

Bedienungsanleitung  
Instruction Manual  
Mode d'emploi  
Gebruiksaanwijzing  
Manual de instrucciones  
Instruções de operação  
Istruzioni di funzionamento  
Инструкция по эксплуатации  
操作说明书



Processor	Memory
<b>600 MHz</b>	<b>128 MB RAM</b>
	<b>64 MB FLASH</b>

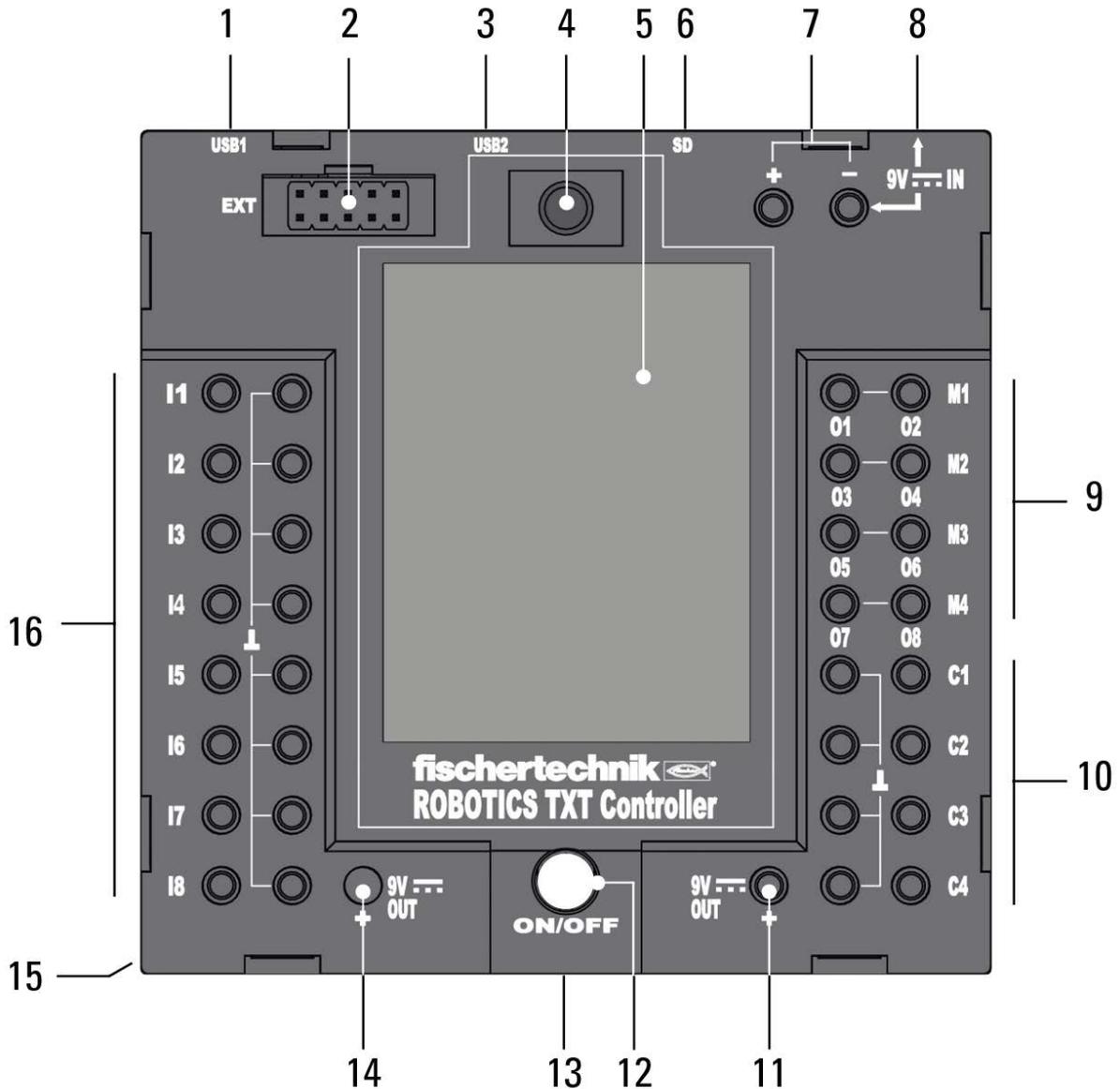


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**TXT Controller**

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## Overview of connections



- |   |                                   |
|---|-----------------------------------|
| 1. USB-A port (USB-1)                           | 9. Outputs M1 to M4 or O1 to O8   |
| 2. EXT connection for extensions                | 10. Inputs C1 to C4               |
| 3. Mini USB port (USB-2)                        | 11. 9 V OUT                       |
| 4. IR receiver diode                            | 12. ON/OFF switch                 |
| 5. Touch display                                | 13. Speaker                       |
| 6. Micro SD card slot                           | 14. 9 V OUT (positive terminal)   |
| 7. 9 V IN, rechargeable battery pack connection | 15. Coin cell battery compartment |
| 8. 9 V IN, DC socket                            | 16. Universal inputs I1 to I8     |

## Safety instructions

- Check the battery charger regularly for damage.
- If damage is found, do not use the battery charger until it is completely repaired.
- Do not insert wires into the electrical outlet.
- Do not attempt to charge non-rechargeable batteries.
- Remove the rechargeable batteries from the battery compartment before charging.
- Only charge rechargeable batteries under the supervision of an adult.
- Ensure the polarity is correct when inserting the batteries.
- Do not short-circuit the connecting terminals.
- Only operate the ROBOTICS TXT Controller with a fischertechnik power supply such as the rechargeable battery pack 35537.
- When connecting the rechargeable battery pack to the controller, pay special attention to the following:
  - Connect the positive terminal of the "9 V IN" connection to the positive terminal (+) of the rechargeable battery pack.
  - Connect the negative terminal of the "9 V IN" connection to the negative terminal (-) of the rechargeable battery pack.
- The maximum permissible operating temperature is 40 °C.
- Do not allow sharp or pointed objects to come in contact with the touch display. You risk damaging the equipment.

