# STELLAR IRD MKII

## MPEG-2 Integrated Receiver Decoder

User and service manual

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# Preface

## Safety and precautions

### General

All electrically powered equipment can be dangerous. At BarcoNet we have taken great care to ensure safety during the design and production of our equipment. Incorrect installation, handling, or interference can, however, impair the safety.

This product complies with the requirements of the directive 73/23/EEC.

### Installation

This product requires protective earthing. With 110/230 V AC this is normally obtained by the use of the supplied 3-wire power cable.
During installation, observe the following rules:

- Establish a separate safety earth connection if the power installation of the building does not have a direct connection to earth.
- Ensure that the unit has the correct line voltage rating.
- **Do not use an extension cord (power cable) without a protective conductor.**
- **Do not remove the covers**.

### Servicing

Only trained service personnel should attempt to dismantle and repair the unit.

During service observe the following rules:

- Before removing any covers, switch off the power and remove the line cable from the unit.
  **Observe:** Capacitors inside the unit may hold dangerous charges for a considerable time after the unit has been switched off.
- If it is necessary to replace components in the line connected circuits, use only new parts of the correct and specified type.
- Take care to maintain or re-establish the protective earthing of the unit during service or repair.
- Do not remove any warning labels. Replace damaged or illegible warning labels with new ones.

### ESD (electrostatic discharge)

Electronic products contain electrostatic sensitive components. Observe the following rule:

- Do not attempt to open a unit without proper precautions against electrostatic discharge, i.e. use a wrist strap and conductive work-bench surface.
  **Reason:** The unit may fail or be degraded.

### Back-up batteries

For units with back-up batteries, observe the following rules:

- Do not dispose of used batteries through the household garbage collection system, but follow your local regulations.
  **Reason:** The batteries contain substances which may be harmful to the environment.
- **Caution:** Replace back-up batteries with the same or equivalent type recommended by BarcoNet.
- **Caution:** Insert batteries correctly.
  **Reason:** There may be a risk of explosion if the batteries are incorrectly inserted.
- When you dispose of the unit itself, first remove the batteries and dispose of them separately.
- Do not recharge the batteries or expose them to temperatures above 100 °C (212 °F).

### Meeting EMC requirements

To meet the EMC requirements of Directives 89/336/EEC and 93/68/EEC you must use correctly shielded cables of good quality for all external connections, except the power, when installing the unit.

Observe the following rules:

- Make sure that all multi-connector cables have conductive connector housings with shield clamps.
- Make sure that the coaxial cables are of the double-braided type.

### Safety symbols

The following safety symbols are currently used in BarcoNet equipment:

| Symbol | Meaning | This symbol indicates |
|---|---|---|
|  | Caution | Dangerous voltages. |
|  | Earth terminal | Protective earth connection to the chassis. |
|  | Attention | The presence of Electrostatic Sensitive Devices. |

# About this user and service manual

**Audience**

This manual was designed to be used by installation engineers and technicians to install, set up, operate and monitor the system.

This manual can also be used as a reference manual during reconfiguration, maintenance and troubleshooting in error situations.

**Software versions**

The manual applies to the ROSA Integrated Management System software version 3.0 and the STELLAR IRD MKII driver version 3.0.

The manual applies to the STELLAR IRD MKII system controller software version 2.0 and greater.

**ROSA User's Manual**

The ROSA management software is further described in "ROSA 3.0 User's Manual".

The COPERNICUS PC and software is further described in "COPERNICUS User's Manual".

# Contents

# Appendices

# Introduction

# The STELLAR IRD MKII

### General description

The STELLAR IRD MKII is intended for professional decoding of a single program comprising one video signal with up to two stereo audio channels. Programs can be decoded according to MP@ML or 4:2:2P@ML.

The STELLAR IRD MKII can be set up and configured individually for specific professional contribution and distribution applications. The unit can be equipped with modules for the:

- L-Band input
- TS output (ASI output).
- audio output (analog audio, digital AES/EBU audio output, audio embedded in the SDI signal)
- video output (PAL, NTSC and SDI output)

The STELLAR IRD MKII will be equipped with the options you have ordered for your unit. This manual describes all available options of the STELLAR IRD MKII.

The design of the STELLAR IRD MKII is compact; the unit features one-channel video processing in a 1 U sub-rack with a depth less than 380 mm (15"). The STELLAR IRD MKII is intended for mounting in a standard 19" rack. The STELLAR IRD MKII uses a fan for forced cooling.

With the ROSA Device Configuration Shell you configure the unit and set all the necessary parameters. ROSA enables full control and monitoring functionality of the STELLAR IRD MKII with error reporting and remote control. For use of ROSA together with the STELLAR IRD MKII, see *Setup and monitoring, p. 59.*

The STELLAR IRD MKII also has a front panel user interface.

### Descrambling

To descramble the transmitted data the STELLAR IRD MKII offers the BISS mode 1 scrambling system which is specified by DVB for use in DSNG applications. It is based on the DVB Common Scrambling Algorithm but all components in a program are scrambled by a fixed control word used during the entire transmission.

### Software update

All software in the STELLAR IRD MKII is stored in non-volatile memory that can be electrically programmed. New software releases for the codec can be downloaded via the management interface.

### Output signals

The transport stream is demultiplexed and one user-specified program is decoded and presented as output. The video signal is recovered and VBI signals are added before being output. The STELLAR IRD MKII has a single (optionally a double) stereo audio output providing analog balanced or digital AES/EBU outputs. Auxiliary data are output as RS-232 and RS-422 data output.

The optional ASI output can used for converting L-band inputs to ASI formats used by external equipment such as a DVB-C modulator. The output bit rate is the same as the input bit rate.

### SDI genlock

The decoder optionally provides a black and burst reference input for genlocking of the SDI video output. The line frequency of the composite video output is also locked to the external reference but not the SCH phase.

