Interface

Audio, USB, RS232, RS485

Kenwood NEXEDGE

ENTWICKLUNG PRODUKTION SOFTWARE HARDWARE ELEKTRONIK BERATUNG

FunkTronic

Kompetent für Elektroniksysteme

Contents

Technical Data

voltage	+12V DC
current consumption	typ. 50 mA
input impedance line	600 Ohm
output impedance line	600 Ohm
input impedance radio	> 8,2 kOhm
output impedance radio	< 50 Ohm
max. output level line	850 mV / 600 Ohm (+1 dBm) 550 mV / 300 Ohm (-3 dBm) 400 mV / 200 Ohm (-6 dBm)
max. output level radio:	1,5 V (+ 6dBm)
amplification line -> radio	-20 ... +10 dBm
amplification radio -> line	-20 ... +10 dBm
weight	ca. 110 g
dimensions W x D x H	100 x 75 x 32 mm

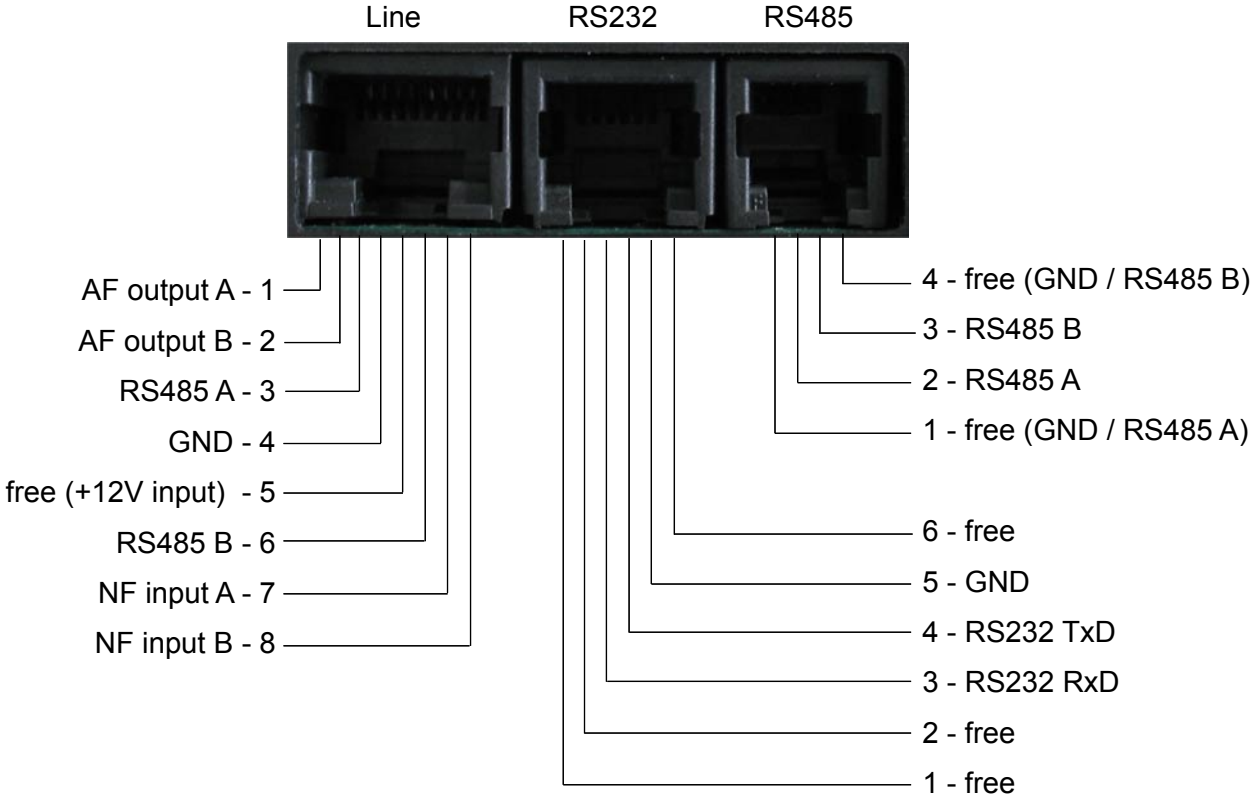
Order Information

Order No.	Description
900020	Interface Audio, USB, RS232, RS485
900921	Cable Audio-USB-Interface <-> FT635 ÜLE
900930	Cable Audio-USB-Interface <-> Kenwood NEXEDGE NX-700-E
900923	Programming Cable Audio-USB-Interface

