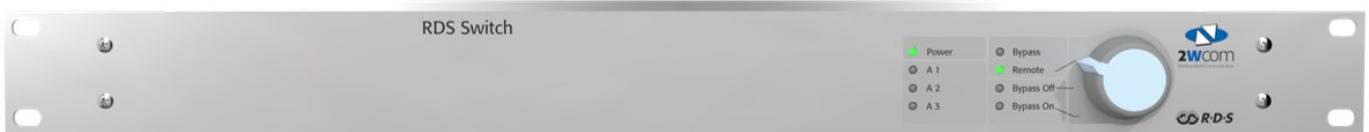


RDS Switch

N+1 Switch for RDS- and 19 kHz pilot signals



User Manual

November 2017

User Manual RDS Switch V01.05

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1. Symbols in this manual

1.1. References and Hyperlinks in this PDF File

The original text document of this manual uses bookmarks for reference purposes. If you read this manual as a non-print version, please note that this PDF file also contains all bookmarks! So you can navigate through the document via the content overview in your PDF viewing software if you activate "bookmarks view".

All references to pages, sections, figures and tables as well as hyperlinks in the text identify a location within this PDF file. Just click the reference to find the referred passage in the text!

1.2. Warning signs and their meaning

The following warning signals are used in this user manual:



Warning of general danger location



Warning of electric shock



Warning of hot surface



Warning of fire hazard

1.3. Tags and their meaning

The following signal words are used in the product documentation in order to warn the reader about risks and dangers. The tags described here are always used only in connection with the related product documentation and the related product.



Indicates a hazardous situation which, if not avoided, will result in death or serious injury.



Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

NOTICE

Describes precautions necessary to protect the equipment.



NOTE: Useful information for the user.

2. Introduction

The RDS Switch is an N+1 switch for RDS signals and 19 kHz pilot tone signals. It is possible to feed the RDS Switch with the signals of up to three RDS encoders, as well as the 19 kHz pilot tone signal of the back-up transmitter. If one of the main transmitters fails, the RDS Switch switches the RDS signal that is intended for the failed transmitter directly to the back-up transmitter, as well as the pilot tone signal of the back-up transmitter directly to the corresponding RDS encoder to keep it synchronized. The RDS switch also provides switching outputs to switch the reference table and the MPX/Sync input of the RDS encoder.

For connection of more than three RDS Encoder, cascading of RDS Switch Devices is also possible.

