TCP/IP subnet mask				
((ç)) LocalUpTime			0 Tg., 0 Std., 17 Min.	Time of operation since last reboot				
Communication (Ad boc)		Version Bootloader	03.01.18	Version number of bootloader				
(contraction (Ed 100)		Version Firmware	01.05.91	Version number of host controller firmware				
((°))	Version Configuration 01.01.02 Version number of configuration							
Communication (Realtime)		Baseband Controller	03.F4.0B	HCI-Version of baseband controller				
The parameters were successfully read from I/O module! Units Duration: 14 sec								

Figure 3: *Bluetooth*[®]-specific parameter area





Attention

For the following, the *Bluetooth*[®] module's must remain intact; i.e., no configuration attempts have been attempted. If this is not the case, click on the **[Default]** button to restore the module to factory default settings.

- 5. Click on [Data Frame] in the toolbar.
- 6. Enter (if not already set) a process image size of 48 bytes and a mailbox size of 12 bytes (see Figure 4).

Data Frame			×
Bluetooth® RF-1	ransceiver: I	Data Frame	
Process Image Size:	48 Bytes 💌	Apply	
Mailbox Size:	12 Bytes 💌	Default	
		Close	

Figure 4: Data structure

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7. Click on the **[Read]** button in the toolbar to update the view of the configuration in the module.



- 8. Choose Net Forming in the navigation bar.
- 9. Choose the option All in the area Search for accessible devices and click on the [Search] button to search the network for *Bluetooth*[®] devices in the environment. To limit the search results to WAGO devices of the 750 series, choose WAGO 750.

The MAC addresses of all found *Bluetooth*[®] devices are displayed in the list of devices within range (see Figure 5).

The MAC address of the slave itself is not displayed in this dialog.

Pos. 4: Settings for 0750-0644	1								x
0750-0644, Bluetooth® RF-Transceiver Version 00.00.01(01) / 2008-05-21									
Image: stateImage: stateCloseOpen] Save	∎ <u>R</u> ead	▶ <u>W</u> rite	<mark>≸</mark> ≣ <u>D</u> efault		R <u>e</u> sta	rt F <u>l</u> ash	Data <u>F</u> rame	⑦ Help
Settings	Net Formin	g							
Not Forming		Access	sible Devices				Rea	ltime Devices	
	ID MAC A	Address	Device Name			Slot	MAC Address	UserFriendlyName	Bind
PI Mapping	01 00:06:	C6:12:00:21				01	00:06:C6:12:00:21		No
Block Transfer	02 00:12:	47:2B:9A:B6				02	00:00:00:00:00:00		No
	03 00:00:	00:00:00:00			>>	03	00:00:00:00:00:00		No
	04 00:00:	00:00:00:00				04	00:00:00:00:00:00		No
	06 00:00:	00:00:00:00				05	00:00:00:00:00:00		No
Device Role	07 00:00:	00:00:00:00				06	00:00:00:00:00:00		No
Master	08 00:00:	00:00:00:00				07	00:00:00:00:00:00		No
)	09 00:00:	00:00:00:00			AdharDavia			has Devices	
Operation Mode	10 00:00:	00:00:00:00				0	Au	Hou Devices	
	11 00:00:	00:00:00:00				Slot	MAC Address	UserFriendiyName	Bina
Configuration	12 00:00:	00:00:00:00				08	00:00:00:00:00:00:00		No
(10)	14 00:00:	00.00.00.00				09	00:00:00:00:00:00		No
((0))	15 00:00:	00:00:00:00			<<	10	00:00:00:00:00:00		No
Communication (Ad hoc)	16 00:00:	00:00:00:00				11	00:00:00:00:00:00		No
((ဋ))		- Search for a	accessible devices —			12	00:00:00:00:00:00		No
Communication (Real <u>t</u> ime)	Search	• All	O WAGO 750	Other		13	00:00:00:00:00:00		No
Inquiry finished. Devices found: 2. Units [GetRemoteDeviceName [1]: DENIED									

Figure 5: Net forming

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10. Search in the list for the MAC address of the master that you wrote down in 2.2 so that you can then connect this master to your slave.



Note

At this point, the master must be in the configuration mode (factory setting).

- 11. Mark the found MAC address of the master with a mouse click.
- 12. Click on the [>>] button to transfer the marked MAC address to the list of real-time devices (or, alternatively, ad hoc devices) for this slave.

The MAC address of the master is entered in the first line (slot 1).



- 13. Give the device a name (UserFriendlyName); e.g., "MyMaster".
- 14. Mark the MAC address and choose the value "Yes" in the dropdown field **Bind** (see Figure 6).

Slot	MAC Address	UserFriendlyName	Bind	
01	00:06:C6:12:00:21	MyMaster	Yes	•
			No	
		-	Yes	

Figure 6: Bind device

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15. Click on the **[Write]** button in the toolbar to write the altered configuration in the module.

You have now allocated a master to the *Bluetooth*[®] slave (Slave \rightarrow Master).