General Information

The **Interface Audio, USB, RS232, RS485** is used for the remote control of Kenwood NEXEDGE-radios. The radios are controlled using a Funktronic Major 4a/5a control panel, that has to be equipped with the software option Kenwood NEXEDGE. Hereby, the instructions to control the radio are transmitted via the serial data interface (RS232), the NF is transmitted in an analog way from the Major to the radio.

Sockets + Pin Assignment



Socket "Line":

Connection to the remote interface
Attention: NF input and output need to be crossed or JP5 - JP8 need to be switched

Socket "RS232":

in normal operation: Connection to the RS232 of the radio or Major
this socket is also used for configuration of the interface

Socket "RS485":

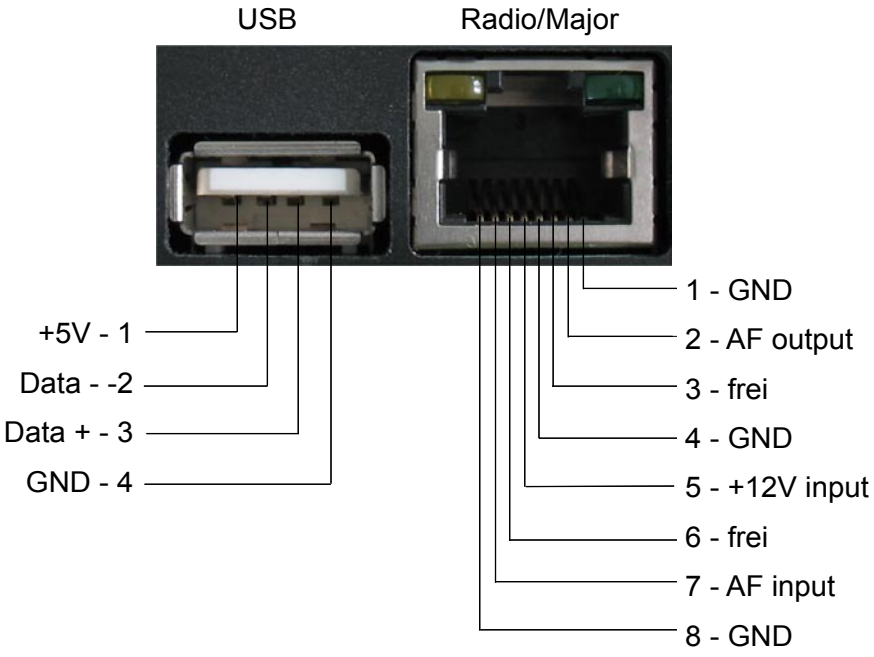
Alternative connection of RS485, if RS485 and AF should be in separate cables.

Radio / Major:

connection to the AF of the radio or Major.
power supply of the interface

USB:

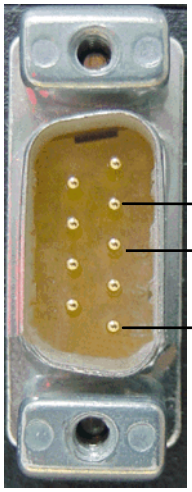
not used



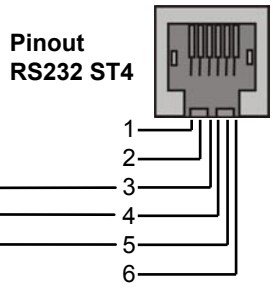
Cables:	Connection Cable FT635 ÜLE <-> Interface	900921
	Connection Cable Kenwood NEXEDGE NX-700-E <-> Interface	900930
	Patch Cable RJ11 (6P4C, 1:1) for RS232 of Major <-> Interface	LV.PATCH4_6
	Patch Cable RJ45 (1:1) for S/E socket of Major <-> Interface	LV.PATCH805
	Patch Cable RJ45 (1:1) Line <-> Line	LV.PATCH805
	Patch Cable RJ10 (4P4C, 1:1) for RS485 <-> RS485	LV.PATCH4_4

Programming Cable

RS232 9-pin plug of the PC



RS232 socket of the interface



2 RxD RS232
3 TxD RS232
5 GND

Attention:
RXD and TXD are switched compared to the Major!