## Intended use

The controller is intended only to be used for the operation and control of fischertechnik models.

## The ROBOTICS TXT Controller

The compact ROBOTICS TXT Controller can be conveniently controlled with the color touch display. The combined Bluetooth/Wi-Fi wireless module provides the perfect, wireless interface for numerous applications. The numerous interfaces also include a USB host port for additional components such as the fischertechnik USB camera. With its powerful processor, Linux operating system and large RAM and flash memory capacity, the ROBOTICS TXT Controller is a high-performance control unit for all fischertechnik ROBOTICS models. The integrated micro SD card slot allows for expansion of the memory capacity.

With the fischertechnik grooves on five sides and the compact dimensions, the space-saving ROBOTICS TXT Controller can be installed in fischertechnik systems and models.

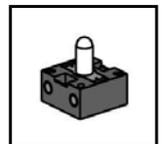
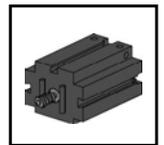
## Devices that are compatible with the ROBOTICS TXT Controller

The following devices can be connected or controlled. Additional devices can also be used to expand the capabilities of the controller.

### Actuators

(9 V, 250 mA)

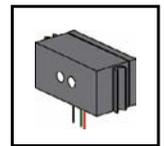
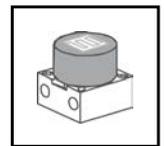
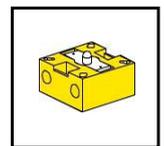
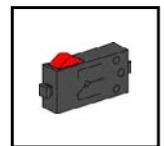
- Electric motors
- Bulbs
- Buzzers
- Electromagnets
- Solenoid valves (from the pneumatic construction sets)



### Sensors

(digital: 5 k $\Omega$ , 10 V; analog: 0 – 5 k $\Omega$ , 0 – 10 V)

- Pushbutton switch
- Magnetic sensors (reed contacts)
- Light sensors (phototransistors, photo resistors)
- Heat sensors (NTC resistors)
- Ultrasonic sensors (TX art. no. 133009 with three-wire connection version only)
- Color sensors
- Infrared sensors (trail sensors)
- Potentiometers
- Magnetic encoders



## TXT Controller

### ROBOTICS TXT Controller / Extensions

Two controllers can be connected via the 10-pin expansion plug (2). This plug is also used to connect I<sup>2</sup>C components and to extend number of inputs and outputs.

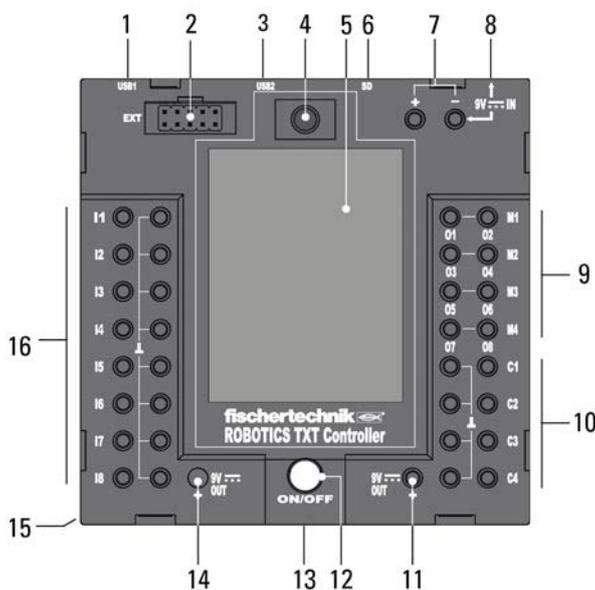
### fischertechnik USB camera

The camera can be connected to the USB host interface (USB-1) (1).

### Radio transmission

Bluetooth or Wi-Fi provides the ability to connect to other devices such as a PC, other ROBOTICS TXT Controllers and smartphones.

### Uses for the jack sockets, connector plugs and pushbutton switches



#### 1. USB-A port (USB-1):

USB 2.0 host connection for components such as the fischertechnik USB camera, art. no. 152522

#### 2. EXT connection for extensions

With this connection, an additional ROBOTICS TX Controller can be connected to extend the number of inputs and outputs. In addition, it includes a I<sup>2</sup>C interface and serves as a connection for future extension modules.

#### 3. Mini USB port (USB-2):

The USB 2.0 port (USB 1.1 compatible) is used to connect to the PC. The appropriate USB cable is included.

#### 4. IR receiver diode

The infrared receiver diode can receive signals from the fischertechnik Control Set transmitter. These signals can be read into the control program via special inputs and analyzed (e.g. using the ROBO Pro software). The transmitter joysticks also provide the ability to control the ROBOTICS models remotely.