### VBI signals for PAL and NTSC systems

The following table gives an overview over the VBI signals supported for PAL and NTSC systems and their treatment in the STELLAR IRD MKII.

| VBI signal | Recovered from the TS | Inserted locally in the decoder | PAL | NTSC |
|---|---|---|---|---|
| Teletext System B | The STELLAR IRD MKII restores the teletext data from the transport stream multiplex and modulates and reinserts the teletext signal in the composite video output or embeds it in the SDI output. | no | yes | no |
| Teletext System C | The STELLAR IRD MKII restores the teletext data from the transport stream multiplex and modulates and reinserts the teletext signal in the composite video output or embeds it in the SDI output. | no | no | yes |
| VITS | No. | **VITS lines are inserted locally in the decoder.** The STELLAR IRD MKII provides internally stored VITS lines. These signals may be inserted in the composite output of the decoder. Up to two VITS lines per field can be inserted in the composite output or embedded in the SDI output in the decoder. | yes | yes |
| Transparent VBI | 4 VBI lines per fields are transferred transparently. The transparent VBI can be inserted in the composite output or embedded in the SDI output. | no | yes | yes |

| VBI signal | Recovered from the TS | Inserted locally in the decoder | PAL | NTSC |
|---|---|---|---|---|
| VITC | Time coded data is recovered from the transport stream signal and inserted in the composite or embedded in the SDI output. | no | yes | yes |
| IDS/VPS | The IDS/VPS signal is recovered from the transport stream and inserted in the composite or embedded in the SDI output. | no | yes | no |
| GCR | no | A ghost cancellation reference signal (GCR) may be inserted in the composite output of the decoder. | yes | yes |

### *Ancillary data in SDI*

The STELLAR IRD MKII optionally supports audio, VBI and EDH embedded in the SDI signal.

### *Synchronization*

The STELLAR IRD MKII needs no external synchronization to the network or transport stream. The STELLAR IRD MKII synchronizes to the encoder through the L-band signal. The video and audio signals are timed to the MPEG-2 specified program clock reference (PCR) to synchronize the program components including VBI signals.

Alternatively the STELLAR IRD MKII can be set in a free running mode where it does not lock to the PCR. This enables the STELLAR IRD MKII to decode Transport Streams with non-compliant PCRs which typically occurs when other equipment in the transmission link adjusts the TS bit rate without restamping the PCR values.

# Application examples

***Distribution***

The STELLAR IRD MKII can be used for distribution to analog VHF/UHF transmitters and to cable head-ends. The decoder includes high-quality composite outputs with VBI support, and features VITS and GCR insertion, dedicated to analog feeds. The MP@ML is the typical choice for this application, and it allows the stream to be used for simulcast of digital TV. 4:2:2P@ML provides increased quality overhead and allows transmission of anti-PAL signals, but the delay is higher.

***Contribution***

The 4:2:2P@ML offers high quality video with sufficient overhead for processing, such as chroma-keying. Encoding rates up to 50 Mbit/s are supported. The decoder includes features dedicated to professional contribution applications, such as genlock, linear audio, and VBI support for both composite and SDI signals.

***DSNG***

The STELLAR IRD MKII is suited for digital satellite news gathering (DSNG) and related temporary contribution applications, such as live coverage of large events. The interfaces of the STELLAR IRD MKII, its support of both 525 and 625 line systems, and its power supply allow world-wide operation.

***Transcoding video and audio formats***

With composite and/or SDI video interfaces installed, the unit supports transcoding between the component and composite domains. A 270 Mbit/s 625-lines SDI video input signal at the encoder may be output at the STELLAR IRD MKII as a composite PAL signal.

**Note!** Conversion between 625-lines and 525-lines systems is not possible.

The following table shows the transcoding possibilities from SDI to Composite video.

| SDI input | Composite output |
|---|---|
| Video system 625 lines at 50 Hz | PAL system B, G, H I |
| Video system 525 lines at 60 Hz | NTSC system M |
| LTC | VITC |

The following table shows the transcoding possibilities from Composite to SDI video.

| Composite input | SDI output |
|---|---|
| PAL system B, G, H I | Video system 625 lines at 50 Hz |
| NTSC system M | Video system 525 lines at 60 Hz |

The following table shows the transcoding possibilities from Audio input to Audio output.

| Audio input | Audio output |
|---|---|
| Digital audio AES/EBU | Analog Audio, |
| Analog audio | Digital audio AES/EBU |
| Embedded audio in the SDI | Audio embedded in the SDI |

## Video interfaces

***Video output modules***

The STELLAR IRD MKII has a composite video output and/or a 270 Mbit/s SDI formatted video output.

***Composite video output***

The composite video output delivers one of the following:

- 525-line NTSC
- 625-line PAL

The output format is determined by the line rate of the input signal to the MPEG-2 Video Encoder, see *Transcoding video and audio formats*, in *Application examples, p. 5.* The video output module automatically detects the video format and configures the composite modulation accordingly.

***Component video output***

The component output option delivers a 270 Mbit/s SDI formatted video signal as a component 525-lines or 625-lines signal.

## Audio and data interfaces

***Audio output modules***

The STELLAR IRD MKII has as standard one analog stereo or digital AES/EBU output. The analog output provides a balanced output signal.

As an option the following output module can be installed:

- one additional analog stereo or digital AES/EBU output.

Both audio channels which are to be decoded must be part of the same program.

***Analog/digital/ embedded audio output***

Audio is output as digital or analog signals and at the same time audio can be embedded in the SDI signal. The audio bandwidth is determined by the selected audio sample frequency in the MPEG-2 Video Encoder. The connector for digital audio output is marked AES/EBU. The optional secondary audio channel may also be analog or digital AES/EBU.

The audio channels are decoded as stereo, joint stereo, dual mono or mono as signalled in the audio bit streams.

The analog output interface is balanced with the option for either 600 Ω or < 20 Ω output impedance. In the user interface you can set the maximum output level of the analog output from -6 to + 24 dBu (< 20 Ω) and -6 to +21 dBm (600 Ω).

***Audio formats***

The audio decoding format is MPEG-1 layer II or 20 bit linear audio.

***RS-232/RS-422 auxiliary data***

The STELLAR IRD MKII supports decoding of an asynchronous transparent data channel with a baud rate of up to 38400.

***N x 64 kbit/s data***

The STELLAR IRD MKII supports decoding of decoding of a synchronous N x 64 kbit/s data channel (N is one to six).

## Network and TS interfaces

***Network/TS interface*** The STELLAR IRD MKII has two L-band inputs and two optional ASI outputs:

***L-band input*** The STELLAR IRD MKII has an L-band demodulator which can connect directly to a Low-noise block converter (LNB). The STELLAR IRD MKII accepts 2 input signals and it can demodulate all the DVB specified modulation/coding schemes (QPSK, 8PSK and 16QAM).

