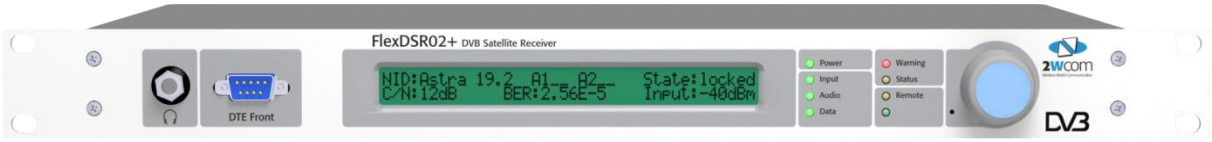
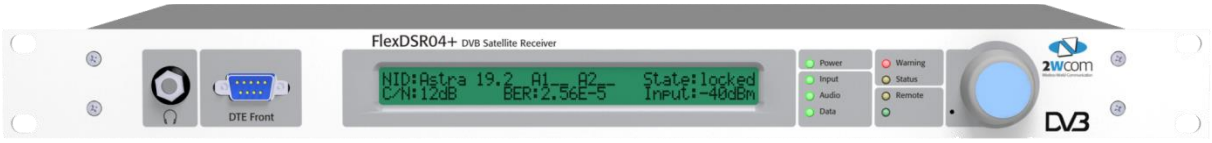
FlexDSR02+ (1/2 Audio Channels)
FlexDSR04+ (4 Audio Channels)

DVB Satellite Receiver

Professional DVB-S audio receiver





User Manual

(Examples and screenshots for simplification mainly based on FlexDSR04+)

September 2021

User Manual FlexDSR02+/04+ V06.37

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1. Symbols in this manual

1.1. 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.

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

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

2. Introduction

The 2wcom FlexDSR02+/04+ is a professional distribution receiver decoder based on DSR02 DVB Satellite Receiver for the reception mainly of audio files over UDP/RTP/TCP/Multicast/Icecast, also of a MPEG2 transport stream via DVB-S/DVB-S2/DVB-ASI, 1000 Base-T and audio files uploaded to the Internal Storage as well as for decoding of included audio signals and auxiliary data. The audio data, received over different available sources, can be output on several different digital and analog interfaces.

FlexDSR02+ has up to two balanced analogue or digital audio outputs.
FlexDSR04+ has four balanced analogue or digital audio outputs.

Any of the available input sources of the FlexDSR02+/04+ can be the main source for one of the audio outputs. Additionally it is possible to define up to three backup sources in case of an input source failure.

The basic functionality of the FlexDSR02+/04+ is shown in the following table:

	Feature List / Model	**FlexDSR02+**	**FlexDSR04+**
Standard	DVB-S/S2 tuner (0.256 - 45 Msysm/s)	✓	✓
	Headphone output	✓	✓
	serial Output for RDS	x4	x8
	Audio interface analogue and digital AES/EBU	x1	x4
	15 kHz low passfilter	✓	✓
	Adjustable audio delay	✓	✓
	TCP/IP and Web interface	✓	✓
	Display and Jogwheel	✓	✓
	SNMPv2c	✓	✓
	RDS/UECP monitor	✓	✓
	DVB-ASI (in- and output)	✓	✓
	Transport stream output over Gigabit IP	✓	✓
	relay output	x7	x7

Optional functionality is also available:

Options	**Transportstream input**		
	DVB-S/S2 Tuner incl. low symbol rates (min. 128 Ksym/s)	✓	✓
	DVB-S/S2 Tuner module 16 APSK A/B switching and PL scrambling	✓	✓
	Transport stream input over Gigabit IP	✓	✓
	Redundancy Inputs		
	IP-audio streaming input as a back-up solution	✓	✓
	Enhanced integrated memory as additional back-up solution	✓	✓
	Audio output		
	Additional 1x audio output analogue and 1x AES/EBU	✓	incl.
	Data output		
	IP data output (e.g. RDS, DRM)	✓	✓
	up to 8 RS232 outputs via IP	✓	✓
	24 relays	✓	✓
	High speed IP Data output (MPE)	✓	✓
	Monitoring		
	IP audio streaming for monitoring purpose	✓	✓
	Decoding		
	Audio decoding: MP2/4/AAC-LC/AAC+ HE v1 & v2	✓	✓
	Control		
	In-Band Control via Satellite (e.g. relay switching, regional advertising)	✓	✓
	Central server for satellite In-Band Control (generation of network control data) *only in combination with option In-Band Control via Satellite*	✓	✓
	Scrambling		
	CI Interface CAM	✓	✓
	BISS 1,E	✓	✓
	2wcom encryption	✓	✓

Important notice

The following manual describes functions of both devices FlexDSR02+ and FlexDSR04+. Screenshots used in this manual deliver examples for FlexDSR04+ and can be also applied for FlexDSR02+ accordingly for two audio outputs instead of four.

NOTE: Read this user manual carefully before attempting to operate the FlexDSR02+/04+.
Save this user manual for future reference – it contains important safety and operating instructions for the device.

Further notices

NOTE: The graphics of the manual may differ from the supplied model or the actual appearance.
Configurations, functions and specifications can be changed without prior notice.
This manual does not cover basics about the transmission of audio and auxiliary data via DVB-S/DVB-S2/DVB-ASI, nor does it cover basics about the usage of web browsers or IP networks. Thus, relating basic knowledge 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 FlexDSR02+/04+ 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 FlexDSR02+/04+ or operation of the parts not having been proved and released by the manufacturer can lead to unforeseen damage.

Every improper use of FlexDSR02+/04+ 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 FlexDSR02+/04+ or give it to another person, attach this user manual to the device.

Never operate FlexDSR02+/04+, 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:

- non-ventilated environment, for example a narrow shelve or built-in wardrobe;
- extremely warm or cold place;
- direct sunlight exposure;
- too high or too low temperature;
- extremely wet or dusty environment.

Do not operate the device in the presence of flammable gases.

Do not cover the ventilation openings of the device to avoid heat accumulation.

Do not put objects with open flames such as burning candles on the device.

Do not put heavy objects on the supply cord. A damaged cord can lead to fire or electric shock hazards.

To disconnect the supply cord, drag always the plug and never the cable to avoid the cord damage.

WARNING

WARNING of explosive atmosphere

FlexDSR02+/04+ may **not** be used in an explosive environment; otherwise there is a risk of the explosion hazard.

WARNING of hot surface

The surface of the device can heat up during operation. FlexDSR02+/04+ is equipped with a passive cooling system. However, it does not switch off automatically, if it is overheated.

Do not touch the surface of the device during operation.

NOTICE

CAUTION: Risk of equipment damage

Before the first operation:

Check the housing, the front panel, the supply cord and the plug for visible damage (e.g. scratches, cracks, damaged isolation and abrasion)

In case of damage, unplug immediately the supply cord. Never operate device with a damaged supply cord.

All damaged components must be replaced immediately.

Installation:

Use only a grounded three-wire power supply cord and -plug that complies with the national regulations.

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.

Make sure that the AC power outlet is next to the device and readily accessible to the user.

Installation of other devices:

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.

Cleaning:

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.

4. Supplied Parts

- FlexDSR02+/04+
- Power supply cord*
- Patch cable
- Serial breakout cable (x2)
- PC Software to download: "FlexDSR02+/04+" for Win98, 2000, XP and Vista for configuring and remote operation
- User manual in PDF format to download; on request by paper
- MIB files to download

*available for different countries

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

5. Manufacturer

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Phone (+49) 461 – 662830-0 • Fax (+49) 461 – 662830-11

contact@2wcom.com • www.2wcom.com

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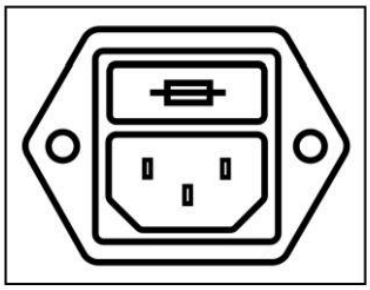
6. Installation

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 the precautions on page 10.

7. First Steps

The following section contains instructions for quick start.

✓ You have already unpacked and installed the device in an appropriate place (see section 6).

7.1. Power supply

NOTICE	
	Make sure that the device and the contained cords are compatible to the domestic line voltage and frequency!

If the device is compatible, connect the power supply cord fully to the IEC power connector at the back panel of the device and a mains power outlet.

⇒ The "Power" LED will then turn on.

7.2. Network configuration

For delivery the device is configured with default settings for the first connection via the IP interface.

To configure the IP settings:

1. Use the jog wheel to select "**Interface→IP**".
2. Configure the settings for your existing IP network (IP address, netmask, gateway etc.; consult the responsible network administrator if applicable).
3. Connect a network patch cable to the "10/100-Base-T" connector on the back panel of the device and your existing IP network.

⇒ Your device is now connected to network.

7.3. Web interface

The device can be fully operated with an internet browser via the integrated web interface. To operate the device via the web interface:

1. Use a computer that is connected to the same IP network that the FlexDSR02+/04+ device is connected to.
2. Start an internet browser (e.g. Firefox/Mozilla ≥ Version 3.0 or Microsoft Internet Explorer ≥ Version 7.0 (both with Java Script activated)).
3. Enter the configured IP address in the address bar of the browser. If the IP address has not been changed in step 7.2, please enter the default address in the address bar of the browser: 192.168.14.250.
4. A login screen with *Username/Password* appears. Use the default accounts:
   - for a read-only access use "guest"/"guest"
   - for a full access use "admin"/"admin"

⇒ After entering the correct login data (case sensitive), the main FlexDSR02+/04+ page appears.

NOTE: Change the login data as soon as possible to avoid unauthorized access to the device and document the login data in a safe place.

7.4. Adjust volume levels

1. Select **Interface Settings→XLR** or **→Headphone** in the web interface menu.
2. Or use the jog wheel to select "**Interface→XLR**" and "**Headphone**".

   Configure the audio volume for the XLR outputs and the headphone output.

7.5. Connect satellite antenna cable

1. Connect the antenna cable that has a connection to the receiving LNB of the satellite antenna to the "A" RF-IN F-type jack.
2. (Only for tuner option 16PSK): Connect another antenna cable that has a connection to the second receiving LNB of the satellite antenna to the "B" RF-IN F-type jack.

NOTE: A well aligned satellite antenna is required for signal reception.

7.6. Tuning

To activate and to configure the tuner for each audio output:

1. Select **Input Source→Audio Output 1-4** in the web interface menu. The dialog box *Input Source for Audio Output 1-4* appears.

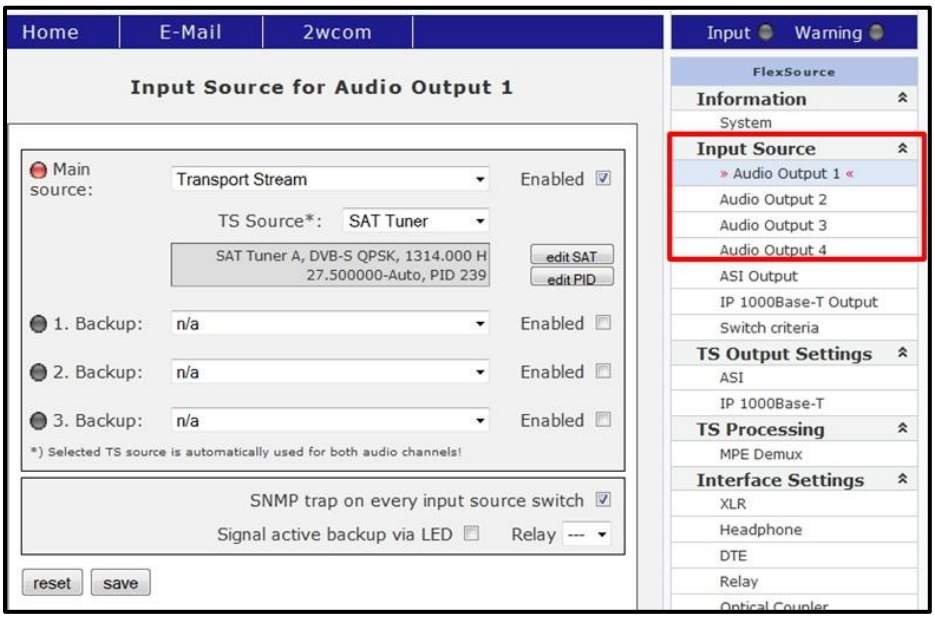


Fig. 1: FlexDSR04+ web interface: Audio Output 1-4 – Settings.

- Activate the **Main source** by ticking **Enabled.**
- Choose "Transport Stream" in the dropdown list **Main source**.
- Choose "SAT Tuner" in the dropdown list **TS Source**.

2. Open the dialog box *SAT Tuner settings–Main Source* by clicking the edit SAT button.

3. Configure satellite transponder signal reception:

   - Modulation type;
   - L-band (LNB IF) tuner frequency: LO frequency, LO e.g. 9.75GHz for lower band and 10.6GHz for upper band on universal LNBs;
   - symbol rate;
   - TS ID: only if symbol rate <1 MSym/s;
   - Polarization;
   - Roll-Off factor used by the receiver filter
     (35 automatically for DVB-S
     20/25/35 options for DVB-S2);
   - Frequency Range (22 kHz) signal;
   - Viterbi function (FEC).

EXAMPLE A: (satellite antenna is aligned to Astra 19.2° east):	
Modulation:	DVB-S QPSK
L-band frequency:	2032 MHz,
Symbol rate:	22 MSym/s
Polarization:	horizontal
22 kHz:	on
Viterbi:	5/6 or Auto

4. Click on the save button to save the changes.

⇒ The virtual "RF"-LED in the upper right corner and the real "RF"-LED (green color) of the device turns on to indicate the reception of a signal.

7.7. Configure input source for audio outputs

For manual or automatic configuration via SID (Service ID) of the PID settings proceed as follows:

1. Select **Input Source→Audio Output 1-4** in the web interface menu. The dialog box *Input Source for Audio Output 1-4* appears (see Fig. 1).

2. Make sure that the **Main source** is activated in the box **Enabled.**

3. Open the dialog box *Demux – Audio Output 1-4* by clicking the edit PID button.

4. If you select the mode "PID (manual)", use the configure buttons to configure the processing (audio decoding, data retrieval) of up to 3 PIDs out of the received transport stream.

EXAMPLE A: PID mode, configure the first three PIDs (only the listed functions are active):

Name: PCR1; PID Number:1035; Audio 1 Synchronisation: PCR1.
Name: AUDIO1; PID Number:1036; Output activated: Audio 1; , Delay: 10 ms.
Name: DATA1; PID Number:1037; DTE1: Data source - Private Data, Parameter: ES.

5. Click on the save button to save the changes.

For more information about input source settings for different outputs see section 11.2

7.8. Connect audio and/or data cables

1. Make the connections to the output interfaces on the back panel of the device to use the signals as configured at step 7.7 (Digital Audio: AES/EBU 1; Analog Audio: Analog L-1 and Analog R-1, Analog Audio: Headphone; Data: DTE1).

2. With the outputs 1-4 (Analog L/R + Digital) it is possible to output up to four individual audio signals (PIDs) of a single transponder signal simultaneously.

7.9. Use station presets

All previous settings 7.2-7.7 are automatically stored in the active preset.

To configure another station:

1. Select **System Settings→Preset** in the web interface menu.

2. Select the next unused preset memory.

3. Use "Preset name" to define a name for the active preset.

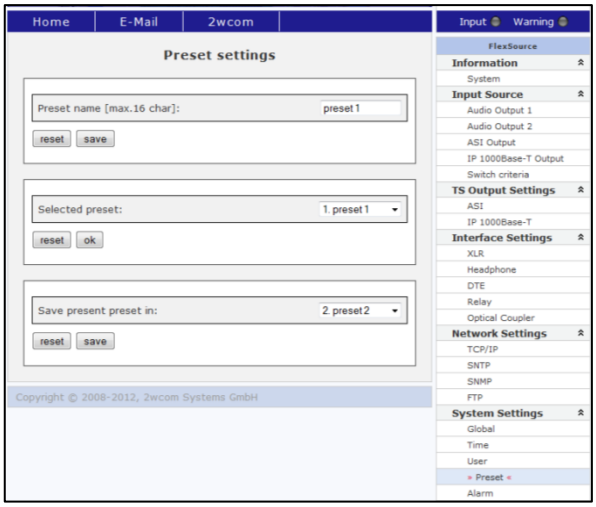


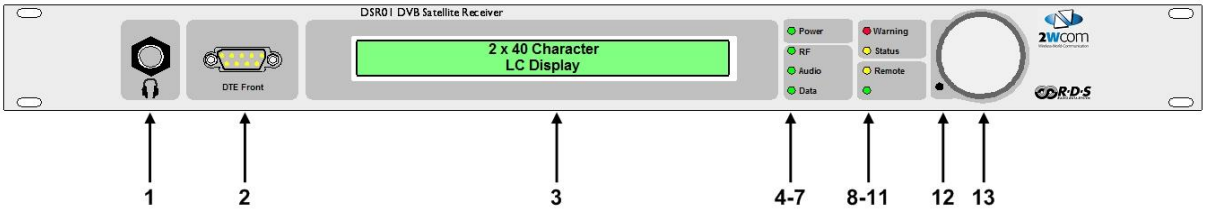
Fig. 2: FlexDSR02+ web interface: Preset memory settings.

⇒ Save changes by clicking save and you're done! FlexDSR02+/04+ is ready to be used.

NOTE: These first steps are only intended for a quick first start and do not cover all device functions. Pease read carefully the entire manual to be able to use all functions of the device.

8. Control Elements and Connectors

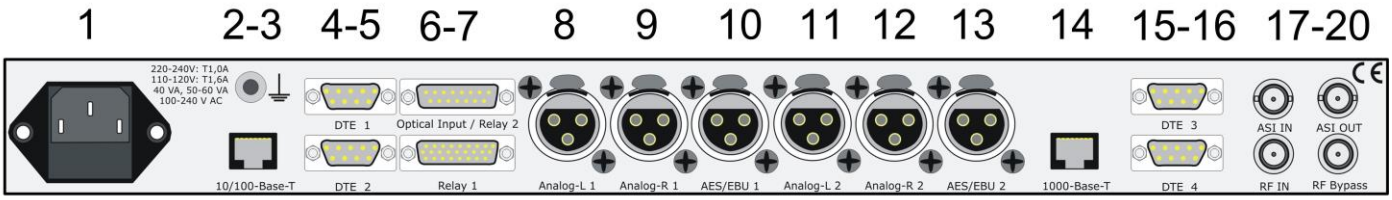
8.1. Front Panel



1	Headphones	6.3 mm / 1/4” socket for the connection of headphones. The device can be configured to output the received audio data on this output.
2	[DTE Front]	9 pole D-Sub male connector; only for device servicing purposes.
3	LCD screen	Illuminated, Liquid Crystal Display (LCD) with two rows of up to 40 characters.
4	[Power] LED	Activated (green color) if the power supply is ok.
5	[RF] LED	Activated (green color) if the receiver detects a signal that can be decoded.
6	[Audio] LED	Activated (green color) if the receiver detects audio data that can be decoded.
7	[Data] LED	Activated (green color) if a data monitoring is activated for the DTE1 interface and data on this interface is detected.
8	[Warning] LED	Flashes (red color) if the monitoring function detected the triggering of a configured alarm.
9	[Status] LED	No function
10	[Remote] LED	No function
11	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.
12	reset button	Recessed reset button for resetting the device in the case of malfunction. To activate the protected button, please use a metal pin or an unbent paper clip.
13	Jog dial	Jog dial for the device operation via the LCD screen on the device. Turn the jog dial to place the cursor on the desired menu entry and push the jog dial to activate the highlighted menu entry.

8.2. Back Panel

8.2.1. FlexDSR02+



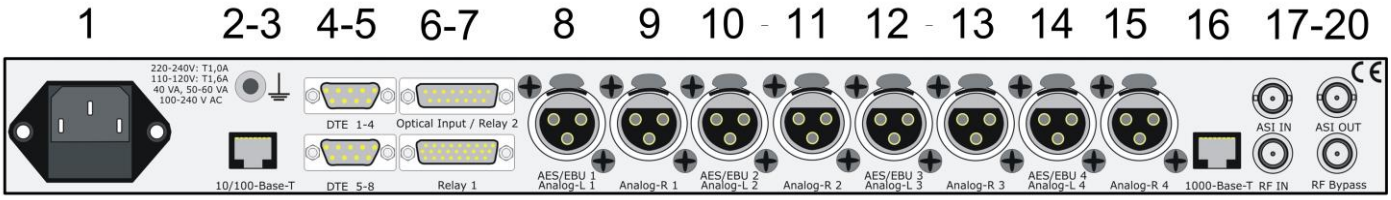
1	IEC power supply connector	Standardized IEC supply connector with integrated fuse holder. Fuse ratings depending on mains supply voltage: 100-120V: T1.6A, time lag type, 5x20 mm, 250 V 220-240V: T1A, time lag type, 5x20 mm, 250 V
2	[Grounding stud]	The stud can be used to connect a grounding system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

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

3	[10/100-Base-T]	RJ-45 connector for control and monitoring the device via Ethernet. The device can communicate with the IP network and can be configured with an internet browser via the integrated web interface. The LED´s at the socket show the link status (green; active if a physical network connection exists) and the activity status (yellow, active if data communication is active).
4-5	[DTE 1/2]	9 pole D-Sub male connector for the serial RS-232 data communication, e.g. the output of application data of the received signal. Use the supplied serial breakout cable to provide each output with a serial interface.
6	[Optical Input / Relay 2]	15 pole D-Sub female connector optical input / or optional: D-Sub male connector, high density, 26 pole. Switch contacts of the integrated relays.
7	[Relay 1]	D-Sub male connector, high density, 26 pole (former version 15 pole D-Sub male connector); Switch contacts of the integrated relays.
8-9	[Analog-L1/R1]	XLR male socket; Output of the left channel of the analog output number 1-4 with configurable signal level.
10	[AES/EBU 1]	XLR male socket; AES/EBU interface for the output of the digital audio signal number 1 in the "Professional Format". The sample rate of the signal depends on the received signal.
11-12	[Analog-L2/R2]	XLR male socket; Output of the left/right channel of the analog output number 2 with configurable signal level.
13	[AES/EBU 2]	XLR male socket; AES/EBU interface for the output of the digital audio signal number 2 in the "Professional Format". The sample rate of the signal depends on the received signal.
14	[1000-Base-T]	RJ-45 connector for Gigabit Ethernet data communication. This interface is used to transceive MPEG2 transport streams as well as

		decoded MPE IP data. The LED´s at the socket show the link status (green; active if a physical network connection exists) and the activity status (yello, blinks if data communication is active).
15-16	[DTE 3/4]	9 pole D-Sub male connector for the serial RS-232 data communication, e.g. the output of application data of the received signal. Use the supplied serial breakout cable to provide each output with a serial interface.
17	[ASI-In]	BNC connector; For the input of a DVB-ASI data stream (270 MHz) to be decoded by the device. (DSR02 only)
18	[RF-In]	F-type jack; Input for the connection to the receiving LNB of the satellite antenna (IF: 950 MHz…2150 MHz, L-band).
19	[ASI-Out]	BNC connector; For the output of a DVB-ASI data stream (270 MHz) received via DVB-S/DVB-S2 tuner, ASI input or 1000Base-T. (DSR02 only)
20	[RF-Bypass]	F-type socket; no function Optional: F-type jack; Second input for the connection to the receiving LNB of the satellite antenna (IF: 950 MHz…2150 MHz, L-band).

8.2.2. FlexDSR04+



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
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	[10/100-Base-T]	RJ-45 connector for control and monitoring the device via Ethernet. The device can communicate with the IP network and can be configured with an internet browser via the integrated web interface. The LED´s at the socket show the link status (green; active if a physical network connection exists) and the activity status (yellow, active if data communication is active).
4-5	[DTE 1-4/5-8]	9 pole D-Sub male connector for the serial RS-232 data communication, e.g. the output of application data of the received signal. Use the supplied serial breakout cable to provide each output with a serial interface.

6	[Optical Input / Relay 2]	15 pole D-Sub female connector optical input / or optional: D-Sub male connector, high density, 26 pole. Switch contacts of the integrated relays.
7	[Relay 1]	D-Sub male connector, high density, 26 pole (former version 15 pole D-Sub male connector); Switch contacts of the integrated relays.
8	[AES/EBU 1 Analog-L1]	XLR male socket; AES/EBU interface for the output of the digital audio signal number 1-4 in the "Professional Format". The sample rate of the signal depends on the received signal.
10	[AES/EBU 2 Analog-L2]	
12	[AES/EBU 3 Analog-L3]	XLR male socket; Output of the left channel of the analog output number 1-4 with configurable signal level.
14	[AES/EBU 4 Analog-L4]	
9	[Analog-R1]	XLR male socket; Output of the right channel of the analog output number 1-4 with configurable signal level.
11	[Analog-R2]	
13	[Analog-R3]	
15	[Analog-R4]	
16	[1000-Base-T]	RJ-45 connector for Gigabit Ethernet data communication. This interface is used to transceive MPEG2 transport streams as well as decoded MPE IP data. The LED´s at the socket show the link status (green; active if a physical network connection exists) and the activity status (green, blinks if data communication is active)
17	[ASI-In]	BNC connector; for the input of a DVB-ASI data stream (270 MHz) to be decoded by the device.
18	[RF-In]	F-type jack; Input for the connection to the receiving LNB of the satellite antenna (IF: 950 MHz…2150 MHz, L-band).
19	[ASI-Out]	BNC connector; for the output of a DVB-ASI data stream (270 MHz) received via DVB-S/DVB-S2 tuner, ASI input or 1000Base-T.
20	[RF-Bypass]	F-type socket; no function Optional: F-type jack; Second input for the connection to the receiving LNB of the satellite antenna (IF: 950 MHz…2150 MHz, L-band).

9. Operation

9.1. Device Control via Web Interface

The device has an integrated web interface. All configurations and operations can be made using a web browser.

To control FlexDSR02+/04+ via web interface:

1. **Connection**: connect the Ethernet (10/100Base-T) port of the device and of the computer with installed internet browser to your existing IP network. See also sections 7.2-7.3.

2. **Browser**: use the web browser Firefox/Mozilla Mozilla ≥ Version 3.0 or MS Internet Explorer ≥ Version 7.0. Activate java-script within the browser.

3. **IP address**: enter the IP address of the device in the address bar of the browser. Upon delivery the default IP address is 192.168.14.250 and the network mask is on 255.255.255.0. To find the IP address of the device, see section 7.2).

4. **Access**: the device is protected by *username / password* against unauthorized access.

   – Upon delivery the read-only account is predefined to username: 'guest' and password: 'guest' (without the apostrophes).

   – For full-access it is 'admin'/'admin'.

⇒ After the correct log-in (case sensitive) you can see the main page of the FlexDSR02+/04+ web interface.

> **NOTE:** to prevent unauthorized access and to document these data in a safe place, change the access accounts to individual *username / password*.
> To change the access data, select **System Settings→User**.

To maintain security, you are automatically logged-out after 15 minutes of no activity.

5. **Navigation**: to navigate through the web interface, use only the menu buttons of the web interface and not those of the web browser (i.e. forward and back).

6. **Buttons**:

   – if you want to save any changes made in the configuration of the device, press the button save;

   – if you don't want to save the changes, press the button reset in the input fields of the web interface. Saved changes cannot be reset by this button to a default.

> **NOTE:** Each field has to be saved individually.
> If you change data in several fields, you must click save under each field, in order to save all changed data.
> Otherwise, the unsaved field will be reset to the previously saved status.

7. **Numbers**: use a decimal point as the decimal separator in numbers in the input fields (i.e. "6.5" for six and a half).

8. **Input fields**: After entering a number or text in an input field, you must click on the corresponding save or ok button to activate the changes. Alternatively you can use the ENTER-key of your computer keyboard.

The next sections explain the separate web interface functions. The operation via jog dial and LCD on the device is similar to these descriptions.

9.2. Operation via LCD / jog dial

Most functions of the device can also be operated via the LCD/jog dial at the device. The operation works analogously to the web interface descriptions. If a function of the web interface is applicable for the LCD/ jog dial, the corresponding **menu path** is shown at the web interface description.

- To change from the default status screen to the main menu screen, push the jog dial.
- To move the cursor "→" in the menu structure, turn the jog dial.
- To open a menu entry or to confirm a setting, push the jog dial.
- If a configurable menu entry is selected, it is displayed in brackets "> <" and you can adjust it by turning the jog dial.
- To confirm the adjustment, push the jog dial.
- To return to a previous menu level, activate the menu entry "**Back**".
- To change the operating language of the LCD-menu select "**Settings→Language**" (or in German Language: "**Einstellung→Sprache**") in the main menu. The available languages are English and German.

10. Audio and Data Processing Flow

The following section describes audio and data processing flows for the FlexDSR02+/04+ device. The FlexDSR02+/04+ has different input sources and outputs that can be individually specified by the user. That is why understanding data flow in the FlexDSR02+/04+ is the key for successful operation.

10.1. Audio processing

FlexDSR02+/04+ has two/four audio channels that each feed into dedicated analog and digital audio outputs or stream the raw audio data via IP network. Each channel can be fed from different inputs: Audio over IP (UDP), Audio over IP (Icecast), Tuner Transport Stream (TS), ASI TS, IP 1000Base-T TS and audio files uploaded to the Internal Storage. Additionally it is possible to define up to three backup sources in case of an input source failure. All available input sources can be used as the main as well as the secondary input.

10.1.1. Primary inputs

All available inputs can be used as a primary input for audio data and for MPEG2-TS (see Fig. 3 and Fig. 4). The 1000Base-T Ethernet interface receives audio data directly via UDP or UDP/RTP instead of decoding MPEG2-TS for that channel. It is also possible for one channel to be fed directly, while the other channel processes MPEG2-TS (see Fig. 3), because audio channels share the same MPEG2-TS input. Thus all available audio channels use the same MPEG2-TS source because FlexDSR02+/04+ is equipped only with one audio-TS demultiplexer. That is why you can set up only one input (SAT Tuner, ASI or IP 1000Base-T) for all audio outputs if the data source consists of MPEG2-TS. However this feature does not apply for the Internal Storage: it can be combined with any other TS sources for all available audio outputs (please consider this during configuring input source for audio outputs 1-4, see section 11.3.1.1.1).

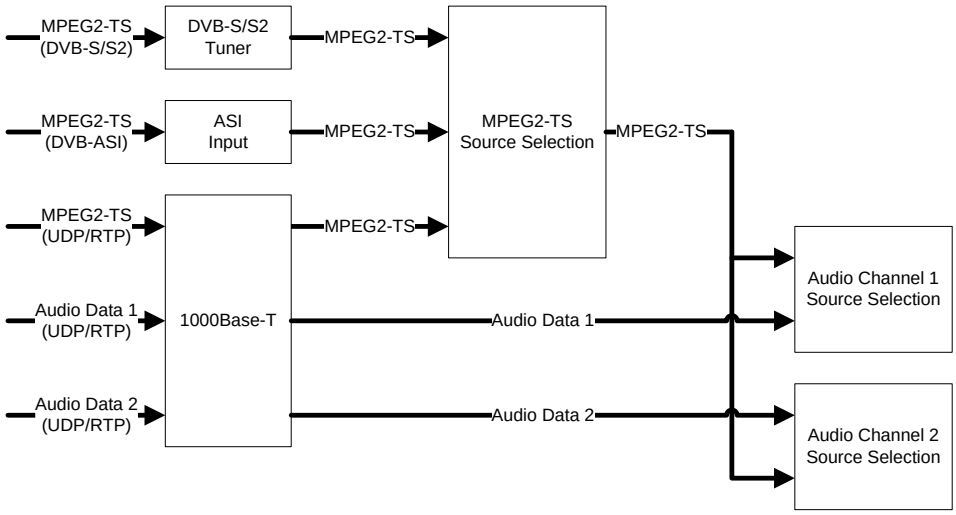


Fig. 3: MPEG2-TS and Audio Data processing via available inputs (primary and secondary): DVB-S/S2, DVB-ASI and 1000Base-T Ethernet in the FlexDSR02+/04+.