- 16. Under navigation in the **Operation Mode** field, choose the real-time mode using the **[Communication (Realtime)]** button.
- 17. Proceed as in section 2.2.2 to create a link from the side of the master as well (Master \rightarrow Slave).



2.2.2 Configuration of the *Bluetooth[®]* Master Using "Net Forming"

- 1. Start the WAGO-I/O-CHECK software (Version 3 or later).
- 2. Click on the button [Identify].

Your node configuration is graphically displayed.

- 3. Click with the right mouse button on the *Bluetooth*[®] module that you would like to configure as a master.
- 4. Choose **Settings** in the context menu. This opens a new window for the configuration of the module.



Attention

For the following, the *Bluetooth*[®] module must remain intact; i.e., no configuration attempts have been attempted. If this is not the case, click on the **[De-fault]**, button to reset the module's configuration.

- 5. Click on [Data Frame] in the toolbar.
- 6. Enter (if not already set) a process image size of 48 bytes and a mailbox size of 12 bytes (see Figure 7).



Figure 7: Data structure

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- 7. Click on the **[Read]** button in the toolbar to update the view of the configuration in the module.
- 8. In the list on the right side, assign the role of master to the module by choosing "Master" under **Device Role**.
- 9. Choose the menu item Net Forming in the navigation bar.



The following section describes how to select the devices required to establish connection to the master. Devices that are visible for search requests can first be searched for in a similar way to slave's configuration (see Section 2.2.1, steps 9-12). They may then be stored using "Drag & Drop", for example, from the search results into the list of authorized devices (slots 1...13). However, for safety reasons, WAGO devices are hidden for search request in communication operating mode; they may also be entered like other hidden devices or inaccessible devices:

- 10. Enter the listed MAC address of the slave, which is already set in the communication operating mode, manually in the allocated field. The following steps assume that you are using slot 1.
- 11. Give the newly added device a name (UserFriendlyName); e.g., "Slave_01". This makes the overview easier for you.
- 12. Mark the slot with the entered MAC address and choose the value "Yes" in the dropdown field **Bind**.
- 13. Click on the **[Write]** button in the toolbar to write the altered configuration in the module.

Master and slave are now assigned to each other. The master is still in configuration mode.



2.2.3 Process Data Allocation

Start with point 3 while the *Bluetooth*[®] configuration window (see Figure 8) is still open.

- 1. Click with the right mouse button on the *Bluetooth*[®] module (master)
- 2. Choose **Settings** in the context menu. This opens a new window for the configuration of the module.
- 3. In the navigation, choose the menu item PI Mapping.

The process data allocation is loaded from the module and graphically displayed in WAGO-I/O-CHECK.

4. Move the ruler for the first slave to the right so that the first slave is assigned the maximum possible number of bytes in the master's process image (see Figure 8).



Figure 8: PI mapping

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- 5. Click on the **[Write]** button in the toolbar to write the altered configuration in the module.
- 6. Under navigation in the **Operation Mode** field, choose the real-time field using the **[Communication (Realtime)]** button.

The example configuration is completed.



2.3 Testing the Process Data Exchange

Proper configuration of the *Bluetooth*[®] device (see sections 2.2.1 through 2.2.3) is a prerequisite for successful testing of the process data exchange. The constant green blinking of LED 2 (top right of *Bluetooth*[®] master) indicates a *Bluetooth*[®] master and slave connection.

- 1. Close the *Bluetooth*[®] parameterization dialog.
- 2. Right click on master and slave, one after the other.
- 3. Choose Process data in the context menu.

The process data dialog opens so that you can view the raw data.

4. Click with the right mouse button on the word "Input" in the dialog of the master.

You have the choices **Input**, **Output** and **Reset**. From now on, you can switch between the displays for input and output data using this menu (see Figure 9).

Pos.5: 0750-0644

Pos.4: 0750-0644								×	
Bluetooth® RF-Transceiver (Input)									
Byte	e 7 6 5 4 3 2 1 0								
+0	00	00	00	00	00	00	00	40	
+8	00	00	00	00	00	00	00	00	
+16	00	00	00	00	00	00	00	00	
+24	00	00	00	00	00	00	00	00	
+32	00	00	00	00	00	00	00	00	
+40	00	00	00	00	00	00	00	00	

Figure 9: View of the process data

Bluetooth® RF-Transcei Input 7 6 5 4 3 Byte ~ Output 00 00 00 00 00 +0 <u>R</u>eset 00 00 00 00 00 +8 00 00 00 00 00 00 +16 00 00 00 00 00 00 00 00 00 00 +24 +32 00 00 00 00 00 00 00 00 00 00 00 00 00 00 +40 00 00

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×

- 5. Enter any data in the "Output" dialog: in the process image of slave and master beginning with offset + 2 (bytes 0 and 1 are reserved for status information)
- 6. Test whether the input data of the one *Bluetooth*[®] module lead to the correct output data of the second *Bluetooth*[®] module.







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