RS485 Interface

RS485 is a differential 2-wire (+GND) data interface for 2 or more participants. The maximum length is about 1000m. Both ends of the bus need to be terminated with 120 Ohm, branches should be short and should not include a terminating resistor.
The RS485 is already equipped with the suitable terminating resistors. For few and short connection lines, these can remain in place. In other cases or if connection problems are encountered the surplus resistors need to be removed (R14-R16). Another possibility to improve the connection is to reduce the rate of the data transfer.

Ex factory, the RS485 is part of the "Line" connector and, thus, transferred in the same cable as the AF lines. Hence, only one cable is necessary to connect 2 interfaces. Depending on the used cables, the cable length and the number of interfaces, coupling of the data telegrams with the AF lines might occur. In this case, the RS485 sockets can be connected using a separate cable. To disconnect the RS485 lines of "Line" socket, open JP1 and JP2.

LEDs

The LEDs at the socket "Radio/Major" (green on the right and yellow on the left) display the different statusses of operation:

- left LED shortly flashes once per second: interface is trying to establish a connection to the Major or the radio
- right LED is on: connection to the Major established
- left LED is on: connection to the radio established

If a connection is eestablished, the LEDs are flashing for a short time on receiving a telegram. The left LED flashes for telegrams from the radio, the right LED flashes for telegrams from the Major.

AF Connection

The interface has 2 AF inputs and outputs. The input and output at the socket "Radio/Major" is single-ended (one pin is GND), while the input and output of the socket "Line" is potential-free. Amplification is possible in both directions from -20dB to +10dB and can be adjusted using the service interface.

Service Interface

The service interface is used to program the EEPROM registers and to adjust the potentiometer. To use the RS232 interface for service purposes, it has to be activated at power-on of the device. Activation is no longer possible after the interface is connected to the Major or to the radio.
When the terminal program is connected to the interface, the telegram "gk00" can be seen, which is sent every second. Now, one hast to blindly type the activation sequence to activate the service interface:
1.) press together button "Ctrl" + button "B"
2.) text input: "monitor" (caps lock must be deactivated - only small letters allowed)
3.) press together button "Ctrl" + button "C"

If the activation was successful, the start text of the monitor is displayed. Sending of the "gk00" telegrams is suspended for 10 seconds after the last character that the interface receives from the terminal program. After this, the telegram reappears, but can be simply ignored and has no influence on the input from the terminal.

Monitor Instructions

In order to excercise a monitor instruction, type the respective characters, confirmed with Enter/ Return.

Rxxx..... read register xxx
Pxxx yyyyyyyy..... program register xxx with yyyyyyyy
A..... adjust potentiometer
Q..... software reset
X..... quit monitor

Before connecting the interface to a Major or a radio again (e.g. to check adjusted potentiometer values), you need to quit the service monitor using the "X" instruction. This way, the monitor can be reactivated simply by pressing Enter/Return again. If the monitor is no longer needed and the interface is intended for normal operation, the monitor must be left using the software reset "Q". Alternatively the interface can be switched off and on again.
!!! The radio should not be operating while the service monitor is not completely deactivated. This may result in malfunctions that can only be fixed by restarting the whole radio system **!!!**