[1] This process is applicable for more than two audio channels if available.

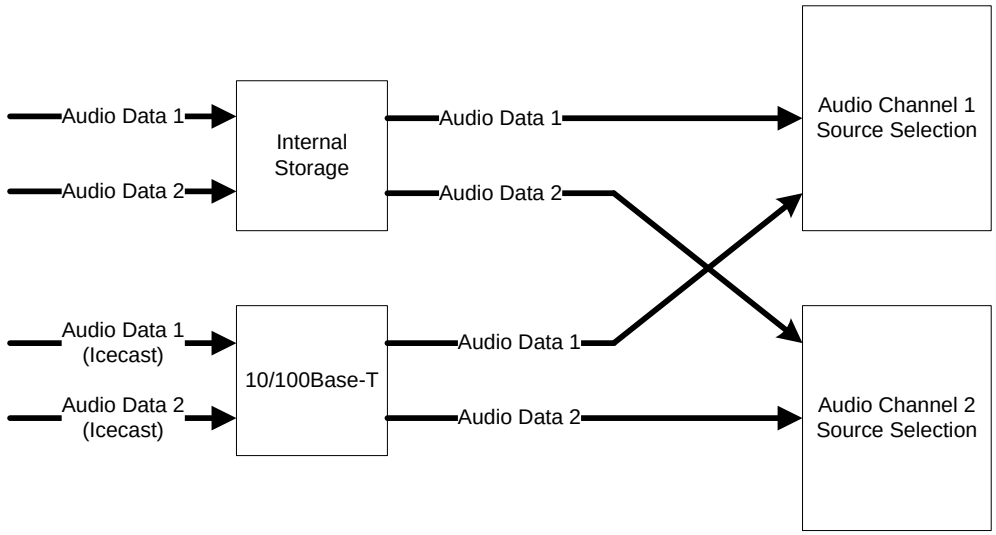


Fig. 4: Audio Data processing via available inputs (primary and secondary): Icecast and internal storage in the FlexDSR02+/04+.

Both channels can receive audio data from the 1000Base-T input at the same time. Moreover, primary input can be either audio files stored in an internal storage or audio streams from an Icecast server in the local network or the internet (see Fig. 4).

10.1.2. Secondary inputs

There are scenarios where the need arises to fall back to an alternate input, for example bad or no satellite reception due to weather conditions. In this case, the FlexDSR02+/04+ can be configured to use a fallback audio source, or secondary input. You can configure up to three backup sources for each audio channel. All available primary inputs can serve as secondary inputs (see Fig. 3 and Fig. 4). Via the web interface you can specify the criteria for switching from the main source to the different backup sources.

It is possible to temporarily disable a chosen input source without the need to alter the source order; when e.g. disabling the main source, the FlexDSR02+/04+ will immediately switch to the backup source so that you are able to check the corresponding settings (please note however, that it will only switch, if the backup source is available).

Additionally, the FlexDSR02+/04+'s alarm system can be used to configure the device for cases when secondary inputs should be used and when the receiver should return to normal operation.

10.1.3. Audio outputs

Once primary and secondary inputs for each audio channel have been configured, outputs for each channel need to be set up. Each audio channel is connected to a dedicated set of outputs: three XLR connectors for analog (left and right) and digital audio. Headphones can only be used by one audio channel at a time. If all channels are configured to use headphones, channel 1 takes precedence.

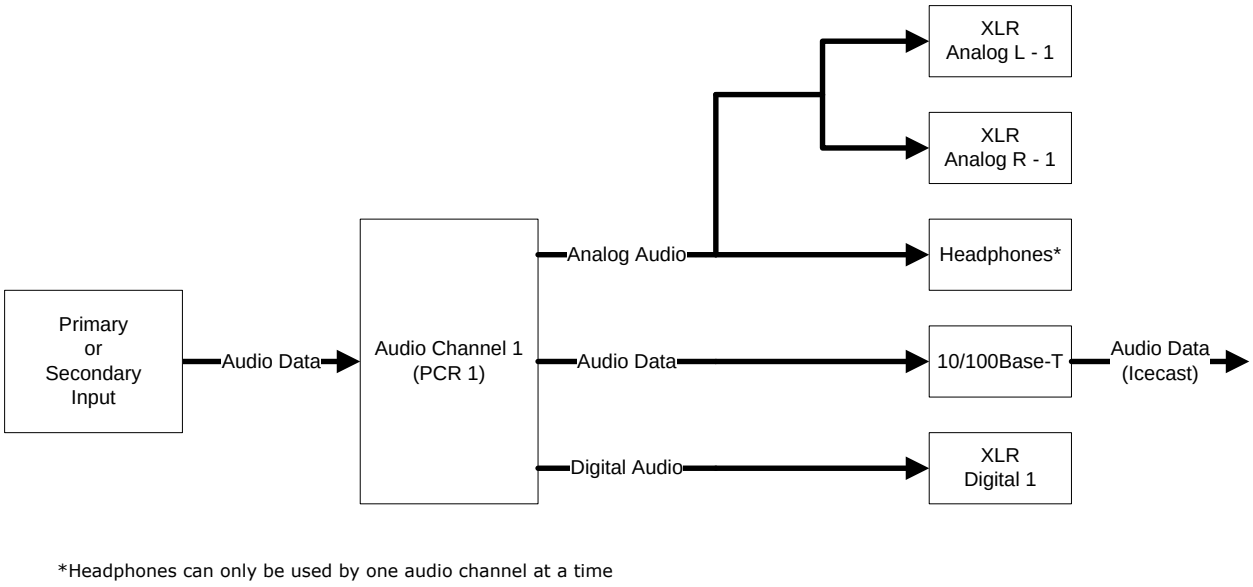


Fig. 5: Possible outputs for audio data in one audio channel in the FlexDSR02+/04+

Note that this figure only shows audio channel 1. Audio channels 2 for FlexDSR02+ and 3-4 for FlexDSR04+ are set up in exactly the same way, except they use PCR2/3/4 and connectors XLR Analog L/R - 2/3/4 and Digital - 2/3/4 instead.

10.2. MPEG TS Data distribution

In the FlexDSR02+/04+ it is possible to forward MPEG2-TS data from inputs to outputs. This can be used for instance to convert a transport stream from DVB-ASI to DVB over IP (transport media conversion) or to reshape a DVB-ASI signal (repeater). Each output is independent of the other, so that for instance while the 1000Base-T input delivers the MPEG2-TS for audio and data processing, the DVB-ASI input acts as source for the 1000Base-T output, while the DVB-S/S2 tuner delivers a transport stream to an external device using the DVB-ASI output (see Fig. 6).

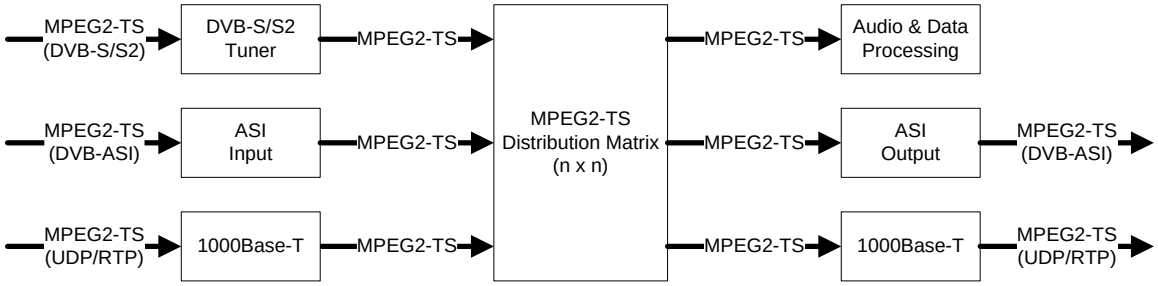


Fig. 6: Data distribution from inputs to outputs in the FlexDSR02+/04+.

11. Control via the Web Interface

The following section describes all menu items of the web interface and navigates you through the possibilities of the FlexDSR02+/04+ device. Depending on the device configuration ordered, certain menu items might not be visible to the user. Menu items that depend on hardware or software options have references to the option. A complete list of available options can be found on page 7.

NOTE: The web interface of the device is dynamic, i.e. menu options are variable and can be hidden, depending on individual settings and activated options.

11.1. System Information

This menu item is available under **"Information→System"** and provides a status page for the device. It includes some fields with short information about the FlexDSR02+/04+, including:

1. **Device identification**: In this field you can see the device name, location and description. You can change these parameters under **System Settings→Global**.

2. **Input Sources:** In this field you can see which input sources are currently active for the different outputs plus the settings and status for these inputs: the currently active input sources, audio codec, bit rate and sample rate (see Fig. 8)

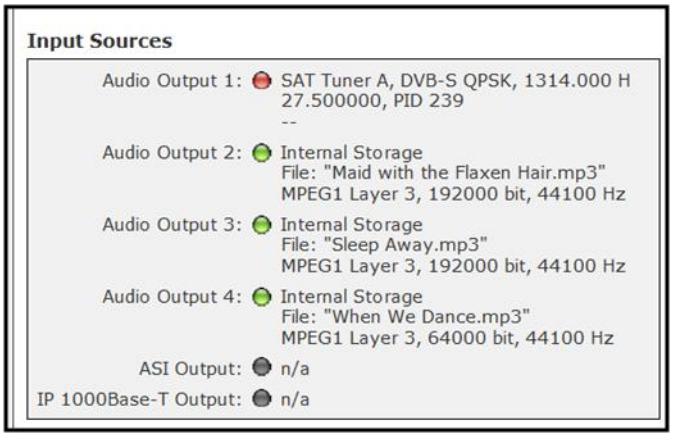


Fig. 7: System information page: the currently active input sources.

The color of the status LEDs will signal the following:
- the main input source is active, everything OK
- one of the backup sources is active; the state of the backup source is OK
- input source failure; no available backup source

In case of tuner input the status page will also show the relevant tuner settings. You can change these parameters for each output in the main menu item **"Input Source"**.

3. **Audio Levels**: In this field you can see the audio levels of the all available audio outputs. You can change volume levels for each output in the main menu item **Interface Settings→XLR** (see section 7.4).

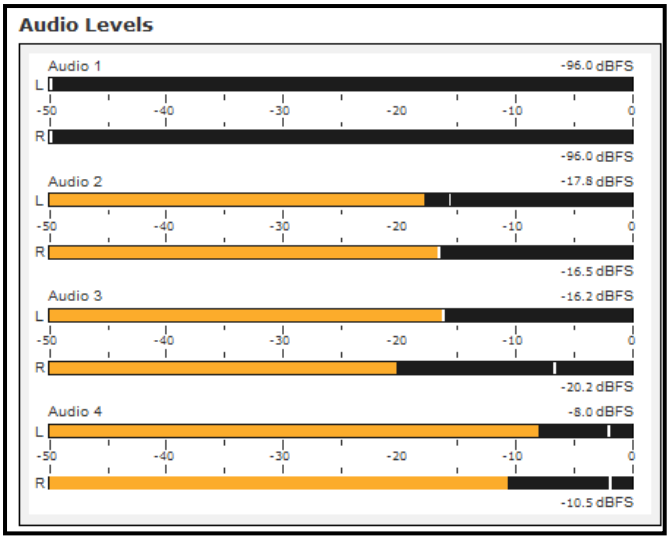


Fig. 8: System information page: Audio Levels.

4. **Tuner State:** In this field you can find the reception information. In case of the reception of a valid DVB-S/S2 signal, network ID (**NID**), tuner state (**State**) and signal bit error rate (**BER**) are shown here. The bar graphs underneath this block represent the channel to noise ratio (**C/N (dB)**) and level of the received signal.

5. **Device run time:** In this field you can find the device run time and date of last system startup.

NOTE: This menu shows only the status of parameters, outputs and inputs, only if they are activated.

LCD-menu: main menu (reception information as stated above only).

11.2. Auxillary and IP Data processing & forwarding

Data processing works similar to the way audio processing does, except it employs different outputs. Data processing in the FlexDSR02+/04+ be extracted from all MPEG2-TS inputs. As is the case with audio processing, all data processing shares the same source.

There are two typical scenarios for data processing:

a) control or other data being transported in ancillary data sections of the audio streams or in the private data sections of the MPEG2 TS, i.e. RDS data for radio transmission or satellite in-band control data to control, among other things, relays or
b) IP data encapsulated in MPEG TS (MPE) or DVB-S2 satellite stream (GSE).

The FlexDSR02+/04+ is able to handle both scenarios and to extract, filter and forward IP data from MPE sections in the MPEG2 TS to the 1000Base-T interface (see Fig. 9).

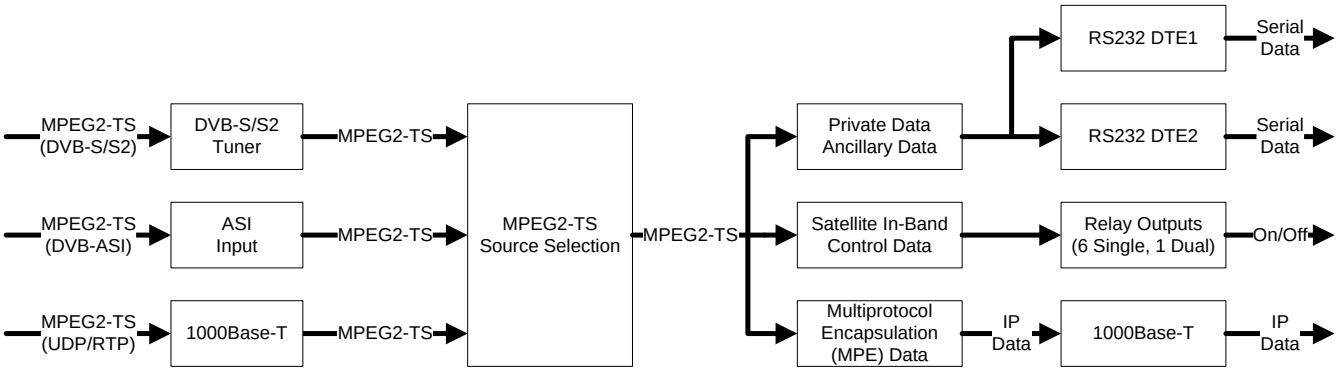


Fig. 9: Data processing in the FlexDSR02+/04+.

11.3. Input Source

In this menu item you can activate and configure input sources for the different outputs (see Fig. 10). The settings for the audio input sources can be centrally controlled via this one separate menu option under **Input Source→Audio Output 1-4.**

For each input source you can activate and configure one main source which serves as a primary input and several backup (secondary) input sources which should replace the original audio source when the original source does not work properly. If backup sources are enabled and configured, they will be automatically switched to in the order they are listed in the menu, also when the previous backup source fail. As soon as the primary input or the previous backup source is reestablished, the system switches automatically back to it. The criteria for switching to the alternative source (e.g. delay time and quality of the signal) and back to the main source can be configured manually via the same menu option under **Input Source→Switch criteria.**

11.3.1. Audio Output 1

This menu item is available under **Input Source→Audio Output 1** and is used to set up the primary as well as 3 secondary (backup) input sources for Audio Output 1.

The following sections describe these configuration options.

11.3.1.1. Main source settings

To activate and to set up the main input source for Audio Output 1 use the following menu options:

1. Activate the **Main source** by ticking the box **Enabled**.

2. Choose one of the following input source options in the dropdown list **Main source:**

    - Transport Stream as a main input source
    - Audio over IP (UDP), Channel 1, as a main input source
    - Audio over IP (Icecast). 1. Server as a main input source
    - Internal Storage as a main input source (if available)
    - n/a – not available

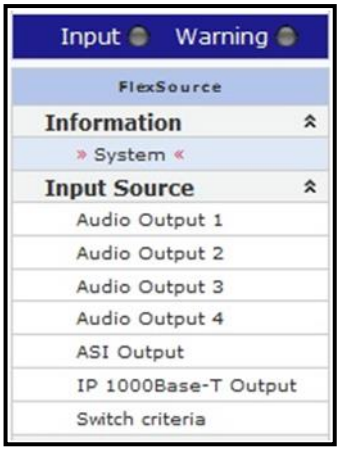


Fig. 10: Input source settings menu.

11.3.1.1.1. Transport Stream as an input source

If you choose "Transport Stream" as a main input source for Audio Output 1 and want to set up this input, select one of the following source options in the dropdown list **TS Source**:

a) SAT Tuner
b) ASI
c) IP 1000Base-T

To set up SNMP monitoring functions for Transport Stream see section 11.3.1.3.

a) SAT Tuner as a TS Source

If you choose „SAT Tuner" as an input source for the transport stream, the following menu will appear:

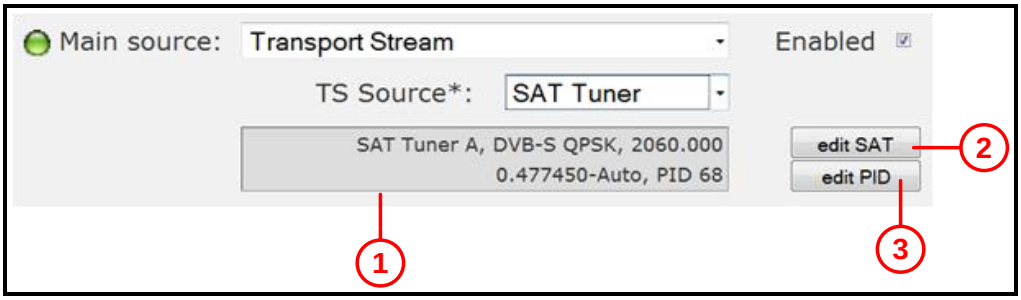


Fig. 11: TS Source for Audio Output: SAT Tuner.
(1) – Current setting of the SAT Tuner
(2) – Satellite Tuner Settings
(3) – Configuration of the individual PIDs containing MPE data to be processed

In this menu you can:

- set up tuner by clicking edit SAT **(2)**
- set up PIDs by clicking edit PID **(3)**

Set up SAT Tuner Input

This menu item is used to configure all necessary parameters for satellite signal reception.

To open the tuner settings:

1. Select **Input-Source→Audio Output 1**.
2. Choose **Transport Stream** as a main input source.
3. Choose **SAT Tuner** as a TS Source.
4. Click the edit SAT button (see Fig. 11 **(2)**).

⇒ The window SAT Tuner Settings – Main Source appears (see Fig. 12).

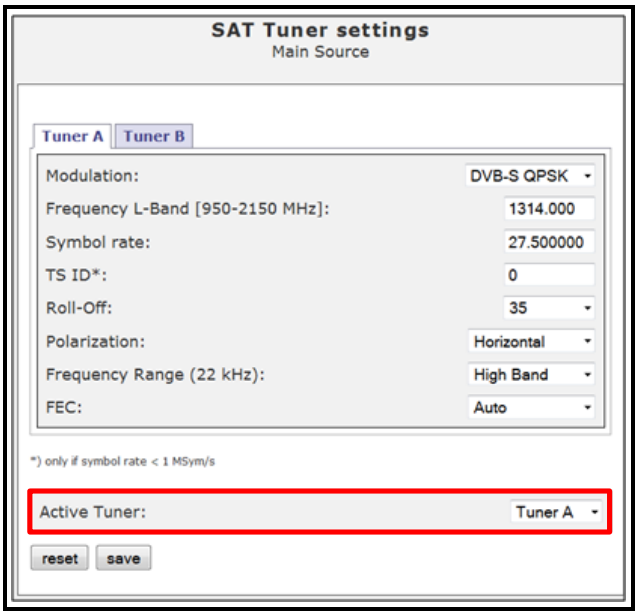


Fig. 12: SAT Tuner settings for TS.

To set up the SAT Tuner for MPEG-TS, enter the following data in the menu fields:

Tuner A/B: Choose between Tuner A and Tuner B on twin tuner boards. (This menu item is only available when device is equipped with a 16APSK tuner board).

Activation: Activate or deactivate tuner in the bottom field by choosing the tuner in the dropdown list (see red box in Fig. 12).

NOTE: You can set up both tuners and save the settings, if the option is available in your device.

Note, that you can activate only one tuner as a main input source at the same time. However, you can activate the second tuner as a backup input (see 11.3.1.2).

Modulation: Select a modulation type of the signal to be received in this dropdown list: DVB-S BPSK, DVB-S QPSK or DVB-S2 XPSK.

Frequency L-Band: Enter the frequency of the signal after it leaves the low noise block converter (LNB) ranging from 950-2150MHz.

NOTE: For standard universal LNBs the frequency is typically 9750MHz lower than the sending frequency for lower band transponders (10700-11750MHz) and 10600MHz lower for upper band transponders (11800-12750MHz), i.e. if the sending frequency of a transponder is 12600, then the frequency L-Band value is 2000MHz, assuming that a universal LNB is used.

Symbol rate: Enter the symbol rate used by the transponder in mega symbols per second (MSym/s).

TS ID:	You can enter Transport Stream ID for low symbol rate transponders with symbol rates below 1MSym/s.
Roll-Off:	Roll-Off factor used by the receiver filter.
Polarization:	Choose either horizontal or vertical polarization used by the transponder or deactivate it in this dropdown list.
Frequency Range:	22kHz signal used to tell the LNB via Digital Satellite Equipment Control (DiSEqC) to pass on lower band (22kHz off) or upper band (22kHz on) signals.
S2 Frame Type and Pilot Mode:	You can use these settings, in order to speed up tuning.
Viterbi (FEC):	Viterbi code puncture rate used by the transponder, if unknown the option "Auto" can be used, resulting in slightly increased tuning times.
PLS:	Physical layer scrambling code in case transmission is scrambled using PLS, for unscrambled transmissions use 0. (This menu item is only available when device is equipped with a 16APSK tuner board).

⇒ Save the settings by clicking the save button.

✓ The RF-LED in the upper right corner and the RF-LED on the front plate, lit up. In case of low symbol rate signals, this can take up to a few seconds to happen.

Incoming signals from the LNB are subject to frequency tolerances, thus check the "CFO Error" under menu item **Status→SAT Tuner**. This value represents the margin by which the entered frequency deviates from the actual frequency. In order to maximize reception quality the CFO error should be minimized.

LCD-menu: Input→Tuner Settings

LCD-menu: Status→Tuner→Signal

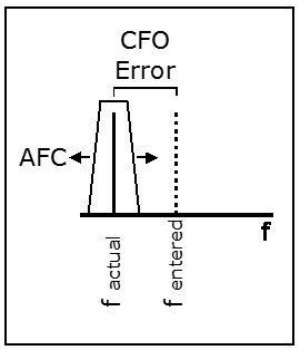


Fig. 13: Determination of the frequency tolerance "CFO Error".

Edit PIDs

In FlexDSR02+/04+ you can manually define the PIDs to be decoded for different TS Inputs:

- SAT Tuner
- ASI
- IP 1000Base-T

To open the PID settings for SAT Tuner:

1. Select **Input-Source→Audio Output 1**.

2. Choose **Transport Stream** as a main input source.

3. Choose **SAT Tuner** as a TS Source.

4. Click the edit PID button (see Fig. 11 **(3)**).

⇒ The window *Demux – Main Source* appears.

This menu item is used to make the necessary settings for distributing and processing of up to three PIDs.

To configure PID settings choose the **mode** of operation:

- SID (automatic)
- PID (manual)

NOTE: You can choose only one mode because the modes are mutually exclusive.

i. Configure SID (automatic)

If you select the automatic mode of operation by service ID (SID) and activate the option button **SID (automatic)**, the following window will appear:

- You can configure one SID for automatic processing. PIDs to be decoded are chosen automatically using the service ID number.
- "1.SID" is associated with the first audio interface group (Analog L1/R1, AES/EBU1).
- Settings take effect only when SID mode is enabled.

ii. Configure PID (manual)

If you select the manual mode of operation and activate the option button **PID (manual)**, the following window will appear:

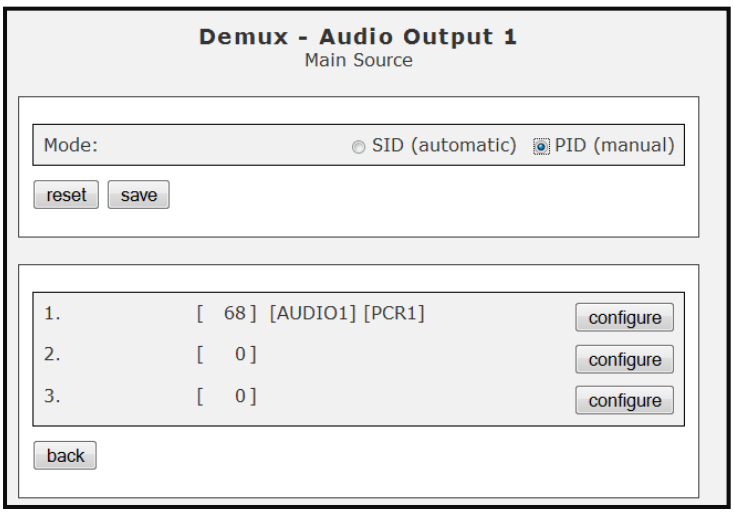


Fig. 14: Demux – Main Source: manual mode of operation for PID configuration.

– Settings take effect only when the **PID (manual)** mode is enabled (see Fig. 14) and saved by clicking the save button.

– You can configure up to three individual PIDs manually for further processing instead of selecting them by a service ID. Manual PID configuration offers advanced and special decoding options.

– To configure PIDs manually, click the configure button.

⇒ The window *Configure* appears (see Fig. 15).

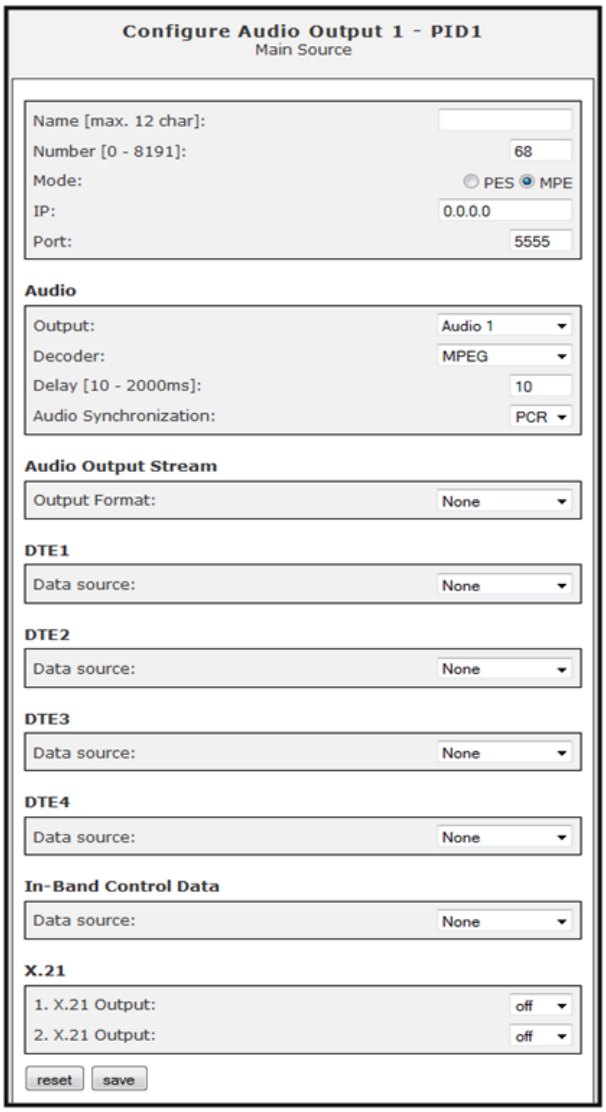


Fig. 15: Manual configuration of PIDs

These settings can also be made via the **LCD-menu**.

To set up PIDs to be decoded, enter the following data in the menu fields (see Fig. 15):

General Data

<u>Prerequisite for MPE: FlexDSR02+/04+ with MPE option</u>

This field is used to define the PID to be decoded. For FlexDSR02+/04+ with MPE option this menu also allows to extract data from a MPEG TS stream encapsulated within MPE.

Name:	Associate a PID with a name using this field.
Number:	PID number to be processed.
Mode:	Choose between packetized elementary stream (PES) for standard audio and data decoding or multi protocol encapsulation (MPE) decoding when the PID is containing multiprotocol encapsulated IP data (if available).
IP:	Destination IP address of MPE IP audio stream to be decoded.
Port:	Destination Port of MPE IP audio stream to be decoded.

Audio

Prerequisite for Analog/Digital/Headphone 2 and PCR2: second audio interface group

In case the selected PID is an audio data carrying PID, outputs for the decoded audio can be configured in this block.

Output:	Assign outputs to the decoded audio signal. Note that each output can only be assigned once and has to be reassigned by first unchecking the box in the currently assigned PID first, before being able to assign it to a new PID. Note also that you choose the correct outputs, if a PCR is used (see Audio 1-2 Synchronisation above).
Decoder:	Choose the audio decoder to be used in case there is more than one option.
Delay:	Choose an audio delay that is applied to the output signal.
Audio 1-2 Synchronisation:	Choose the type of synchronization for the audio data within the first and the second audio interface group. You can assign a PCR (Program Clock Reference) to a PID or disable this option by choosing „off‟. Note that each PCR can only be assigned once and has to be reassigned by first unchecking the box in the currently assigned PID first, before being able to assign it to a new PID. There is no explicit need to assign a PCR, however in doing so the time before processing starts can be decreased and stability is increased. Note also that PCR 1 is associated only with the first audio interface group (Analog L1/R1, AES/EBU1 and X21.1), PCR 2 with the second group (provided hardware option was ordered).

Audio Output Stream

Prerequisite: IP audio streaming server for monitoring

This function can be used to stream audio data streams (one per PID) over IP for monitoring purposes. Streams are based on the SHOUTcast or Icecast protocol and contain the original, unprocessed (audio) data contained in the PID. To receive streams clients like Winamp or VLC can be used, using the 10/100-Base-T's IP address and the port configured for this stream (see below). Note that it is possible to stream other data than audio, as long as the receiving application extracts the data from the Icecast stream. This however is not supported by the manufacturer. Note also that the 10/100-Base-T Ethernet interface is used for audio streaming, so the bandwidth might not suffice for data other than audio.

Output Format	Enable audio streaming for current PID by choosing “Icecast” or disable it by choosing “None”. The streaming protocol used by Icecast is TCP.
Streaming Port:	Choose port for audio streaming server.

DTE1 and DTE2

Prerequisite for RDS over IP: IP data output

These two fields can be used to configure DTEs 1 and 2 to output data extracted from the PID. DTEs 3 and 4 are optional.