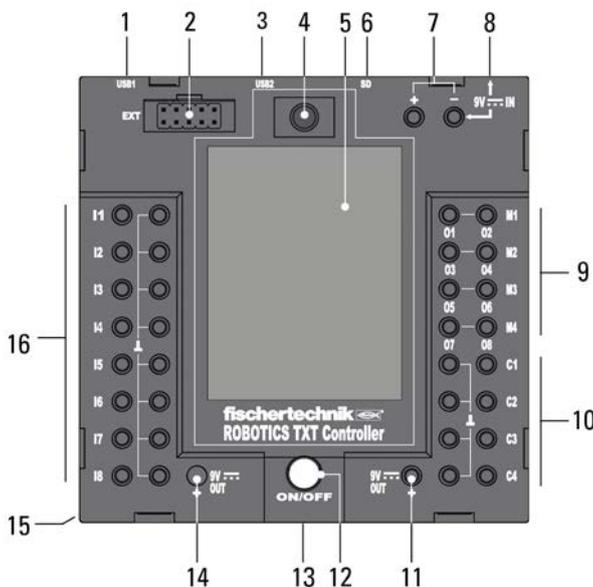


### 5. Touch display

The color touch display shows the status of the controller, which programs are loaded, and where you are in the menu. Functions and programs can be selected, activated and deactivated. When a program is running, you can view values of variables or values of analog sensors. A useful menu overview is shown under "Configuring the controller (menu overview)."

### 6. Micro SD card slot

A micro SD card (not included in the scope of delivery) can be inserted in this slot to provide additional storage space.



### 7. 9 V IN rechargeable battery pack connection

This connection allows mobile power supply through the fischertechnik rechargeable battery pack (not included in the scope of delivery) as an alternative to the power unit.

### 8. 9 V IN DC socket

(3.45 mm, center positive terminal)

This is where the power unit from the Power Set is connected (not included in the scope of delivery).

### 9. Outputs M1 to M4 or O1 to O8

Four motors can be connected to the outputs. Alternatively, you can connect eight lamps or electromagnets whose second terminal is connected to a ground connection ( $\perp$ ).

### 10. Inputs C1 to C4

Quick counter inputs record counts up to 1 kHz (1000 pulses per sec.), such as from fischertechnik encoder motors. Can also be used as digital inputs, for example, for pushbutton switches.

### 11. 9 V OUT

Supplies sensors such as color sensors, trail sensors, ultrasonic distance sensors and magnetic encoders with the required 9 V+ operating voltage.

### 12. ON/OFF switch

Switches the power supply to the controller on or off.

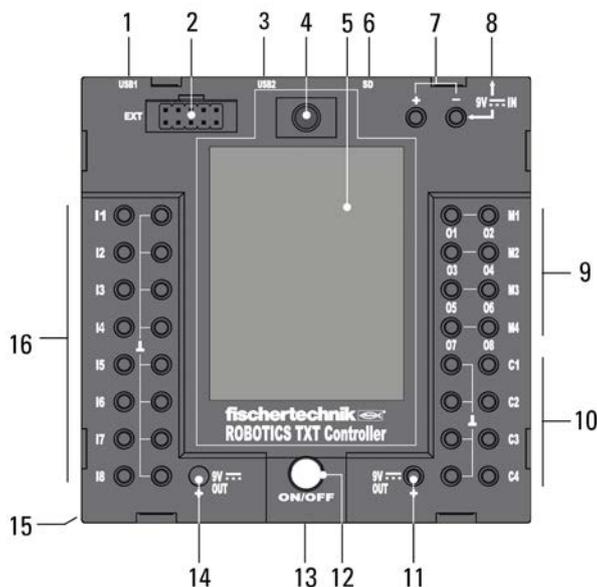
## TXT Controller

### 13. Speaker

The speaker plays back noises or sounds stored on the controller or memory card.

### 14. 9 V OUT

Supplies sensors such as color sensors, trail sensors, ultrasonic distance sensors and magnetic encoders with the required 9 V+ operating voltage.



### 15. Coin cell battery compartment

The controller contains a real-time clock that is powered by a CR 2032 coin cell battery. The controller can then output the measured data with the time. Should the battery die, you can open the battery compartment cover and replace the battery.

### 16. Universal inputs I1 to I8

These are the all-purpose signal inputs. They can be set with the ROBO Pro software for:

- Digital sensors (pushbutton switches, reed switch contacts, phototransistors) – digital 5 k $\Omega$
- Infrared trail sensors – digital 10 V
- Analog sensors, 0–5 k $\Omega$  (NTC resistors, photo resistors and potentiometers)
- Analog sensors, 0–10 V (color sensors) display of value in millivolts (mV)
- Ultrasonic distance sensors (only the TX version with three-wire connection, art. no. 133009)

## Software requirements

Software requirement for the ROBOTICS TXT Controller:

- ROBO Pro version 4.0 or higher

In the ROBO Pro software Help, the following, among other things, are described in detail:

- Installing the ROBO Pro software on the PC
- Installing the USB driver for the ROBOTICS TXT Controller for Windows operating systems

## Powering the Controller

There are two power options available:

- Connect the rechargeable battery pack to the "9 V IN" connections  
See number 7 under "Overview of connections"

This connection allows for a mobile power supply through the fischertechnik rechargeable battery pack (not included in the scope of delivery).

- Connect the power unit to the "9 V IN" DC socket  
See number 8 under "Overview of connections"

In this case, the power unit from the Power Set is connected (not included in the scope of delivery).

## Switching the Controller on and off

### Switching on

To switch on, press and hold the ON/OFF button (12) for approximately 1 second. See number 12 under "Overview of connections". Once activation is complete, you will first see a welcome screen and then the main menu.