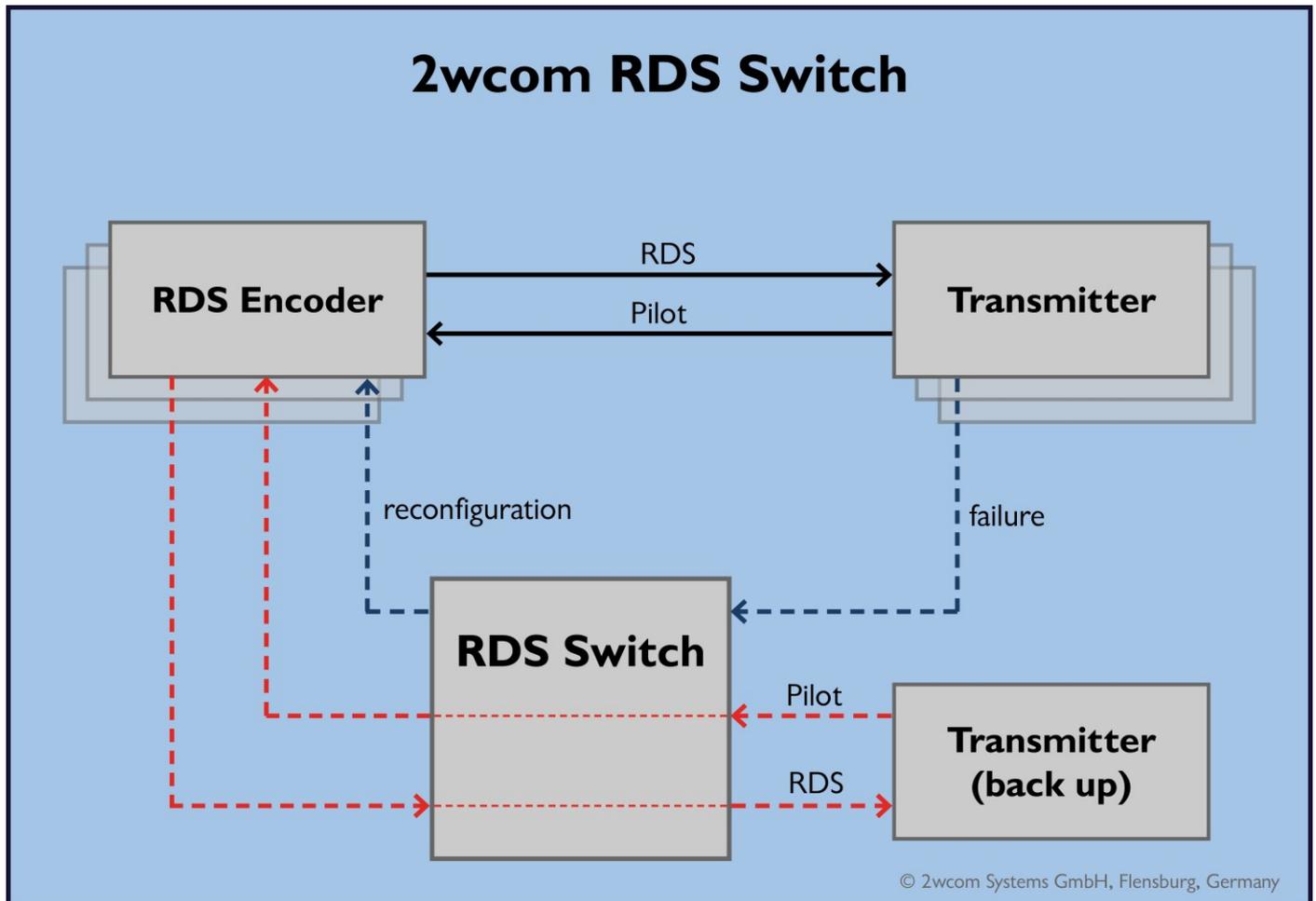


Figure 1: Solution diagram



NOTE: Read this user manual carefully before attempting to operate the device. Save this user manual for future reference – it contains important safety and operating instructions for the device.



NOTE: The graphics of the manual may differ from the supplied model or the actual appearance. Only experienced technical personnel or engineers should operate the RDS Switch. Basic knowledge about FM, RDS, transmission of audio signals and IP networks is required. Some functions described may not be applicable to the device ordered.

If you require further assistance please contact our support team.

3. Safety Instructions

For a secure operation of the device the user should read and hold on all safety instructions mentioned in this manual before the first operation.



WARNING

Non-compliance with the safety instructions can lead to serious injury.

Any changes on RDS Switch or operation of the parts not having been proved and released by the manufacturer can lead to unforeseen damage.

Every improper use of RDS Switch and all actions on the device not mentioned in this user manual are regarded as a not allowed misuse outside the statutory limits for liability of the manufacturer.

If you sell RDS Switch or give it to another person, attach this user manual to the device.

Never operate RDS Switch, if it does not function properly. If the device or its part is out of order, put it out of operation. Never repair the device by yourself. If there are any damages in the device, sent it immediately to 2wcom Systems for maintenance or dispose it professionally according to the regional disposal regulations.

Keep the device away from unauthorized persons.



DANGER



DANGER of electrical shock

Plug the device into a grounded power socket only. Never remove the grounding wire/contact.

Never open the housing of the device by yourself. Never touch open electrical parts.

Dangerously high voltages are present inside the housing. Even after disconnecting the mains supply, dangerously high voltage levels may be present for a certain time.

Do not touch the device with wet hands.

Never expose the device to liquids. If any liquid comes inside the housing, immediately disconnect the device completely from the power supply. Do not continue operating the device.



FIRE HAZARD of overheating or electric shock

Ensure sufficient heat dissipation during operation. Avoid following when installing the device:

	<ul style="list-style-type: none"> - non-ventilated environment, for example a narrow shelf or built-in wardrobe; - extremely warm or cold place; - direct sunlight exposure; - too high or too low temperature; - extremely wet or dusty environment. <p>Do not operate the device in the presence of flammable gases.</p> <p>Do not cover the ventilation openings of the device to avoid heat accumulation.</p> <p>Do not put objects with open flames such as burning candles on the device.</p> <p>Do not put heavy objects on the supply cord. A damaged cord can lead to fire or electric shock hazards.</p> <p>To disconnect the supply cord, drag always the plug and never the cable to avoid the cord damage.</p>
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 WARNING	
	<p>WARNING of explosive atmosphere</p> <p>RDS Switch may not be used in an explosive environment; otherwise there is a risk of the explosion hazard.</p>
	<p>WARNING of hot surface</p> <p>The surface of the device can heat up during operation. RDS Switch is equipped with a passive cooling system. However, it does not switch off automatically, if it is overheated.</p> <p>Do not touch the surface of the device during operation.</p>