Data source:	Choose type of data to be output or “None” to disable data output. Note that DTEs can only be used once; in order to reassign a DTE it needs to be deactivated in the PID it is currently being used in.
Parameter:	Depending on the data source additional parameters can be set.
Enable Data over IP (e.g. RDS):	Enable or disable IP streaming of RDS UECP data extracted from data source over the 10/100-Base-T network interface. The stream is send using UDP. Note that when RDS over IP is enabled, RDS data is still put out on the DTE interface.
Destination IP:	Destination IP address of RDS data stream.
Destination Port:	Destination Port of RDS data stream.

In-Band Control Data

This block can be used to configure In-Band Control Data processing, in case the PID is carrying such data. 2wcom’s Satellite In-Band Control System can be used to remotely control DSR0x’s by inserting the control data into the transport stream. Remote control can be used for example to update settings, update firmware, upload files or switch outputs and relays. For further information on the Satellite In-Band Control System please contact us.

Data Source:	Choose type of data to be processed or “None” to disable data processing for In-Band Control Data.
Parameter:	Depending on the data source additional parameters can be set.

⇒ Save the settings by clicking the save button.

b) ASI as a TS Source

If you choose „ASI“ as an input source for the transport stream, the following menu will appear:

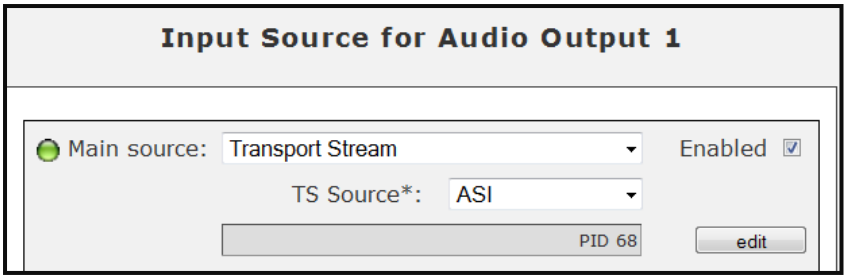


Fig. 16: TS Source for Audio Output: ASI.

In this menu you can similarly to SAT Tuner settings choose the mode of operation and configure up to three PIDs for ASI as a TS Source.

> **NOTE**: Independently from the chosen TS Source, the last saved PIDs' settings are displayed in the PID configuration menu.
>
> You can change these settings at any time.

To open the PID settings for ASI Tuner:

1. Select **Input-Source→Audio Output 1.**
2. Choose **Transport Stream** as a main input source.
3. Choose **ASI Tuner** as a TS Source.
4. The current settings are displayed in the grey field near the edit button.
5. Click the edit button (see Fig. 16) to open the setting window.
6. To configure PIDs and SIDs see the instructions in section Edit PIDs on page 33.

c) IP 1000Base-T as a TS Source

Prerequisite: Transport stream input over 1000Base-T

If you choose processing of an incoming transport stream via 1000Base-T Ethernet input, the following menu will appear:

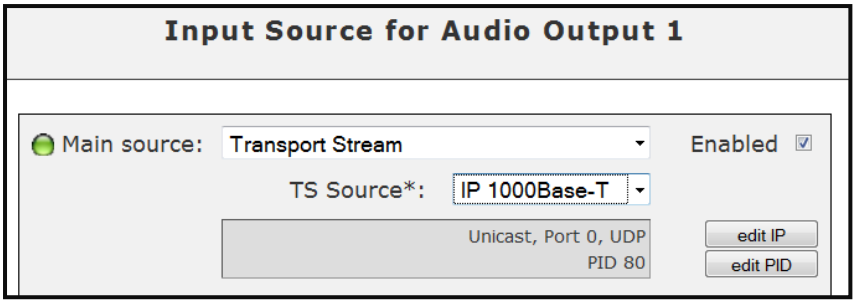


Fig. 17: TS Source for Audio Output: IP 1000Base-T.

In this menu you can:

- edit IP
- edit PIDs

Edit IP 1000Base-T Input

In this menu item you can configure the 1000Base-T Ethernet input parameters for one UDP or UDP/RTP encapsulated Transport Stream over IP.

The following instructions will help you:

- to open the IP 1000Base-T settings
- to configure 1000Base-T input

To open the IP 1000Base-T settings:

1. Select **Input-Source→Audio Output 1**.
2. Choose **Transport Stream** as a main input source.
3. Choose **IP 1000Base-T** as a TS Source.
4. Click the edit IP button (see Fig. 17).

⇒ The window *IP 1000Base-T – Main Source* appears:

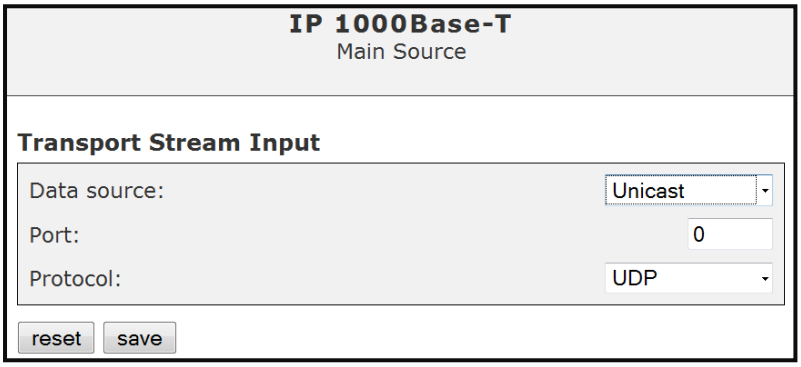


Fig. 18: Configuration of the TS Input over IP 1000Base-T as a main source for Audio Output.

To configure the 1000Base-T Ethernet input parameters, enter the following data in the menu fields:

Data source:	Use this option to declare the transmission method of the incoming transport stream, Unicast (point to point) or Multicast (point to multipoint)
Port:	Port number that incoming transport streams need to be sent to for further processing.
Protocol:	Protocol type used to encapsulate incoming transport stream. Needs to be set manually for correct decoding.

NOTE: It is always possible to ping the interface, even if its activation is disabled.

⇒ Save the settings by clicking the save button.

Edit PIDs for IP 1000Base-T Input

In this menu you can similarly to SAT Tuner settings choose the mode of operation and configure up to three PIDs for ASI as a TS Source.

NOTE: Independently from the chosen TS Source, the last saved PIDs' settings are displayed in the PID configuration menu.

You can change these settings at any time.

To open the PID settings for IP 1000Base-T:

1. Select **Input-Source→Audio Output 1.**
2. Choose **Transport Stream** as a main input source.
3. Choose **IP 1000Base-T** as a TS Source.
4. The current settings are displayed in the grey field near the edit IP button.
5. Click the edit IP button (see Fig. 17) to open the setting window.
6. To configure PIDs and SIDs see the instructions in section Edit PIDs on page 33.

11.3.1.1.2. Audio over IP (UDP) as an input source

This menu item is used to configure the 1000Base-T Ethernet input parameters for corresponding Raw Audio over IP streams.

To configure the 1000Base-T input for Audio over IP output:

1. Select **Input Source→Audio Output 1.**
2. Choose **Audio over IP (UDP). Channel 1** as a main input source for Audio Output 1 as described in section 11.3.1.1. The following menu appears:

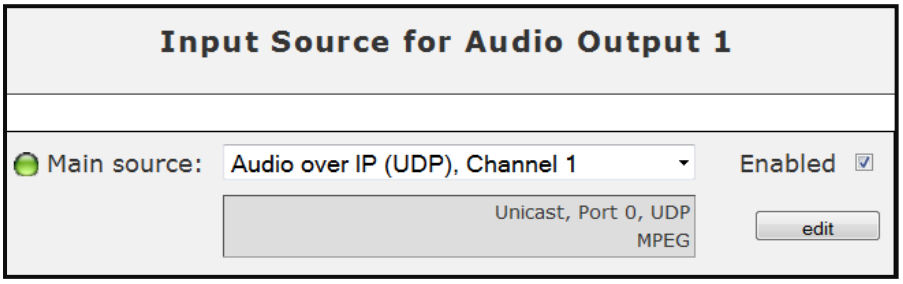


Fig. 19: Main source for Audio Output 1: Audio over IP (UDP).

3. Click the edit button.

4. Enter the following data in the menu fields:

Data source:	Use this option to declare the transmission method of the incoming IP audio stream, **Unicast** (point to point) or **Multicast** (point to multipoint).
Port:	UDP Port number that incoming raw audio streams need to be sent to for further processing.
Protocol:	Protocol type used to encapsulate incoming transport stream. Needs to be set manually for correct decoding.
Decoder:	Choose the audio decoder to be used in case there is more than one option.
Delay:	Time in milliseconds before audio is put out.

To set up SNMP monitoring functions for Audio over IP Output see section 11.3.1.3

11.3.1.1.3. Audio over IP (Icecast) as an input source:

<u>Prerequisite for second client: second audio interface group</u>

In this menu item you can define one Icecast compatible audio streaming server per a corresponding channel.

To configure the 10/100Base-T input for Audio over IP (Icecast) output:

1. Select **Input Source→Audio Output 1.**

2. Choose **Audio over IP (Icecast). 1. Server** as a main input source for Audio Output 1 as described in section 11.3.1.1. The following menu appears:

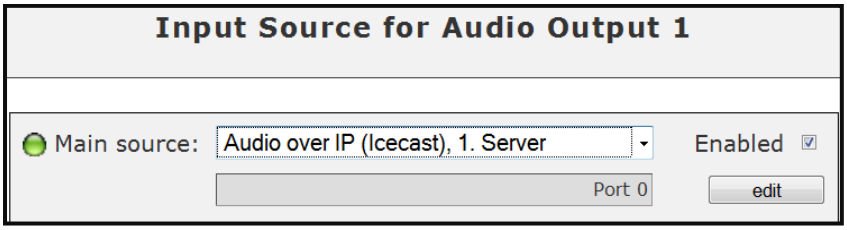


Fig. 20: Main source for Audio Output 1: Audio over IP (UDP).

3. Click the edit button.

4. Enter the following data in the menu fields:

Name:	Assign a name to the Icecast server for better reference.
IP or URL:	Icecast server IP address or URL, i.e. "247.56.38.14" or "www.backup-audio.com"
Port:	Icecast server port, i.e. "8080".
Ignore First Streaming data:	Ignore the first 0 to 20 seconds of audio data. Can be used to ignore burst audio data transfers that usually start each

	new audio data transmission from Icecast servers, after a few seconds, the incoming data is more streamlined, resulting in better and especially synchronized audio playback.
Delay:	Delay time from 10 to 2000ms before playback is started. Note that the delay timer is started after the "ignore first streaming data timer" has expired.

NOTE: It is necessary to configure a gateway under "Network Settings→TCP/IP" in order for the clients to reach the servers.
Clients use the 10/100-Base-T Ethernet interface (control and monitoring). If an URL is chosen instead of an IP address at least one DNS server needs to be configured ("Network Settings→TCP/IP").

To set up SNMP monitoring functions for Audio over IP Output see section 11.3.1.3.

11.3.1.1.4. Internal Storage as an input source

<u>Prerequisite: Internal Storage Option</u>

The internal storage can be used as a primary source to store audio files to be played back to the correspondent audio channel. Audio files can be uploaded to the internal storage using a FTP client connecting to the 10/100Base-T interface (same as web interface) using the login data of the web interface. Alternatively, the 2wcom Satellite In-Band Control System can be used to download files via satellite onto the internal storage. For further information on 2wcom's Satellite In-Band Control System contact us.

To configure a file for an audio slot:

1. Select **Input Source→Audio Output 1.**
2. Choose **Internal Storage** as a main input source for Audio Output 1 as described in section 11.3.1.1.
3. Click the edit button.
4. Select the audio file to be played back from the dropdown list **File**.
5. Save the settings by clicking save.

NOTE: Upload a file to the internal storage directory, in order to make a file visible in the dropdown list.

To set up SNMP monitoring functions for internal storage see section 11.3.1.3.

11.3.1.2. Backup source settings

Additionally to the main source it is possible to define up to three backup sources in case of an input source failure. All possible main input sources can be used as backup sources (see

section 10.1.2): Tuner Transport Stream (TS), ASI TS, IP 1000Base-T TS, Audio over IP (UDP), Audio over IP (Icecast) and audio files uploaded to the Internal Storage.

There are some examples for different stetting combinations, which have to be regarded:

1. Different sources (see Fig. 21):

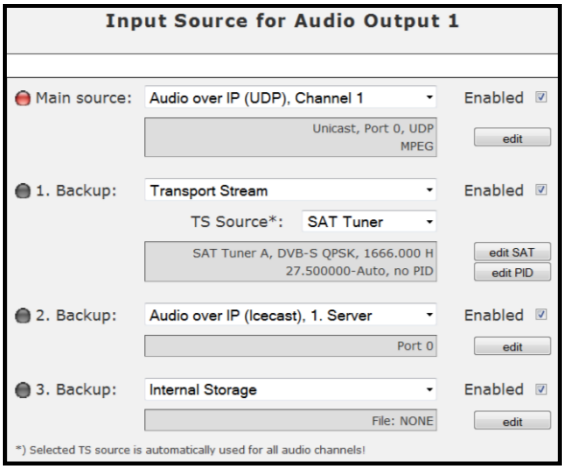


Fig. 21: Example for different backup source settings.

For example, "Audio over IP (UDP)" is chosen as the main source for Audio Output 1 and the Tuner Transport Stream is used as the first backup source. If even the tuner input does fail, an Icecast server and the internal storage are configured as additional backups. It is possible to temporarily disable a chosen input source without the need to alter the source order; when e.g. disabling the main source in the above example (Fig. 21), the FlexDSR02+/04+ will immediately switch to the backup source so that you are able to check the corresponding settings.
If you have configured different main and backup sources, the system will be continuously checking for all available prior sources and switches automatically back as soon as the signal is good again.

NOTE: The device will only switch, if the backup source is available.

2. Several identical sources (see Fig. 22):

For example, two identical input sources for Audio Output 1 are chosen, e.g. SAT Tuner as a main source and as the first backup with different frequencies. If the main source fails, the system switches to the first backup by tuning to the configured frequency.

But note (!), that the system is not checking, if the main source (also SAT Tuner) is again available, because there is only one tuner and it cannot tune on different frequencies at the same time. Therefore, the second SAT Tuner backup remains active, till it fails. The system does not switch back automatically to the main source.

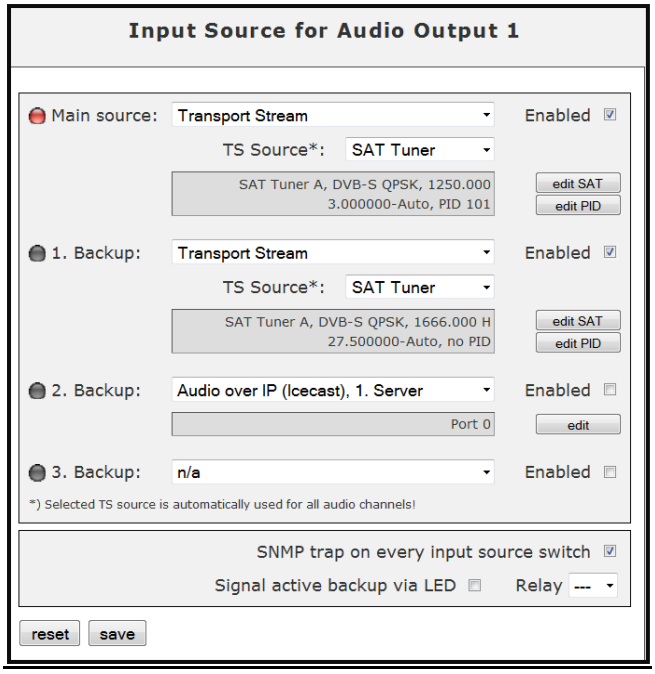


Fig. 22: Example for identical main and backup input source.

This applies to all other identical input sources: the system switches further to the next or prior source automatically only if the active backup source fails.

You can only switch back to the main source, if you re-enable the active backup source manually.

3. Two identical backup sources and one different/distinguishing backup source (Fig. 23):

If you set up two identical sources as well as one different backup source and both inputs fail, the system switches to the different backup and continues checking the prior sources.

The red blinking lamp near the source means, that this source is now being checked for the signal quality.

If one of the identically configured prior sources is again available, the system switches to it automatically.

You can configure backup sources in a similar way as the main source because all sources can be used also as secondary inputs.

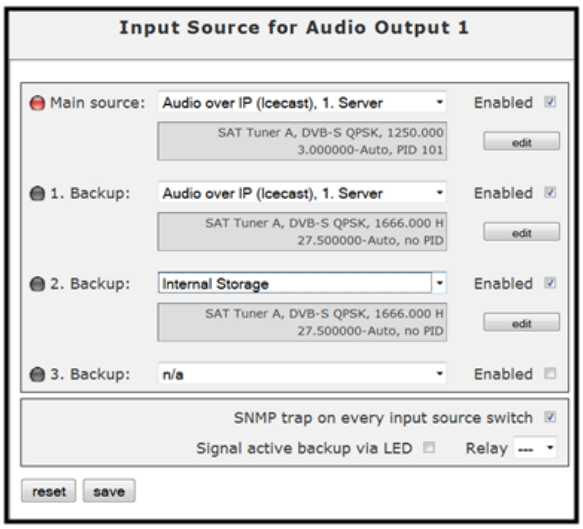


Fig. 23: Example for two identical and one different input source.

To configure the backup sources:

1. Select **Input Source→Audio Output 1.**

2. In the red box in Fig. 24 you can activate and configure up to three backup sources.

3. Follow the same steps as in the main source settings in section 11.3.1.1.

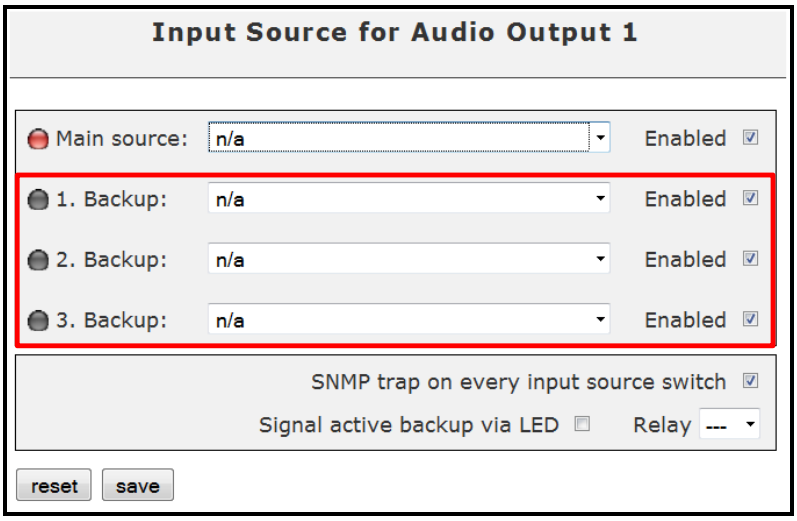


Fig. 24: Backup source settings for Audio Output 1.

For each source you can set up the monitoring functions via SNMP manager (see section 11.3.1.3).

11.3.1.3. Activate Monitoring Function

In every settings menu for Input Sources there is a field (e.g. under the red frame in Fig. 24), in which you can activate monitoring function of the SNMP manager for the current input source and enable the signal for active backup via LED which will be blinking red, if a backup source is active. You can also set up the relays' number for alarm signal. Note that you can choose only the relay, which is activated under **Interface Settings → Relay** for alarm.

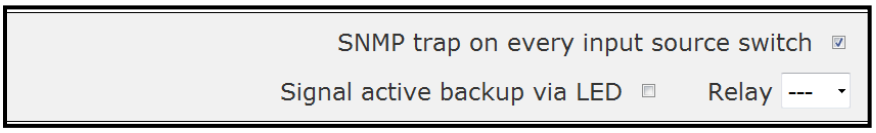


Fig. 25: Monitoring activation menu.

11.3.2. Audio Output 2-4

NOTE: If the main input source for audio outputs is Transport Stream, all audio outputs can use only one inputexcept for the internal storage (see section 10.1.1). It means that you can only set up the same TS Source for all audio outputs (1-4): SAT Tuner, ASI or IP 1000Base-T.

You can set the primary and secondary Input Sources for the Audio Output 2 in FlexDSR02+ and for the Audio Output 3-4 in FlexDSR04+ in a similarly way as for Audio Output 1. Follow the analog steps for the configuration of the Audio Output 1 in section 11.3.1 and apply the instructions correspondently for the Audio Channel 2-4 and IP Server 2-4.

11.3.3. ASI Output

This menu item is used to set up the primary (main) as well as two secondary (backup) data input sources for ASI Output.

This menu item is available under **Input Source→ASI Output** and is used to configure the DVB-ASI output.

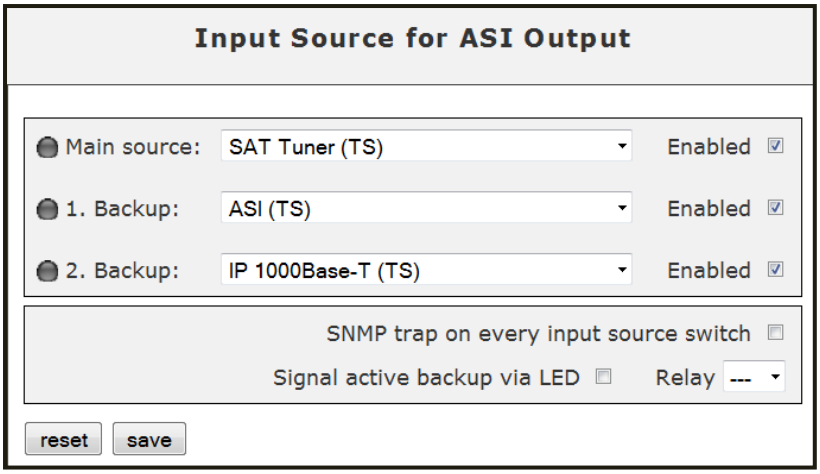


Fig. 26: Input Source Settings for ASI Output.

1. Activate the main and backup sources for the DVB-ASI output by ticking **Enabled.**

2. Choose the main and two backup sources of the MPEG2 transport stream from the dropdown lists to be transmitted over DVB-ASI: SAT Tuner, ASI or IP 1000Base-T.

> **NOTE:** Don't set up identical sources.
> Use three different input sources to ensure seamless transmission.

3. Save the settings by clicking the save button.

For ASI Output you can also set up SNMP monitoring (see section 11.3.1.3).

11.3.4. IP 1000Base-T Output

This menu item is used to set up the primary (main) as well as two secondary (backup) data input sources for IT 1000Base-T Output.

This menu item is available under **Input Source→IP 1000Base-T Output** and is used to configure the data source for the MPEG2 transport stream and the targets IP address data. IP address parameters for the Gigabit-Ethernet output itself can be configured under **Network Settings→TCP/IP** (see section 11.7.1)**.**

To configure IP 1000Base-T Output, follow the same steps as for ASI Output (see section 11.3.3):

1. Activate the main and backup sources for the IT 1000Base-T Output by ticking **Enabled.**

2. Choose the main and two backup sources of the MPEG2 transport stream from the dropdown lists to be transmitted over Gigabit-Ethernet output: SAT Tuner, ASI or IP 1000Base-T.

> **NOTE:** Don't set up identical sources.
> Use three different input sources to ensure seamless transmission.

3. Save the settings by clicking the save button.

For IT 1000Base-T Output you can also set up SNMP monitoring (see section 11.3.1.3).

11.3.5. Switch Criteria

This menu item is available under **Input Source→Switch criteria** and is used to define the criteria for switching between the main and different backup input sources:

11.3.5.1. Switch Criteria for SAT Tuner

To define the switch criteria for SAT Tuner input source:

1. Select **Input Source→Switch criteria.**

⇒ The following menu for **Tuner (TS)** appears (see Fig. 27):

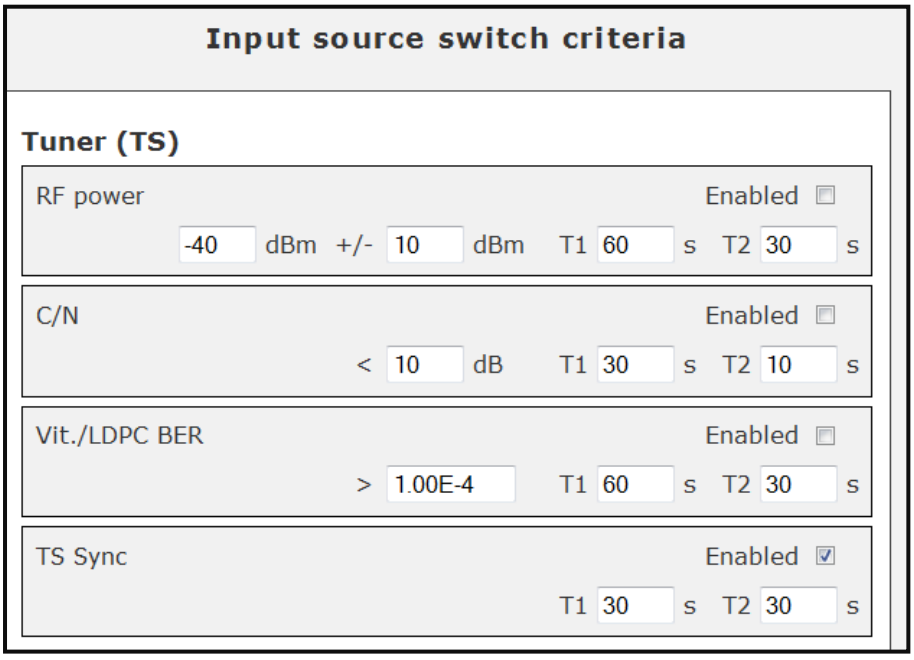


Fig. 27: Switch criteria for main and backup input source - SAT Tuner

2. Enter the following data in the menu field **Tuner (TS)**:

RF power	– Activate the criteria by ticking **Enabled**. – Enter the acceptable interval "good" for radio frequency (minimum/maximum). If the signal does not match to this interval, the system will regard it as "bad" and will switch to the backup source. – Define the delay time T1 (in seconds) when the system should switch to the backup source, if the RF signal is "bad". – Define the time T2 (in seconds), how long a "good" RF signal should be available, before the system switches back to the main source.

C/N	– Activate the criteria by ticking **Enabled.** – Enter the minimal "good" value for the Channel to Noise Ratio. The signal under this defined value will be regarded by the system as "bad", so that after the delay time T1 it will switch to the backup source. – Define the time T2 (in seconds), how long a "good" C/N signal should be available, before the system switches back to the main source.
Vit./LDPC BER	– Activate the criteria by ticking **Enabled.** – Enter the maximal "good" value for the Bit Error Rate, e.g. $1{,}00 \cdot e^{-4}$. The received signal above this defined value will be regarded by the system as "bad", so that after the delay time T1 it will switch to the backup source. – Define the time T2 (in seconds), how long a "good" BER signal should be available, before the system switches back to the main source.
TS Sync	– Activate the criteria by ticking **Enabled.** – Define the delay time T1 (in seconds), when the system should switch to the backup source, if TS synchronization fails. – Define the time T2 (in seconds), how long TS synchronization should be available, before the system switches back to the main source.

3. Save the settings by clicking the save button on the bottom of the page.

NOTE: If you define several switching criteria for SAT Tuner, the system will switch to the backup source, as soon as at least one enabled function is applied. However, the system will switch back to the main source, only when all defined criteria for switching back are again fulfilled.

11.3.5.2. Switch criteria for ASI Input (TS)

To define the switch criteria for ASI input source:

1. Select **Input Source→Switch criteria.**

⇒ The following menu for **ASI Input (TS)** appears (see Fig. 28):

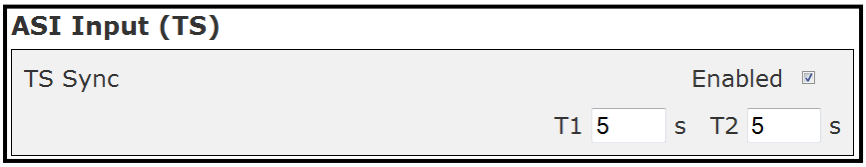


Fig. 28: Switch criteria for main and backup input source - ASI Input (TS).

2. Enter the following data in the menu field **ASI Input (TS)**:

TS Sync	– Activate the criteria by ticking **Enabled.** – Define the delay time T1 (in seconds), when the system should switch to the backup source, if TS synchronization fails. – Define the time T2 (in seconds), how long TS synchronization should be available, before the system switches back to the main source.

3. Save the settings by clicking the save button on the bottom of the page.

11.3.5.3. Switch criteria for IP 1000Base-T Input (TS)

To define the switch criteria for IP 1000Base-T input source:

1. Select **Input Source→Switch criteria.**

⇒ The following menu for **IP 1000Base-T Input (TS)** appears (see Fig. 29):

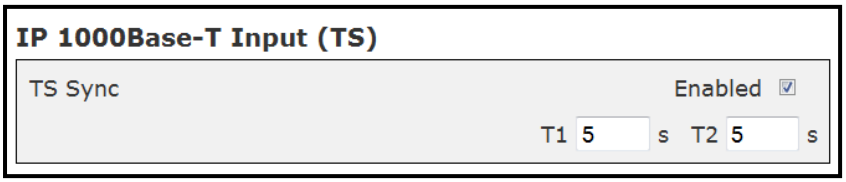


Fig. 29: Switching criteria for main and backup input source - IP 1000Base-T Input (TS)

2. Enter the following data in the menu field **IP 1000Base-T Input (TS)**:

TS Sync	– Activate the criteria by ticking **Enabled.** – Define the delay time T1 (in seconds), when the system should switch to the backup source, if TS synchronization fails. – Define the time T2 (in seconds), how long TS synchronization should be available, before the system switches back to the main source.

3. Save the settings by clicking the save button on the bottom of the page.

11.3.5.4. Switch criteria for Audio over IP (UDP)

To define the switch criteria for Audio over IP (UDP) Input:

1. Select **Input Source→Switch criteria.**

⇒ The following menu for **Audio over IP Input (UDP)** appears (see Fig. 30):

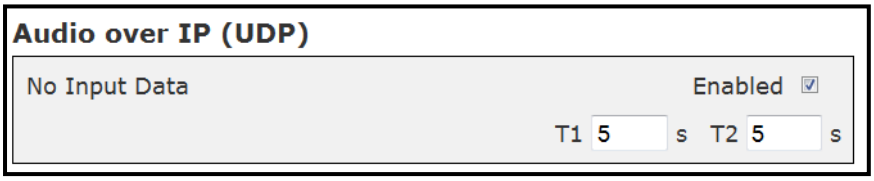


Fig. 30: Switching criteria for main and backup input source – Audio over IP Input (UDP).

2. Enter the following data in the menu field **Audio over IP (UDP)**:

No Input Data	– Activate the criteria by ticking **Enabled.** – Define the delay time T1 (in seconds), when the system should switch to the backup source, if no input data is being received. – Define the time T2 (in seconds), how long the input data should be available, before the system switches back to the main source.