When switching on for the first time, you will need to select the desired language using the touchscreen (the default setting is English):

## TXT Controller

To change the language:

1. Tap Settings | Language.
2. Tap the desired language.
3. Use the -button to return to the main menu.

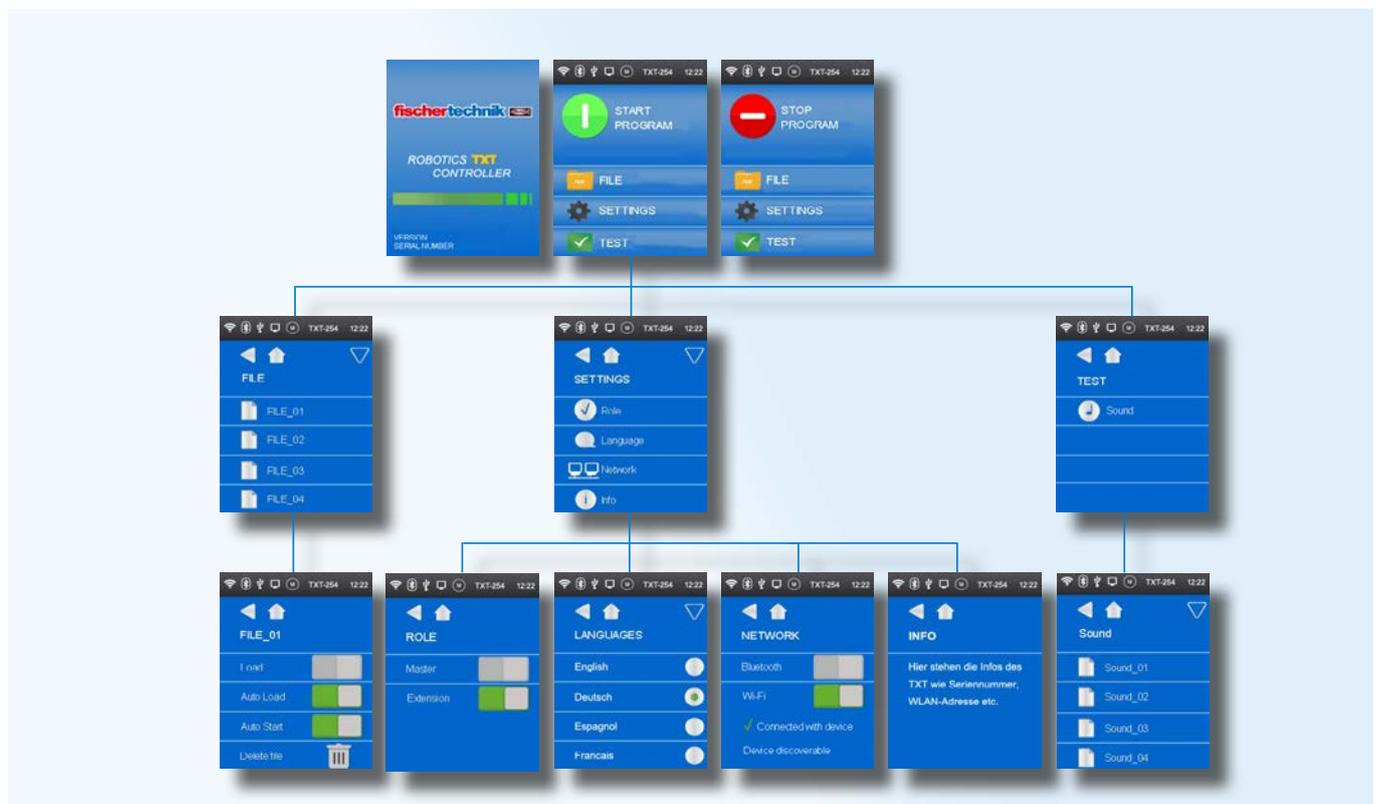
### Switching off

To switch off, press and hold the ON/OFF button (12) for approximately 3 seconds. After it has powered down, disconnect the power unit from the electrical outlet. See number 12 under "Overview of connections".

### Configuring the Controller

The following sections cover the controller menu and settings options in detail.

### Menu overview



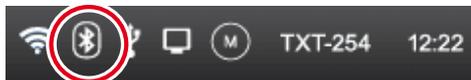
## Menu in detail

### Status bar

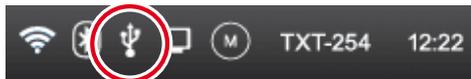
The status bar contains display icons. The first four icons indicate the status of data connections. If the icons are visible, a connection is present.



### Wi-Fi



### Bluetooth



### USB



### Online mode

When in online mode, the program runs on the PC and data is exchanged continuously between the PC and TXT Controller (see also ROBO Pro Help).



### Master or Extension

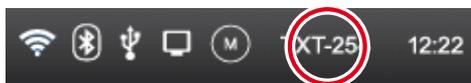
This icon indicates whether the controller is set as the Master\* or Extension\*. M = operating as master; E = operating as extension.

Settings can be changed in the Settings | Role menu.

\* Master: The controller, which is set as the master, receives control commands directly from the PC and passes these on to the extensions.

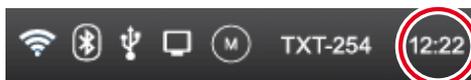
Extension: The controller, which is set as the extension, receives control commands only through the master.

## TXT Controller



### Serial number

This number is permanent and unique to each controller. If more than one controller is connected to a system, this number serves as the differentiating factor in the assignment of control signals.



### Time

Displays the currently set time. You can change this using the menu Settings | Time.

### Control elements

Touch the control elements to browse the menu.



Goes back one step in the menu.



Returns to the main menu.



Direction arrows used to scroll through the menu (only appear when the menu is required).

**Level 1:**

**Main menu**

- **Line 1: Start Program**

The selected program is started.

If no program is selected the green Start icon appears gray instead.

After starting the program, the icon changes to a Stop icon so you can stop the program.

- **Line 2: File**

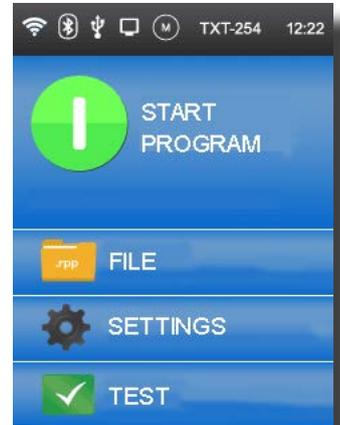
Leads to the File menu.