EEPROM Registers

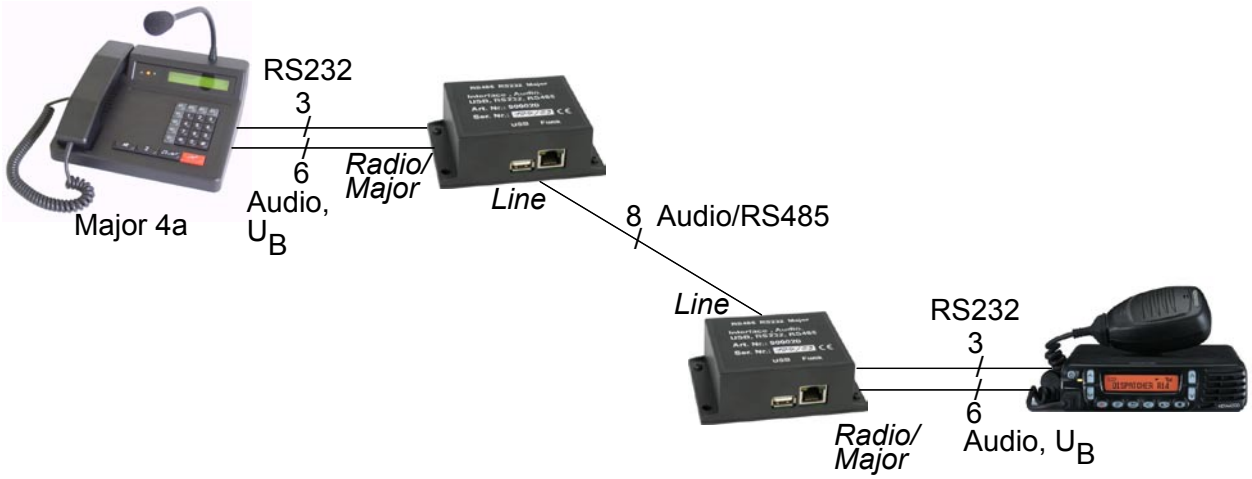
Register 000 Digit 1: Baud rate of the RS485 interface, set ex factory to: E (230400)

Wert	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Baud	4800	9600	14400	19200	28800	38400	57600	76800
Wert	**8**	**9**	**A**	**B**	**C**	**D**	**E**	**F**
Baud	96000	115200	128000	134400	161280	201600	230400	249600

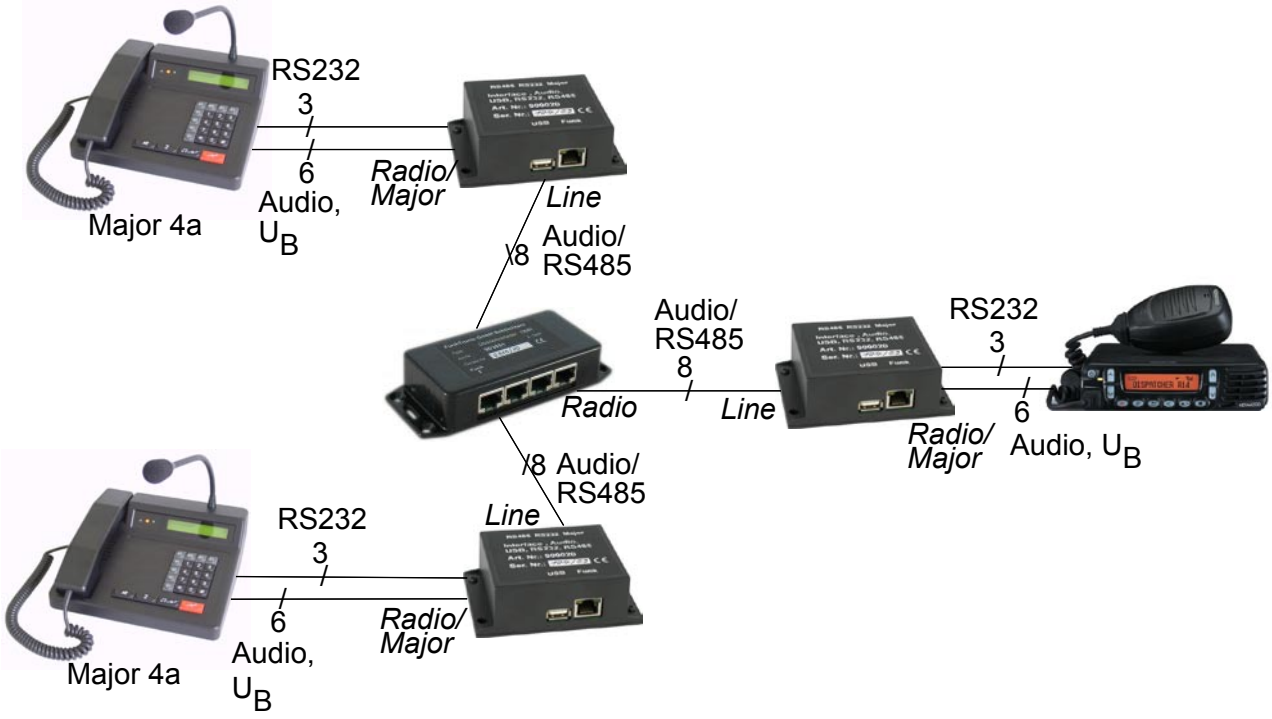
Higher bau rates result in reduced reaction times, lower baud rates allow for transmissions over longer distances. The baud rate has to be programmed equally for all interfaces that are connected to the RS485 bus.