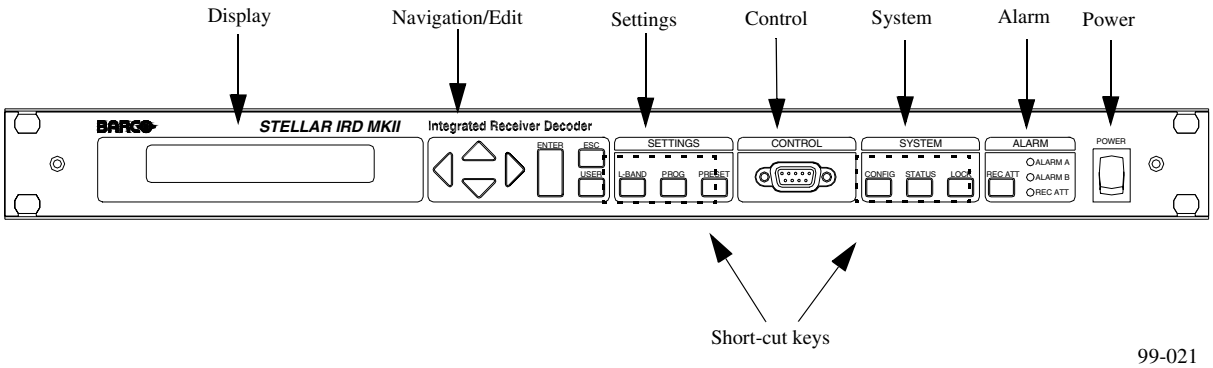
***ASI output*** When installed with the ASI output option the STELLAR IRD MKII can relay the full transport stream recovered from the input. The output bit rate of the STELLAR IRD MKII is the same as the input bit rate. The physical rate of the ASI output is always 270 Mbit/s.

# User interface and front panel control

***Overview***

The STELLAR IRD MKII is controlled via the front panel user interface. The user interface is designed for very quick and intuitive set up of parameters.

The following drawing shows the front panel with its different sections.

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***Features***

The matrix display with adjustable back-light, makes it easy to see and adjust settings. Short-cut keys enable you to quickly navigate through the menu trees.

## User interface and control with ROSA/COPERNICUS

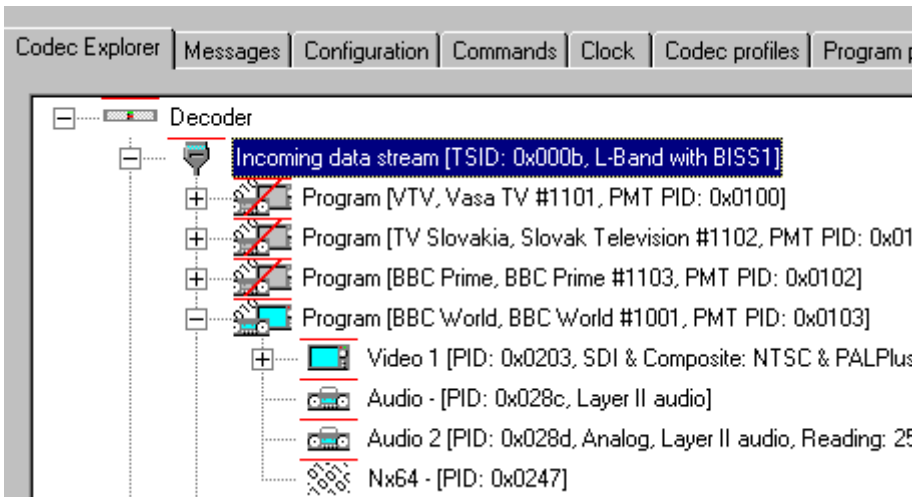
***Integrated management system ROSA***

The integrated management system ROSA provides unique management capabilities. The STELLAR IRD MKII can be set up, controlled and monitored remotely by ROSA which controls the server software COPERNICUS, which in turn controls the connected STELLAR IRD MKII or other compatible units.

You set up and monitor the STELLAR IRD MKII using the integrated management system ROSA, either in its full version with COPERNICUS, an industrial computer, and a network, or in a stand-alone version on a PC directly connected to the codec (ROSA Device Configuration Shell). ROSA operates with Windows NT, Windows 95 or Windows 98 on an IBM compatible PC with a standard RS-232 communication port.

***ROSA codec explorer view***

You configure the STELLAR IRD MKII from the codec explorer view.




***ROSA functionality***

Using the management system you can perform the following functions:

- Change the STELLAR IRD MKII configuration
- Set up video, audio and data programs to decode
- Set up alarms
- Set up system and error messages
- View messages
- Save a system configuration for future use
- Load a previous system configuration
- Get context-sensitive help
- Display name and version no. of the installed software and hardware

All inputs and outputs are checked for validity, and in case of faults, alarms are sent to the ROSA/COPERNICUS management system.

## Sub-rack, power supply and environmental aspects

***Design***

The STELLAR IRD MKII is a 1 U unit to be mounted in a standard 19" rack. All connections to and from the sub-racks are made at the rear panel with the exception of the local control connector which is accessible from the front. You connect a PC to the local control connector. From the PC you set up and configure the STELLAR IRD MKII.

***Power supply***

The STELLAR IRD MKII has an AC power supply (from 100 V to 240 V AC).

***EMC***

The STELLAR IRD MKII is EMC compliant according to EN 55 022, EN 55 024, EN 61000-3-2 and EN 61000-3-3.

***Ventilation***

The thermal design is based on forced cooling using an integrated fan.

# Installation

# Before you start

### General precautions

This chapter contains instructions for installing the STELLAR IRD MKII and must be read to ensure correct installation. When handling the STELLAR IRD MKII, you must take the following precautions:

- Use proper precautions against ESD.
- Do not change a blown fuse before the line plug is pulled out.
  The line power input is protected with fuses in the supply connectors.

### Factory installed

The STELLAR IRD MKII is customer-specific and is delivered with the modules which the customer has specified. All the ordered options and modules are installed at the factory.

**Note!** If, at a later date, you wish to add further options or modules you must send the STELLAR IRD MKII back to the factory and we will install them for you.

**Note!** Under no circumstances should non-Barconet personnel attempt to install modules in the STELLAR IRD MKII.

### Unpacking the equipment

When unpacking the equipment, examine the unit, accessories, and packing material for obvious signs of damage. Check the equipment against the delivery/packing note. Retain the packing material as it is required for warranty shipments and for later inspection by the carrier.

**Note!** Should any item be damaged or any equipment be missing, notify the carrier and your BarcoNet representative.

The equipment is ready for installation when you have ensured that all the equipment you ordered has been received and no damage has occurred. However, before you apply power to the equipment we recommend that you read the section *Safety and precautions* in the section *Preface*.

### Installed fuses

The fuses are factory installed. The STELLAR IRD MKII requires the following fuse type:

| Power supply | Fuse |
|---|---|
| 100 to 240 V AC operation | 1 AT |

# Installing the STELLAR IRD MKII

### Rack mounted

The STELLAR IRD MKII is a 1U unit with connector access at the rear panel. The STELLAR IRD MKII is intended for mounting in a standard 19" rack.