3. Save the settings by clicking the save button on the bottom of the page.

11.3.5.5. Switch criteria for Audio over IP (Icecast)

To define the switch criteria for Audio over IP (Icecast):

1. Select **Input Source→Switch criteria.**

⇒ The following menu for **Audio over IP Input (Icecast)** appears (see Fig. 31):

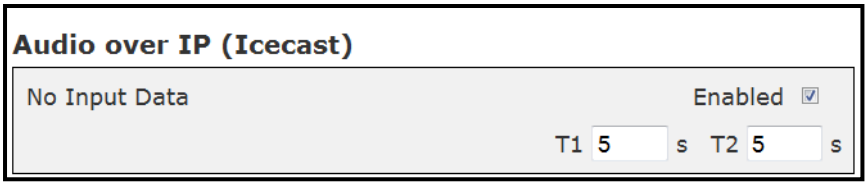


Fig. 31: Switching criteria for main and backup input source – Audio over IP Input (Icecast)

2. Enter the following data in the menu field **Audio over IP (Icecast)**:

No Input Data	– Activate the criteria by ticking **Enabled.** – Define the delay time T1 (in seconds), when the system should switch to the backup source, if no input data is being received. – Define the time T2 (in seconds), how long the input data should be available, before the system switches back to the main source.

3. Save the settings by clicking the save button on the bottom of the page.

11.3.5.6. Switch criteria for Internal Storage

To define the switch criteria for Internal Storage:

1. Select **Input Source→Switch criteria.**

The following menu for **Internal Storage** appears (see Fig. 32).

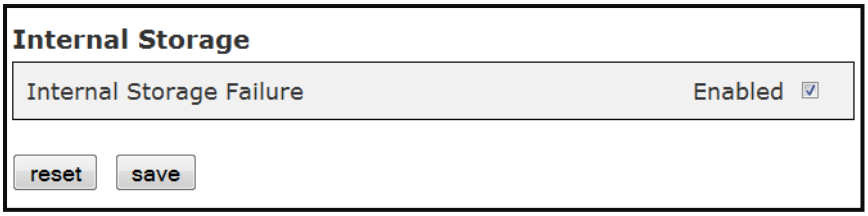


Fig. 32: Switching criteria for main and backup input source – Internal Storage.

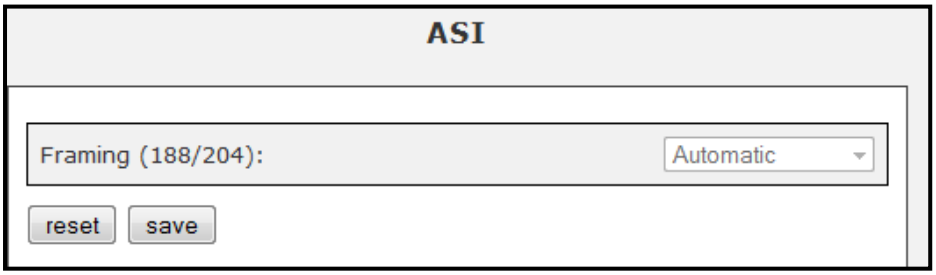
2. Activate the criteria by ticking **Enabled** in the menu field **Internal Storage**, and the system will switch to the backup source as soon as internal storage fails.

3. Save the settings by clicking the save button on the bottom of the page.

11.4. TS Output Settings

11.4.1. ASI: configuration of DVB-ASI output

This menu item is available under **TS Output Settings→ASI** and is used to configure framing for the DVB-ASI output. The TS framing is usually 188 bytes long and can be enforced to 204 bytes. However, the default ASI output configuration "Automatic" is already set by the system:



The main settings for the DVB-ASI output can be adjusted under **Input Source→ASI Output.**

11.4.2. IP 1000Base-T: Configuration of the Gigabit-Ethernet MPEG-TS output

This menu item is available under **TS Output Settings→IP 1000Base-T** and is used to configure the data source for the MPEG2 transport stream and the target IP address data. IP address parameters for the Gigabit-Ethernet output itself can be configured under **Network Settings→TCP/IP**.

Enter the following data in the menu field IP 1000Base-T:

Destination address:	Destination IP address.
Destination port:	Destination UDP port. Usually 1234 for DVB streaming.
Source port:	Sender UDP port.
Protocol:	MPEG2 transport stream encapsulation, either UDP only or UDP/RTP. Note that with UDP/RTP, RTCP packets are generated also and send in 5 second intervals.

⇒ Save the settings by clicking the save button.

11.5. TS Processing

11.5.1. MPE Demux: demultiplexing of MPE data

Prerequisite: MPE demux option

This menu item is available under **TS Processing→MPE Demux** and is used to make the necessary settings for distribution of IP packets to an attached IP network by processing of up to 16 PIDs containing MPE data (see Fig. 33).

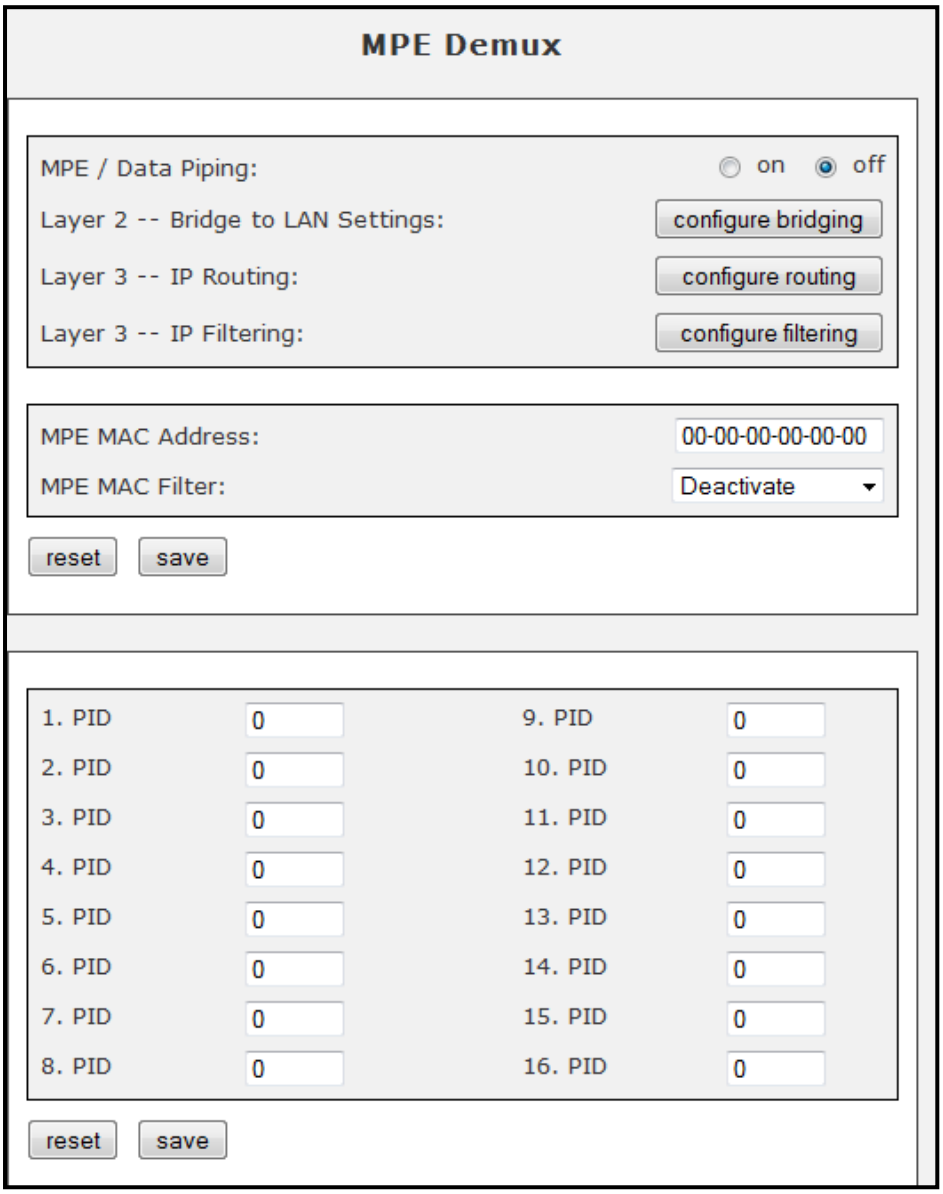


Fig. 33: MPE Demux menu.

Multiprotocol Encapsulation (short MPE), defined in EN 301 192, allows among other things, to transport IP datagrams using the MPEG transport stream (TS). IP datagrams are fitted into MPE sections, which in turn are fitted into TS-size packets and later multiplexed into the stream. On the receiver side, MPE sections are reassembled and IP datagrams are restored for further processing, usually to be sent into a connected network. This for instance is used to provide asymmetric internet services via satellite, where the downlink is provided using MPE and a telephone modem as an uplink. The FlexDSR02+/04+ is also able to decode MPE IP datagrams that contain audio data.

In order to control distribution of data, as all receivers receive the same data, MPE sections include a DVB Media Access Control (MAC) address, similar to the Ethernet MAC address. This DVB MAC address can be used to filter MPE sections, because each receiver can be given a unique DVB MAC address and receivers with no corresponding address will drop the section in question. Filtering can be applied to target single, a group of or all devices by selecting how many of the DVB MAC address bytes are used for filtering by the receiver. Note, that filtering is always setup and applied on the receiving end, not by the sending side.

Decoded IP packets are put out on the 1000Base-T Interface.

To configure MPE demultiplexing, enter the following data in the menu field in Fig. 33:

In the first block, general settings are made and packet filtering can be set up.

MPE / Data Piping:	Enable or disable MPE demultiplexing functionality.
Layer 2 -- Bridge to LAN Settings	Click on [configure filtering] to get to the sub-menu to set up Layer2 bridging. See below for further explanation.
Layer 3 IP Routing	Click on [configure routing] to get to the sub-menu to set up Layer 3 routing. See below for further explanation.
Layer 3 IP Filtering	Click on [configure filtering] to get to the sub-menu to set up Layer 3 filtering. See below for further explanation
MPE MAC Address:	Six byte DVB MAC address in hexadecimal representation. Note that each byte has to be represented by two characters, i.e. hex "0" by "00", 12 characters in total. The address can be entered with or without dashes in between each byte, as they will be added automatically upon successful saving. Example: "FE-00-11-99-DC-BA"
MPE MAC Filter:	Defines how many of the DVB MAC address bytes (MPE MAC Address) of the receiver are compared to the MAC address included in the MPE table. Options are no filtering (deactivate) or one to six bytes, counting from most significant byte to least significant byte, i.e. a setting of 2 bytes will only compare the "FE-00" portion of above example with the address in the MPE section table.

⇒ Save the settings by clicking the [save] button.

In the second block, the individual PIDs containing MPE data to be processed are configured.

PID:	Up to 16 PIDs containing MPE sections can be configured for MPE demultiplexing. PIDs are entered in decimal format. In order to deactivate MPE demultiplexing for a certain PID, set the PID to 0. Entering a wrong PID has no negative effect, apart from using up one demultiplexing slot.

⇒ Save the settings by clicking the [save] button.

NOTE: MPE is decoded from the same source, that is used in "**Demux**" (see menu item Edit PIDs on page 33).

11.5.1.1. MPE Packet Filtering in General

The following Fig. 34 illustrates how MPE IP packets are filtered:

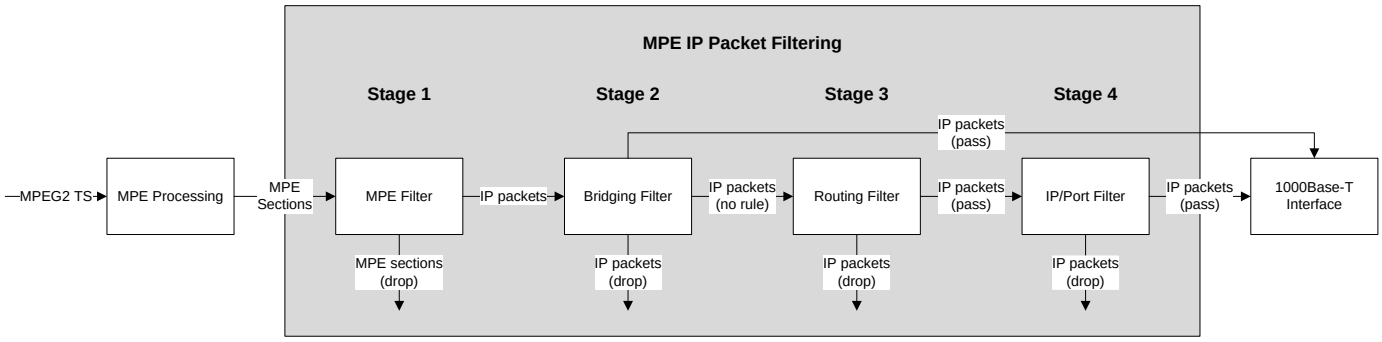


Fig. 34: MPE Packet Filtering.

There are four filtering stages an IP packet can pass through:

Stage 1	MPE sections are first compared with the MPE MAC Filter. If a section passes through the filter, the MPE section is disassembled and the included IP packet is forwarded to the next stage. MPE sections that do not pass this filter are dropped.
Stage 2	The destination address of the IP Packet is checked for type and then compared with the Layer 2 bridging table. If the type of the destination address (unicast, multicast or broadcast) is deactivated, the packet is dropped, otherwise the address is compared to the bridging table and the packet will be dropped or passed on to the 1000Base-T interface. If there is no active rule, the packet is passed to the next stage.
Stage 3	In this stage rules can be set up to further narrow down packet output. A general rule regarding Unicast or Multicast can be applied or if those rule don't apply or are activated, IP packets can be filtered by source and destination IP address ranges. Packets that pass through this filter stage are then passed on to the last stage, others are dropped.
Stage 4	The last stage is used to filter outgoing traffic by IP address and/or port of source and/or destination address. Packets that pass the filter are then passed on to the 1000Base-T interface.

11.5.1.2. MPE Layer 2 - Bridge to LAN Settings

This menu is used to configure MPE Layer 2 bridging (see Fig. 35).

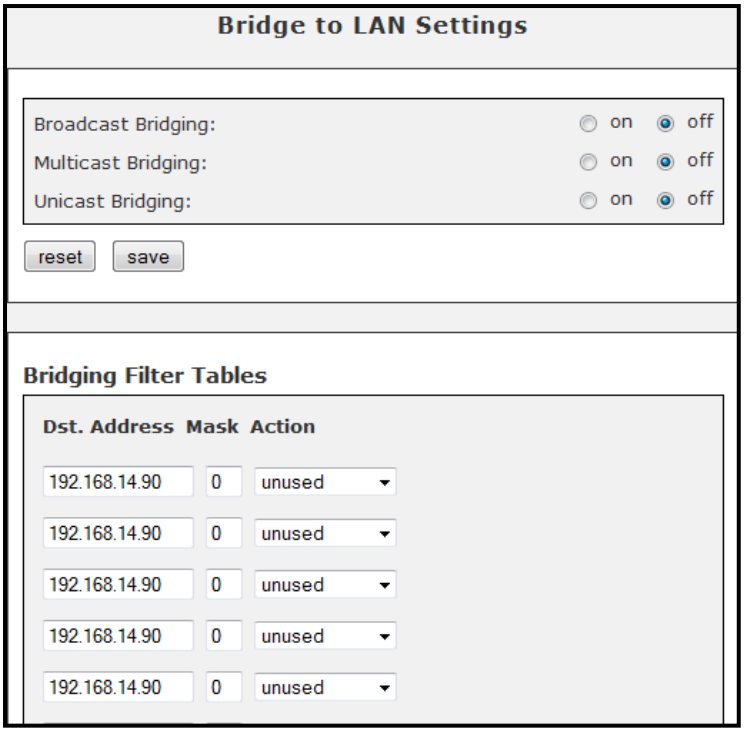


Fig. 35: MPE Demux - Menu with Bridge to LAN Settings.

As there are no MAC addresses in multiprotocol encapsulated IP packets, the destination IP addresses are used as a. First of all, bridging can be enabled for broadcast, multicast and/or unicast packets. If a packet falls under one of these three categories and the category is enabled, the packet is then compared to the bridging filter table. Packets can either be accepted or removed by the filter. If accepted, a packet is then forwarded to the 1000Base-T Interface. Packets in an enabled category that have no filter rule are passed on to the routing filter.

Rules are executed from top to bottom. If a packet fits, i.e. the first rule, then the other rules will not be applied anymore!

There are two blocks in this menu, each of which needs to be saved individually after changes were made (see Fig. 35).

The first block is used to control bridging categories.

Broadcast Bridging:	When enabled, all broadcast traffic will be forwarded to the bridging filter table.
Multicast Bridging:	When enabled, all multicast traffic will be forwarded to the bridging filter table.
Unicast Bridging:	When enabled, all unicast traffic will be forwarded to the bridging filter table.

⇒ Save the settings by clicking the save button.

The second block is used to configure up to 16 bridging filter rules.

Destination Address:	Destination IP address of IP packet.

Netmask:	Netmask corresponding to the IP address. The netmask is entered in decimal corresponding with the number of bits set in the netmask, i.e. 8 for 255.0.0.0 or 24 for 255.255.255.0.
Action:	Choose between "accept" (forward to 1000Base-T Interface), "remove" (drop packet) or "unused" (disable filter rule).

⇒ Save the settings by clicking the save button.

There is one special rule, when choosing address "0.0.0.0" and netmask "0" this rule is applied to any packet. As rules are executed from top to bottom, you can use this special rule to drop all other packets by putting this rule at the bottom of the rule set. In this case, set Action to "remove". Alternatively, you can forward all other packets by choosing "accept", in case the previous rules were set to remove packets. This is necessary when there are no routing and IP filters set up, since all packets without a rule will be passed on by a configured filter and dropped by an unconfigured filter (see Fig. 34). This way, the next two stages can be bypassed.

Example 1

Dest. Address	Mask	Action	Comment
192.168.45.0	24	Accept	Forward any packet from 192.168.45.0 to 192.168.45.255
192.168.46.0	24	Remove	Drop any packet from 192.168.46.0 to 192.168.46.255
0.0.0.0	0	unused	Forward all other packets to routing filter stage

Example 2

Dest. Address	Mask	Action	Comment
192.168.45.0	24	Accept	Forward any packet from 192.168.45.0 to 192.168.45.255
0.0.0.0	0	Remove	Drop all other packets (no further filtering necessary)

Example 3

Dest. Address	Mask	Action	Comment
192.168.45.0	24	Remove	Drop any packet from 192.168.45.0 to 192.168.45.255
192.168.46.0	24	Remove	Drop any packet from 192.168.46.0 to 192.168.46.255
0.0.0.0	0	Accept	Forward all other packets (bypassing further filtering)

11.5.1.3. MPE Layer 3 - IP Routing

This menu is used to configure MPE Layer 3 IP routing (see Fig. 36).

IP packets that are forwarded by the bridging filter are processed by the routing filter. Packets that pass the routing filter are passed on to the IP filter, all other packets are dropped. Thus it is important to make sure, that packets that are to be processed by the IP filter, need to clear the routing filter first.

There are two blocks to configure routing parameters, each block needs to be configured and saved individually (see Fig. 36):

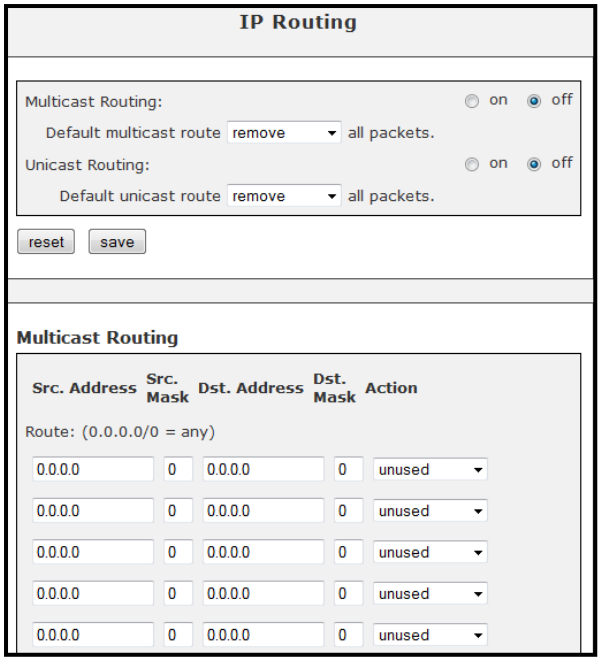


Fig. 36: Demux - Menu with IP Routing Settings.

The first block is used to set up general routing processing.

Multicast Routing:	When enabled, all multicast packets forwarded from the previous filter will be processed. "Default Multicast Route" selects the general behavior: "Accept" meaning, forward all packets unless a filter applies, "Remove" meaning, forward only packets that a filter allows to pass.
Unicast Routing:	When enabled, all unicast packets forwarded from the previous filter will be processed. Here "Default Unicast Route" works different: "Accept" forwards all unicast packets to the IP filter in the next stage, whereas "Remove" only forwards packets to the next stage that are in the same subnet as the 1000Base-T interface.

⇒ Save the settings by clicking the save button.

The second block "Multicast Routing" is used to configure multicast routing rules. IP address "0.0.0.0" in combination with netmask "0" act as a wildcard.

Source Address:	Source IP address of IP packet.
Source Mask:	Netmask corresponding to the source IP address. The netmask is entered in decimal corresponding with the number of bits set in the netmask, i.e. 8 for 255.0.0.0 or 24 for 255.255.255.0.
Destination Address:	Destination IP address of IP packet.
Destination Mask:	Netmask corresponding to the destination IP address. The netmask is entered in decimal corresponding with the number of bits set in the netmask, i.e. 8 for 255.0.0.0 or 24 for 255.255.255.0.
Action:	Choose between "accept" (forward to next filter stage), "remove" (drop packet) or "unused" (disable filter rule).

Example 1

Src. Addr.	Mask	Dest. Addr.	Mask	Action	Comment
0.0.0.0	0	228.0.0.18	24	Accept	Accept all packet to destinations 228.0.0.0 till 228.0.0.255 from any source address

Example 2

Src. Addr.	Mask	Dest. Addr.	Mask	Action	Comment
192.168.0.45	32	0.0.0.0	0	Accept	Accept packets from source address 192.168.0.45 to all destinations

Example 3

Src. Addr.	Mask	Dest. Addr.	Mask	Action	Comment
192.168.0.45	32	228.0.0.18	32	Accept	Accept packets from source address 192.168.0.45 to destination address 228.0.0.18

⇒ Save the settings by clicking the save button.

11.5.1.4. MPE Layer 3 IP Filtering

This menu is used to configure MPE Layer 3 IP Filtering. Filter rules consist of source IP address, source port, destination IP address and/or destination port in any given combination. IP packets that are forwarded by the routing filter are processed by the IP filter. Packets that pass the IP filter are passed on to the 1000Base-T interface, all other packets are dropped. Thus it is important to make sure, that packets that are to be processed by the IP filter, need to clear the bridging and routing filters first.

There are two blocks to configure IP filtering parameters, each block needs to be configured and saved individually (see Fig. 37):

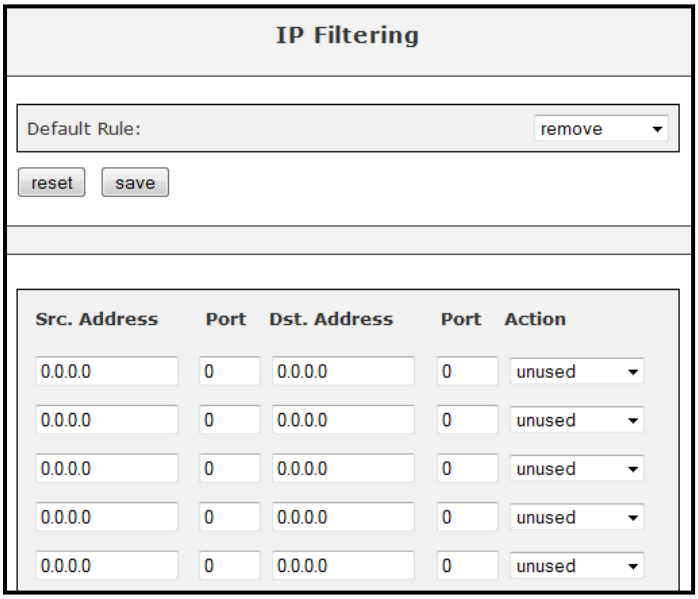


Fig. 37: Demux - Menu with IP Filtering Settings.

The first block is used to set up general filter processing.

Default Rule:	"Default Rule" selects the general behavior: "Accept" meaning, forward all packets unless a filter applies, "Remove" meaning, forward only packets that a filter specifically allows to pass.

⇒ Save the settings by clicking the save button.

The second block is used to set up filter rules. IP address "0.0.0.0" and port "0" act as wildcards.

Source Address:	Source IP address of IP packet.
Source Port:	Source port address of IP packet.
Destination Address:	Destination IP address of IP packet.
Destination Port:	Destination port address of IP packet.
Action:	Choose between "accept" (forward to 1000Base-T interface), "remove" (drop packet) or "unused" (disable filter rule).

Example 1

Src. Addr.	Port	Dest. Addr.	Port	Action	Comment
0.0.0.0	0	228.0.0.18	1024	Accept	Accept all packets to destination IP address 228.0.0.18 port 1024

Example 2

Src. Addr.	Port	Dest. Addr.	Port	Action	Comment
192.168.0.45	2000	0.0.0.0	0	Accept	Accept all packet from source address 192.168.0.45 port 2000

Example 3

Src. Addr.	Port	Dest. Addr.	Port	Action	Comment
192.168.0.45	2001	0.0.0.0	0	Remove	Drop all packets from source address 192.168.0.45 port 2001

⇒ Save the settings by clicking the save button.

11.6. Interface Settings

11.6.1. XLR: configuration of audio level and 15kHz low pass filter

This menu item is available under **Interface Settings→XLR** and is used to adjust the output level of the XLR outputs, separately for the analog outputs and digital AES/EBU outputs. Adjustable range: -36…+6 dB (related to the received signal) (see Fig. 38):

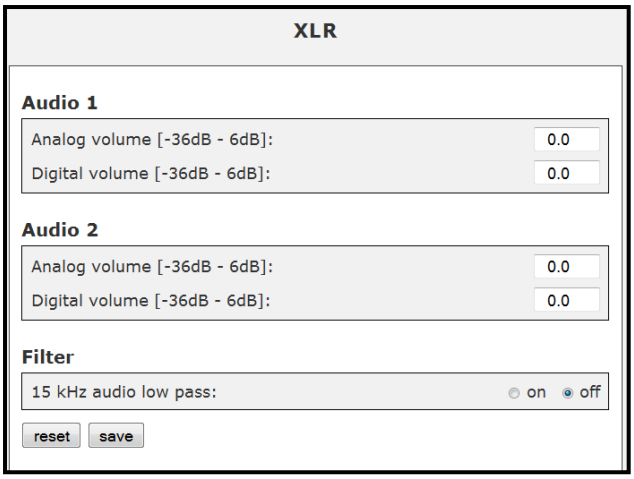


Fig. 38: Interface Settings Menu - XLR

Additionally a 15 kHz low pass filter can be activated to suppress unwanted audio signals that may exist above this frequency, useful when feeding audio directly into FM-transmitters or older stereo encoders.

⇒ Save the settings by clicking the save button.

LCD-menu: Interface→XLR

11.6.2. Headphone: adjusting headphone audio volume

This menu item is available under **Interface Settings→Headphone** and is used to adjust the volume at the headphone output (see Fig. 39).

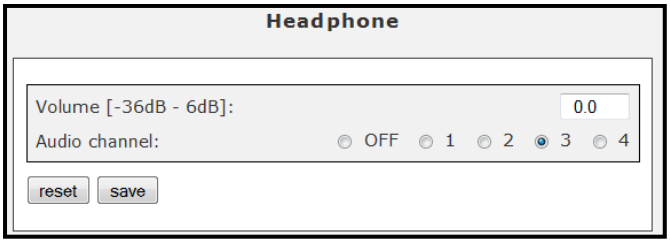


Fig. 39: Interface Settings Menu - Headphone.

Adjustable range: -36…+6 dB (related to the received signal).

⇒ Save the settings by clicking the save button.

LCD-menu: Interface→Headphone

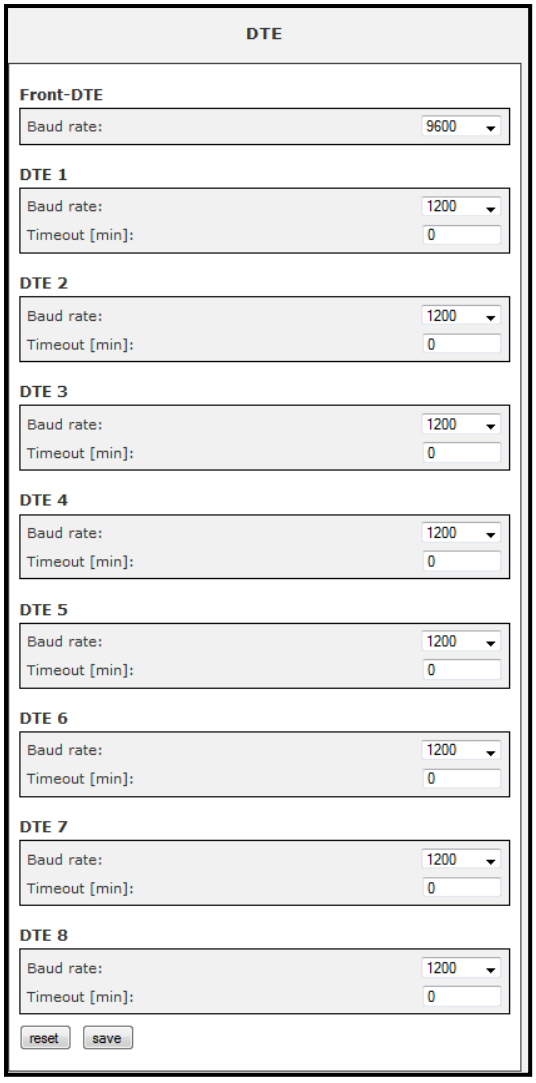
11.6.3. DTE: configuration of the serial RS-232 interfaces

This menu item is available under **Interface Settings→DTE** and is used to configure the serial RS-232 interfaces Front-DTE, DTE1 - 8 of the device. To connect all 8 serial interfaces use the supplied serial breakout cable.

Configurable settings are the baud rate and the data activity timeout. To activate the data activity timeout, set the value different from zero.

Only in the DSR02: To activate the data activity timeout, set the value different from zero. If the timeout (≥ Version 6.28) is activated, the DTE server will end the connection with the client when the data distribution has been finished after the configured time interval.

Possible baud rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 baud.