- **Line 3: Settings**

Leads to the Settings menu.

- **Line 4: Test**

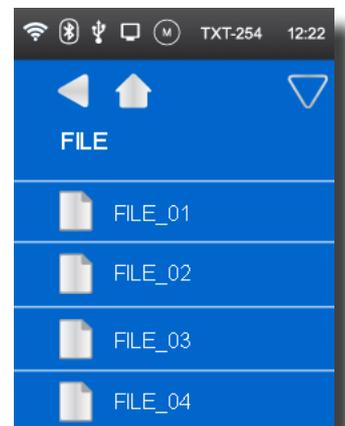
Leads to the Test menu.



**Level 2:**

**File selection**

If program files have been transferred by downloading them from the PC to the controller, then they are listed here. You can then select or delete them, or apply start functions to them (see Main Menu | File | File Name).



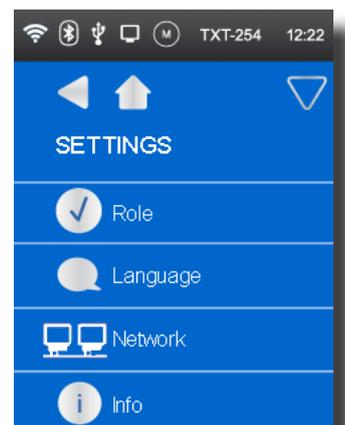
**Settings**

- **Line 1: Role**

Leads to the Role menu. This is where an assignment is made to set the controller function as Master\* or Extension\*.

- **Line 2: Language**

Leads to the Language Selection menu.



- **Line 3: Network**

Leads to the Network menu. Wireless connections can be enabled or disabled here.

In addition, this also shows the pairing code for Bluetooth and the network security key for Wi-Fi, both of which are needed for connecting up to the PC.

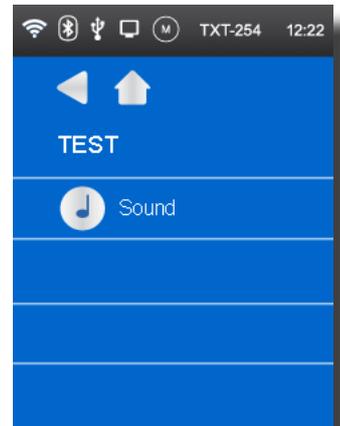
- **Line 4: Info**

Leads to the information screen with controller information such as the serial number, wireless address and Bluetooth ID code.

### Test

- **Line 1: Sound**

Leads to a screen where you can select and listen to audio (sound) files.



### Level 3:

#### Program files

- **Line 1: Load**

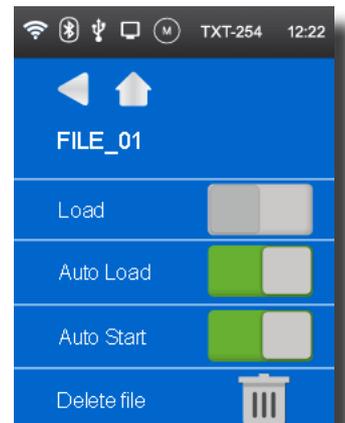
If this function is enabled, the program is loaded into program memory and can be started using the Start button in the main menu.

- **Line 2: Auto Load**

If this function is enabled, the program loads automatically into program memory as soon as the controller is powered up and can be started using the Start button in the Main Menu.

- **Line 3: Auto Start**

If this function is enabled, the selected program starts automatically as soon as the controller is powered up.



- **Line 4: Delete File**

The program is deleted, but first a confirmation prompt appears.

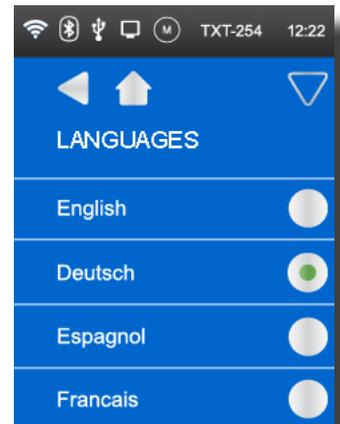
### Role

Here, the controller is assigned the role of Master or Extension. More on the subject is available under "Extensions."



### Languages

Here you can change the menu language.



### Network

- **Line 1: Bluetooth**

The Bluetooth function is switched on or off here. The pairing code is shown here.

- **Line 2: Wi-Fi**

The Wi-Fi function is switched on or off here. The network security key is shown here

- **Line 3: Connected with device**

Indicates whether there is an existing Wi-Fi connection.

- **Line 4: Device discoverable**

Indicates whether the ROBOTICS TXT Controller can detect other devices.



### Time

You can set the time here.

### INFO display

- **Firmware**

Shows the version number of the firmware.

- **Name**

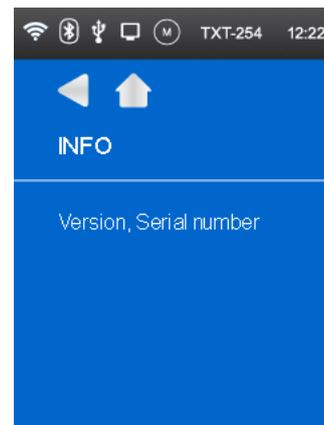
The name of the device is shown (for example, TXT 254).

- **Bluetooth**

Unique Bluetooth ID code of the device (Bluetooth standard).