Example Configurations

Single control panel connected to the radio (remotely)

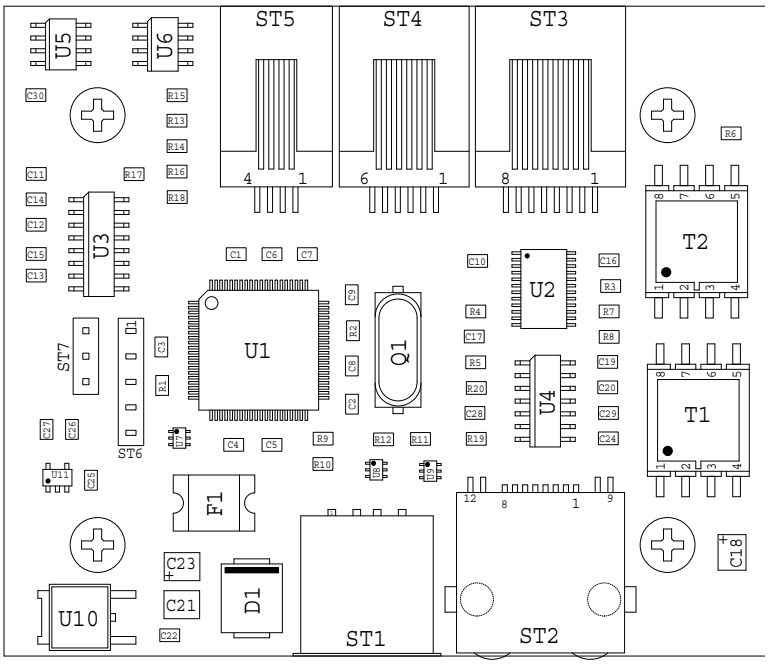


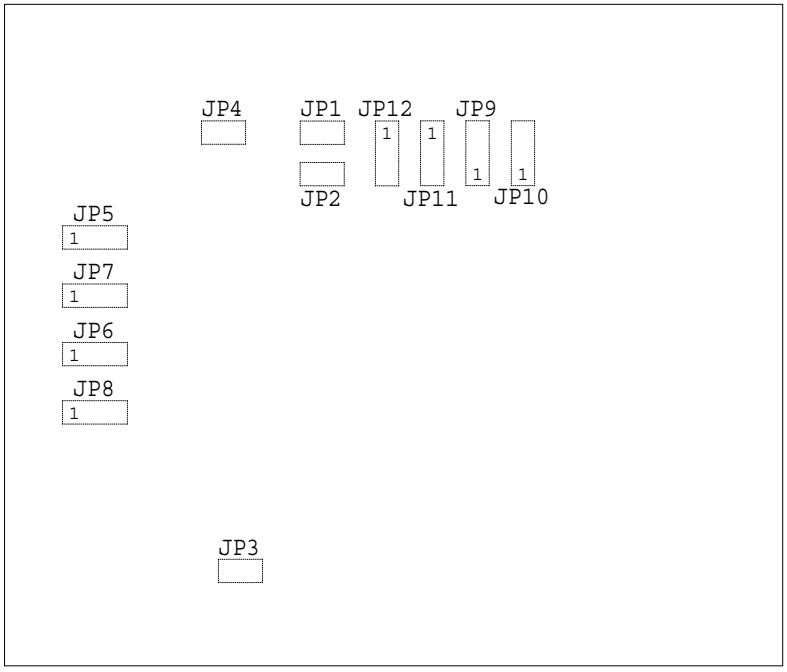
Several control panels connected to one radio