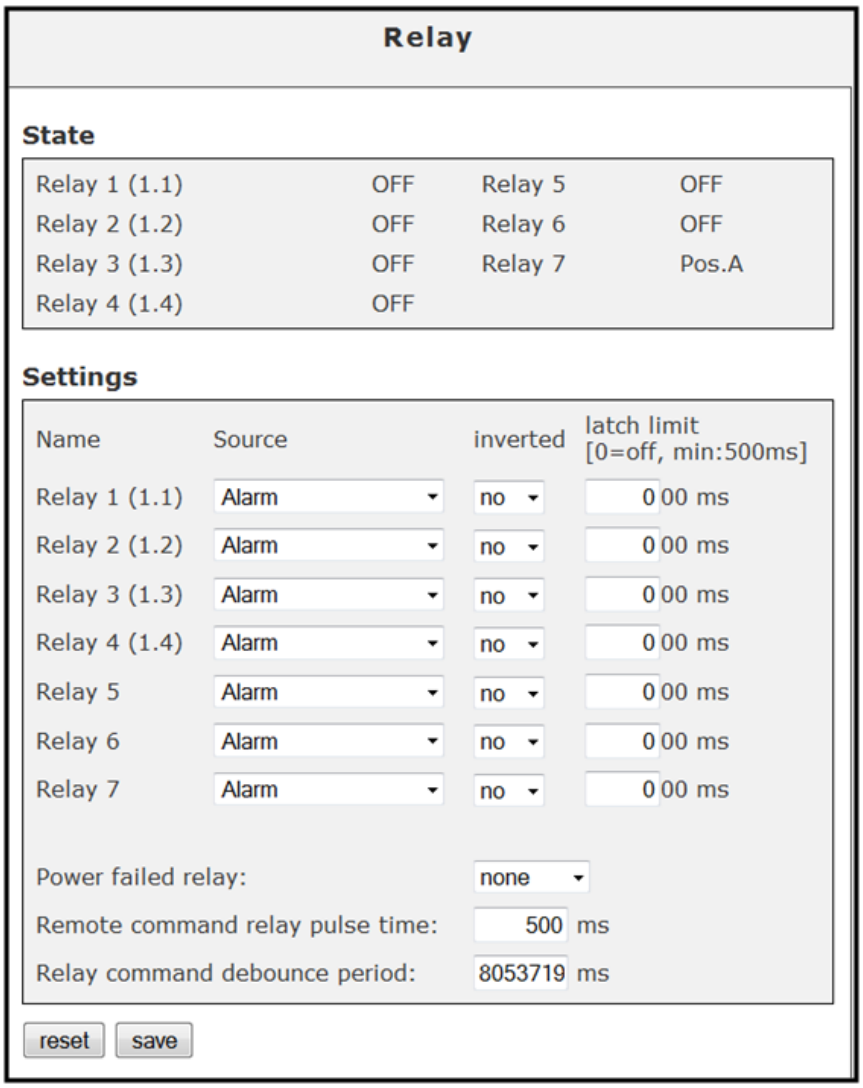


Fig. 40: Interface Settings Menu - DTE. ***Fig. 41: Interface Settings Menu - Relay.***

⇒ Save the settings by clicking the save button.

`LCD-menu: Interface→Front-DTE / DTE1 / DTE2 / …`

11.6.4. Relay: relay configuration

This menu item is available under **Interface Settings→Relay** and is used to configure the relay outputs of the device.

State:

This block represents the actual state of the relays. Relays 1-6 are simple switches, whereas relay 7 is a dual pole relay.

Settings:

Source:	In this drop menu choose the source which should switch the correspondent relay:
	• Alarm
	  ○ see section 11.3.1.3 to activate monitoring functions for different sources
	  ○ see section 11.8.5 to set up alarm
	• Q561 input – the corresponding GPIO Input of a Q561 MPEG encoder drives the relay.
	• Remote command – the commands via the remote control function.

inverted:	Relays functions can be inverted here. Also the brownout function (typically assigned to relay 7) can be assigned to another relay. This will override its original function though.
Latch limit:	Enter the time, how long the relay should be on. 0 ms means that the relay will be switched of as soon as the alarm is off.
Power failed relay:	Define the relay which will be responsible for indicating power failure.
Remote command relay pulse time:	If necessary, define pulse time for switching the relay via remote command.
Relay command debounce period:	Define the period, in which the switching commands received via the remote control should be executed, for example to ignore the same commands being sent several times in a short period of time. 0 ms means that all commands will be executed.

⇒ Save the settings by clicking the save button.

11.7. Network Settings

11.7.1. TCP/IP: configuration of the Ethernet interfaces

11.7.1.1. Control Interface (10/100)

This menu item is available under **Network Settings→TCP/IP** and is used to configure the Ethernet interface (control/monitoring) of the device (see Fig. 42).

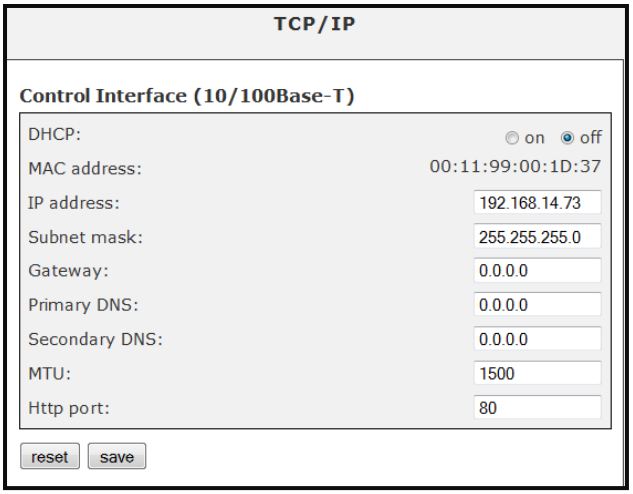


Fig. 42: Network Settings: TCP/IP – Control Interface.

Configurable settings are the IP-address, subnet mask, gateway, and the http port.

DHCP:	Activate or deactivate the Dynamic Host Configuration Protocol which enables the device to get an IP Address automatically.
IP-address:	Individual address that is necessary to identify hardware in an IP network like the internet or intranet.
Subnet mask:	Bit mask, which separates an IP address into a network part and a host part.
Gateway:	Address of the local system that is used for the internet access (e.g. the router).
Primary DNS:	IP address of the primary Domain Name Service (DNS) server.
Secondary DNS:	IP address of the secondary Domain Name Service (DNS) server.
MTU:	Maximum Transmission Unit - The largest physical packet size, measured in bytes that the network can transmit.
Http port:	The port that is used for the data connection between device and internet browser (default port: 80).

The necessary address settings above depend on the individual network and should be assigned by the responsible network administrator if applicable.

⇒ Save the settings by clicking the save button.

LCD-menu: Interface→IP

11.7.1.2. Data Interface (10/100/1000)

This menu item is available under **Network Settings→TCP/IP** and is used to configure the Gigabit-Ethernet interface (TS-streaming) of the device (see Fig. 43).

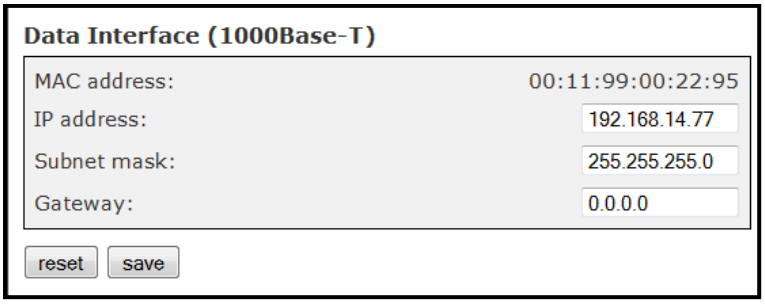


Fig. 43: Network Settings: TCP/IP – Data Interface.

Configurable settings are the IP-address, netmask, and gateway.

IP-address	Individual address that is necessary to identify hardware in an IP network like the internet or intranet.
Subnet mask	Bit mask, which separates an IP address into a network part and a host part.
Gateway	Address of the local system that is used for the internet access (e.g. the router).

The necessary address settings above depend on the individual network and should be assigned by the responsible network administrator if applicable.

⇒ Save the settings by clicking the save button.

11.7.2. SNTP Settings

This menu item is available under **Network Settings→SNTP** and is used to enable the synchronization of the devices date and time with an external SNTP server (see Fig. 44).

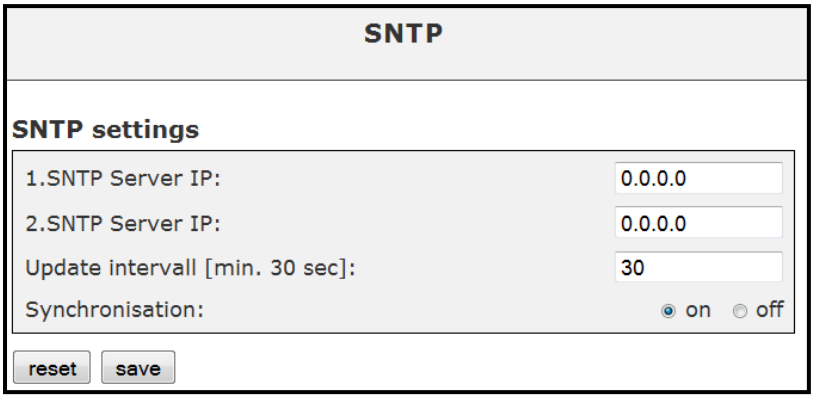


Fig. 44: Network Settings - SNTP.

1. SNTP Server IP	IP address of the first NTP server to be used.
2. SNTP Server IP	IP address of the second NTP server to be used.
Update interval [min. 30 sec]	Time interval for synchronizing the device clock with the NTP server in seconds.
Time zone	Time shift between the time of the NTP server and the local time in hours.
Synchronisation	Selection if the device clock should be synchronized via SNTP or not.

⇒ Save the settings by clicking the save button.

11.7.3. SNMP: SNMP configuration

As part of the monitoring function, the device is capable to send SNMP traps to the defined IP addresses of the SNMP managers. It is also possible to readout device settings via SNMP Get.

This menu item is available under **Network Settings→SNMP** and is used to setup the IP addresses of the SNMP managers (see Fig. 45).

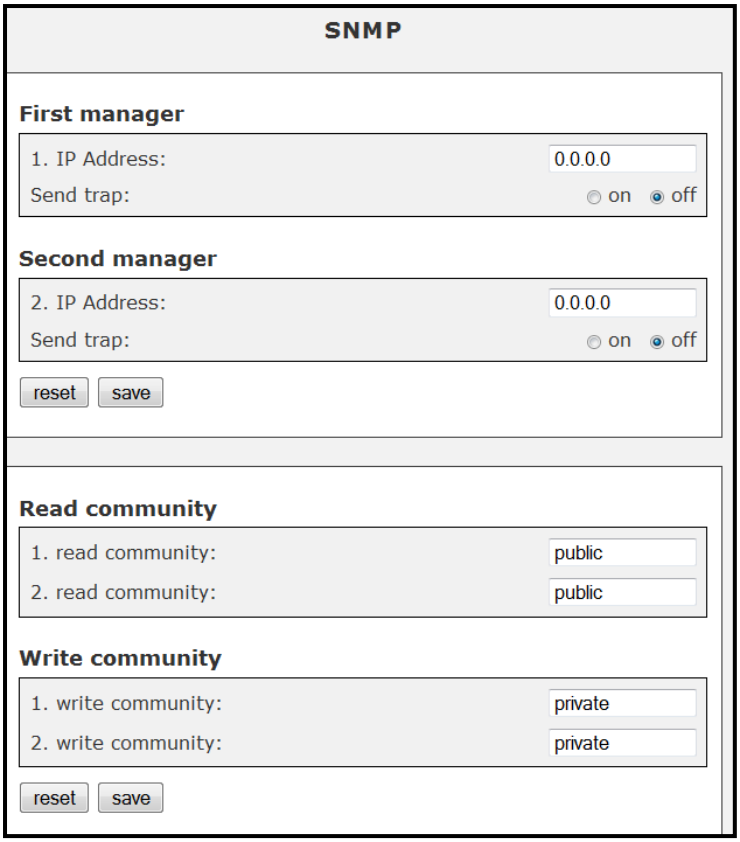


Fig. 45: Network Settings – SNMP.

Additionally access data (read community / write community) that is necessary for external SNMP requests to device can be configured here.

First manager:	IP address of the first SNMP manager that receives SNMP traps. The trap sending to this address can also be deactivated by a checking "off" at "Send trap:".
Second manager:	IP address of the second SNMP manager that receives SNMP traps. The trap sending to this address can also be deactivated by a checking "off" at "Send trap:".
Read community:	SNMP access data for the external read SNMP access to the device.
Write community:	SNMP access data for the external write SNMP access to the device.

⇒ Save the settings by clicking the save button.

LCD menu: Interface→IP

NOTE: In order for the SNMP manager tool to operate correctly, it requires the FlexDSR02+/04+ specific MIB files. These MIB files need to be compiled by the SNMP manager tool and are provided on the setup CD or via email.

SNMP traps used by the monitoring function:

Trap No.	Trap Name	Monitoring Function
1	tunerRfPowerEvent	Signals the status of the SAT tuner RF power
2	tunerCnEvent	Signals the status of the SAT tuner C/N value
3	tunerBerEvent	Signals the status of the SAT tuner Viterbi/LDPC value
4	tunerTsSyncEvent	Signals the SYNC status of the TS received via the SAT tune
5	asiTsSyncEvent	Signals the SYNC status of the TS received via the ASI input
6	ipTsSyncEvent	Signals the SYNC status of the TS received via the IP 1000Base-T interface
7	etr290ConformityEvent	Signals the ETR 290 conformity of the currently active TS
8	aoipUdpInputDataEvent	Signals the input data status for Audio over IP (UDP)
9	aoipIcecastInputDataEvent	Signals the input data status for Audio over IP (Icecast)
10	audioEvent	Signals the audio data status (presence/absence of audio data)
11	audioLevelEvent	Signals the status of the audio level (silence detection)
12	dteEvent	Signals the status of the DTE (ancillary) data
13	internalStorageEvent	Signals the status of the internal storage
14	caseTemperatureEvent	Signals the case temperature status
15	inputSourceEvent	Signals the current input source for the different outputs

1) audioEvent 1 and 2

NOTE: Each activated trap will be sent once at startup for initialization.

11.7.4. FTP

This menu item is available under **Network Settings→FTP** and is used to setup the IP addresses of two FTP external servers for downloading files to the internal storage of the device and uploading health reports about the status of the device as well as other files to the server (see Fig. 46).

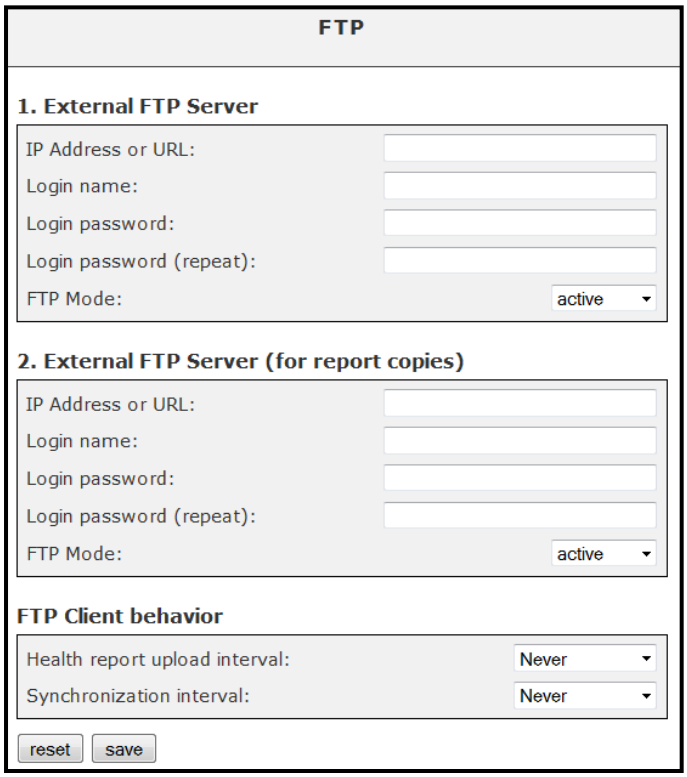


Fig. 46: Network Settings – FTP.

Enter the following data in the menu field in Fig. 46:

1. External FTP Server:	The device can get files from an external FTP server and save them in the internal storage and send health reports to the FTP server with information about the status of the device. Enter the access data to the 1. FTP server such as the IP Address or URL, login name and password. Choose an active or passive FTP mode in the drop list.
2. External FTP Server:	It can be used only for uploading copies of the health reports additional to 1. External FTP Server. Configure the access data for the 2. External FTP server in the same way as the 1. FTP server above.
FTP Client behavior:	**Health report upload interval** - Choose the period of time, how often the device should upload the health reports with the status to the external FTP servers. **Synchronization interval** – Choose the period of time, how often the device should access to the server.

⇒ Save the settings by clicking the save button.

11.8. System Setting

11.8.1. Global settings: device parameters and settings

This menu item is available under **System Settings→Global** and is used to execute basic device functions and retrieve basic device data:

11.8.1.1. System parameter – device identification

This block can be used to assign a device description (i.e. "S/N:00001584"), name (i.e. "FlexDSR02+/04+") and location (i.e. "Tower X198,Y612"). These device identification parameters are also included in the SNMP traps. If the SNMP management application does not support special characters, they should not be used in the device identification parameters.

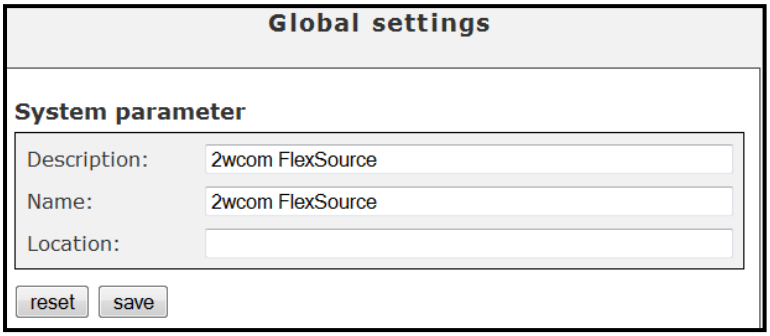


Fig. 47: Global settings – System parameter

⇒ Save the settings by clicking the save button.

11.8.1.2. System information

This block contains information about device uptime, serial number, device type, version numbers, device rights, firmware versions and device temperature.

System information

Last reboot [dd.mm.yyyy hh:mm:ss]:	27.06.2012 15:23:02
Uptime [days, hh:mm:ss]:	0 days, 00:57:11

Serial number:	430.000184
Device type:	2wcom FlexSource
ARM firmware version:	02.36
DSP firmware version:	1.89
FPGA firmware version:	1.08
MIB version:	1.06
Customer:	Default
Rights:	Analog-1 Digital-1 Analog-2 Digital-2 Tuner ASI Audio over IP (out) RDS over IP AAC apt-X SFN Monitor RDS Data Gigabit IP Audio over IP (in) Display Audio fading Gigabit IP (in) Remote Control MPE

Device temperature:	41.5 ºC

Fig. 48: System settings - System information

11.8.1.3. Upload Settings – restore device settings

This dialog can be used to upload a device settings file to the FlexDSR02+/04+. Settings can be downloaded from the device using the "Download settings" dialog on the same page. To upload a setting file, click "Browse…" locate and select the settings file and click [upload]. Note that upload times can vary and must not be interrupted. After a successful upload the user is prompted to reboot the device.

11.8.1.4. Firmware Update

This dialog can be used to update a devices firmware. To upload a firmware setting file, click "Browse…" locate and select the firmware file and click [update]. Note that upload times can vary and must not be interrupted. After a successful upload the user is prompted to reboot the device. Accidental interruption (user or network) of the upload has no impact on the device's functioning. It can simply be restarted. Firmware uploads are protected by CRC.

11.8.1.5. Download Settings

This dialog can be used to download and backup the current device settings of the FlexDSR02+/04+ (including all presets) to file in order to be able to upload them at a later date. Also this file can be used to configure others devices with the exact same settings, i.e. redundancy devices. Settings can be uploaded to the device using the "Upload settings" dialog on the same page. To download the current device settings to file, click [download] and locate a folder to save it to.

11.8.1.6. Reboot and Factory Settings

These two dialogs can be used to manually reboot the device (click the reboot button) and to reset the user configurable device parameters to factory settings (click the load factory settings button). Note that in the latter case **all** user configurable data, with the exception of the device's control interface IP address data (web interface), is deleted! This also includes the user accounts, which will be reset to the default described in this manual.

11.8.2. Time: date and time setup

This menu item is available under **System Settings→Time** and is used to configure the time zone and the date of the device clock (see Fig. 49):

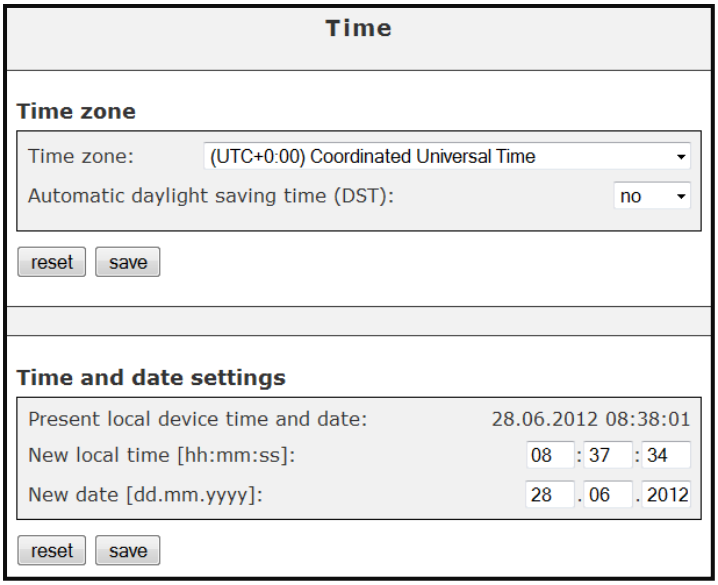


Fig. 49: System settings – Time

Time zone:	
Time zone:	Choose the present time zone of the device clock from the drop list.
Automatic daylight saving time (DST):	You can activate a city-based time zone system separately for this device, which automatically detects daylight saving time (summer time) periods and adjusts corresponding dates' outputs accordingly.

⇒ Save the settings by clicking the save button.

Time and date settings:	
Present device time and date	The present time and date of the device clock.
New time [hh:mm:ss]	Input to manually set the device clock to a specific time (24h format).
New date [dd.mm.yyyy]	Input to manually set the device clock to a specific date.

⇒ Save the settings by clicking the save button.

11.8.3. User

This menu item is available under **System Settings→User** and is used to change user access control to the device. Note that without valid user access data, the device cannot be configured via web interface. The admin account has unlimited read/write control over the device, whereas the guest account is only able to read.

If you lost your login data please contact the manufacturer for further instructions how to regain access to the device.

⇒ Save the settings for each account by clicking the save button.

11.8.4. Preset station preset configuration, activation, and copying

This menu item is available under **System Settings→User** and is used to name, activate and copy the two presets. A preset is a complete device configuration set that can be used to switch in between different configurations (with 2 audio programs to be decoded each). Two different presets can be used per device. Presets enable a quick and comfortable switching between different device configurations, i.e. switching from a national broadcast to a localized news broadcast or localized advertisement broadcast. In this scenario the audio fading option is helpful, as it allows for a smooth (audio) transfer in between preset switches, by fading out the old broadcast, switching the preset and fading in the new broadcast.

Preset changes can also be triggered by the relay inputs, allowing the device to be used for redundancy purposes by an external device.

Preset name:	Assign a name to the current preset.
Selected preset:	Select the desired station preset.
Save present preset in:	This can be used to copy the current preset select into another preset, overwriting it in the process.

⇒ Save the settings for each field individually by clicking the save button.

NOTE: Any change in any setting is stored to the current preset immediately and as such there is no need to save changes to a preset.

IP interface settings are excluded from preset data however, as those are meant to be static.

LCD-menu: Settings→Preset

11.8.5. Alarm

This menu item is available under **System Settings→Alarm** and is used to configure a monitoring of RF parameter, PID parameter, as well as the RS-232 DTE interfaces. If monitoring triggers an alarm, the device can send SNMP traps, can switch one of the seven integrated relays and can activate the "Warning" LED on the web interface and the front panel of the device.

The monitoring functions have an alarm activation delay time (T1) and some also have an alarm reset delay time (T2) in seconds (see 11.3.5 “Switch Criteria”, page 47).

Every monitoring function has a checkbox “warning LED on” to select if the “Warning” LED on the web interface and the front panel of the device is activated on alarms or not.

Every monitoring function can be activated or deactivated with the “alarm enable” checkbox.

Every monitoring function provides a red status LED that indicates a detected alarm if the corresponding alarm monitoring is active.

NOTE: As several alarms can be assigned to the same relay, on problems with a relay activation, it should be checked if the relay is already activated by another alarm.

11.8.5.1. Alarm Settings: Tuner (TS)

This menu item is available under **System Settings→Alarm** (see Fig. 50).

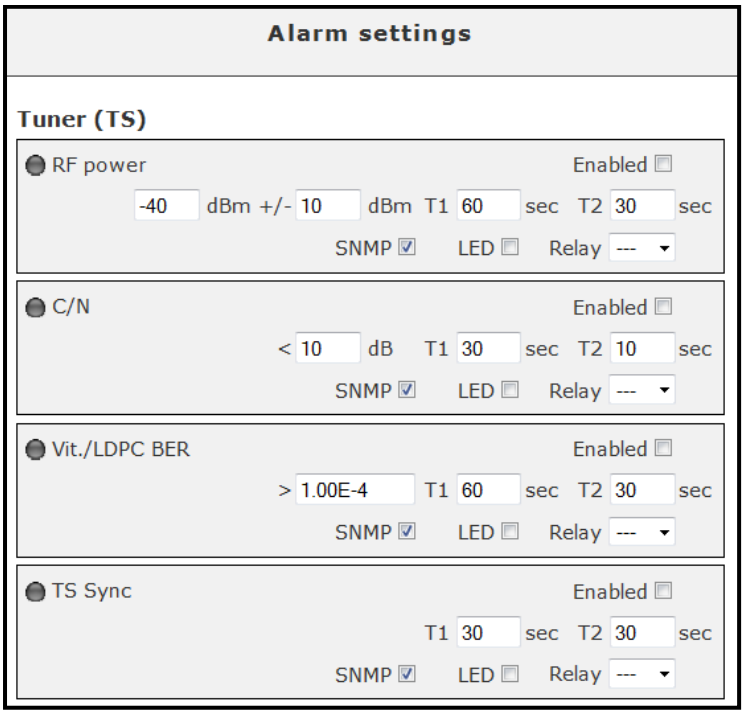


Fig. 50: Alarm settings – Tuner (TS)

Enter the following data in the menu field shown in Fig. 50:

RF power:	Monitors the RF level at the RF-IN input for significant variations. It is possible to define a reference level and a tolerance range. Unit: dBm – Activate the monitoring parameter by ticking **Enabled**. – Enter the acceptable interval “good” for radio frequency (minimum/maximum). If the signal does not match to this

interval, the system will regard it as “bad” and will trigger the alarm.

- Define the delay time T1 (in seconds) when the system should trigger the alarm, if the RF signal is “bad”.
- Define the time T2 (in seconds), how long a “good” RF signal should be available, before the system switches off the alarm.
- Activate the warning signal by ticking **LED** or/and **SNMP** and choose a responsible relay.

C/N: Monitors the calculated signal carrier/noise ratio. Unit: dB

- Activate the criteria by ticking **Enabled.**
- Enter the minimal “good” value for the Channel to Noise Ratio. The signal under this defined value will be regarded by the system as “bad”, so that after the delay time T1 it will trigger the alarm.
- Define the time T2 (in seconds), how long a “good” C/N signal should be available, before the system switches off the alarm.
- Activate the warning signal by ticking **LED** or/and **SNMP** and choose a responsible relay.

Vit./LDPC BER: Monitors the detected bit error rate (BER) in front of the Viterbi decoder of the decoded signal.

- Activate the criteria by ticking **Enabled.**
- Enter the maximal “good” value for the Bit Error Rate, e.g. $1{,}00 \cdot e^{-4}$. The received signal above this defined value will be regarded by the system as “bad”, so that after the delay time T1 it will trigger the alarm.
- Define the time T2 (in seconds), how long a “good” BER signal should be available, before the system switches off the alarm.
- Activate the warning signal by ticking **LED** or/and **SNMP** and choose a responsible relay.

TS Sync: Monitors for a loss of the positive transport stream (TS) detection.

- Activate the criteria by ticking **Enabled.**
- Define the delay time T1 (in seconds), when the system should trigger the alarm, if TS synchronization fails.
- Define the time T2 (in seconds), how long TS synchronization should be available, before the system switches off the alarm.
- Activate the warning signal by ticking **LED** or/and **SNMP** and choose a responsible relay.

⇒ Save the settings by clicking the save button.

11.8.5.2. Alarm Settings: ASI Input (TS)

This menu item is available under **System Settings→Alarm** (see Fig. 51).

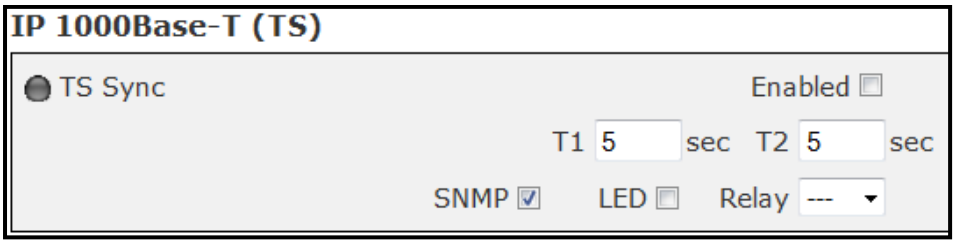


Fig. 51: Alarm settings - IP 1000Base-T (TS).

You can set up alarm for the following criteria:

TS Sync:	Monitors for a loss of the positive transport stream (TS) detection.

Enter the following data in the menu field shown in Fig. 51:

1. Activate the monitoring parameter by ticking **Enabled.**
2. Define the delay time T1 (in seconds), when the system should trigger the alarm, if TS synchronization fails.
3. Define the time T2 (in seconds), how long TS synchronization should be available, before the system switches off the alarm.
4. Activate the warning signal by ticking **LED** or/and **SNMP** and choose a responsible relay.

⇒ Save the settings by clicking the save button.

11.8.5.3. Alarm Settings: IP 1000Base-T (TS)

This menu item is available under **System Settings→Alarm** (see Fig. 52).

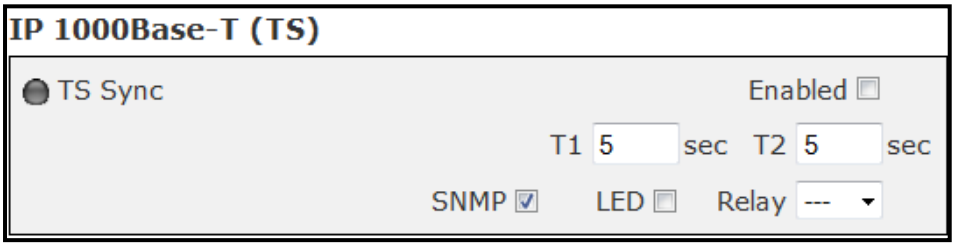


Fig. 52: Alarm settings: IP 1000Base-T (TS).

You can set up alarm for the following criteria:

TS Sync:	Monitors for a loss of the positive transport stream (TS) detection.

Enter the following data in the menu field shown in Fig. 52:

1. Activate the monitoring parameter by ticking **Enabled.**
2. Define the delay time T1 (in seconds), when the system should trigger the alarm, if TS synchronization fails.