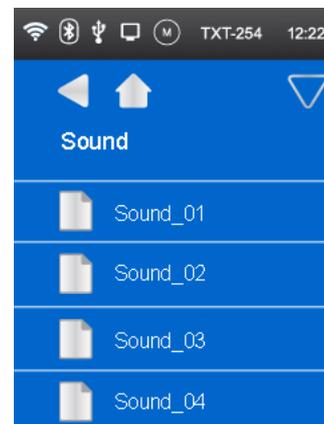
- **Wi-Fi**

Wi-Fi address



### Sound

Here you can select and listen to the displayed audio files.



## Connecting the Controller to the PC

When connecting the controller to the PC for the first time, the driver for the USB interface must be installed on the PC. This is usually done automatically if the ROBO Pro software is already installed on the PC. The details are described in the ROBO Pro software Help.

1. Connect the USB cable to the PC.
2. Plug the power unit into the electrical outlet (or connect the rechargeable battery pack).
3. Plug the small connector of the power unit into the 9 V IN input jack (8) of the controller.
4. Switch on the controller with the ON/OFF switch (12). Hold the switch down for approximately 1 second when doing so.

A welcome screen appears with the version number of the firmware. The operating system is loaded. The main menu is then displayed. This is the starting point for navigating the controller menu (see "Menu in detail").

## Selecting and starting a program

1. First, a program must be transferred by downloading it from the PC to the ROBOTICS TXT Controller. A test of the connection and the precise steps for downloading the program are described in the ROBO Pro software Help.
2. After the program is downloaded, it starts automatically in the basic setting.
3. The process is halted by tapping on the red Stop icon on the display.
4. Changes to the start behavior can be assigned individually to any program file, for example, Auto Start or Auto Load. You can choose the settings in the File | "File Name X" | Settings menu.

Details about the particular functions can be found under "Menu in detail."

## Extensions (EXT connection)

### Additional TXT Controller

The "EXT" 10-pin plug connector is used to connect another ROBOTICS TXT Controller. See number 2 under "Overview of connections".

This allows for an additional number of inputs and outputs.

1. Provide power to the unit using the power unit or the rechargeable battery pack.
2. Use the display to assign the extension function to the new controller.  
This is done through the Settings | Role | Extension menu.
3. Connect the controllers with each other using the ribbon cable, which is included. The controller status bar will then show which is the master (M) and which is the extension (E). See "Status bar".

Plans for additional extension modules are underway.

### I<sup>2</sup>C interface

This standard interface is intended for commercially available components that use this interface, such as special sensors.

## Bluetooth/Wi-Fi connections

The ROBOTICS TXT Controller includes a function module that can connect wirelessly to a PC or other devices via Bluetooth or Wi-Fi. The setting for enabling Bluetooth or Wi-Fi is made using the Settings menu in the controller display.

These wireless connections replace the USB connection cable with a wireless radio connection. This allows the ROBOTICS TXT Controller to receive and transmit information in the online mode, which means the program runs on the PC and data is exchanged continuously between the PC and the ROBOTICS TXT Controller. Using one of these wireless connections, programs can also be loaded onto the controller, where they are then processed independently of the PC.

### Requirements:

Bluetooth/Wi-Fi-capable PC or commercially available USB Bluetooth or Wi-Fi adapter with a Windows-compatible wireless chip.

fischertechnik has published a list of compatible USB Bluetooth adapters that have been successfully tested to work smoothly with the ROBOTICS TXT Controller. New adapters are continually appearing on the market, while others are no longer available. To keep up with these changes, this list is continually updated through a service on our website at:

[www.fischertechnik.de](http://www.fischertechnik.de) – Downloads – ROBOTICS TXT Controller

### Notes on the data transmission quality:

The range is about 10 meters and is dependent on the quality of the USB/Wi-Fi adapter and the ambient conditions (interference from other devices, obstacles in the area, etc.).

Due to the limited range, expect limitations when transmitting image data from the fischertechnik USB camera when connected via Bluetooth.

The available range via Wi-Fi is much higher, providing for superior quality image transmission.

Use the USB cable to achieve the highest range and thus the best quality when transmitting images.

## Connecting the TXT Controller to the PC via Wi-Fi

### Requirements:

1. The PC must have a Wi-Fi module, or a USB Wi-Fi adapter must be connected to the PC and the associated driver software installed.
2. The ROBOTICS TXT Controller must be switched on and **Wi-Fi** must be enabled in the **Settings** menu under **Network** (see "Menu in detail").

To connect to the ROBOTICS TXT Controller, click on the network icon in the bottom right-hand section of the taskbar on the computer screen.



### Note:

If the computer already has a wireless connection, the icon will appear as follows:



The following window appears:

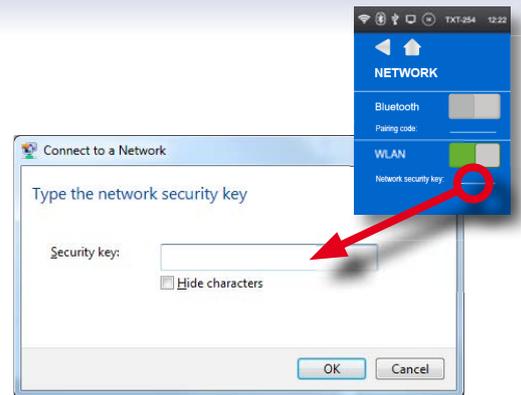


Select **ft-TXT\_....**

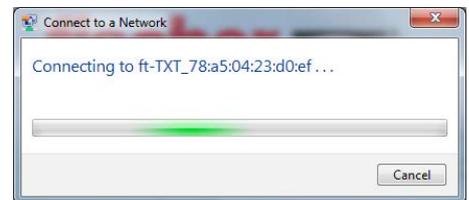


and then click **Connect**

The **network security key** then has to be entered. This can be found on the controller display under **Settings – Network**.