### To mount the STELLAR IRD MKII

To mount the STELLAR IRD MKII in a rack do the following:

1. **We recommend that you mount rails in the rack to support each STELLAR IRD MKII to be installed.**
   For further information, contact your rack supplier.
   **Note!** If you mount several STELLAR IRD MKIIs on top of each other in a stationary installation then you need only to mount rails for every second STELLAR IRD MKII.
2. **Place the STELLAR IRD MKII in its position in the rack.**
3. **Mount the STELLAR IRD MKII securely to the rack by securing 4 screws in the holes in the front panel mounting flanges.**
4. **Make sure that air can circulate on the sides of the STELLAR IRD MKII.**

### To apply power

The STELLAR IRD MKII is powered by AC. To apply power to the STELLAR IRD MKII do the following:

1. **Connect the power cord to the power inlet.**
2. **Make sure that the power cable is connected to protective earth or use the ground stud.**

# Connecting input and output signals

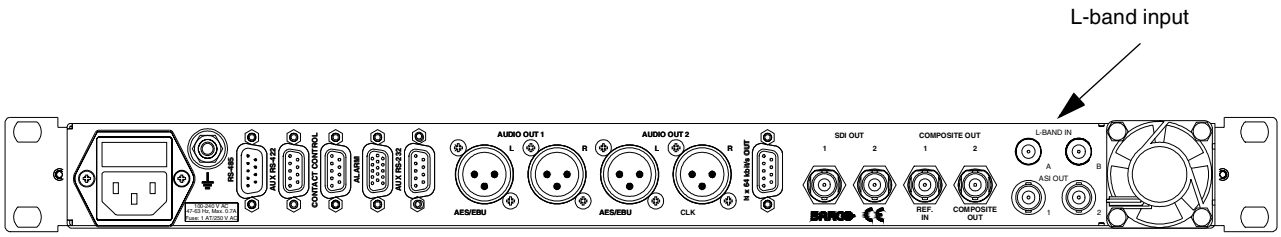
## Customized connector panel

***Custom made STELLAR IRD MKII***

According to which network and output modules are installed in your STELLAR IRD MKII, some of the described connectors might not be on the connector panel of your unit. The following paragraphs describe all modules and connectors available.

***Connector panel, example***

The following drawing shows an example of connector panel containing some of the available output and network connectors.




Control, alarm and aux data interface  Audio output  Data output  Video output  ASI output

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***Connectors available***

According to the ordered options for the STELLAR IRD MKII, the connector panel comprises the following connectors:

| Video output | Text on the rear panel | Connector type |
|---|---|---|
| Composite video output | COMPOSITE OUT<br>1 and 2 | 2 BNC |
| Composite video output and genlock reference input | COMPOSITE OUT<br>REF IN | 2 BNC |
| Component SDI video output | SDI OUT<br>1 and 2 | 2 BNC |

| Network or TS input | Text on the rear panel | Connector type |
|---|---|---|
| L-Band | L-BAND IN<br>A B | 2 F-connectors |

| Audio output | Text on the rear panel | Connector type |
|---|---|---|
| Audio ch. 1. Analog stereo audio output | AUDIO OUT 1<br>L, R | 2 XLR female. The left connector is shared with the digital stereo output |
| Audio ch. 2. Analog stereo audio output | AUDIO OUT 2<br>L, R | 2 XLR female.<br>The connectors are shared with the digital stereo output |
| Audio ch. 1. Digital stereo audio output | AUDIO OUT 1<br>AES/EBU | 1 XLR female<br>**(left connector)** |
| Audio ch. 2. Digital stereo audio output and clock input | AUDIO OUT 2<br>AES/EBU, CLK | 2 XLR female |

| TS Output | Text on the rear panel | Connector type |
|---|---|---|
| ASI output | ASI OUT 1 and 2 | 2 BNC |

| Control, alarm and data | Text on the rear panel | Connector type |
|---|---|---|
| Auxiliary data on RS-232 | AUX RS-232 | 9-pin sub-D female |
| Auxiliary data on RS-422 | AUX RS-422 | 9-pin sub-D female |
| N x 64 kbit/s data | N x 64 kbit/s OUT | 9 pin sub-D female |
| Contact control | CONTACT CONTROL | 9-pin sub-D female |
| RS-485 remote connector | RS-485 | 9-pin sub-D male |
| Alarm relays | ALARM | 15-pin HD sub-D female |

| Control | Text on the front panel | Connector type |
|---|---|---|
| RS-232 local connector | CONTROL | 9-pin sub-D female |

## Connecting to the L-Band input

***To connect to the L-band***

Do as follows to establish the L-band input connection:

Connect the L-band input cables to the interface connectors.

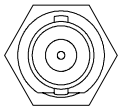
The following connector is available:

| Connector | Interface | Connector type |
|---|---|---|
|  | L-band input | F-type.<br>2 identical input connectors. The STELLAR IRD MKII can supply the LNB with power and control polarization and band if required. |

## Connecting to the TS output

***To connect to the TS output***

To establish the TS output connection, connect the TS cables to the interface connectors. The following connector is available:

| Connector | Interface | Connector type |
|---|---|---|
|  | ASI output | BNC.<br>2 connectors.<br>The output bit rate follows the input bit rate. The entire incoming transport stream is output on the ASI output. You can choose whether or not to descramble the selected program. |

## Connecting the output signals

### Video output

All video output signals are output at BNC connectors. Each video output comprises two BNC connectors, one marked 1 and the other one marked 2. The two connectors carry the same signal.

The following video output signals are supported:

- 270 Mbit/s digital SDI, connector pair marked SDI OUT, 1 and 2
- Analog composite PAL or NTSC, connector pair marked COMPOSITE OUT 1 and 2

### Inserting VBI signals

The STELLAR IRD MKII provides a ghost cancellation reference signal (GCR) which may be inserted in the composite output of the decoder. The STELLAR IRD MKII provides internally stored VITS lines. These signals may be inserted in the composite output of the decoder. Up to two VITS lines per field can be inserted in the composite output in the decoder. For further information on VBI signals, see *VBI signals for PAL and NTSC systems*, in *The Stellar IRD MKII, p. 3.*

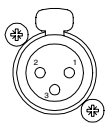
### Video output formats

The following table shows the possible video output formats for one single video channel depending on which video output module is installed:

| Installed video output option | Default setting |
|---|---|
| Composite only | The STELLAR IRD MKII decoders detects the output format as PAL or NTSC and configures the decoding process accordingly. |
| Component only | The STELLAR IRD MKII decoders detects the output format as 525 lines or 625 lines and configures the decoding process accordingly. |
| Composite and component | Both formats, composite and component, are output on their respective connectors. |

### Audio output

Up to two stereo channels can be output at the STELLAR IRD MKII. In the user interface you configure the output to be analog or digital AES/EBU. All audio output is output at XLR female connectors. The following table shows the pin allocation for an XLR connector.

| Connector | Pin allocation | Output signal |
|---|---|---|
|  | 1 Ground<br>2 Signal +<br>3 Signal - | Analog and digital audio output, XLR female, connector. |

**Example:** The **analog audio outputs** for audio channel 1 are connected to the XLR connector pair marked AUDIO OUT 1, L and R. Single channel

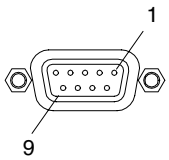
mono is output on both connectors.
The **digital AES/EBU audio output** for audio channel 1 is connected to the XLR connector marked AUDIO OUT 1 AES/EBU.