3. Define the time T2 (in seconds), how long TS synchronization should be available, before the system switches off the alarm.

4. Activate the warning signal by ticking **LED** or/and **SNMP** and choose a responsible relay.

⇒ Save the settings by clicking the save button.

11.8.5.4. Alarm Settings: Demuxed Data

This menu item is available under **System Settings→Alarm** (see Fig. 53). Configure alarm for each available audio channel.

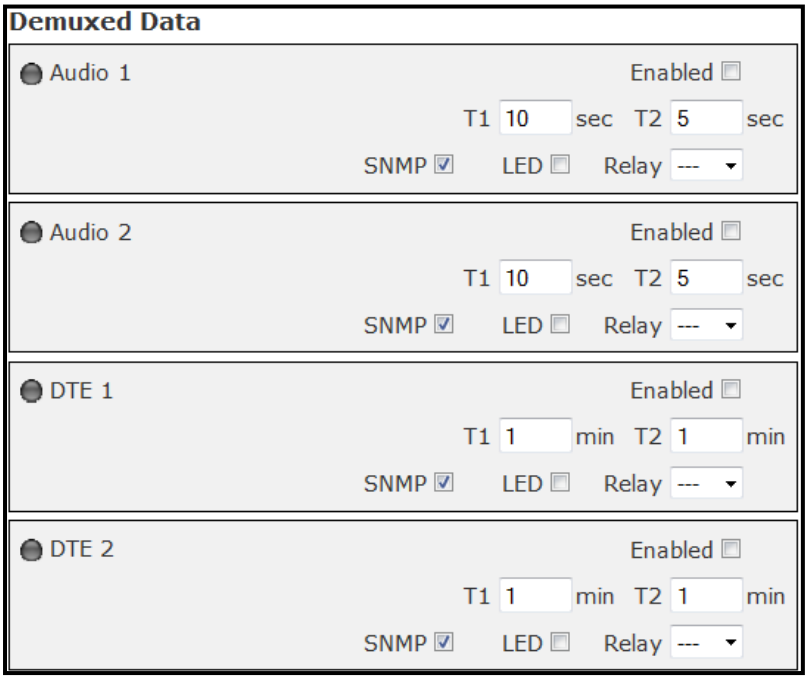


Fig. 53: Alarm settings: Demuxed Data.

You can set up alarm for the following criteria for each audio channel:

Audio 1:	Monitors the signal for a loss of the positive audio stream 1 detection.
Audio 2:	Monitors the signal for a loss of the positive audio stream 2 detection.
DTE 1:	Monitors the DTE 1 interface for data inactivity. If the monitoring is activated and active data is detected, the green LED "data" on the front panel of device is activated.
DTE 2:	Monitors the DTE 2 interface for data inactivity. If the monitoring is activated and active data is detected, the green LED to the right side of the "Data" LED on the front panel of device is activated.

Enter the following data in the menu field for each function shown in Fig. 53:

1. Activate the monitoring parameter by ticking **Enabled.**

2. Define the delay time T1 (in seconds), when the system should trigger the alarm, if data processing fails.

3. Define the time T2 (in seconds), how long data processing should be available, before the system switches off the alarm.

4. Activate the warning signal by ticking **LED** or/and **SNMP** and choose a responsible relay.

⇒ Save the settings by clicking the save button.

11.8.5.5. Alarm Settings: Audio over IP (UDP)

This menu item is available under **System Settings→Alarm** (see Fig. 56).

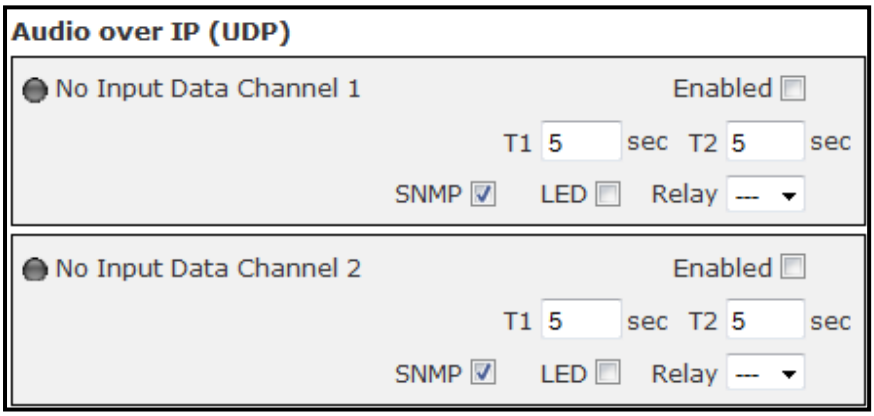


Fig. 54: Alarm settings: Audio over IP (UDP).

You can set up alarm for the following criteria for each channel:

No Input Data Channel 1-4	Monitors the 1000Base-T Ethernet interface for inactive audio data input for audio channel 1-4.

Enter the following data in the menu field for each function shown in Fig. 56:

1. Activate the monitoring parameter by ticking **Enabled.**

2. Define the delay time T1 (in seconds), when the system should trigger the alarm, if data input is inactive.

3. Define the time T2 (in seconds), how long data input should be available again, before the system switches off the alarm.

4. Activate the warning signal by ticking **LED** or/and **SNMP** and choose a responsible relay.

⇒ Save the settings by clicking the save button.

11.8.5.6. Audio over IP (Icecast)

This menu item is available under **System Settings→Alarm** (see Fig. 55).

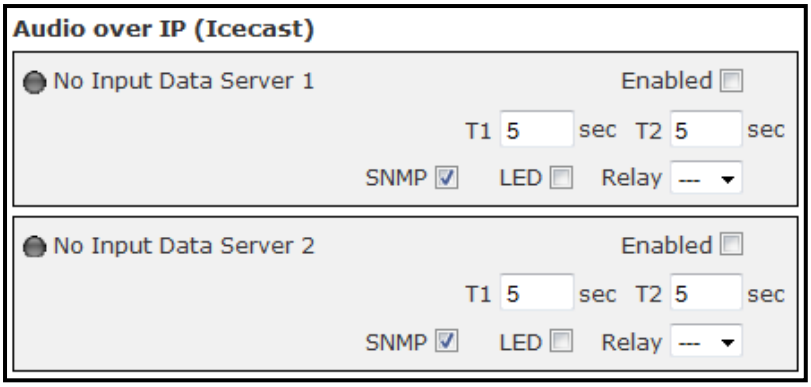


Fig. 55: Alarm settings: Audio over IP (Icecast).

You can set up alarm for the following criteria for each channel:

No Input Data Channel 1-4	Monitors the 10/100Base-T interface for inactive audio data input for audio channel 1-4

Enter the following data in the menu field for each function shown in Fig. 56:

1. Activate the monitoring parameter by ticking **Enabled.**
2. Define the delay time T1 (in seconds), when the system should trigger the alarm, if data input is inactive.
3. Define the time T2 (in seconds), how long data input should be available again, before the system switches off the alarm.
4. Activate the warning signal by ticking **LED** or/and **SNMP** and choose a responsible relay.

⇒ Save the settings by clicking the save button.

11.8.5.7. Audio silence detection

This menu item is available under **System Settings→Alarm** (see Fig. 56).

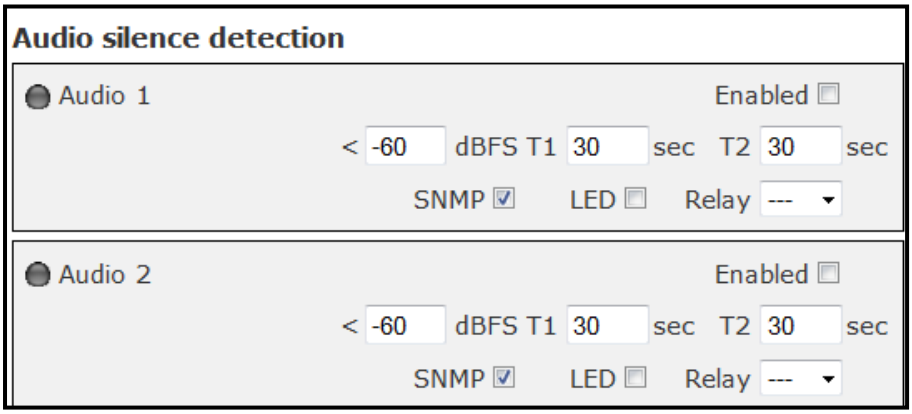


Fig. 56: Alarm settings: Audio silence detection

You can set up alarm for the following criteria for each audio output:

Audio 1-4	Monitors the decibel amplitude level of audio outputs 1-4 for silence and inactivity.

Enter the following data in the menu field for each function shown in Fig. 56:

1. Activate the monitoring parameter by ticking **Enabled**.

2. Enter the minimal "good" value for the decibel amplitude level of the audio output. The signal under this defined value will be regarded by the system as "bad", so that after the delay time T1 it will trigger the alarm.

3. Define the time T2 (in seconds), how long a "good" audio signal should be "good" again, before the system switches off the alarm

4. Activate the warning signal by ticking **LED** or/and **SNMP** and choose a responsible relay.

⇒ Save the settings by clicking the save button.

11.8.5.8. Case temperature

This menu item is available under **System Settings→Alarm** (see Fig. 57).

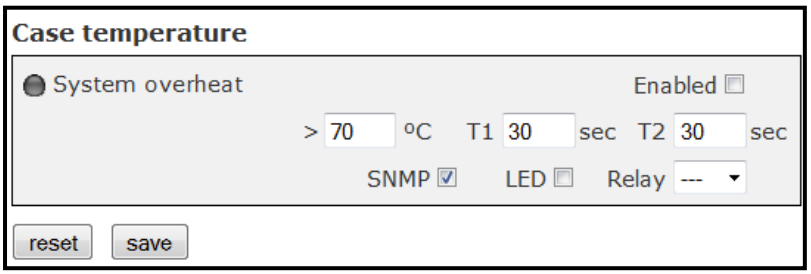


Fig. 57: Alarm settings: Case temperature.

You can set up alarm for the following criteria:

System overheat	Monitors the device temperature for overheating.

Enter the following data in the menu field for each function shown in Fig. 57:

1. Activate the monitoring parameter by ticking **Enabled**.

2. Enter the minimal "good" value for the decibel amplitude level of the audio output. The signal under this defined value will be regarded by the system as "bad", so that after the delay time T1 it will trigger the alarm.

3. Define the time T2 (in seconds), how long a "good" audio signal should be "good" again, before the system switches off the alarm.

4. Activate the warning signal by ticking **LED** or/and **SNMP** and choose a responsible relay.

⇒ Save the settings by clicking the save button.

11.8.6. Remote Control

Prerequisite: Control via satellite carrier

Using remote control, it is possible to easily control and service a network of FlexDSR02+/04+ devices from one single location. Remote control is primarily intended for servicing of remote locations, which often lack fast internet connections, via satellite. But it can also be used to service the entire network via IP. Of course, a mixture of satellite and IP connections is also possible.

Devices can be addressed by device type, serial number, group name or group number, allowing the controller (the embedded 2wcom Controller EC01 and SIRC server) to apply individual updates, i.e. change a devices preset, or target groups of devices, i.e. update the firmware of all tuned in FlexDSR02+/04+ receivers.

Remote control can be used to do the following:

Firmware updates:	New device firmware can be uploaded using remote control and is stored until the controller sends an activation command, enabling the controller to precisely time the update process in the network. All uploads are CRC protected and updates only take place if CRC check passes.
Change presets:	Presets can be changed using remote control.
Switch relays:	Relay states can be changed using remote control.
Device configurations:	A new device configuration file can be uploaded using remote control and is stored until the controller sends an activation command, enabling the controller to precisely time the update process in the network. All uploads are CRC protected and updates only take place if CRC check passes.
Upload files:	Different Files can be uploaded using remote control, for example audio files, playlists and audio scheduling files.
Switch programs:	You can switch presets, play back audio files from the SD card, switch audio PID and switch the redundant audio source via remote control.

The remote control data can be transported via a special data channel with an own PID (in-band, when no IP connection is available).

If an IP connection to the device is available, it can also be transported via an UDP IP stream (out of band).

In order to use remote control, the remote control data web page needs to be configured (see Edit PIDs on page 33).

This menu item is available under **System Settings→Remote Control** and is used to configure the access control to the device via remote control (see Fig. 58).

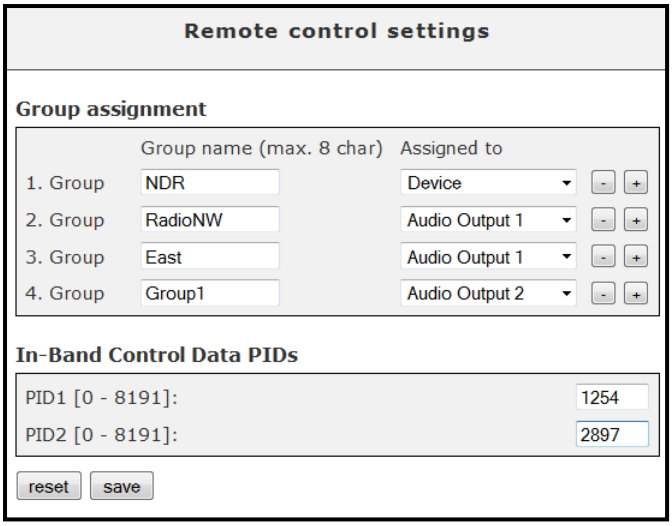


Fig. 58: System settings: Remote control settings.

You can set up alarm for the following criteria:

Group assignment	You can assign the device or individual channel to up to twelve groups of devices.
In-Band Control Data PIDs	In this field it is necessary to set the number of the PID containing the remote control data.

Enter the following data in the menu field shown in Fig. 58:

1. Enter the name of the device group which the device should be assigned to. Use max. 8 characters. Don't use such special characters as (/), (.), (§) etc.

2. Choose the **device** or an individual **audio output** in the drop list which should be assigned to the group for remote controlling. Option "**Device**" for a certain Group assigns the remote commando to **all outputs**.

3. Click the "+"-Button to add a new group.

NOTE: You can assign the same device or audio output to several groups.

4. Enter the numbers of max. two PIDs containing the remote control data.

⇒ Save the settings by clicking the save button.

11.8.7. Crossfading

<u>Prerequisite: Crossfading option</u>

This menu item is available under **System Settings→Crossfading** and is used to configure the duration of a gradual increase or decrease in the level of an audio signal (**fading**) for all audio outputs (see Fig. 59). You can use this option, when the receiver switches from the main source

to the internal storage for playing back the audio files. The function “Crossfading” enables parallel reduction (**fade-out**) of the previous audio signal and increase of the next audio signal from silence (**fade-in**) to the normal level, so that the crossing of two signals sounds equally.

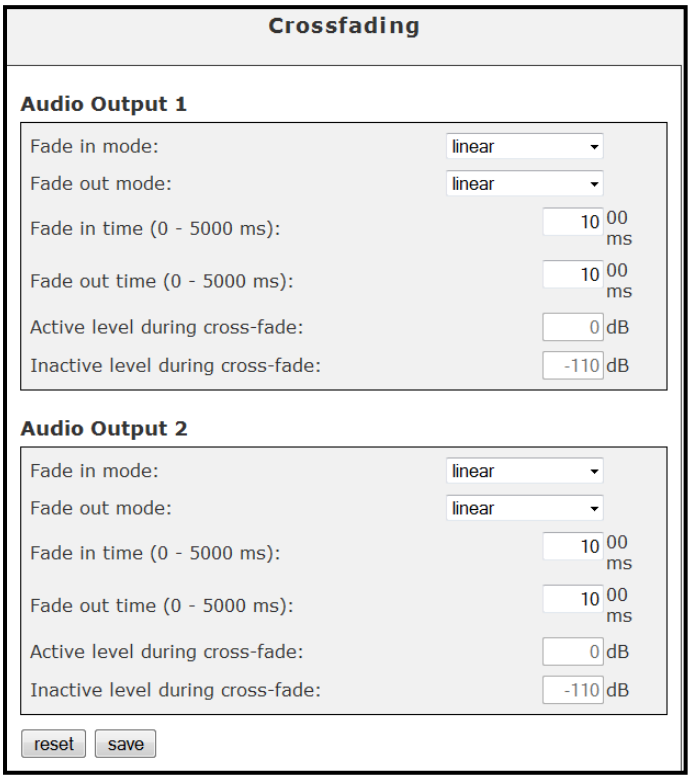


Fig. 59: System settings: Crossfading.

The following functions are available in the setting menu Fig. 59 for each audio output:

Fade in mode:	Temporally only linear mode of fade-in is available, it means that the level of the audio signal is decreasing steadily during the configured time.
Fade out mode:	Temporally only linear mode of fade-out is available, it means that the level of the audio signal is increasing steadily during the configured time.
Fade in time:	Duration of the fade-in.
Fade out time:	Duration of the fade-out.
Active level during cross-fade	This function indicates the loudness of the active audio signal during crossfading. Temporally only one default level is available: 0dB (normal loudness).
Inactive level during cross-fade:	This function indicates the level of the inactive signal during crossfading. Temporally only one default level is available: -110dB (silent).

Enter the following data in the menu field shown in Fig. 59 for all audio outputs:

1. The fade-in time in Milliseconds, i.e. the duration of the signal decreasing.
2. The fade-out time in Milliseconds, i.e. the duration of the signal increasing.

⇒ Save the settings by clicking the save button.

11.9. Status

11.9.1. SAT Tuner – Tuner Status

This menu item is available under **Status→SAT Tuner** and is used to display the status of the tuner. The parameter of the received RF signal and the contained station signals including a signal quality statement (bit error rate) are shown in this menu (see Fig. 60).

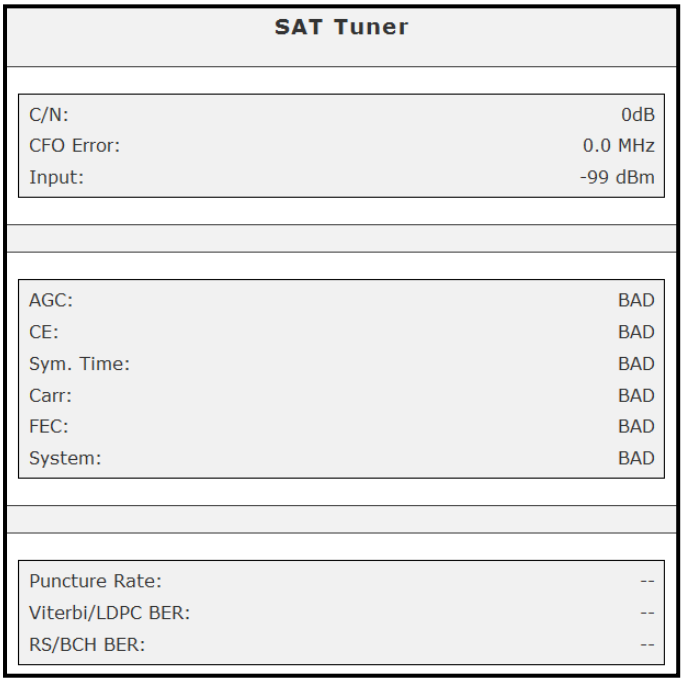


Fig. 60: Status – SAT Tuner

The following parameters are displayed in this status menu in Fig. 60

C/N:	Calculated carrier/noise ratio of the signal. To avoid data errors, the decoding of a received signal requires a minimum C/N ratio that depends on the FEC rate. Unit: dB
CFO Error:	Carrier Frequency Offset – shows the frequency offset in respect to the current tuner frequency. Unit: MHz
Input:	Level of the RF signal at the "RF-In" input. Unit: dBm
AGC:	Tuner status AGC (Automatic Gain Control). "Bad" or "OK".
CE:	Tuner status CE (Carrier Frequency Offset Estimation). "Bad" or "OK".
Sym. Time:	Tuner status Symbol Timing. "Bad" or "OK" (configured symbol rate is detected).
Carr.:	Tuner status Carrier. "Bad" or "OK" (Phase & Frequency loop locked).
Viterbi (FEC):	Tuner status of the Viterbi error correction. "Bad" or "OK".
System:	Tuner status "Bad" or "OK" (all preceding OK).
Puncture Rate:	Ratio of protection bits and data bits of the Viterbi error correction.
Viterbi/LDPC BER:	Present bit error rate in front of the Viterbi error correction.
RS/BCH BER:	Present bit error rate in front of the Reed Solomon error correction.

LCD-menu: State→Tuner→Signal
LCD-menu: State→Tuner→LockState
LCD-menu: State>Tuner→Viterbi+RS

11.9.2. TS: display transport stream status

This menu item is available under **Status→TS** and is used to display details of the satellite transport stream.

The following parameters are displayed in the status menu:

State:	Tuner detected the received data transport stream. "No" or "OK".
NID:	Network Identification: Identity string of the received satellite (e.g. "Astra 19,2E").
Data Rates:	This field shows the current rates of the transport stream over for different TS inputs: Tuner, ASI and IP 1000Base-T.

LCD Menu: Status→Tuner→TS

11.9.3. IP 1000Base-T

This menu item is available under **Status→IP 1000Base-T** and is used to display parameter details about the uplink data over of the Ethernet and the current Ethernet speed.

11.9.4. Audio: display MPEG status

This menu item is available under **Status→MPEG** and is used to display parameter details of the received MPEG / AAC data.

The following parameters are displayed in the status menu for all audio channels:

Version:	MPEG version of the received signal.
Layer:	MPEG layer of the received signal or term "AAC".
Bit rate:	Bit rate of the received signal. Unit: bit/s
Sample rate:	Sample rate of the received MPEG signal. Unit: kHz

LCD Menu: Status→Tuner→MPEG

11.9.5. RDS Data

<u>Prerequisite: RDS decoder via web interface</u>

This menu item is available under **Status→RDS Data** and is used to display details of UECP-encapsulated RDS data that is transmitted via DTE1 and DTE2. In case the transmitted data is not RDS data, the display fields stay empty.

11.9.6. FTP: External FTP server status (optional)

This menu item is available under **Status→FTP** and is used to display the current connection with the first and the second external FTP server and the time of the last synchronization as well as the time of the last health report upload for each server (see Fig. 61).

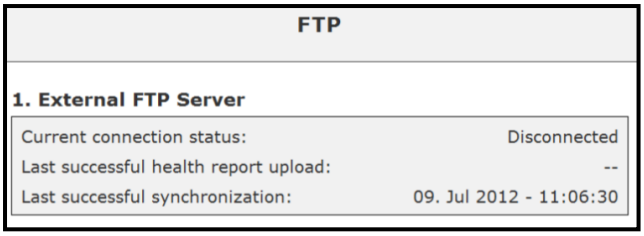


Fig. 61: Status: External FTP Server status.

To set up the connection with external FTP servers see Section 11.7.4.

11.9.7. Scheduler (optional)

This menu item is available under **Status→Scheduler** and is used to display the schedule of the audio files which should be played back from the internal storage of the device (see Fig. 62).

Fig. 62: Status – Scheduler.

You can define the schedule commandos (destination, filename, start time, duration and event) for playing back audio files from the internal storage via a special FlexDSR02+/04+ scheduling file. The file can consist of multiple lines. Each line refers to one audio file (see Fig. 63). Each commando is separated by the |-Symbol.

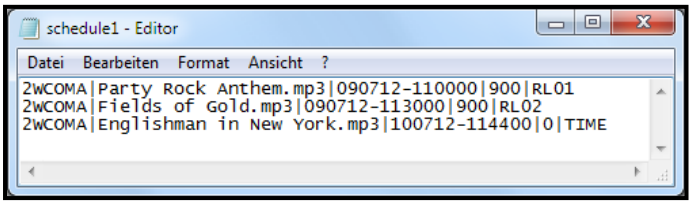


Fig. 63: Example of a scheduling file.

The following instructions will help you:

- to create a scheduling file
- to upload the scheduling file to the internal storage

To create a scheduling file:

1. Create a new text file, e.g. with Microsoft Editor.
2. Save the file with an extension .SHD
3. Write one of the following commando types for destination on the device:
   - APIDXXXX: will be played on output that is currently using PID XXXX

- Groupname: will be played on assigned output by a group name

4. Write one of the following commando types for the file name which should be played back (suffix of filename indicates type of file):
   - mp2,mp3,mp4: audio files
   - plst: playlist file
5. Write the start time in the following format: DDMMYY-HHMMSS
6. Write the duration of valid time in seconds:
   - Files are only started when trigger is received within valid time frame.
   - Ignored for TIME event
7. Define the activation event:
   - RLXX: will be triggered by relay cue
   - TIME: will be automatically started at start time
   - PLAY: will be triggered by SIRC play command

You can upload a scheduling file to the internal storage of the device via the following three ways:

8. From an FTP server
9. Via synchronization of the internal audio folder with an external audio folder on the FTP server.
10. Via SIRC, i.e. remote control.

When an audio file from the schedule is being played back, the corresponding entry in the menu is marked green (Fig. 64).

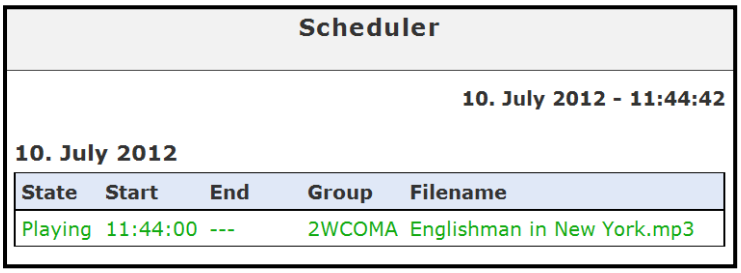


Fig. 64: Status – Scheduler – active audio file.

11.9.8. Error Log

This menu item is available under **Status→Error Log** and is used to display a log with events that have occurred since the lists last reset. A printable list with a description and a timestamp is shown. You can print it out by clicking the [print] –Button, save as a text file or delete it by clicking the [delete Log] –Button.

12. Interfaces

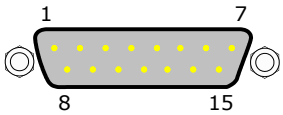
12.1. RF Inputs

RF - In	F-type jack; Input for the connection of the receiving LNB of the satellite antenna. The LNB supply voltage can be set to 13 V, 18 V, or 0 V (off) to set the LNB polarization*. Z=75 Ω. Admissible RF signal input range -82…-10 dBm * Depending on the hardware version, the LNB supply voltage may only be present if an LNB is connected.
RF - Bypass	No function.

12.2. Audio Outputs

Analog - L 1-4 / Analog – R 1-4	XLR male sockets; Outputs for the analog audio signal 1-4 with adjustable analog audio level, separately for the left (L) and the right (R) channel. (Z<20 Ω balanced)
AES/EBU 1	XLR male socket; Output for the digital audio signal 1 with adjustable digital audio level. (Z=110 Ω balanced) The sample rate of the signal depends on the received signal. The device supports 8…96 kHz.
X.21 - 1	(optional on request) 15 pole male D-Sub interface for the output of an MPEG data stream in X.21 protocol format.
AES/EBU 2	XLR male socket; Output for the digital audio signal 2 with adjustable digital audio level. (Z=110 Ω balanced) The sample rate of the signal depends on the received signal. The device supports 8…96 kHz.
X.21 - 2	(optional on request) 15 pole male D-Sub interface; No function
Headphone jack	6.3 mm / 1/4” jack for the output of the audio signal 1 or 2 with adjustable signal level to connected headphones. (L/R, Z<10 Ω unbalanced)

Pin configuration of the X.21 connector (optional on request)



X-21-1 / X-21-2

Pin	*Function*
4	Receive +
11	Receive -
5	Control +
12	Control -
2	Transmit +
9	Transmit -

Pin	*Function*
3	Indication +
10	Indication -
6	Signal Timing +
13	Signal Timing -
8	GND

12.3. ASI Connectors

ASI In	BNC connector for the input of a DVB-ASI data stream (270 MHz) to be decoded by the device. Cable impedance: 75 Ω
ASI Out	BNC connector for the output of the DVB-ASI data stream from the ASI Input as a DVB-ASI data stream (270 MHz) after decoding, processing and encoding. Cable impedance: 75 Ω It is also possible to output the DVB-S/DVB-S2 data from the tuner in the DVB-ASI format.

12.4. Ethernet Sockets

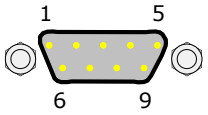
10/100/1000-Base-T	RJ-45 socket for the connection to an IP network. The IP connection is used to output a MPEG2 transport stream, that was previously captured with the DVB-ASI input or DVB-S/S2 tuner card.
10/100-Base-T	RJ-45 socket for the connection to an IP network. The IP connection can be used for SNMP and to operate the device via the integrated web interface. As an option a function for the output of "Private Data", "MPEG ancillary data (IRT)" or MPEG audio is available.

The default IP address / network mask of the 10/100-Base-T interface is "192.168.14.250" / "255.255.255.0". If these setting were changed but not documented and so you cannot access the web interface of the device, you can do the following:

Devices with LCD/jog dial:	Configure the IP settings at the device with the LCD/jog dial (**LCD: Interface→IP**).
Devices without LCD/jog dial:	Connect the "DTE Front" interface of the device with an RS-232 cross-over / null modem cable to an RS-232 interface of a computer. Open a terminal software (e.g. Microsoft HyperTerminal), make a connect with the "DTE Front" baud rate as configured in the device (default: 9600 baud) and the parameter 8N1, and use the following commands to setup the IP parameter: "set ipaddress=", "set gateway=", "set netmask=" (each without spaces and supplemented with the IP address to be set). Then enter reboot and hit ENTER for the changes to take effect. Example: "set ipaddress=192.168.14.250","set netmask=255.255.255.0", then reboot.

12.5. Serial RS-232 Interfaces: DTE

DTE 1-4 DTE 1-8	9 pole male D-Sub connectors for data communication. These can be used to output "Private Data" or "MPEG Ancillary Data (IRT)" of the received satellite signal.



Use the supplied serial brakout cable to connect all available serial RS-232interfaces.

Possible baud rates: 1200…115200 Baud.

Configuration: 8N1; Use a cross-over / null modem cable to connect.

12.5.1. DTE 1-4: Pin configuration for DSR02+

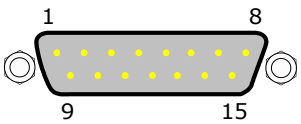
DTE 1-2:			DTE 3-4:	
Pin	*Function*		*Pin*	*Function*
1	DCD		1	-
2	RXD		2	RXD
3	TXD		3	TXD
4	DTR		4	-
5	GND		5	GND
6	DSR		6	-
7	RTS		7	-
8	CTS		8	-
9	-		9	-

12.5.2. DTE1-8: Pin configuration for DSR04+

DTE 1-4:		DTE 5-8:	
Pin	*Function*	*Pin*	*Function*
1	-	1	-
2	-	2	-
3	TXD1	3	TXD5
4	TXD2	4	TXD6
5	GND	5	GND
6	-	6	-
7	TXD3	7	TX7
8	-	8	-
9	TXD4	9	TX8

12.6. Relay Output

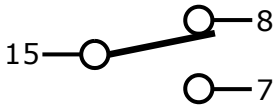
The DSR0x is either equipped with a D-Sub 15 pole male connector or a high density D-Sub 26 pole male connector on newer hardware revisions for more relay outputs (>=V1.22 for DSR01, >=V1.11 for DSR02). Additional relay outputs have to be ordered with the unit or the unit has to be sent back for servicing/upgrading at a later date.