<h2 style="margin: 0;">NOTICE</h2>	
	<p>CAUTION: Risk of equipment damage</p> <p><i>Before the first operation:</i></p> <p>Check the housing, the front panel, the supply cord and the plug for visible damage (e.g. scratches, cracks, damaged isolation and abrasion)</p> <p>In case of damage, unplug immediately the supply cord. Never operate device with a damaged supply cord.</p> <p>All damaged components must be replaced immediately.</p> <p><i>Installation:</i></p> <p>Use only a grounded three-wire power supply cord and -plug that complies with the national regulations.</p> <p>If necessary, another than the supplied supply cord has to be used, in compliance with the regulations of the country where the device is operated.</p> <p>Make sure that the AC power outlet is next to the device and readily accessible to the user.</p> <p><i>Installation of other devices:</i></p> <p>External devices which are connected to the device could be damaged by the device or damage the device itself, if the output levels exceed the specified limits.</p> <p><i>Cleaning:</i></p> <p>Do not use corrosive detergents on the device such as benzine, thinner, alcohol or acetone. Clean the surface of the device only with a soft dry cloth.</p>

4. Supplied Parts

- RDS Switch
- Power supply cord*
- User manual in PDF format to download; on request by paper

*available for different countries



NOTE: The scope of delivery may deviate in special cases.

5. Manufacturer

2wcom Systems GmbH • Am Sophienhof 8 • 24941 Flensburg • Germany
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contact@2wcom.com • www.2wcom.com

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6. Installation

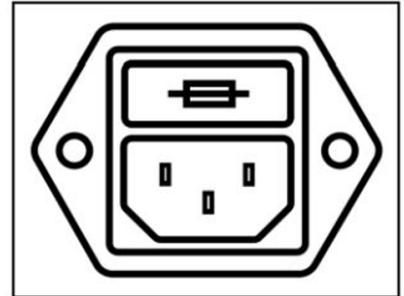
6.1. Best setup location

The device should be installed in a 19" rack. Avoid direct sunlight, close proximity to radiators and air conditioning, dust, water, and chemicals. Choose a rack location that permits a clear view to the indicators on the device and ensure a sufficient heat dissipation of the device.

6.2. Power supply

The device is designed for operation with 100 to 240 V AC, 50 Hz to 60 Hz. Check the corresponding device labeling for compatibility to the domestic line voltage and frequency before connecting the IEC power connector to the mains supply!

No power switch is available; unplug mains supply connector to power off the device. Keep the mains supply plug readily accessible to the user.



WARNING



WARNING

Disconnect mains power plug before you open the housing.
Repair of the equipment must only be carried out by authorized and qualified personnel.
Read also section „Safety Instructions“.