The connection will be established:



If you then click on the network icon again, you will see in the window that appears that the connection has been established and the device can now be used:

**Note:**

The window where you set up a Wi-Fi connection can also be accessed via the following:

**Windows Start button – Control Panel – Network and Internet – Connect to a network.**

The dialog boxes and icons may vary in appearance on different Windows operating systems. The example here is from Windows 7.



**Connecting the TXT Controller to the PC via Bluetooth**

**Requirements:**

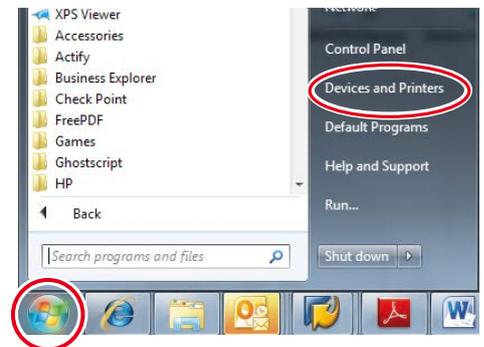
1. The PC must have a Bluetooth module, or a USB Bluetooth adapter must be connected to the PC and installed.

**Note:** If using a USB Bluetooth adapter, always use the preinstalled Windows Bluetooth drivers and not the specific driver associated with the Bluetooth adapter that usually comes with it on a CD. This will ensure for a smooth and easy Bluetooth connection between the PC and ROBOTICS TXT Controller. To do this, simply insert the Bluetooth adapter into an available USB port. Windows will automatically load the preinstalled Microsoft drivers and will inform you after a short time that the device is ready.

2. The ROBOTICS TXT Controller must be switched on and "Bluetooth" must be enabled in the Settings menu under Network (see "Menu in detail").

**Connecting via Bluetooth:**

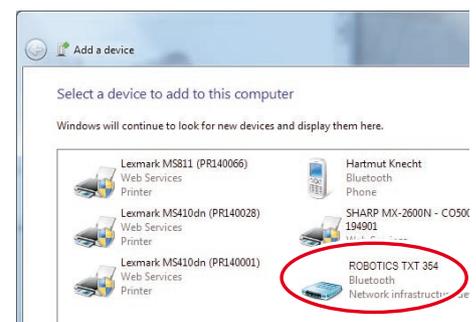
To connect to the ROBOTICS TXT Controller via Bluetooth, select the **Windows Start button** on the computer screen and then select **Devices and Printers**.



A new window appears:  
Click **Add a device**.

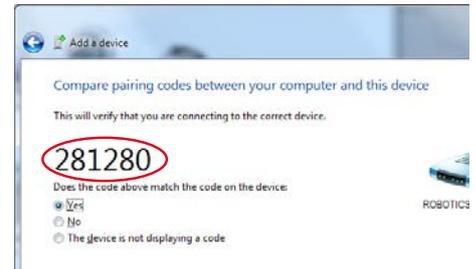


All visible devices will then be displayed, including the ROBOTICS TXT Controller.  
Double-click to select the TXT Controller.

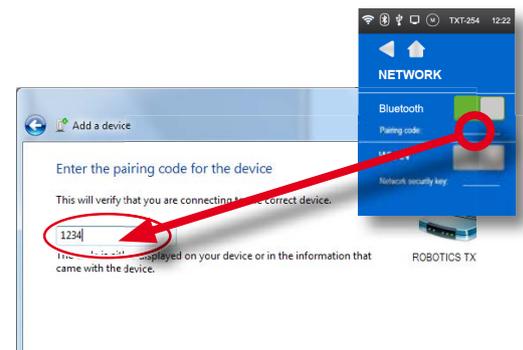


A new window appears:

**Confirm** either the proposed pairing code:



or, if you're asked for the pairing code of the device, enter the code which you can find on the controller display under **Settings - Network**.

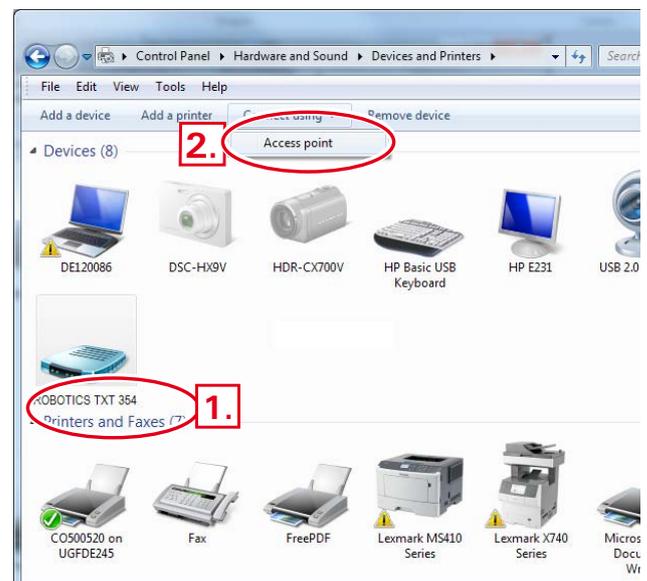


Click **Next** to establish a connection to the device. Once the connection is successful, the message "The device has been successfully added to this computer." It may take some time before Windows finishes installing all the drivers. It does not matter if no driver will be found, the connection will work anyway.

Then the following steps have to be done in **Control panel – Hardware and Sound – devices and printers**:

1. The TXT Controller has to be selected
2. in the menu **Connect using – Access point** the Bluetooth connection has to be activated.

**Important: This last step has to be done allways when th PC or the TXT Controller is switched off and on again.**



Once complete, the Bluetooth connection can be used for this device in the ROBO Pro software and can be selected as an interface under **COM/USB**.