D-Sub male connector, 15 pole

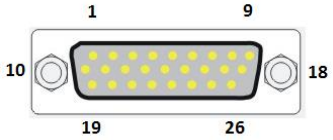
Relay Output (former versions)

Relay No.	*Switch contacts*	*Switch type*
1	1,9	SPST, NO
2	2,10	SPST, NO
3	3,11	SPST, NO

4	4,12	SPST, NO
5	5,13	SPST, NO
6	6,14	SPST, NO
7		SPDT

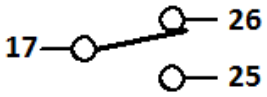
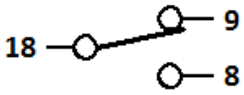
The relays can be used for alerts of the monitoring function.

NOTICE	
	The relay contacts have a rating of 0.5 A at 125 V AC / 60 V DC. The maximum current is 1 A!



Relay Output

D-Sub male connector, high density, 26 pole

Relay No.		*Switch contacts*	*Switch type*
	*option**		
1	1	1,10	SPST, NO
2	2	11,19	SPST, NO
3	3	2,20	SPST, NO
4	4	3,12	SPST, NO
5	5	13,21	SPST, NO
6	6	4,22	SPST, NO
	7	5,14	SPST, NO
	8	15,23	SPST, NO
	9	6,24	SPST, NO
	10	7,16	SPST, NO
7	11		SPDT
	12		SPDT

The relays can be used for alerts of the monitoring function.

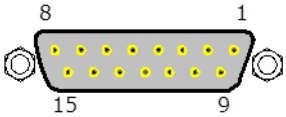
[option*] Relay numbers 7, 8, 9, 10, 11 and 12 are available only when the additional relay outputs hardware option was purchased.

NOTICE	
	The relay contacts have a rating of 0.5 A at 125 V AC / 60 V DC. The maximum current is 1 A!

12.7. Optical Input

There are two possible hardware functions for the unit "Optical Input / Relay 2" (see page 20). Additional relay outputs have to be ordered with the unit or the unit has to be sent back for servicing/upgrading at a later date. If an additional relay is installed, the option "optical input" is deactivated.

D-Sub female connector, 15 pole



Optical Input / Relay 2

Optical Coupler No.	*Control Pin No.*
1	1
2	2
3	3
4	4
5	5
6	6
7	7

To actuate an optical coupler pull the corresponding control pin electrically to ground (pins 9,10,11,12,13,14,15). The control current is less than 5 mA.

NOTICE	
	Voltage on opto-isolated inputs must not be negative or exceeding +0.7 V!

13. File Format Specifications for Remote Control

13.1. Advanced reports

Beyond the standard health report, which can be automatically uploaded to a FTP server by the IRD, additional advanced reports shall get created:

- Configuration report (uploaded to FTP or stored on the Internal Storage only on external request), containing information about the current IRD configuration in XML format.
- Internal Storage content report (uploaded to FTP or stored on the Internal Storage only on external request), containing a directory listing with detailed file information (name, creation date, size) of all files on the Internal Storage in XML format.
- Event log report (uploaded to FTP or stored on the Internal Storage only on external request), containing all entries in the event log in CSV format.
- Remote Control log report (uploaded to FTP or stored on the Internal Storage only on external request), containing all entries in the Remote Control log in CSV format.
- Affidavit report (uploaded to FTP and/or stored on the Internal Storage periodically), containing a log of all audio file playbacks done by the IRD together with timestamp of playback start and end of playback.

13.1.1. Configuration report

The configuration report can be requested by means of the **CONF** command. On reception of the command the IRD will upload the current configuration report to the configured FTP server. If the CONF command is followed by IS ("CONF IS"), the report will get stored on the Internal Storage of the IRD in the report folder. The file format of the configuration report is XML.

A possible configuration report will look like this:


```xml
<?xml version="1.0" encoding="iso-8859-15"?>
<!--2wcom DSR configuration report v1.0-->
<configuration>
 <audioOutput no="1">
  <inputSource enabled="1" type="Tuner(TS)" rank="0">
   <tunerInput>
    <activeTunerInput>A</activeTunerInput>
    <modulation>DVB-S2 XPSK</modulation>
    <frequency>1730.000</frequency>
    <symbolRate>3.215000</symbolRate>
    <polarization>Off</polarization>
    <frequencyRange>Low Band</frequencyRange>
    <fec>Auto</fec>
   </tunerInput>
   <pidConfig>
    <pid no="1">
     <name/>
     <number>1130</number>
     <audio delay="50" output="audio1"/>
     <audioSync>PCR</audioSync>
    </pid>
   </pidConfig>
  </inputSource>
  <inputSource enabled="0" type="n/a" rank="1"/>
  <inputSource enabled="0" type="n/a" rank="2"/>
  <inputSource enabled="0" type="n/a" rank="3"/>
 </audioOutput>
 <dteBaudrates>
  <frontDTE>9600</frontDTE>
  <dte1>9600</dte1>
  <dte2>9600</dte2>
 </dteBaudrates>
 <remoteControl>
  <groups>
   <group entity="device" name="UID2546"/>
  </groups>
  <pids>
   <pid no="1">8189</pid>
   <pid no="2">0</pid>
  </pids>
  <rights>
   <pid number="8189">
    <device>1</device>
    <audio1>1</audio1>
    <audio2>1</audio2>
   </pid>
```

13.1.2. Internal Storage report

The Internal Storage report can be requested by means of the **`DIR0`** command. On reception of the command the IRD will upload the current Internal Storage report to the configured FTP server. If the `DIR0` command is followed by `IS` ("`DIR0 IS`"), the report will get stored on the Internal Storage of the IRD in the report folder. The file format of the Internal Storage report is XML.

A possible Internal Storage report will look like this:


```xml
<?xml version="1.0" encoding="iso-8859-15"?>
<!--2wcom DSR directory listing v1.0-->
<storage>
  <folder name="audio">
    <file size="601654" creationTime="23.04.2013 15:31:50">ID_KSBJ.mp3</file>
    <file size="112" creationTime="14.06.2013 08:47:30">Playlist.pls</file>
    <file size="970752" creationTime="07.03.2013 08:10:06">Jingle-2.mp2</file>
    <file size="10688932" creationTime="11.02.2013 15:12:20">Englishman in New York.mp3</file>
    <file size="412" creationTime="24.07.2013 11:29:56">KSBJ7712_1.xml</file>
  </folder>
  <folder name="settings">
    <file size="45058" creationTime="30.08.2013 14:04:32">MCR-201_20130830_102449.bin</file>
  </folder>
  <folder name="firmware">
    <file size="2700704" creationTime="08.05.2013 12:16:16">ARM-web-image-V03.33.bin</file>
    <file size="2700704" creationTime="08.05.2013 12:12:56">ARM-web-image-V03.32.bin</file>
    <file size="1048616" creationTime="01.08.2013 15:04:58">DSP-web-image-V03.49.bin</file>
  </folder>
  <folder name="report">
    <file size="2449" creationTime="07.05.2013 11:06:34">configreport_20130507_110634.xml</file>
    <file size="3165" creationTime="31.10.2013 09:19:42">configreport_20131031_091943.xml</file>
  </folder>
</storage>
```

13.1.3. Event log report

The Event log report can be requested by means of the **EVNT** command. On reception of the command the IRD will upload the current event log report to the configured FTP server. If the EVNT command is followed by IS ("EVNT IS"), the report will get stored on the Internal Storage of the IRD in the report folder. The file format of the event log report is CSV.

A possible event log report will look like this:

```
Index;Date;Time;Message
32;23.10.13;10:00:33;Audio 2 level alarm, State: FAILED
31;23.10.13;10:00:33;Audio 1 level alarm, State: FAILED
30;23.10.13;10:00:33;Audio 2 alarm, State: FAILED
29;23.10.13;10:00:33;Audio 1 alarm, State: FAILED
28;22.10.13;10:00:34;Warmstart
27;22.10.13;10:00:24;New DSP firmware
26;22.10.13;09:04:29;Audio 2 level alarm, State: OK
25;22.10.13;09:04:29;Audio 1 level alarm, State: OK
24;22.10.13;09:04:28;Audio 2 alarm, State: OK
23;22.10.13;09:04:28;Audio 1 alarm, State: OK
22;22.10.13;08:44:50;Audio 2 alarm, State: FAILED
21;22.10.13;08:44:50;Audio 1 alarm, State: FAILED
20;22.10.13;08:44:50;Audio 2 level alarm, State: FAILED
19;22.10.13;08:44:50;Audio 1 level alarm, State: FAILED
18;22.10.13;08:30:40;Audio 2 level alarm, State: OK
17;22.10.13;08:30:40;Audio 1 level alarm, State: OK
16;22.10.13;08:30:40;Audio 2 alarm, State: OK
15;22.10.13;08:30:40;Audio 1 alarm, State: OK
14;22.10.13;08:30:39;Tuner RF power alarm, State: OK
13;22.10.13;08:30:39;Tuner TS Sync alarm, State: OK
12;22.10.13;08:30:39;Tuner Viterbi LDPC BER alarm, State: OK
11;22.10.13;08:30:39;Tuner C/N alarm, State: OK
10;22.10.13;08:30:16;Tuner TS Sync alarm, State: FAILED
9;22.10.13;08:30:16;Tuner Viterbi LDPC BER alarm, State: FAILED
8;22.10.13;08:30:16;Tuner C/N alarm, State: FAILED
7;22.10.13;08:30:16;Tuner RF power alarm, State: FAILED
6;22.10.13;08:29:55;Audio 2 alarm, State: FAILED
5;22.10.13;08:29:55;Audio 1 alarm, State: FAILED
4;22.10.13;08:29:55;Audio 2 level alarm, State: FAILED
3;22.10.13;08:29:55;Audio 1 level alarm, State: FAILED
2;21.10.13;10:01:12;Warmstart
```

13.1.4. Remote Control log report

The Remote Control log report can be requested by means of the **RCON** command. On reception of the command the IRD will upload the current event log report to the configured FTP server. If the RCON command is followed by IS ("RCON IS"), the report will get stored on the Internal Storage of the IRD in the report folder. The file format of the Remote Control log report is CSV.

A possible Remote Control log report will look like this:

```
Index;Date;Time;SIRC;Command;Result
7;26.07.13;12:47:31;8189;TESTA1_PLAY ID_KSBJ.mp3;OK
6;26.07.13;12:43:25;8189;TESTA1_RL01;OK
5;24.07.13;11:59:58;8189;TESTA1 Upload OK;OK
4;24.07.13;11:59:58;8189;TESTA1 Upload ID_KSBJ.mp3;OK
3;20.07.13;11:29:42;8189;TESTD Flash FW OK;OK
2;20.07.13;11:28:44;8189;TESTD Upload FW OK;OK
1;20.07.13;11:26:43;8189;TESTD Upload ARM-FW;OK
```

13.1.5. Affidavit report

The affidavit report shall log all audio file playbacks done by the IRD (initiated by SIRC, external trigger commands or the internal scheduler) together with timestamp of playback start and end of playback.

The reports will be on a per audio channel base.

For playlist files the playback start and end can only be logged for the complete playlist, but not for the individual files. The log will however contain the names of the audio files played from the playlist.

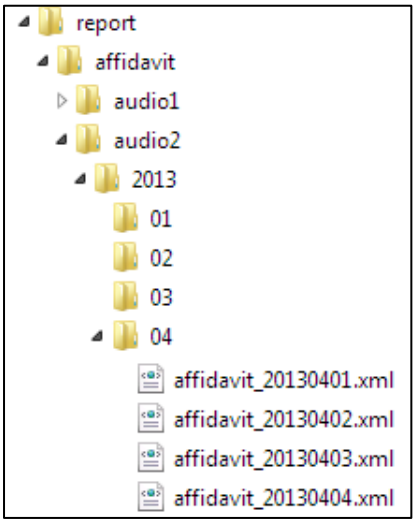
The file format of the affidavit report will be XML.

A possible affidavit report will look like this:

```
<?xml version="1.0" encoding="iso-8859-15"?>
<affidavitreport>
  <playback date="25.10.2013" starttime="22:01:13" endtime="22:03:44" file="contemporary.mp3" />
  <playback date="25.10.2013" starttime="22:10:37" endtime="22:15:10" file="playlist.pls">
    <plsfile>jingle.mp3</plsfile>
    <plsfile>commercial1.mp3</plsfile>
  </playback>
</affidavitreport>
```

Activating affidavit report generation is done via the FTP configuration page, where the user can select a period for the FTP upload (Never/Once per day/Once per week). As long as the period for the affidavit report is not set to "Never", the reports will additionally always get stored on the Internal Storage in the report folder, even if no FTP server is configured.

The folder structure on the Internal Storage will be the following:



13.2. Playlist Files and Audio Transition

13.2.1. Playlist files

Filename: playlist.pls

Format identifiers of lines in playlist file (File can contain multiple lines):

filename	Name of File – mp2,mp3,mp4: audio files
fade in time	Transition time of the inactive file from inactive level to active level – Value: 0-3000 ms
fade out time	Transition time of active file/main source from active level to inactive level – Value: 0-3000 ms
last fade in time	Transition time of the inactive file from inactive level to action level – Value: 0-3000 ms
last fade out time	Transition time of active file/main source from active level to inactive level – Value: 0-3000 ms
active level	Audio level attenuation of active file during active playlist (after fade in) – Only valid for first line (transition from Main Source to File) – Action level is used for the complete playlist as audio level of the audio files
inactive level	Audio level attenuation of main source during active playlist (after fade out) – Only valid for first line (transition from Main Source to File) – Inactive level is used for the complete playlist as audio level of the main source

Valid format identifiers of first line in schedule file:

1. <Filename>|<fade in time>|< fade out time >|< active level>|<inactive level>
2. <Filename>
   (Basic cross fade parameters from web page will be used for transition)

Valid format identifiers of in between lines in schedule file:

1. <Filename>|<fade in time>|< fade out time >
2. <Filename>
   (Basic cross fade parameters from web page will be used for transition)

Valid format identifiers of last lines in schedule file:

1. <Filename>|<fade in time>|< fade out time > |<last fade in time>|< last fade out time >
2. <Filename>
   (Basic cross fade parameters from web page will be used for both transitions)

EXAMPLE:

JINGLE2.mp2|100|3000|0|-110
PUB1.mp2|3000|100
PROMO.mp2|3000|0
IPHONE.mp2|3000|3000|3000|3000

1st line:	Main source is faded out during 3 seconds to a level of -110dB (switched off) JINGLE2.mp2 is faded in during 100ms to maximum level
2nd line:	JINGLE2.mp2 is faded out during 100ms PUB1.mp2 is faded in during 3 seconds to maximum level
3rd line:	PUB1.mp2 is immediately faded out Promo.mp2 is faded in during 3 seconds to maximum level
4th line:	Promo.mp2 is faded out during 3 seconds IPHONE.mp2 is faded in during 3 seconds to maximum level IPHONE.mp2 is faded out during 3 seconds Main source is faded in during 3 seconds to maximum level

13.2.2. Transition timing

Timing Rules:

1. Both transitions (fade in and fade out) do always start at the same time
2. For the first line, the starting point of a Crossfade is the triggering event of the playlist
3. For other lines, the starting point of a Crossfade is the end of the previous file minus fading out time

EXAMPLE:

This means for a fade out time of 1 second and a fade in time is 3 seconds:

1. Both transitions start at the same time
2. After 1 second

- Fade out is finished (At the end of the previous file)
- Fade in level is at 33%

3. After 3 seconds Fade in level is at 100%
4. Conclusion:
   - If both files have a length of 20 seconds, the complete length of both files with transitions is 19 seconds, because 1 second is played together

13.3. Scheduling and Audio Files

13.3.1. Schedule file

Example of one line in schedule file (File can contain multiple lines):

<Destination>|<Filename>|<Starttime>|<Duration>|<Event>|<Option>
(Pipe char is used as separator)

Destination Destination on IRD
- APIDXXXX: will be played on output that is currently using PID XXXX
- Groupname: will be played on assigned output by a group name

Filename Name of File (Suffix of Filename indicates Type of file)
- mp2,mp3,mp4: audio files
- pls: playlist file

Starttime DDMMYY-HHMMSS

Duration Duration of valid time in seconds
- Files are only started when trigger is received within valid time frame.
- Ignored for TIME event

Event Activation event
- RLXX: will be triggered by Relay cue / ASCII command
- RQXX: will be triggered by Qbit Optocoupler Input
- TIME: will be automatically started at Starttime
- PLAY: will be triggered by SIRC play command

Option Automatic trigger
- AUTO: Files are started when trigger is not received within valid time
- (Files are not started, if no option is present or option is not "AUTO")

EXAMPLES:

FOXNEWS1|NewsAfternoon.mp3|120412-131500|300|RL20|AUTO
FOXSPORT|SportAfternoon.mp3|120412-131500|0|TIME
APID1012|Commercial25.pls|120412-131500|300|PLAY

13.3.2. Audio filename

- Format for upload via SIRC FTP upload folder: <group name>_<filename>_<suffix> (separated by an underline symbol ‚_')

  EXAMPLE: FOXNEWS1_commercial01.mp3

  The <group name> will get removed after transmission to the IRD

- Format for upload via IRD FTP upload folder:
  <filename>_<expiration date>.<suffix>
  (separated by an underline symbol ‚_')

  EXAMPLE: commercial01.mp3

13.4. Triggering of regionalized commercials

There are two possibilities to trigger regionalized content via the SIRC system.

1. Externally scheduled out of (SIRC file transfer) band
2. Internally Scheduled in IRDs using scheduling files

To realize triggering of audio files (regionalized content) the user can choose if triggers will be sent by an external system (out of the standard SIRC server band) or if triggers are sent in band with using externally generated scheduling files.

In this document for both methods it won't be described how files will be uploaded to the system.
It will be assumed that files are already delivered to the IRDs.

13.4.1. Externally scheduled out of band commands

If the triggering of audio files shall be done by an external system like an existing radio automation software, this can be done by sending special trigger commands.

These commands can be sent out of band using MPEG TS private data channels or MPEG ancillary data.

Commands:

The trigger commands are special ASCII text commands that can trigger the decoding of two types of files.

These files are:

- Audio files (*.mp3, *.mp2, *.aac)
- Playlists (text files with a list of files to play)

A typical play command will be: FOXNEWS_PLAY commercial.mp3.

This command will start the commercial.mp3 playlist on all IRDs belonging to audio group FOXNEWS. (The exact syntax can be checked in section 14 "2wcom IRD ASCII Command Structure" on page 103)

Playlists:

By using Playlists the following three functions are achieved:

1. It is possible to play multiple files directly after each other using only one play command.
   (For each file a different set of fading parameters can be defined).
2. It is possible to play different audio files on different IRDs by using the same play command.
   This means every IRD could play a different set of commercials triggered by the same command.

Wildcards:

By using wildcards inside of a play command it is possible to use the same trigger command for different files. This means it is possible to send every day the same command, but a different set of files will be played.

Possible Wildcards are:

Wildcard	Will get replaced by
%WD%	abbreviation of the current weekday (Mon/Tue/Wed/Thu/Fri/Sat/Sun)
%D%	Day of month (01/02/…/31)
%M%	Month (01/02/…/12)
%Y%	Year (13/14/…)
%MDY%	Month,Day,Year (e.g. 122313 for 23rd of December, 2013)
%DMY%	Day,Month,Year (e.g. 231213 for 23rd of December, 2013)

EXAMPLE:

FOXNEWS_PLAY %WD%_h1b1_ksbj.pls

In the IRD seven playlists with the following names have to exist:

Mon_h1b1_ksbj.pls, Tue_h1b1_ksbj.pls, Wed_h1b1_ksbj.pls, Thu_h1b1_ksbj.pls, Fri_h1b1_ksbj.pls, Sat_h1b1_ksbj.pls and Sun_h1b1_ksbj.pls

⇒ The IRD will now play every day a different playlist regarding to the actual weekday.

13.4.2. Example: usage of playlist with external trigger

There are two IRDs. IRD one with unique audio group ID NY-01FOX and IRD two with unique ID DEN01FOX.

IRD "NYO01FOX" files:

mo_h1b1_ksbj.pls	Playlist will play on each Monday the listed files after the command:

FOXNEWS_PLAY %WD%h1b1_ksbj.pls

```
ksbj_coke_com.mp3
ksbj_pepsi_com.mp3
```

mo_h12b1_ksbj.pls Playlist will play on each Monday the listed files after the command:

FOXNEWS_PLAY %WD%h12b1_ksbj.pls

```
ksbj_jingle.mp3
```

ksbj_jingle.mp3

ksbj_coke.mp3

ksbj_pepsi.mp3

IRD "DEN01FOX" files:

mo_h1b1_ksbj.pls Playlist will play on each Monday the listed files after the command:

FOXNEWS_PLAY %WD%h1b1_ksbj.pls

```
ksbj_coke_com.mp3
ksbj_pepsi_com.mp
```

mo_h12b1_ksbj.pls Playlist will play on each Monday the listed files after the command:

FOXNEWS_PLAY %WD%h12b1_ksbj.pls

```
ksbj_jingle_north.mp3
```

ksbj_jingle.mp3

ksbj_jingle_north.mp3

ksbj_coke.mp3

ksbj_pepsi.mp3

Both IRDs have the playlist files with the name ***mo_h1b1_ksbj.pls*** and ***mo_h12b1_ksbj.pls***.

Playlist ***mo_h1b1_ksbj.pls*** shall be played each Monday at 1.00 o clock.
Playlist ***mo_h12b1_ksbj.pls*** shall be played each Monday at 12.00 o clock.

The command FOXNEWS_PLAY %WD%h1b1_ksbj.pls will activate the playlist ***mo_h1b1_ksbj.pls*** on both IRDs at the same time on Monday playing the same files ***ksbj_coke.mp3*** and ***ksbj_pepsi.mp3***.

The command FOXNEWS_PLAY %WD%h12b1_ksbj.pls will activate the playlist ***mo_h12b1_ksbj.pls*** on both IRDs at the same time on Monday but playing different files on both IRDs.

IRD with audio group "NY-01FOX" will play ***ksbj_jingle.mp3***

IRD with audio group "DEN01FOX" will play ***ksbj_jingle_north.mp3***

13.4.3. Internally Scheduled in IRDs using scheduling files

Another option to trigger audio files would be to send scheduling files to the IRDs.

These scheduling files control the internal scheduler function of the IRDs and are able to start regionalized content play out at predefined times.

Using scheduling files an external software/server can define triggers to play out audio files or playlists at predefined times or events. This means an external software/server can create scheduling files and deliver it via the SIRC server to the IRDs in advance before play out has to start. By using this mechanism an external software can define and control the complete schedule of all regionalized events in all IRDs.

Of course the same advantages of playlist can be utilized than shown in chapter "Triggering of regionalized content using externally scheduled out of band commands".

Schedule File format:

The complete schedule file format is defined in section 13.3 "Scheduling and Audio Files" on page 98.

EXAMPLE OF A FILE WITH FOUR ENTRIES USING TIMED SCHEDULING:

```
FOXNEWS|NewsMorning.pls|120412-091500|0|TIME
FOXNEWS|SportAfternoon.mp3|120412-151500|0|TIME
FNSOUTH|CommercialBreakSouth.pls|120412-161500|0|TIME
FNNORTH|CommercialBreakNorth.pls|120412-161500|0|TIME
```

The first two lines will start different files in the morning or afternoon on all IRDs with an audio group FOXNEWS.

Line 3 and 4 are showing the possibility to upload the same scheduling file to multiple IRDs and the IRDs will decide which file is intend to get played out in which IRD by checking the availability of the destination group. Only if the destination group is available in an IRD, it will get play out using the IRD scheduler mechanism.

Not shown in the example but it is also possible to define events with play out time corridors and do the final trigger by a relay triggering event or a general out of band play command.

14.2wcom IRD ASCII Command Structure

14.1. General

2wcom IRDs can decode a set of ASCII commands (clear text) that can be used by automation systems to control and configure certain functions of devices remotely. The commands are sent individually but can also be bundled into sets of one or more commands that are stored in “auto.cfg” files. Commands can be delivered using the following mechanisms:

- Using the web interface of the SIRC Server and creating an action
- Using the web interface of the SIRC Server to upload an “auto.cfg” command set
- Opening a TELNET connection to the IRD and sending commands via TELNET
- Uploading an “auto.cfg” file via FTP directly to the IRD
- Embedding commands in MPEG/AAC ancillary data or private data within a transport stream

Note that the SIRC Server uses an external device, a DVB IP Audio Encoder, to embed SIRC specific content in a transport stream.

14.2. Command structure

A command is build up on:

- destination group name (8 characters maximum) followed by an underscore character
- 4 character command code
- (optional) followed by a space character and a so called “optional text” parameter

Example:
The command **CUSTGRP1_RR04** would switch relay number four of all function units belonging to the group called CUSTGRP1.

Each command is checked after being received for validity. Invalid commands or those with invalid parameters will not be executed but instead are ignored altogether.

14.3. Function units and destination group labels of IRDs

In order to control audio, serial and relays outputs of a receiver there needs to be a mechanism to address these outputs. To be able to address these outputs with simple commands there are two definitions.

- Destination group label
  A destination group label is a name consisting of a maximum of 8 ASCII characters that can be used to group IRDs or parts of IRDs (so called function units). The underscore character is not allowed in group names, as it is used to separate group names from commands.

- Function unit
  A function unit is a logical summary of IRD output interfaces. One function unit consists of 1 audio output (i.e. XLR analog L and R, as well as XLR digital), 2 RS232 interfaces and 4 or 8 relays.

A destination group can be set inside of an IRD to address this IRD and it can additionally be aligned to a function unit of an IRD. More Information about function units addressing groups of IRDs see section 11.22 "Addressing Methods" in the SIRC User Manual .

14.4. Commands

14.4.1. Special destination group labels

There are two special destination group labels that can be used instead of or in addition to the standard group labels:

EVERYIRD Wildcard, matching every function unit in every IRD. Not all commands are supported within the EVERYIRD group label

APIDXXXX Targets IRDs or function units with audio PID XXXX (APIDXXXX could be used if it is necessary to address receivers respectively function units by the PID. Is not as flexible as using groups in combination with function units)

Examples:

EVERYIRD_STOP stops file playback on every function unit on all IRDs

APID101_RL01 latch relay 1 of all function groups with PID 101 in all corresponding IRDs

14.4.2. Relays

Relay commands allow for setting, resetting relays in IRDs as well as creating a short pulse with a relay.

RMxx momentary relay pulse for relay xx. Pulse duration is an IRD setting. Default value is 500msec

RLxx relay latch command – activates relay xx. Relay remains active until an RRxx command or an RMxx command is sent to the same relay number.

RRxx relay reset command – de-activates relay xx.

Depending on the number of relays the addressed device is equipped with and that are enabled for remote control, the number of addressable relays varies as follows:

Destination Group	Number of relays in device	Addressable Relays
IRD	7	7
	12	12
	24	24

Destination Group	Number of relays in device	Addressable Relays			
		AUDIO1	AUDIO2	AUDIO3 (FlexDSR04+ only)	AUDIO4 (FlexDSR04+ only)
Function unit or **PID**	7	1-4	n/a	n/a	n/a
	12	1-4	1-4	n/a	n/a
	24	1-4	1-4	1-4	1-4

Destination group labels: All destination group types possible for relay commands

14.4.3. Fallback entries

The IRD supports up to three fallback entries for each function group, labeled from 0 to 3 where 0 is the primary source and 1-3 are the fallbacks in order of their activation should the primary source fail. Each entry is made up of a set of parameters that describe the fallback source.

There are several sources each fallback can have:

FxIS optional text

Set fallback entry for input source. Valid values are **TS_SAT, TS_ASI, TS_IP, UDP_AUDIO, SHOUTCAST_AUDIO** or **FILE**

Note: In cases, where the IRD is shared between different customers, setting TS input sources will only be accepted for device groups addressing the IRD, as it's not possible to have different TS input source for the same fallback level in the different function units. This is a common setting and cannot be set individually, therefore the command will get rejected in a shared IRD when addressing a function unit.

Example: **CUSTGRP1_F1IS SHOUTCAST_AUDIO**

Set input source to a shoutcast stream for fall back one (first backup) of function unit CUSTGRP1

If the input source is set to **TS_SAT** the following parameters **FxCM, FxCF, FxCS, FxCC, FxCP** and **FxCV** are needed to describe a valid DVB-S or DVB-S2 carrier and PID as a valid fallback:

FxCT optional text

Set fallback entry x tuner input for tuner with A/B switching possibility. Possible values are **A** or **B**. The other tuner carrier related commands like FxCM, FxCF and so on will change the corresponding values of the selected tuner input.
Example: **CUSTALL_F1CT A**

Select tuner input A for fall back one of all IRDs belonging to the CUSTALL group.

FxCM optional text

Set fallback entry x DVB-S standard and modulation type. Valid values are **DVB-S BPSK, DVB-S QPSK** or **DVB-S2 XPSK**.
Example: **CUSTALL_F1CM DVB-S2 XPSK**

Set DVB-S standard and modulation type to DVBS2 - XPSK for fall back one of all IRDs belonging to the CUSTALL group.

FxCF optional text

Set fallback entry x (L-band) frequency. Valid values range from 950.000 to 2150.000 MHz.
Example: **CUSTALL_F1CF 1563.145**

Set L-band frequency to 1563.145MHz for fall back one of all IRDs belonging to the CUSTALL group

FxCS optional text

Set fallback entry x symbol rate. Valid Values range from 0.05 to 45.0 MSym/s.
Example: **CUSTGRP1_F1CS 1.138652**

Set symbol rate to 1.138652MSym/s for fall back one of function unit CUSTGRP1

FxCC optional text

Set fallback entry x carrier coding rate. Valid Values are **1/2, 2/3, 3/4, 5/6, 6/7, 7/8** or **Auto** for DVB-S and **QPSK 1/4, QPSK 1/3, QPSK 2/5, QPSK 1/2, QPSK 3/5, QPSK 2/3, QPSK 3/4, QPSK 4/5, QPSK 5/6, QPSK 8/9, QPSK 9/10, 8PSK 3/5, 8PSK 2/3, 8PSK 3/4, 8PSK 5/6, 8PSK 8/9, 8PSK 9/10, 16APSK 2/3, 16APSK 3/4, 16APSK 4/5, 16APSK 5/6, 16APSK 8/9, 16APSK 9/10, 32APSK 3/4, 32APSK 4/5, 32APSK 5/6, 32APSK 8/9, 32APSK 9/10** or **Auto** for DVB-S2.
Example: **CUSTALL_F2CC 32APSK 3/4**

Set carrier coding rate to DVB-S2 32APSK 3/4 for fall back two of all IRDs belonging to the CUSTALL group

FxCV optional text

Set fallback entry x polarization (LNB supply voltage) and LNB frequency range (22kHz). Valid values for **POLARIZATION** are **HORIZONTAL, VERTICAL** and **OFF** and for **LNB FREQUENCY RANGE** are **LOWBAND** and **HIGHBAND**.
Example: **CUSTALL_F3CV VERTICAL LOWBAND**

Set polarization to vertical and frequency range to low band for fall back one of all IRDs belonging to the CUSTALL group

FxCP optional text

Set fallback entry x audio PID number. Valid values range from 32 to 8190. If one of the three possible PID entries per function unit has already audio output enabled, that entry will be changed. Otherwise the PID number will be set in the first PID entry and audio output will get enabled.
Example: **CUSTGRP1_F0CP 101**

Set audio PID to 101 for fall back zero of function unit CUSTGRP1

FxCD optional text

Set fallback entry x audio delay. Valid values range from 20 to 2000 ms. Audio output has to be enabled in one of the three possible PID entries per function unit (using e.g. the FxCP command), otherwise the command will return with an error.