7. Connection and Function Scheme

7.1. Connection scheme

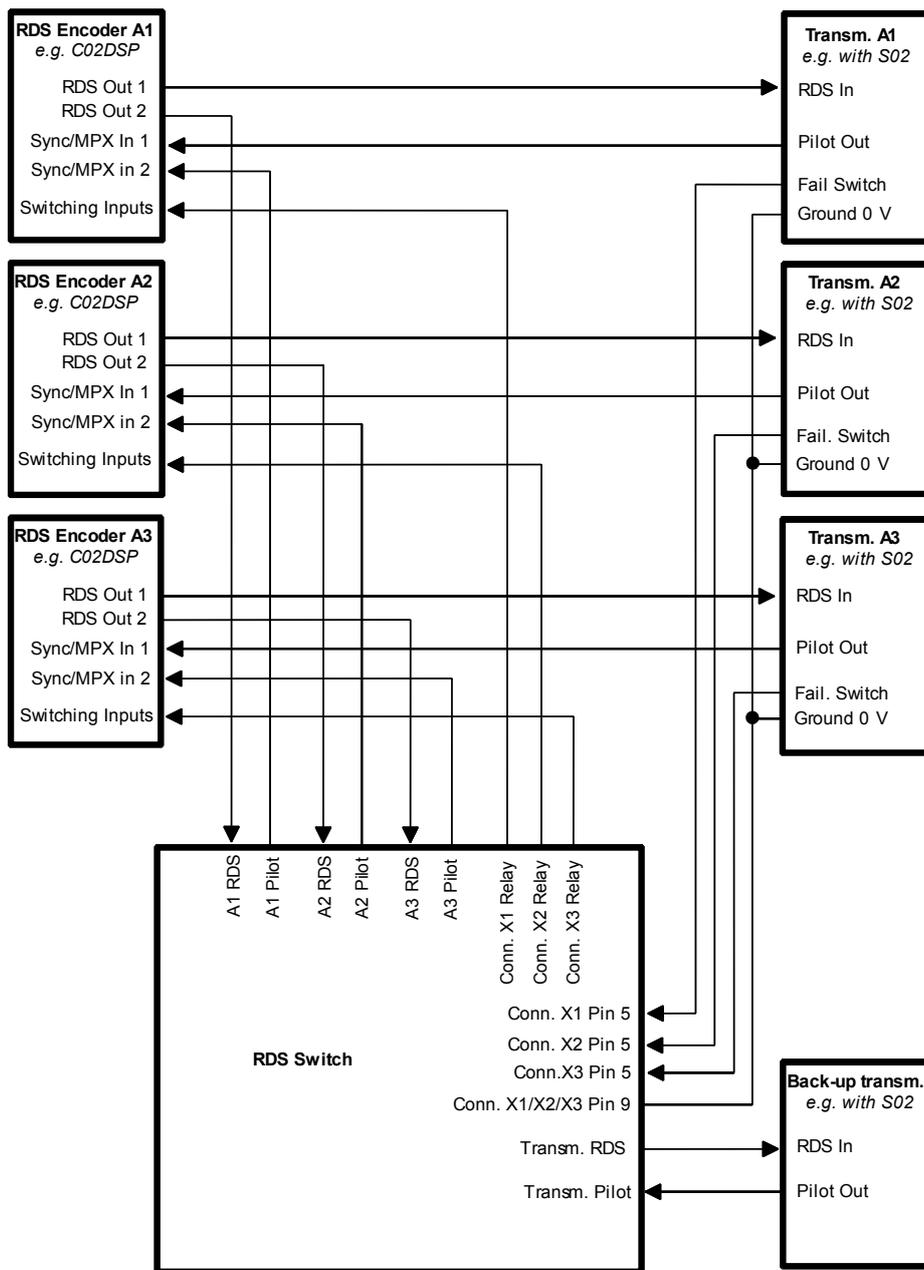


Figure 2: Connection scheme RDS Switch

7.2. Function scheme

The RDS Switch uses its switching inputs (Pin 5 on connector X1/X2/X3) to detect a transmitter failure. In case of transmitter failure, the RDS Switch switches the RDS signal that is intended for the failed transmitter directly to the back-up transmitter, as well as the pilot tone signal of the back-up transmitter directly to the corresponding RDS encoder to keep it synchronized. The RDS switch also provides two switching output pins on connector X1/X2/X3 to switch the reference table and the MPX/Sync input (C02_{DSP}/C04_{DSP}: MPX In 1/2;) of the RDS encoder (C02_{DSP}/C04_{DSP}: opto-isolated inputs can be configured accordingly). See also Figure 1 on page 4.

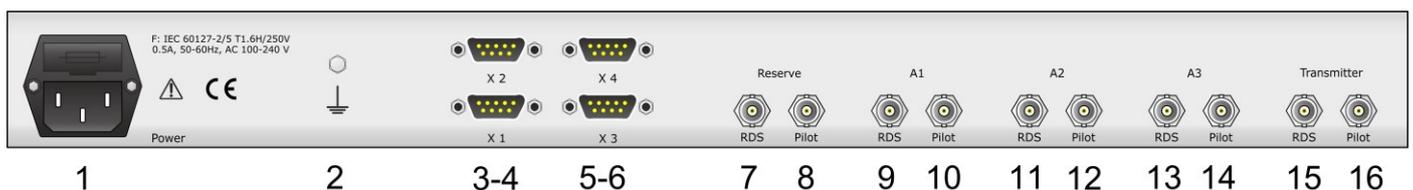
8. Control Elements and Connectors

8.1. Front Panel



1	[Power] LED	Activated (green color) if the power supply is ok.
2	[A1] LED	Activated (green color) if the receiver detects a signal that can be decoded.
3	[A2] LED	Activated (green color) if the receiver detects audio data that can be decoded.
4	[A3] LED	Activated (green color) if a data monitoring is activated for the DTE1 interface and data on this interface is detected.
5	[Bypass] LED	Flashes (red color) if the monitoring function detected the triggering of a configured alarm.
6	[Remote] LED	No function
7	[Bypass Off] LED	No function
8	[Bypass On] LED	LED to the right side of the DATA LED. Activated (green color) if a data monitoring is activated for the DTE2 interface and data on this interface is detected.
13	[Mode Selection Switch]	Jog dial for selection of the mode of operation of the device. Turn the jog dial to place the figure on the desired LED entry.