***Auxiliary data output***

One unidirectional auxiliary data channel may be decoded from the incoming data stream. The auxiliary data channel which was assigned to the video channel will be decoded in the decoder. The auxiliary data is output on both the AUX RS-232 and the AUX RS-422 connector.

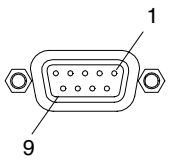
***RS-232 aux. pin allocation***

The following table shows the connector and the pin allocation for the RS-232 data output.

| Connector | Pin allocation | Output signal |
|---|---|---|
|  | 1: Not connected<br>2: RxD (output)<br>3: Not connected<br>4: DTR (input)<br>5: Ground<br>6: DSR (output)<br>7: Not connected<br>8: CTS (output)<br>9: Not connected | Transparent data channel RS-232-E, at a bit rate of 600 to 38400 baud.<br>Connector type: 9-pin sub-D female. |

***RS-422 aux. pin allocation***

The following table shows the connector and the pin allocation for the RS-422 data output.

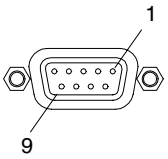
| Connector | Pin allocation | Output signal |
|---|---|---|
|  | 1: Shield<br>2: TxA (output)<br>3: Not connected<br>4: Ground<br>5: Not connected<br>6: Ground<br>7: TxB (output)<br>8: Not connected<br>9: Ground | Transparent data channel RS-422, at a bit rate of 600 to 38400 baud.<br>Connector type: 9-pin sub-D female. |

***N x 64 kbit/s data***

A synchronous N x 64 kbit/s data channel (N is one to six) may be decoded from the incoming data stream. The data is output at the N x 64 kbit/s Out connector.

### N x 64 kbit/s data output, pin allocation

The following table shows the connector and the pin allocation for the N x 64 kbit/s data output.

| Connector | Pin allocation | Output signal |
|---|---|---|
|  | 1: Ground<br>2: Not connected<br>3: Clk (A) (Output)<br>4: Data (A) (Output)<br>5: Indication (A) (Output)<br>6: Not connected<br>7: Clk (B) (Output)<br>8: Data (B) (Output)<br>9: Indication (B) (Output) | N x 64 kbit/s data output. N = 1, 2, 3, 4, 5 or 6.<br>Connector type: 9-pin sub-D female. |

### To connect to the video, audio and data outputs

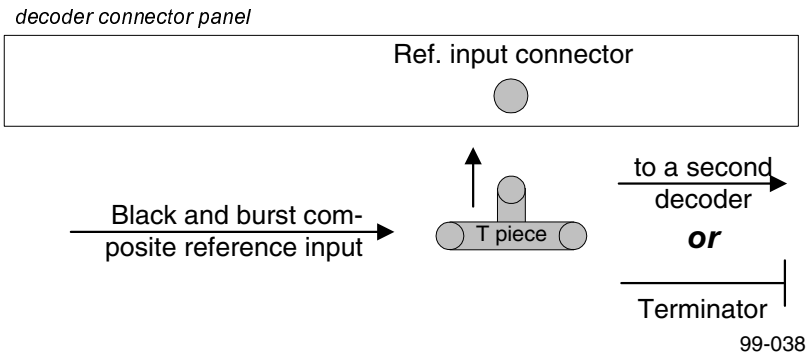
1. **Connect the cable for the video signal to the connector for SDI or composite video.**
   If you have a studio input reference connect the cable to the **REF. IN** connector. You need a composite Black and burst input signal and the SDI genlock module must be installed.
   **Note!** You must terminate the Reference input. The order number for the terminator is 906565. For further information on termination, see *To terminate the reference input*, in *Connecting the output signals, p. 23.*
2. **Connect the two cables for the analog audio signal to the appropriate connectors in the connector groups AUDIO 1 L and R or AUDIO 2 L and R or**
3. **Connect the cable for the digital AES/EBU audio signal to the appropriate connector AUDIO 1 AES/EBU or AUDIO 2 AES/EBU.**
4. **Connect the auxiliary data output to the connector marked RS-232 or RS-422.**
   The auxiliary data channel which was assigned to the video channel will be decoded in the decoder.

5. **Connect the N x 64 kbit/s data output to the connector marked N x 64 kbit/s OUT.**

***To terminate the reference input***

You must terminate the reference input:

1. **Connect a T-piece to the reference input connector.**



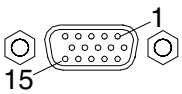

2. **Connect a terminator to the other end of the T-piece.**
3. **If you are using a second STELLAR IRD MKII, connect the T-piece at the reference input of the second STELLAR IRD MKII.**
4. **Connect the open end of the T-piece of STELLAR IRD MKII 1 to the T-piece at the reference input at STELLAR IRD MKII.**
5. **Connect a terminator to the other end of the T-piece at STELLAR IRD MKII.**

## Connecting to an external alarm system

***To connect to an external alarm system***

The STELLAR IRD MKII is equipped with a connector for alarm relay outputs for remote alarm signaling.