Example: **CUSTGRP1_F0CD 50**

Set audio delay to 50 ms for fall back zero of function unit CUSTGRP1

FxPy optional text

Set fallback entry x PID number of PID entry y. Valid values range from 32 to 8190.

Example: **CUSTGRP1_F0P2 102**

Set PID number of PID entry 2 to 102 for fall back zero of function unit CUSTGRP1

FxNy optional text

Set fallback entry x PID name/label of PID entry y, where y=1..3..
The maximum length for the name/label is 15 characters.

Example: **CUSTGRP1_F0N1 RTL_RDSData**

Set PID name/label of PID entry 1 to RTL_RDSData for fall back zero of function unit CUSTGRP1

FxSY optional text

Set fallback entry x audio synchronization (PCR).
Syntax of the optional text:
PIDy [Off|PCR], where y=1..3 (selecting the PID entry to set)
When audio synchronization is enabled In a PID entry and this command will enable it in a different PID entry, the audio synchronization will automatically be set to Off for the other PID entry (changing the PID entry responsible for the audio synchronization).

Example: **CUSTGRP1_F0SY PID1 PCR**

Enable PCR audio synchronization on PID entry 1 for fall back zero of function unit CUSTGRP1

FxDy optional text

Set fallback entry x assignment of DTEy. Valid range for y depends on the number of DTE ports the device has.
Additional parameters are the PID entry, to which the DTE port should get assigned (**PIDx**, where x=1..3) and the DTE data source, which can be one of the following values:
None, **MpegAncillary**, **PrivateData_TS_Adaption**, **PrivateData_PES_Extension**, **PrivateData_ES**, **PrivateData_ES_Tandberg**
Be aware, that the **PrivateData_x** data sources can only be used for PID entries with audio output disabled, whereas **MpegAncillary** can only be used for PID entries with enabled audio output.

Example: **CUSTGRP1_F0D2 PID3 PrivateData_ES**

Assign DTE2 to PID entry 3, using PrivateData/ES as data source for fall back zero of function unit CUSTGRP1

FxRC optional text

Set fallback entry x Remote Control Data assignment.
Additional parameters are the PID entry, for which the Remote Control data source should be set (**PIDx**, where x=1..3) and the Remote Control data source itself, which can be one of the following values:
None, **MpegAncillary**, **PrivateData_TS_Adaption**, **PrivateData_PES_Extension**, **PrivateData_ES**, **PrivateData_ES_Tandberg**
Be aware, that the **PrivateData_x** data sources can only be used for PID entries with audio output disabled, whereas **MpegAncillary** can only be used for PID entries with enabled audio output.

Example: **CUSTGRP1_F0RC PID3 PrivateData_ES**

Enable Remote Control Data input for PID entry 3, using PrivateData/ES as data source for fall back zero of function unit CUSTGRP1

If the input source is set to **TS_ASI** only the **FxCP** command needs to be set for a valid fallback entry.

If the input source is set to **TS_IP** both the **FxGI** and **FxCP** commands need to be set for a valid fallback entry:

FxGI optional text

Set fallback entry x 1000Base-T input parameters for routing scheme, multicast IP address, protocol and port. Valid values for **ROUTING SCHEME** are **UNICAST** or **MULTICAST**, for **MULTICAST IP ADDRESS** addresses ranging from **224.0.0.1** to **239.255.255.254**, for **PROTOCOL** are **UDP** or **RTP** and for **PORT** are values ranging from **1024** to **65535**. The multicast IP address is only needed when the routing scheme is set to multicast.

Example: **CUSTGRP1_F0GI UNICAST RTP 5004**

Set 1000Base-T input parameters to routing scheme unicast, protocol RTP and port 5004 for fall back zero of function unit CUSTGRP1

Example: **CUSTGRP1_F0GI MULTICAST 224.0.1.4 UDP 5004**

Set 1000Base-T input parameters to routing scheme multicast, multicast IP address 224.0.1.4, protocol UDP and port 5004 for fall back zero of function unit CUSTGRP1

If the input source is set to **UDP_AUDIO** the **FxUM, FxUP, FxUR, FxUF** and **FxUD** commands are needed to be set for a valid fallback entry:

FxUM optional text

Set fallback entry x IP UDP/RTP audio stream input routing scheme and multicast IP address. Valid values for **ROUTING SCHEME** are **UNICAST** or **MULTICAST**, for **MULTICAST IP ADDRESS** addresses ranging from **224.0.0.1** to **239.255.255.254**. The multicast IP address is only needed when the routing scheme is set to multicast.
Example: **CUSTGRP1_F0UM UNICAST**

Set IP UDP/RTP audio stream input to routing scheme unicast for fall back zero of function unit CUSTGRP1

Example: **CUSTGRP1_F0UM MULTICAST 229.3.0.2**

Set IP UDP/RTP audio stream input to routing scheme multicast and multicast IP address 229.3.0.2 for fall back zero of function unit CUSTGRP1

FxUP optional text

Set fallback entry x IP UDP/RTP audio stream input port. Valid values for **PORT** range from **1024** to **65535**.

Example: **CUSTGRP1_F0UP 10000**

Set IP UDP/RTP audio stream input to port 10000 for fall back zero of function unit CUSTGRP1

FxUR optional text

Set fallback entry x IP UDP/RTP audio stream input protocol. Valid values for **PROTOCOL** are **UDP** or **RTP**.

Example: **CUSTGRP1_F0UR RTP**

Set IP UDP/RTP audio stream input to protocol RTP for fall back zero of function unit CUSTGRP1

FxUF optional text

Set fallback entry x IP UDP/RTP audio stream format. Valid values for **FORMAT** are **MPEG, APTX** or **LPCM**. As different audio decoders need different sets of parameters, additional parameters for **APTX** and **LPCM** are needed:

APTX: SAMPLERATE with values of **32000** or **48000** and **BIT DEPTH** with a value of **16**
LPCM: SAMPLERATE with values of **8000, 16000, 22050, 24000, 32000, 44100** or **48000, BIT DEPTH** with values of **16, 20** or **24** and **ENDIANESS** with either **L** (little endian) or **B** (big endian).

Example: **CUSTGRP1_F0UF MPEG**

Set IP UDP/RTP audio stream input to MPEG decoder for fall back zero of function unit CUSTGRP1

Example: **CUSTGRP1_F0UF APTX 48000 16**

Set IP UDP/RTP audio stream input to APTX decoder, 48kHz sample rate with 16Bit samples for fall back zero of function unit CUSTGRP1

Example: **CUSTGRP1_F0UF LPCM 32000 20 B**

Set IP UDP/RTP audio stream input to Linear PCM decoder, 32kHz sample rate with20Bit samples, big endian format for fall back zero of function unit CUSTGRP1

If the input source is set to **SHOUTCAST_AUDIO** only the **FxAS** command is needed for a valid fallback entry:

FxAS optional text Set fallback entry x to Shoutcast/Icecast IP audio stream input. Valid values are a Shoutcast/Icecast server **IP ADDRESS** and a **PORT** number in standard format, separated by a colon.

Example: **CUSTGRP1_F2AS 172.96.5.159:9000**

Set IP Shoutcast/Icecast IP audio stream input to server IP address 192.96.5.159 port 9000 for fall back two of function unit CUSTGRP1

If the input source is set to **FILE** only the **FxAF** command is needed for a valid fallback entry:

FxAF optional text Set fallback entry x to playback of an audio file. Valid value is the **AUDIO FILE NAME** of any audio file that is stored on the IRDs internal storage. If **SMART** is used instead of an audio file name, the fallback entry becomes a smart fallback entry (see smart fallback description below). If the file does not exist on the IRD, this entry will be skipped in a fallback situation.

Example: **CUSTGRP1_F3AF Up is down is up.mp3**

Set audio file playback to file "Up is down is up.mp3" for fall back three of function
unit CUSTGRP1

Example: **CUSTGRP1_F3AF SMART**

Set audio file playback to smart mode for fall back three of function unit CUSTGRP1

FBGO optional text	Force fallback to fallback entry specified in optional text. Valid values are numbers ranging from **0** to **3**, zero being the primary source, 1 to 3 being the fallback options in the order they're used. If the fallback entry specified is not accessible or not valid, the IRD will use the normal fallback mode and proceed to the next available valid source. ***Note***: In cases, where the IRD is shared between different customers and the enforcing of a specific fallback entry would result in switching the TS input source the command will only be accepted for device groups addressing the IRD, as switching the TS input source in one function unit would switch it in the other function units, too (if used there, too). Example: **CUSTGRP1_FBGO 2** *Set fallback to fallback entry two of function unit CUSTGRP1*

14.4.3.1. FTP

FTP specific commands in red are planned but have not yet been implemented and are mere proposals and subject to change. The FTP server is configured in the IRD and cannot be configured via SIRC commands.

FTPG	Command to log into FTP server and get files if accessible.
FTPI optional text	Command that sets FTP get interval. The command parameter will be a number of half-hours between check-ins with the FTP server.

Destination group labels: All destination group types possible for FTP commands

14.4.3.2. Logging

Logging specific commands in red are planned but have not yet been implemented and are mere proposals and subject to change. The FTP server is configured in the IRD and cannot be configured via SIRC commands.

LOGR	Request log report command – if IRD has access to FTP server, immediately log in and upload log
AFFR	Request affidavit log – if IRD has access to FTP server, immediately log in and upload affidavit log.
HLTH	Request health log - If IRD has access to FTP server, immediately log in and upload health log.
DIR0	Request directory listing – if IRD has access to FTP server, immediately log in and upload storage report.
DIR1	Request enhanced directory listing – if IRD has access to FTP server, immediately log in and upload storage report plus. (Storage report plus the contents of each *.pls file in the folder).
PRGL	Purge log. Clears all entries in IRD log.
PRGA	Purge affidavit log. Clears all file playback entries in IRD log.
PRGH	Purge health log. Clears all IRD health entries in log.

Destination group labels: All destination group types possible for Logging commands

14.4.3.3. Audio file handling

The following commands are intended for the specific use in conjunction with audio files that are stored on the IRDs internal memory.

PLAY optional text

Causes IRD to play/execute an audio file from its internal storage of the function unit defined in the destination group of the command. Ignored if the file does not exist. Valid value is the FILE NAME of the corresponding file. File types include audio or playlist files. Playlist and audio files need to be used in conjunction with function groups or PID-addressing.

Example: **CUSTGRP1_PLAY BFFs Foreva.mp3**

Start playback of audio file "BFFs Foreva.mp3" on all devices with a CUSTGRP1 function unit

Example: **CUSTGRP1_PLAY jingles.pls**

Start playback of all audio files that are listed in the playlist file "jingles.pls" on all devices with a CUSTGRP1 function unit

STOP

Causes IRD to stop playing a file from its storage in the function unit defined in the destination group of the command.

Example: **CUSTGRP1_STOP**

Stop playback of audio files on all devices with a CUSTGRP1 function unit

DELA optional text

Causes IRD to delete an audio file from storage. Valid values are all FILE NAMES that are currently stored on the device in the specific function group. If a file doesn't exist, the command will be ignored. If ALL is used instead of a file name, all files belonging to the function group are purged.

Example: **CUSTGRP1_DELA BFFs Foreva.mp3**

Deletes file "BFFs Foreva.mp3" on all devices with a CUSTGRP1 function unit

Example: **CUSTGRP1_DELA ALL**

Deletes all audio and playlist files belonging to CUSTGRP1 on all devices with a CUSTGRP1 function unit

SIZE

size1 size2 … sizeN

Constrains the maximum storage size of the folder of each channel (AUDIO1-4). Values are given in megabytes. The size command can only be applied on device groups not function unit groups

Example: **CUSTALL_SIZE 1024 1024 2048 2048**

Constrains the audio file folder size for a FlexDSR04+ to 1024MB for AUDIO1 and 2 and to 2048MB for AUDIO3 and 4 on all devices belonging to group CUSTALL

14.4.3.4. Others

This section contains general IRD commands. Commands in red are planned but have not yet been implemented and are mere proposals and subject to change.

FLT1 optional text	Sets or resets the state of IRD fault indicator 1. Normal IRD operation may change this state afterward. Valid values are **ON** or **OFF**.
FLT2 optional text	Sets or resets the state of IRD fault indicator 2, or if FLASH is the parameter, causes the FAULT2 indicator to flash until turned off by subsequent command. Normal IRD operation may change this state afterward. Valid values are **ON, OFF** or **FLASH**.
BOOT	Reboot IRD.
ACTF optional text	Activate firmware file stored in IRD internal storage Example: **CUSTALL_ACTF FlexDSR02+ ARM-web-image-V03.12.bin** *Activate the firmware file "FlexDSR02+ ARM-web-image-V03.12.bin"*
ACTC optional text	Activate configuration file stored in IRD internal storage Example: **CUSTALL_ACTC FlexDSR02+_20130205_133001.bin** *Activate the configuration file "FlexDSR02+_20130205_133001.bin"*
SRPD optional text	Set relay pulse duration. Valid values are **DURATIONS** in the range of **1** to **1024** msec. Default is 500msec. Example: **CUSTALL_SRPD 1024 1024 2048 2048** *Constrains the audio file folder size for a FlexDSR04+ to 1024MB for AUDIO1 and 2 and to 2048MB for AUDIO3 and 4 on all devices belonging to group CUSTALL*
PIDA x y	With the **PIDA** command you can temporary change the PID for the output: Use the new **PID x** for audio outputs during **y** seconds. The remote command will apply to **all** audio outputs, if the addressed "Group" is assigned to option "Device" under **System Settings→ Remote Control**. If the option "Audio Output 1-4" is selected, the remote command applies **only** to the selected output (see Fig. 58 in section 11.8.6 "Remote Control on page 79). After the configured time of **y** seconds is expired, the DSR0x+ uses the previous PID again.
PIDR	Use the previous PID again, if the new PID from the command **PIDA** is still valid. If the device gets this command before the **y** seconds of **PIDA** command are expired, the DSR0x proceeds the previous PID again.

Destination group labels: All destination group types possible for other commands

14.4.4. auto.cfg File

Autoconfig files are simple text files that consist of at least one SIRC command. Multiple SIRC commands can be put into an autoconfig file, one per line. Empty lines can be used for better reading flow and serve as no operation. There is no support for adding user comments to autoconfig files yet, but might be added in the future.

Example (comments were added for this document only and are not part of the file!):

auto.cfg	Comments
EVERYIRD_ARCG CUSTGRP1 AUDIO1	*Create group name CUSTGRP1 for AUDIO 1 on all IRDs*
EVERYIRD_ARCG CUSTGRP2 AUDIO2	*Create group name CUSTGRP2 for AUDIO 2 on all IRDs*
EVERYIRD_ARCG CUSTALL IRD CUSTGRP1_F0CF 1314.0	*Create group name CUSTALL on all IRDsSet frequency to 1314MHz for fall back zero on CUSTGRP1 devices*
CUSTGRP1_F0CV HORIZONTAL HIGHBAND	*Set polarization and band control to horizontal and high band for fall back zero on CUSTGRP1 devices*
CUSTGRP1_F0CS 27.500000	*Set symbol rate to 27.5 MSym/s for fall back zero on CUSTGRP1 devices*
CUSTGRP1_F0CM DVB-S QPSK	*Set modulation type to DVB-S QPSK for fall back zero on CUSTGRP1 devices*
CUSTGRP1_F0CC Auto	*Set forward error correction (FEC) mode to auto for fall back zero on CUSTGRP1 devices*
CUSTGRP1_F0CP 239	*Set PID to 239 for fall back zero on CUSTGRP1 devices*
CUSTGRP1_F1AS 80.237.157.79:80	*Set IP audio streaming with IP address 80.237.157.79 and port 80 for fall back one on CUSTGRP1 devices*
CUSTGRP1_F2UM MULTICAST 224.0.0.1	*Set UDP/RTP audio streaming mode with multicast address 224.0.0.1 for fall back two on CUSTGRP1 devices*
CUSTGRP1_F2UP 5001	*Set UDP/RTP audio streaming port to 5001 for fall back two on CUSTGRP1 devices*
CUSTGRP1_F2UR RTP	*Set UDP/RTP audio streaming protocol to RTP for fall back two on CUSTGRP1 devices*
CUSTGRP1_F2UF LPCM 44100 20 B	*Set UDP/RTP audio streaming format to PCM, 44.1kHz 20Bit, big endian mode for fall back two on CUSTGRP1 devices*
CUSTGRP1_F3AF Supersong.mp3	*Set audio file to "Supersong.mp3" for fall back three on CUSTGRP1 devices*
CUSTGRP1_F0IS TS_SAT	*Set input source to satellite for fall back zero on CUSTGRP1 devices*
CUSTGRP1_F1IS SHOUTCAST_AUDIO	*Set input source to Shoutcast audio for fall back one on CUSTGRP1 devices*
CUSTGRP1_F2IS UDP_AUDIO	*Set input source to UDP/RTP audio for fall back two on CUSTGRP1 devices*
CUSTGRP1_F3IS FILE	*Set input source to file (from internal memory) for fall back three on CUSTGRP1 devices*

15. Maintenance & Servicing

15.1. 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.

15.2. 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.

15.3. Calibration

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

16.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**
Device does not turn on	• Power cable is improperly connected • Mains supply failure • Blown fuse	• Check supply cord • Make sure that the power plug at the device is fully inserted • Check mains supply • Replace fuse by same type
No satellite reception	• Antenna cable improperly connected • Alignment of satellite antenna not correct • The LNB outputs an L-band signal with a high frequency offset.	• Connect antenna cable with F-type plug to the RF-In jack of the device. • Precisely align the satellite antenna to satellite azimuth and elevation setting with the lobe area free of obstacles. • Try to alter the tuner frequency +-250 kHz, use a high quality LNB.
Faulty reception	• L-Band signal interference	• Use only high quality, double-shielded antenna cable to avoid coupling of other signals (e.g. DECT cordless phones, GSM1800/1900 mobile phones etc.).
Device cannot be operated via Ethernet	• Network cable not connected • IP address / TCP port is not known. • A device with the same IP address was connected a few minutes before. Then the ARP table still assigns the old MAC address to the IP address.	• Connect the network cable. • Use the default address 192.168.14.250. If the address was changed and is not known please see page 87. • Usually the ARP table is refreshed automatically after a few minutes by the operation system. For an instant access to the device please reset the ARP table of your computer e.g. by entering “arp –d” in the Windows Command Prompt.

17.Technical Data

Rear view FlexDSR02+ DVB Satellite Receiver
(For full double tuner: RF IN = RF A / RF Bypass = RF B)

FlexDSR02+ DVB Satellite Receiver – Technical Details

Inputs

RF

	F-jack female tuner A (Tuner B optional)
Frequency	950 .. 2.150 MHz, step 1 kHz all LNB oscillator frequencies possible
Input Level, impedance	-75 .. -20 dBm, 75 Ω
LNB Control	13 V vertical, 18 V horizontal, off 0 kHz low band, 22kHz high band
Noise Figure	typical 6dB, max. 12 dB

ASI

Data	MPEG2 TS
Connector	BNC 270 Mbps

Gigabit IP

Data	MPEG TS or RTP, UDP, Audio
Type	Auto Switching 10/100/1000 BASE-T Unicast, Multicast

Redundancy Input

IP

Data	Shoutcast ICY Audio
Type	Auto Switching 10/100 BASE-T

Internal Memory

Data	internal Audio Files
Size	1 GB .. 64 GB (other sizes on request)
Type	Professional FlashCard

Outputs

Gigabit IP

Data	MPEG TS or MPE
Connector	RJ45
Type	Auto switching 10/100/1000 BASE-T, Unicast, Multicast

ASI

Data	MPEG2 TS
Connector	BNC 270 Mbps

Audio

Digital reference	-9 dBFS (adjustable)
Volume	-32 .. +6 dB
Filtering	Switchable 15 kHz Low-Pass
Harmonic distortion	<0.05 % / <-66 dB (40 Hz .. 10 kHz)
Frequency response	<0.2 dB (20 Hz .. 20 kHz)
Digital	AES/EBU, 110 Ω bal., 600 Ω comp. Integrated XLR-3, 1x Stereo (opt. 2x)
Analogue	L/R, <20 Ω bal., 600 Ω compatible, Integrated XLR-3, 1x Stereo (opt. 2x)
Headphone	L/R, <10 Ω, 6.3 mm

*X.21** (* possible development - may be changed for RS232 interfaces)

Data	MPEG Audio
Connector	15 pole sub-D male

Control & Monitor

Ethernet

Data	Controlling and Setup functions
optional:	Private data, MPEG ancillary data, UECP/RDS, MPEG audio (acc. to TR 101 154)
Connector	RJ45
Type	Auto Switching 10/100 BASE-T
Protocol	HTTP, SNMPv2c, SMTP, UDP

Contact closure

Inputs	7 opto isolated inputs (excludes option: 24 relay contacts) 15 pole sub-D female
Outputs	12 floating relays (10x SPST, 2x SPDT) (for DC: max. 30 V, 1 A, 10 W) 26 pole sub-D male
optional:	24 floating relays (excludes: 7 opto isolated inputs)

Serial

	3x RS-232C (1 front, 2 rear)
optional:	2x additional RS-232C (rear)
Data	Private data, MPEG ancillary data, UECP/RDS (acc. to TR 101 154)e
Connector	9 pole sub-D male
Transmission rate	1200 to 115200 baud, asynchronous

Front panel

LCDisplay	2x 40 characters
Jog Wheel	Impulse, ENTER button
8 LEDs	Power, Signal, Warning, Status, Alarm, Remote

Satellite Modulation

Tuner option 1 (standard)

DVB-S (EN 300 421)

Standard Modulation/Symbol rate	QPSK (0.128 .. 45 MSym/s)
Roll-off	0.35
FEC	Viterbi, Reed Solomon 1/2, 2/3, 3/4, 5/6, 6/7, 7/8

DVB-S2 (EN 302 307)

Standard Modulation/Symbol rate	QPSK (0.128 .. 35 MSym/s)
FEC	LDPC, BCH 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
Modulation/Symbol rate	8PSK (0.128 .. 31 MSym/s)
FEC	LDPC, BCH 3/5, 2/3, 3/4, 5/6, 8/9,9/10
Roll-off	0.20, 0.25, 0.35

Tuner option 2 (optional)
(High performance & Advanced DVB-S2 processing functions)

DVB-S (EN 300 421)

Modulation/Symbol rate	QPSK (0.064 .. 45 MSym/s)
Roll-off	0.35
FEC	Viterbi, Reed Solomon 1/2, 2/3, 3/4, 5/6, 6/7, 7/8

DVB-S2 (EN 302 307)

Modulation/Symbol rate	QPSK (0.064 .. 45 MSym/s) 8PSK (0.064 .. 45 MSym/s) 16 APSK (0.064 .. 45 MSym/s)
Modulation type	CCM
Frame type	Short, Normal
Roll-off	0.20, 0.25, 0.35
FEC	LDPC, BCH 1/4, 1/3, 2/5,1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
Transport stream processing	Single Transport Stream
PL scrambling	ID 0 .. 262144
Input switching	loop through, A/B switch (optional)
Dual input tuning/decoding	Full dual tuner for parallel decoding of 2 transport streams (optional)

Advanced processing functions (optional)

Modulation/Symbol rate	32 APSK (0.064 .. 38 MSym/s)
Modulation Type	VCM, ACM
Transport stream processing	Single and Multiple Transport stream / Single and Multiple Generic stream

All tuners

IF filter bandwidth	automatic selection

MPEG decoding

	acc. to ETSI TR 101 154
No. of decoders	up to 2
adjustable Delay	10 .. 1000 ms
Codecs	MPEG 1&2 Layer 1, 2, 3
optional:	MPEG 2/4 AAC LC/LD, HEv1&v2, linear PCM, E-aptX, other codecs
Analogue & digital audio data rate	32 .. 384 kbps, selectable

Audio Performance

Output Mode	Mono, Dual Mono, Stereo
Peak Output level	+18 dBu (optional +22 dBu) into 600Ω
Sampling rate	32, 44.1 or 48 kHz
Frequency response	0,2 dB; 20 Hz .. 20 kHz
Total harmonic distortion (THD)	< 0,05 %; 40 Hz .. 10 kHz
Cross Talk	1kHz: > 100 dB, L&R 20 Hz .. 20 kHz: > 75 dB, L&R
Signal to noise ratio (A-weighted)	Digital: > 105 dB Analogue: > 95 dB

General data

Power consumption	40 VA
Case dimensions	19", 1 HU, 310/424/484 mm
Weight	<4 kg
Housing	steel plate (aluminum-zinc coated)
Operating temp. range	0 .. +45°C
Storage temp. range	-40 .. +70°C
Power supply	internal, 90 .. 260 V, 47 .. 63 Hz
Languages	English

Version 05.09.2018
These data are subject to modifications and amendments.
Errors excepted

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Rear view FlexDSR04+ DVB Satellite Receiver

FlexDSR04+ DVB Satellite Receiver – Technical Details

Inputs

RF

	F-jack female tuner A (Tuner B optional)
Frequency	950 .. 2.150 MHz, step 1 kHz all LNB oscillator frequencies possible
Input Level, impedance	-75 .. -20 dBm, 75 Ω
LNB Control	13 V vertical, 18 V horizontal, off 0 kHz low band, 22kHz high band
Noise Figure	typical 6dB, max. 12 dB

ASI

Data	MPEG2 TS
Connector	BNC 270 Mbps

Gigabit IP

Data	MPEG TS or RTP, UDP, Audio
Type	Auto Switching 10/100/1000 BASE-T Unicast, Multicast

Redundancy Input

IP

Data	Shoutcast ICY Audio
Type	Auto Switching 10/100 BASE-T

Internal Memory

Data	internal Audio Files
Size	1 GB .. 64 GB (other sizes on request)
Type	Professional FlashCard

Outputs

Gigabit IP

Data	MPEG TS or MPE
Connector	RJ45
Type	Auto switching 10/100/1000

ASI

Data	MPEG2 TS
Connector	BNC 270 Mbps BASE-T, Unicast, Multicast

Audio

Digital reference	-9 dBFS (adjustable)
Volume	-32 .. +6 dB
Filtering	Switchable 15 kHz Low-Pass
Harmonic distortion	<0.05 % / <-66 dB (40 Hz .. 10 kHz)
Frequency response	<0.2 dB (20 Hz .. 20 kHz)
Digital	AES/EBU, 110 Ω bal., integrated XLR-3 4x Stereo
Analogue	L/R, <20 Ω bal., 600 Ω compatible integrated XLR-3, 4x Stereo
Headphone	L/R, <10 Ω, 6.3 mm

Control & Monitor

Ethernet

Data	Controlling and Setup functions
optional:	Private data, MPEG ancillary data, UECP/RDS, MPEG audio (acc. to TR 101 154)
Connector	RJ45
Type	Auto Switching 10/100 BASE-T
Protocol	HTTP, SNMPv2c, SMTP, UDP

Contact closure

Inputs	7 opto isolated inputs (excludes option: 24 relay contacts) 15 pole sub-D female
Outputs	12 floating relays (10x SPST, 2x SPDT) (for DC: max. 30 V, 1 A, 10 W) 26 pole sub-D male
optional:	24 floating relays (excludes: 7 opto isolated inputs)

Serial

	9x RS-232C (1 front, 8 rear) (1 or 2 breakout-cable mandatory)
Data	Private data, MPEG ancillary data, UECP/RDS (acc. to TR 101 154)
Connector	9 pole sub-D male
Transmission rate	1200 to 115200 baud, asynchronous

Front panel

LCDisplay	2x 40 characters
Jog Wheel	Impulse, ENTER button
8 LEDs	Power, Signal, Warning, Status, Alarm, Remote

Satellite Modulation

Tuner option 1 (standard)

DVB-S (EN 300 421)

Standard Modulation/Symbol rate	QPSK (0.128 .. 45 MSym/s)
Roll-off	0.35
FEC	Viterbi, Reed Solomon 1/2, 2/3, 3/4, 5/6, 6/7, 7/8

DVB-S2 (EN 302 307)

Standard Modulation/Symbol rate	QPSK (0.128 .. 35 MSym/s)
FEC	LDPC, BCH 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
Modulation/Symbol rate	8PSK (0.128 .. 31 MSym/s)
FEC	LDPC, BCH 3/5, 2/3, 3/4, 5/6, 8/9,9/10
Roll-off	0.20, 0.25, 0.35

Tuner option 2 (optional)

(High performance & Advanced DVB-S2 processing functions)

DVB-S (EN 300 421)

Modulation/Symbol rate	QPSK (0.064 .. 45 MSym/s)
Roll-off	0.35
FEC	Viterbi, Reed Solomon 1/2, 2/3, 3/4, 5/6, 6/7, 7/8

DVB-S2 (EN 302 307)

Modulation/Symbol rate	QPSK (0.064 .. 45 MSym/s) 8PSK (0.064 .. 45 MSym/s) 16 APSK (0.064 .. 45 MSym/s)
Modulation type	CCM
Frame type	Short, Normal
Roll-off	0.20, 0.25, 0.35
FEC	LDPC, BCH 1/4, 1/3, 2/5,1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
Transport stream processing	Single Transport Stream
PL scrambling	ID 0 .. 262144
Input switching	loop through, A/B switch (optional)

Advanced processing functions (optional)

Modulation/Symbol rate	32 APSK (0.064 .. 38 MSym/s)
Modulation Type	VCM, ACM
Transport stream processing	Single and Multiple Transport stream / Single and Multiple Generic stream

All tuners

IF filter bandwidth	automatic selection

MPEG decoding

	acc. to ETSI TR 101 154
No. of decoders	4
adjustable Delay	10 .. 1000 ms
Codecs	MPEG 1&2 Layer 1, 2, 3
optional:	MPEG 2/4 AAC LC/LD, HEv1&v2, linear PCM, E-aptX, other codecs
Analogue & digital audio data rate	32 .. 384 kbps, selectable
Audio Performance	
Output Mode	Mono, Dual Mono, Stereo
Peak Output level	+18 dBu (optional +22 dBu) into 600Ω
Sampling rate	32, 44.1 or 48 kHz
Frequency response	0,2 dB; 20 Hz .. 20 kHz
Total harmonic distortion (THD)	< 0,05 %; 40 Hz .. 10 kHz
Cross Talk	1kHz: > 100 dB, L&R 20 Hz .. 20 kHz: > 75 dB, L&R
Signal to noise ratio (A-weighted)	Digital: > 105 dB Analogue: > 95 dB

General data

Power consumption	40 VA
Case dimensions	19", 1 HU, 310/424/484 mm
Weight	<4 kg
Housing	steel plate (aluminum-zinc coated)
Operating temp. range	0 .. +45°C
Storage temp. range	-40 .. +70°C
Power supply	internal, 90 .. 260 V, 47 .. 63 Hz
Languages	English

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