8.2. Back Panel



1	IEC power supply connector	Standardized IEC supply connector with integrated fuse holder. Fuse ratings depending on mains supply voltage: 100-120V: T1.6A, time lag type, 5x20 mm, 250 V 220-240V: T1A, time lag type, 5x20 mm, 250 V
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2 [Grounding stud] The stud can be used to connect a grounding system if necessary.



NOTE: The required protection earth (PE) is accomplished via the 3-wire mains supply cord.

- | | | |
|----|-----------------|--|
| 3 | [X1] | 9 pole D-Sub female connector; Pins of the switching input A1 for detecting transmitter A1 failure and switching output to switch the reference table and the MPX/Sync input (C02 _{DSP} /C04 _{DSP} : MPX In 1/2;) of the RDS encoder A1 (C02 _{DSP} /C04 _{DSP} : opto-isolated inputs can be configured accordingly). |
| 4 | [X2] | 9 pole D-Sub female connector; Pins of the switching input A2 for detecting transmitter A2 failure and switching output to switch the reference table and the MPX/Sync input (C02 _{DSP} /C04 _{DSP} : MPX In 1/2;) of the RDS encoder A2 (C02 _{DSP} /C04 _{DSP} : opto-isolated inputs can be configured accordingly). |
| 5 | [X3] | 9 pole D-Sub female connector; Pins of the switching input A3 for detecting transmitter A3 failure and switching output to switch the reference table and the MPX/Sync input (C02 _{DSP} /C04 _{DSP} : MPX In 1/2;) of the RDS encoder A3 (C02 _{DSP} /C04 _{DSP} : opto-isolated inputs can be configured accordingly). |
| 6 | [X4] | 9 pole D-Sub female connector; Pins of the mains supply loss indicator relay, signal switching mode indicator relay, and the switching inputs for remote control. |
| 7 | [Res. RDS] | BNC female connector; Connector for back-up (reserve) RDS encoder or for cascading RDS switch devices, to input an RDS signal. |
| 8 | [Res. Pilot] | BNC female connector; Connector for back-up (reserve) RDS encoder or for cascading RDS switch devices, to output a pilot signal. |
| 9 | [A1 RDS] | BNC female connector; Connector for input the RDS signal of RDS encoder A1. |
| 10 | [A1 Pilot] | BNC female connector; Connector for output the pilot signal for RDS encoder A1. |
| 11 | [A2 RDS] | BNC female connector; Connector for input the RDS signal of RDS encoder A2. |
| 12 | [A2 Pilot] | BNC female connector; Connector for output the pilot signal for RDS encoder A2. |
| 13 | [A3 RDS] | BNC female connector; Connector for input the RDS signal of RDS encoder A3. |
| 14 | [A3 Pilot] | BNC female connector; Connector for output the pilot signal for RDS encoder A3. |
| 15 | [Transm. RDS] | BNC female connector; Connector for output the RDS signal to the back-up transmitter. |
| 16 | [Transm. Pilot] | BNC female connector; Connector for input the pilot signal from the back-up transmitter. |

9. Operation

9.1. Activate signal switching mode (Local operation)

- Set the mode selection switch to [Bypass Off].
- ⇒ If a transmitter failure is detected, the RDS Switch switches the RDS signal that is intended for the failed transmitter directly to the back-up transmitter, as well as the pilot tone signal of the back-up transmitter directly to the corresponding RDS encoder to keep it synchronized.
- ⇒ The failed transmitter is indicated by the activated LED [A1], [A2], or [A3] and the two DPDT relay contacts that are provided on connector [X1], [X2], [X3] are switched.



NOTE: The highest switching priority has the input at connector [X3], followed by the inputs on connector [X2] and [X1]. That means that the back-up transmitter gets the signal of the failed transmitter A3, even if transmitter A1 is also failed.

9.2. Deactivate signal switching mode (Local operation)

In this mode, no signal switching is performed in case of transmitter failure!

- Set the mode selection switch to [Bypass On].
- ⇒ The LED [Bypass] lights up.



NOTE: The connectors [Transm. RDS] / [Trans. Pilot] are connected to the connectors [Res. RDS] / [Res. Pilot] if the signal switching is deactivated, the device is in stand-by mode, or not connected to mains supply.