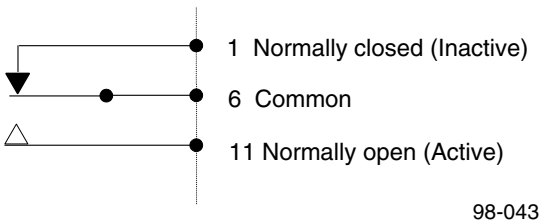
The Alarm output connector is a 15-pin high-density Sub-D female connector. The following drawing shows the connector and the pin allocation table for the Alarm output connector and the function for each of the three alarm sequences. , see

| Connector | Relay name | Function in alarm sequence 1 | Function in alarm sequence 2 | Function in alarm sequence 3 | Normally closed pin | Common pin | Normally open pin |
|---|---|---|---|---|---|---|---|
|  98-020 | **A** | A-Alarm | A-Alarm | A-Alarm | **1** | **6** | **11** |
| | **B** | B-Alarm | B-Alarm | B-Alarm | **2** | **7** | **12** |
| | **C** | C-Alarm | $Z_A$-Alarm | C-Alarm | **3** | **8** | **13** |
| | **D** | Receiving Attention | Receiving Attention | D-alarm | **4** | **9** | **14** |
| | **E** | Alarm Clear | $Z_B$-Alarm | E-alarm | **5** | **10** | **15** |

**Connect the cable from the external alarm system to the alarm connector.**

***Example, alarm relays***

The following figure shows an example of how the alarm relays work.




98-043

For example, for an A-alarm under normal operational conditions (no alarm), pin 1 is closed, that is connected to pin 6 and pin 11 is open. However, should an alarm condition occur pin 1 is open and pin 11 is closed, that is connected to pin 6. This means that the A-alarm is active and the A-alarm LED lights on the front panel.

**Note!** The A-alarm is always activated when the power is off, whereas the other alarms maintain their status.
For example, if a B-alarm is inactive when the power is switched off, it stays inactive. However, if it is active when the power is switched off, it stays active.

# Control connectors

## Connecting a PC to the codec

You can set up and control the STELLAR IRD MKII by using a PC and the management and control system ROSA.

### Overview

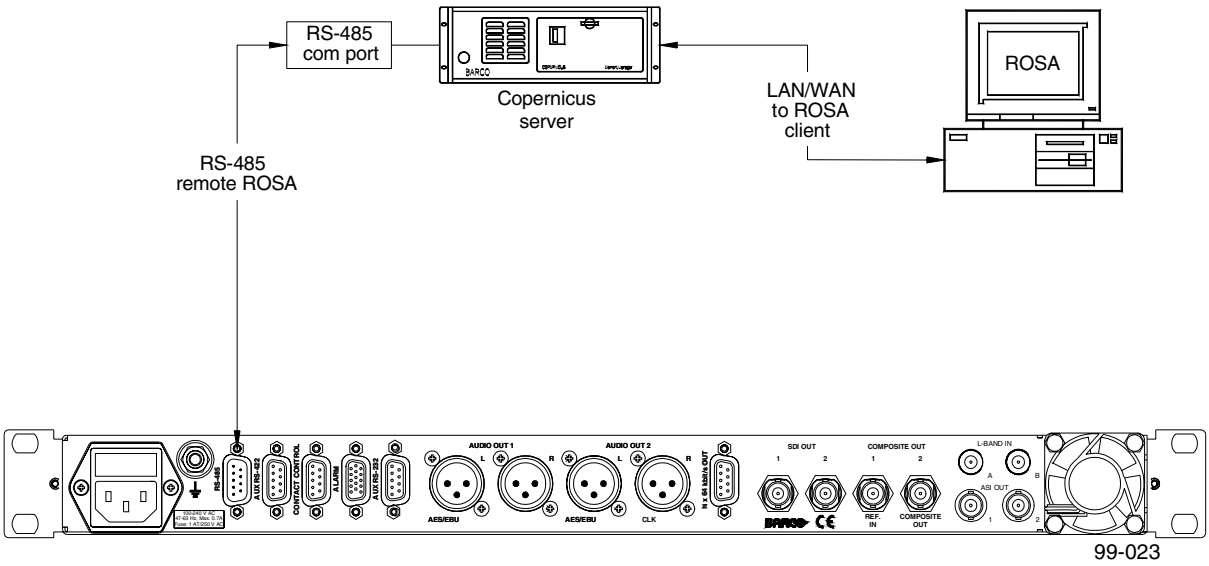
The STELLAR IRD MKII can be controlled via a PC in three different ways:

| Control | Connector | Comm. | Use |
|---|---|---|---|
| Local | Front panel, **local** | RS-232 | Local setup and control of one STELLAR IRD MKII. Cable length between the STELLAR IRD MKII and the PC up to 5 m. |
| Local | Connector panel, **remote** | RS-485 | Local setup and control of several STELLAR IRD MKIIs. Cable length between the STELLAR IRD MKII and the PC up to 50 m. |
| Remote | Connector panel, **remote** | RS-485 | Permanent monitoring and management of several STELLAR IRD MKIIs s in a network. The PC is connected to the Management system COPERNICUS (industrial computer). Cable length up to 50 m. |

# Connecting for remote PC control and management

***Overview***

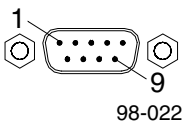
The following drawing shows how to connect a ROSA PC and a COPERNICUS server to the STELLAR IRD MKII in a remote control and management environment.




***To connect the STELLAR to the COPERNICUS***

To enable remote communication between the STELLAR IRD MKIIs and the COPERNICUS server, do the following:

1. **Connect the COM port on the COPERNICUS to the remote connector on the STELLAR IRD MKII.**
   The remote connector is placed on the connector panel of the STELLAR IRD MKII and is labelled “RS-485”. It is a 9-pin male Sub-D connector which connects to the RS-485 port of the COPERNICUS using a 9-way cable. The cable may be unshielded. The following table shows the connector and the pin allocation.

| Connector drawing | Pin number | Description | Use |
|---|---|---|---|
|   98-022 | pin 1 | - | Not connected |
| | pin 2 | TxB | Data to host |
| | pin 3 | RxB | Data from host |
| | pin 4 | TxA | Data to host |
| | pin 5 | RxA | Data from host |
| | pin 6 | - | Not connected |
| | pin 7 | Ground | Signal ground |
| | pin 8 | - | Not connected |
| | pin 9 | - | Not connected |

2. **Follow the instructions in the COPERNICUS user manual.**

### *To connect the COPERNICUS to the network*

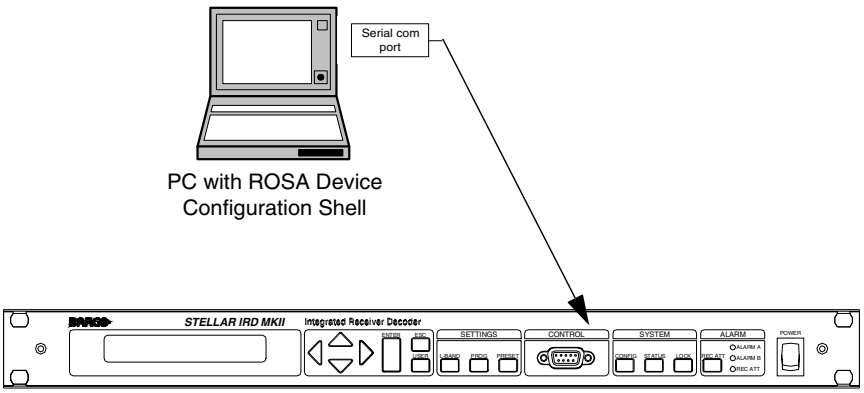
Do as follows to connect the COPERNICUS to the Network:

1. **Connect the COPERNICUS to your LAN/WAN network.**
   The COPERNICUS supports 10 Base 2, 10 Base T and AUI interface types.
2. **Follow the instructions in the COPERNICUS user manual.**

# Connecting for local PC control and management

***Overview***

The following drawing shows how to connect a PC to the STELLAR IRD MKII in a local environment.