If several control panels are used to control a single radio, the connection is realized with a Distribution Frame DMR. Here, the RS485 lines are connected in parallel.

Board Layout





Sockets

ST1 - USB
ST2 - Major / Radio
ST3 - Data / NF Line
ST4 - RS232
ST5 - RS485

Jumper

JP1 - connects RS485 A to pin 3 at ST3 (*ex factory*: jumper is set)
JP2 - connects RS485 B to pin 6 at ST3 (*ex factory*: jumper is set)
JP3 - connects the +12V-input to pin 5 at ST3 (*ex factory*: jumper is open)
JP4 - connects GND to pin 4 at ST3 (*ex factory*: jumper is set)
JP9 - connects RS485 A(1-2) or GND (2-3) to pin 1 at ST5
(*ex factory*: jumper is open)
JP10 - connects RS485 B (1-2) or GND (2-3) to pin 4 at ST5
(*ex factory*: jumper is open)

Jumpers JP5, JP6, JP7 and JP8 configure the AF in-/outputs of the "Line" (ST3). Inputs and outputs can be switched, so that standard patch cables can be used for the connection of 2 interfaces.

JP5/JP6 and JP7/JP8 set to 1/2 (ex factory setting)
AF-output to pins 1 and 2
AF-input to pins 7 and 8

JP5/JP6 and JP7/JP8 set to 2/3
AF-output to pins 7 and 8
AF-input to pins 1 and 2

General Safety Information

Please read the operating instructions carefully before installation and setup.

The relevant regulations must be complied to when working with 230V line voltage, two-wire-lines, four-wire-lines and ISDN-lines. It is also very important to comply to the regulations and safety instructions of working with radio installations.

Please comply to the following safety rules:

- All components may only be mounted and maintained when power is off.
- The modules may only be activated if they are built in a housing and are scoop-proof.
- Devices which are operated with external voltage - especially mains voltage - may only be opened when they have been disconnected from the voltage source or mains.
- All connecting cables of the electronic devices must be checked for damage regularly and must be exchanged if damaged.
- Absolutely comply to the regular inspections required by law according to VDE 0701 and 0702 for line-operated devices.
- Tools must not be used near or directly at concealed or visible power lines and conductor paths and also not at and in devices using external voltage – especially mains voltage - as long as the power supply voltage has not been turned off and all capacitors have been discharged. Electrolytic capacitors can be still charged for a long time after turning off.
- When using components, modules, devices or circuits and equipment the threshold values of voltage, current and power consumption specified in the technical data must absolutely be complied to. Exceeding these threshold values (even if only briefly) can lead to significant damage.
- The devices, components or circuits described in this manual are only adapted for the specified usage. If you are not sure about the purpose of the product, please ask your specialized dealer.
- The installation and setup have to be carried out by professional personnel.

Returning of Old Equipment

According to German law concerning electronic devices old devices cannot be disposed off as regular waste. Our devices are classified for commercial use only. According to § 11 of our general terms of payment and delivery, as of November 2005, the purchasers or users are obliged to return old equipment produced by us free of cost. FunkTronic GmbH will dispose of this old equipment at its own expense according to regulations.

Please send old equipment for disposal to:

FunkTronic GmbH
Breitwiesenstraße 4
36381 Schlüchtern

>>> Important hint: freight forward deliveries cannot be accepted by us.

2 February, 2006

Subject to change, Errors excepted

Release Notes

Oct-09, 2014 - translation of German version dated from Aug-21, 2014