9.3. Activate remote control mode

The remote control mode allows activating / deactivating the switching mode by the remote switching inputs.

- Set the mode selection switch to [Remote].
- ⇒ The LED [Remote] lights up



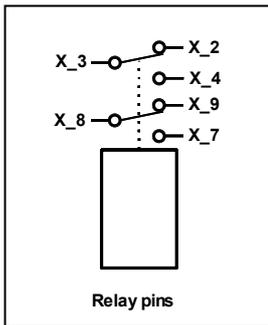
NOTE: The local operation has a higher priority than the remote control operation. The state of the signal switching mode (activated/deactivated) does not get lost in case of mains power black out.

10. Interfaces

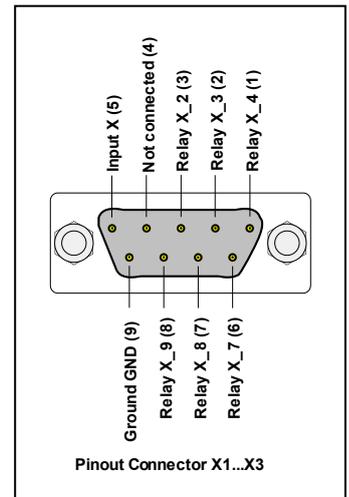
10.1. Connectors [X1], [X2], [X3]

The pins of the 9 pole D-Sub female connectors [X1], [X2], and [X3] are used as switching output and switching input. The pinout of the connectors [X1], [X2], and [X3] is identical. So in total three relays (outputs) with two DPDT switch contacts each, as well as three switching inputs are provided.

The switching input of the connector (Input X) needs to be connected to the failure switching output of the transmitter. For switching action, the pin (voltage: approx. 5 V) needs to be switched to ground (switching current: approx: 1 mA). So the device detects a transmitter failure and switches the RDS/Pilot signals of the failed transmitter to the back-up transmitter.



The switching outputs (Relay X) are galvanically isolated relay contacts (dual pole dual throw DPDT switch) and can be switched in case of a detected transmitter failure. These switches can be used to switch the Sync./MPX input, as well as the reference table of the affected RDS encoder.



NOTICE

Maximum ohmic ratings: 0.5 A/125 V AC or 1 A/30 V DC.



NOTE: The relays at the connectors [X1]...[X3] and the LEDs [A1]...[A3] are linked. So if a failure of transmitter A2 is detected, the relay of connector [X2] as well as the LED [A2] are activated.

10.2. Connector [X4]

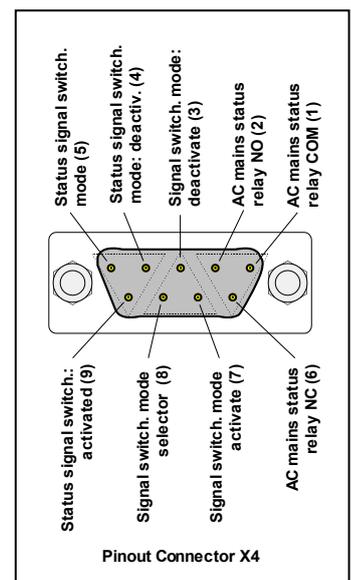
The pins of the 9 pole D-Sub female connector [X4] are used for various purposes:

10.2.1. AC mains power supply loss indicator relay

When the device is powered by mains supply, an integrated relay switch connects Pin 1 to Pin 2. When the device is not powered by mains supply it connects Pin 1 to Pin 6.

NOTICE

Maximum ohmic ratings: 0.5 A/125 V AC or 1 A/30 V DC.



10.2.2. Remote control operation

Activate/Deactivate signal switching mode:

If pin 8 is temporary connected to Pin 7, the signal switching mode gets permanently activated. If pin 8 is temporary connected to Pin 3, the signal switching mode gets permanently deactivated. The switching current is approx. 40 mA.

10.2.3. Signal switching mode indicator relay

When the signal switching mode is activated, an integrated relay connects pin 5 to pin 9. When the signal switching mode is deactivated, pin 5 is connected to pin 4.

NOTICE

Maximum ohmic ratings: 0.5 A/125 V AC or 1 A/30 V DC.

NOTICE

Never connect pins 3, 7, and 8 to other pins or external voltage!