99-021

***To connect a PC to the local connector***

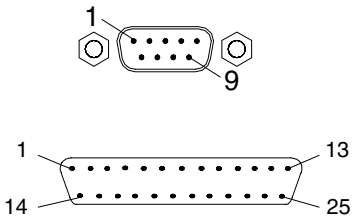
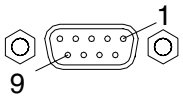
To enable local communication between the STELLAR IRD MKII and a PC, do the following:

1. **Connect the COM port of the PC to the local connector of the STELLAR IRD MKII.**
   The local connector is placed on the front panel of the STELLAR IRD MKII and is labelled “CONTROL”. It is a 9-pin sub-D connector which connects to the RS-232 COM port of the PC using a 9-way one-to-one RS-232 interface cable.
   If your COM port connector does not have a 9-pin connector, you must first fit a 25-to-9-pin adapter to the COM port connector.

2. **Configure the PC COM port in ROSA.**
   From the COPERNICUS explorer, right-click on your COM port and select “Properties”. Select the “RCDS protocol” driver.

### STELLAR IRD MKII and PC connectors

The following table shows the STELLAR IRD MKII and PC connectors for local RS-232 communication and their pin allocations:

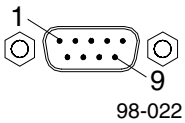
| PC | | | STELLAR IRD MKII | |
|---|---|---|---|---|
|  | | |  | |
| **Signal name** | **PC, 9-pin Sub-D male** | **PC, 25-pin Sub-D male** | **STELLAR IRD MKII, 9-pin Sub-D female** | **Use** |
| - | pin 1 | Pin 8 | pin 1 | Not connected |
| RxD (PC input) | pin 2 | Pin 3 | pin 2 | Data from the STELLAR IRD MKII |
| TxD (PC output) | pin 3 | Pin 2 | pin 3 | Data from the PC |
| DTR (PC output) | pin 4 | Pin 20 | pin 4 | Ready signal from the PC |
| GND | pin 5 | Pin 7 | pin 5 | Signal ground |
| DSR (PC input) | pin 6 | Pin 6 | pin 6 | Ready signal from the STELLAR IRD MKII |
| RTS (PC output) | pin 7 | Pin 4 | pin 7 | Handshake signal asserted by the PC |
| CTS (PC input) | pin 8 | Pin 5 | pin 8 | Handshake signal asserted by the STELLAR IRD MKII |
| - | pin 9 | Pin 22 | pin 9 | Not connected |

## Connecting for local PC control on the remote connector

***To connect a PC to the remote connector***

To enable local communication between the STELLAR IRD MKII and the PC, do the following:

1. **Connect the Com port on the PC to the remote connector on the STELLAR IRD MKII.**
   The remote connector is placed on the connector panel of the STELLAR IRD MKII and is labelled “RS-485”. It is a 9-pin male Sub-D connector which connects to the RS-485 port of the PC using a 9-way cable. The cable may be unshielded.
   The following table shows the connector and the pin allocation.

| Connector drawing | Pin number | Description | Use |
|---|---|---|---|
|  | pin 1 | - | Not connected |
| | pin 2 | TxB | Data to host |
| | pin 3 | RxB | Data from host |
| | pin 4 | TxA | Data to host |
| | pin 5 | RxA | Data from host |
| | pin 6 | - | Not connected |
| | pin 7 | Ground | Signal ground |
| | pin 8 | - | Not connected |
| | pin 9 | - | Not connected |

2. **Configure the PC COM port in ROSA.**
   From the COPERNICUS explorer, right-click on your COM port and select “Properties”. Select the “RCDS protocol” driver.

***To convert from RS-232 to RS-485***

If your PC is not equipped with an RS-485 I/O card you need an RS-232 to RS-485 9-pin sub-D converter. The order number is C9825860.

Connect the RS-232 side of the adapter as close to the PC as possible, preferably connected directly to the PC port. The RS-485 connector connects to the STELLAR IRD MKII via a 9-way shielded cable. The converter does not require external power.

# Connecting to the contact control interface

### Contact control connector

The STELLAR IRD MKII has 8 macro contact inputs. A macro contact input is an ON/OFF switch controlled to execute a series of programmed commands.

For each of the eight inputs, you can record two macros - one for execution on contact open, and one on contact closed, giving a total of 16 macros.

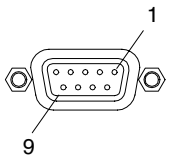
Presets are stored in macros so you can recall a preset by using the contact inputs.

**Example:** To recall preset 3 first close contact input 3 and then open contact input 3.

**Connect the external contact control equipment to the contact control connector.** External control equipment could be an I/O box or a control panel.

### Pin allocation

The connector marked **CONTACT CONTROL** is a 9-pin Sub-D connector (female). The following table shows the connector and the pin allocation.

| Connector drawing | Pin number | Description |
|---|---|---|
|  | 1 | Input 1 |
| | 2 | Input 2 |
| | 3 | Input 3 |
| | 4 | Input 4 |
| | 5 | Input 5 |
| | 6 | Input 6 |
| | 7 | Input 7 |
| | 8 | Input 8 |
| | 9 | Ground |