### Bluetooth connection between different TXT Controllers

In download mode, a ROBO TXT Controller can exchange data with up to seven other ROBOTICS TXT Controllers. Each device establishes a Bluetooth connection with every other participant and transmits and receives data over this connection.

Special program elements are provided in ROBO Pro to send and receive messages.

Additional information about this operating mode is available in the ROBO Pro software Help (version 4.0 or higher).

### Bluetooth/Wi-Fi connection between TXT Controllers and other devices (e.g., a mobile phone)

Basically, the ROBO TXT Controller can also communicate with other Bluetooth/Wi-Fi devices, such as suitable smartphones. To do this, the particular device must have special communication software, which is adapted for the ROBOTICS TXT Controller. Since continual changes can also be expected in this area, current information and links are also available at:

[www.fischertechnik.de - Downloads - ROBOTICS TXT Controller](http://www.fischertechnik.de - Downloads - ROBOTICS TXT Controller)

## Faults

### Electromagnetic interference

If the controller is affected by external electromagnetic influences, it can still be used for the purpose intended once the interference passes. It may be necessary to disconnect the power supply briefly and then restart the controller.

Fault	Cause	Elimination
Program version failure	An attempt was made to load or start a ROBO Pro program that is part of an older firmware version and is therefore no longer compatible.	Reload the program with the latest ROBO Pro version onto the ROBO TX Controller.
Program error 1	ROBO Pro error message: The number of processes in the ROBO Pro program is greater than the maximum possible number.	Under the "Properties" tab of the ROBO Pro program, increase the "minimum number of processes."
Program error 2	ROBO Pro error message: The minimum memory per process is too small.	a) Under the "Properties" tab of the ROBO Pro program, increase the "minimum memory per process (download)". b) A variable or a subprogram calls itself endlessly (recursion), resulting in a stack overflow. Change the program so that the recursion no longer occurs.
Program file open failure	The program file could not be opened because it was deleted in the flash memory.	Reload the program file onto the ROBO TX Controller.
Program file read failure	The program file could not be read because it is too large to fit in the program memory.	The program file must be reprogrammed so that it requires less space in the memory.

## Technical data

### Dimensions and weight

90 x 90 x 25 mm (L x W x H)

150 g

### Memory and processor

128 MB DDR 3 RAM, 64 MB flash, micro SD card slot (memory card not included)

32-bit ARM Cortex A8 processor (600 MHz) + 32-bit Cortex M3 coprocessor; programmable with ROBO Pro software or C-Compiler (not provided)

### Operating system

Linux-based, Open Source, incl. Linux camera drivers, image processing software integrated in ROBO Pro (ROBO Pro not included in scope of delivery).

### Power supply (not included)

With Accu Set (8.4 V, 1500 mAh), or

Power Set (9 V / 2500 mA)

### Interfaces:

USB 2.0 device: mini USB port

USB 2.0 host: USB-A port

Wireless interface (2.4 GHz / range approx. 10 m)

Bluetooth: BT 2.1 EDR+4.0

or Wi-Fi 802.11 b / g / n

IR receiver code: for fischertechnik Control Set transmitters, art. no. 500881

EXT extension connection: 10 pin plug connector; I<sup>2</sup>C

**EXT PIN assignment:**

Ser-RX (3V3)	10		9	Ser-TX (3V3)
Reserved	8		7	Reserved
I2C / SCL clock (3V3)	6		5	I <sup>2</sup> C / SDA data (3V3)
Extension data	4		3	Extension data
Extension data	2		1	Ground / GND

Please note that all cables are configured to operate with 3.3 volts.

**Warning:** External voltages greater than 3.3 volts could damage the device!

**Signal inputs and outputs**

8 Universal inputs: digital, analog 0 to 9 V DC; analog 0 to 5 kΩ

4 high speed counter inputs: digital, frequency up to 1 kHz

4 motor outputs 9 V / 250 mA: speed infinitely adjustable, short-circuit proof, alternative 8 individual outputs

Sound output: .wav files through speaker

**Touch display**

2.4" TFT, 320 x 240 pixels, 65,536 colors

**Warning:** Do not allow sharp or pointed objects to come in contact with the touch display. You risk damaging the equipment.

**Real-time clock**

Backup battery: CR-2032 coin cell

## Proper disposal

Notes on environmental protection:

Do not dispose of the electrical and electronic components of this construction set (e.g. motors, lamps and sensors) in the household waste. At the end of their service life, take them to a collection point for electrical and electronic device recycling.

The symbol on the product, packaging or the instructions indicates this.

## Warranty

The fischertechnik GmbH provides a warranty for the freedom from defects of the controller according to the particular state of the technology. fischertechnik GmbH reserves the right to make design or model alterations which neither adversely affect the operational reliability nor the value of the device. Such changes do not entitle the customer to file a complaint.

Notification of claims due to obvious defects must be provided in writing within 14 days after the delivery, otherwise any warranty claims as a result of obvious defects shall be excluded.

Warranty claims do not apply in the case of minor defects in the controller. In other respects, the customer may only demand remedy for the defect, which means subsequent improvement or the delivery of a replacement. The customer is entitled to choose at his discretion either to withdraw from the contract or to demand a reduction in the purchase price if the remedy of defect is unsuccessful, particularly if it is impossible, if we are unable to remedy it within a reasonable time frame, if we refuse to perform the remedy, or if delays in the remedy are culpably caused by us. The warranty period is 24 months from the date of delivery. We shall not accept responsibility for material defects related to the controller which are the result of improper or negligent handling or due to improper or unauthorized modifications, changes or repair work performed by the customer or a third party. This warranty is governed by German law.

## **Liability**

fischertechnik GmbH shall not assume liability for damages as a result of use of the device in a manner not corresponding with its intended use.