10.3. BNC connectors

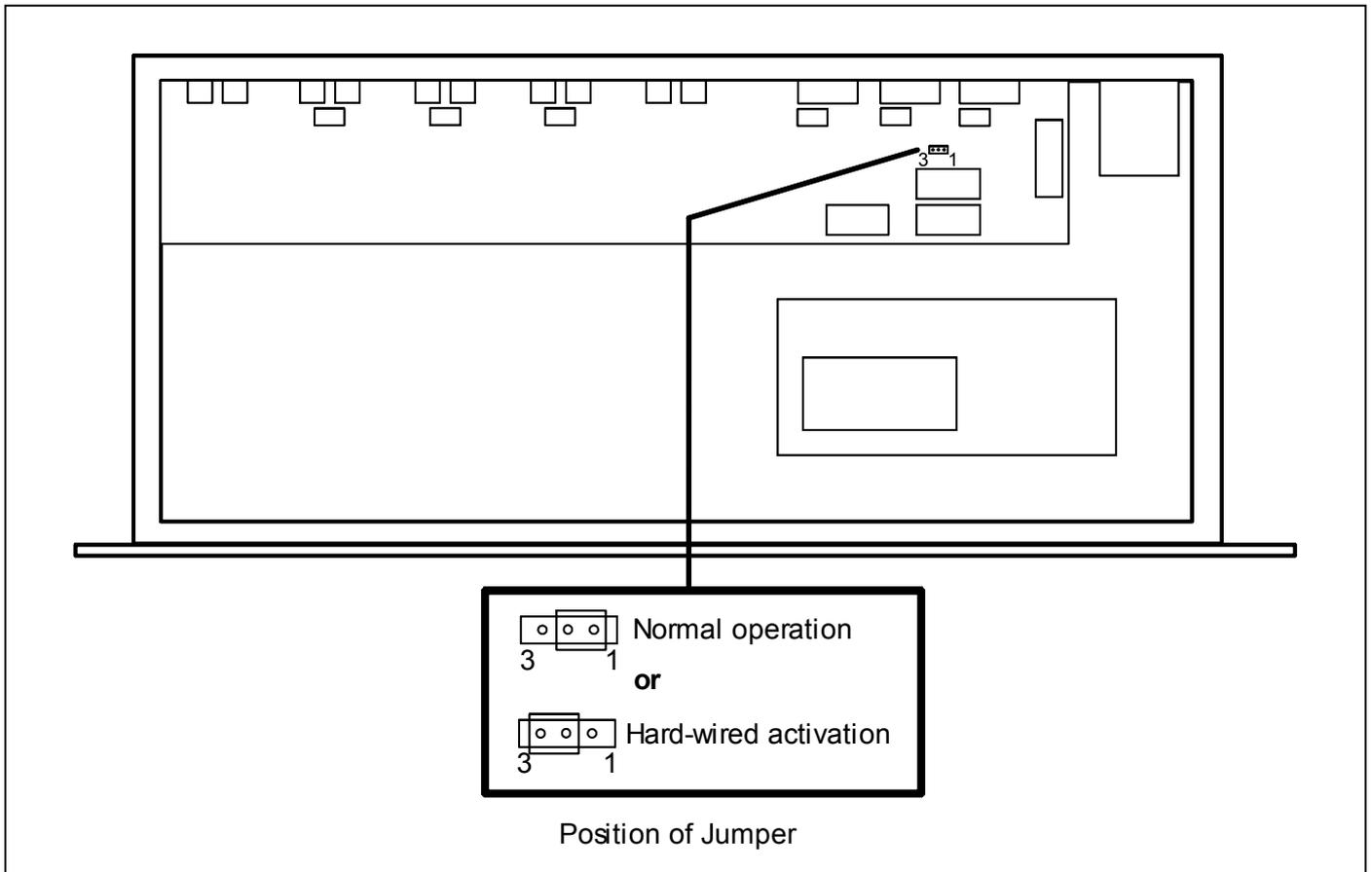
[A1 RDS]	Connector for encoder A1, for the input of an RDS signal
[A1 Pilot]	Connector for encoder A1, for the output of a pilot signal
[A2 RDS]	Connector for encoder A2, for the input of an RDS signal
[A2 Pilot]	Connector for encoder A2, for the output of a pilot signal
[A3 RDS]	Connector for encoder A3, for the input of an RDS signal
[A3 Pilot]	Connector for encoder A3, for the output of a pilot signal
[Transm. RDS]	Connector for back-up transmitter, for the output of an RDS signal
[Transm. Pilot]	Connector for back-up transmitter, for the input of a pilot signal.
[Res. RDS]	Connector for back-up (reserve) RDS encoder or for cascading RDS switch devices, to input an RDS signal.
[Res. Pilot]	Connector for back-up (reserve) RDS encoder or for cascading RDS switch devices, to output a pilot signal.

NOTICE

The connectors are only rated for analog signals (RDS, pilot tone) with a signal level below +12 dBu.

10.4. Jumper for hard-wired activation of signal switching mode

Inside the device is a jumper that can be used to permanently activate the signal switching mode. The position of the mode selection switch and the state of the remote control switching input is then ignored. Therefore it is recommended to place corresponding information on the outside of the device if this function is used!



WARNING



WARNING

Disconnect mains power plug before you open the housing.
Repair of the equipment must only be carried out by authorized and qualified personnel.
Read also section „Safety Instructions“.

NOTICE

Take proper steps against electrostatic discharge (ESD) to avoid damage to the opened device!

11. Maintenance & Servicing

11.1. Maintenance

No special maintenance is necessary on the device. Dust can be removed by a dry cleaning cloth / duster. For cleaning use only neutral, non-corrosive detergents applied to a cloth - not the device.

11.2. Servicing

The modules of the device are complex, and should be serviced only by authorized personnel.

The 2wcom GmbH is equipped with special measurement and repair kits. Therefore a repair by the user is not intended.

11.3. Calibration

Due to the design and construction of the device, no calibration is necessary.

12. Troubleshooting

The following chart is designed to help you to correct minor problems with the use of the device prior to contact our service department (report failures by email to contact@2wcom.com or fax to +49 461-662830-11). Also be sure to read the entire manual carefully, as this often helps in understanding and fixing typical problems.

Problem	Possible Cause	Solution	Ref.
Device does not turn on	<ul style="list-style-type: none"> • Power cable is improperly connected • Mains supply failure • Blown fuse 	<ul style="list-style-type: none"> • Check supply cord • Make sure that the power plug at the device is fully inserted • Check mains supply • Replace fuse by same type 	
Device does not operate as expected	<ul style="list-style-type: none"> • Wrong switching signal mode selected • Switching inputs are not correctly activated 	<ul style="list-style-type: none"> • Check position of the mode selection switch, check remote control signals, check switching inputs, check jumper position for hard wired mode selection • Check connection between the failure switching output of the transmitters and the switching inputs of the device (inputs are activated by switching to ground). 	<p>section 9 "Operation" on page 13,</p> <p>section 10.4 "Jumper for hard-wired activation of signal switching mode" on page 16</p> <p>section 8 "Control Elements and Connectors" on page 11</p> <p>section 7 "Connection and Function Scheme" on page 10</p>
Pilot signal of a transmitter is not detected at the RDS encoder or RDS signal of an RDS encoder is not found at the transmitter.	<ul style="list-style-type: none"> • Connection not correctly • An unscreened cable is used 	<ul style="list-style-type: none"> • Check connection (connector "Transm." connected to the back-up transmitter, connectors "A1"... "A3" connected to the RDS encoder.) • Only use screened quality cables for signal connections. 	<p>section 7 "Connection and Function Scheme" on page 10</p>

13. Technical Data



RDS Switch – Technical Details

Inputs

Connector	5x analog unbalanced BNC
Inputs	3x RDS input 1x RDS input for cascading several RDS Switch devices 1x input for pilot tone
Input level	≤+12 dBu
Crosstalk	<-70 dB

Outputs

Connector	5x analog unbalanced BNC
Outputs	3x pilot tone output 1x pilot tone output for cascading several RDS Switch devices 1x output for RDS
Crosstalk	<-70 dB
Frequency response	20 Hz ... 100 kHz <0.1 dB

Interfaces

Connector	3x 9 pole Sub-D female, combined for input and relay switches
Relay	6x DPDT for switch control of external devices 1x DPDT for indication of device operating mod 1x DPDT for power fail indication
Switching time	<10 ms
Control input	3x TTL compatible input for detecting transmitter failure 1x remote control input for switching device operating mode
Front Panel LED's	Power, A1, A2, A3, Bypass, Remote, Bypass Off, Bypass On

General Data

Power consumption	20 VA
Case dimensions	19", 1 HU depth: 310 mm width: 424mm front panel: 484 mm
Weight	<4 kg
Housing	aluminium chromated
Operating temp. range	0...+45°C
Storage temp. range	-40...+70°C
Power supply	internal, 90...260 V, 47...63 Hz

Version: 12.09.2017
These data are subject to
modifications and amendments.
Errors excepted.