**Note!** Contact open = not connected (internal pull-up).
Contact closed = connected to ground.

Chapter 3

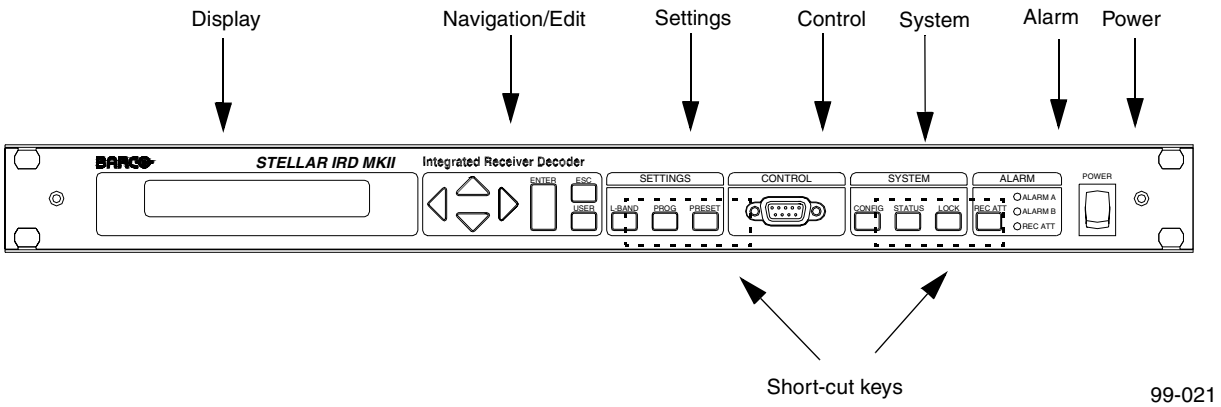
# Front panel operation

# Background

## Front panel sections

***Introduction***

The front panel of the STELLAR IRD MKII is divided into 6 sections, a connector, and a power button. These sections are described in the following:




99-021

***Display***

The display is a 2 x 24 character matrix with adjustable back light. Parameter descriptions are usually shown in the upper row and settings (values) in the lower one.

***Navigation/Edit***

The four cursor keys are used to navigate in the menu structure and to adjust settings. The “Enter”, “Esc” and “User” keys are mostly used for editing and are described in a subsequent section.

***Settings***

The three setting keys are used to jump directly to the top field of the most important sub menus independently of the current location in the menu structure. The three keys are:

| Key | Function |
|---|---|
| L-band | L-band parameters |
| Program | Program selections |
| Preset | User presets |

### System

These three keys give access to the following areas.

| Key | Function |
|---|---|
| Config | Configuration menu. The basic system settings can be controlled here. |
| Status | Viewing of Alarms. |
| Lock | When the STELLAR IRD MKII is controlled by an external management system, for example ROSA, the front panel is locked. The “Lock” key unlocks the front panel if the management system approves this action. This menu is not available yet meaning that the front panel is always unlocked. |

### Alarm

This section features three LEDs indicating two types of alarms as well as “Receiving Attention”. Furthermore there is one key:

**REC ATT** If you press this key the alarm is acknowledged. This key is also used to set the STELLAR IRD MKII address in ROSA.

### Local control port

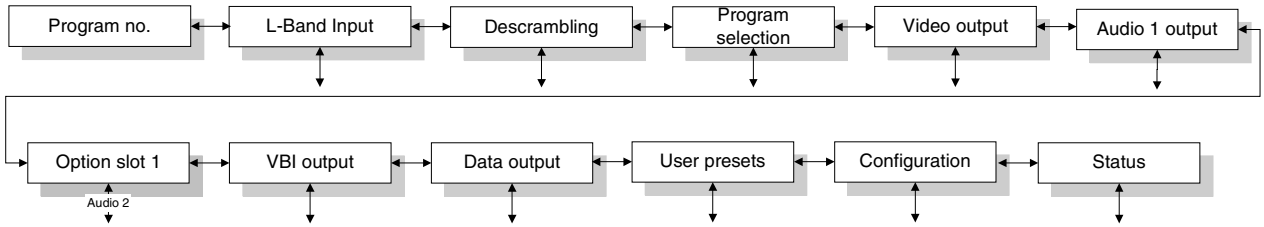
The RS-232 port is used for connecting a PC to the STELLAR IRD MKII for local control.

# Menu structure

***Introduction***

This section gives an overview of the internal structure of all the menus. One main aspect of the implementation is that all the menus and parameters are **dynamic**. That is, only parameters for actually installed modules/options are shown. For example you have one or two audio outputs to set up depending on whether or not you have an audio module installed in the option slot.

The following drawing shows the **name** (“top” parameter) of each of the menus. The menus are situated horizontally.




99-020

Several items in each menu are not shown as the underlying functions are not implemented yet. These functions are available via the ROSA user interface. For information on the functions which are available via ROSA, see *Setting up the Stellar IRD MKII, p. 69.*

# Navigating and editing

***Introduction***

This section describes how to navigate through the menus and how to edit the settings.

***Navigating***

There are three different ways of navigating through the menus.

| Keys | Function |
|---|---|
| **Cursor** ▲ ▼ ◀ ▶ | With the 4 cursor keys you can move left and right to access the different main menus. In each menu you can scroll down (and up) to access the different parameters for the chosen main menu.<br>If you want to go to another menu, you have to go upwards to the top item and then move left/right again. To do this quicker you can use one of the following methods. |
| **Shortcut** | By using the shortcut keys, you can jump directly from your current position to the top of the most important menus: **L-BAND, PROGRAM, PRESET**, **CONFIG, STATUS**.<br>Then you can use the cursor keys to scroll downwards. |
| **Esc key** | When you have moved downwards in one of the menus and you want to go back to the top, you can press the Esc key, instead of scrolling all the way up again. |
| **User** | Not implemented yet. |

***To edit a parameter***

When you have navigated to the parameter you want to change, use the following procedure:

1. **Press Enter to go into edit mode.**
2. **Use the cursor keys to change the value.**
   You do this either by scrolling through a list of possible settings, or by changing each digit of a number, for example a bit rate. If you have changed a setting and realize that you do not want to change it anyway – press **Esc** – and the original value is restored.
3. **Press Enter to confirm the new value and leave the edit mode.**

# Menu descriptions

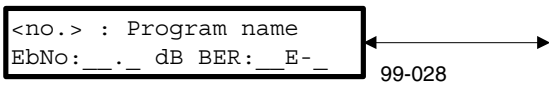
## Program no. and name window

***Structure***

When you power up the STELLAR IRD MKII the display automatically shows the program no. and name window. The program no. and name window is also displayed if the menus of the STELLAR IRD MKII are untouched for one minute. When you press the L-band shortcut key and the left arrow key, the program no. and name window appears.

This window allows for monitoring of the most important parameters.

The program no. and name window contains the following information:




***no.***

Description — The number and name of the decoded program.

***$E_bN_0$***

Description — The measured $E_b/N_0$ value in dB. $E_b/N_0 > 15$ dB are subject to great uncertainty.

***BER***

Description — The measured BER value.

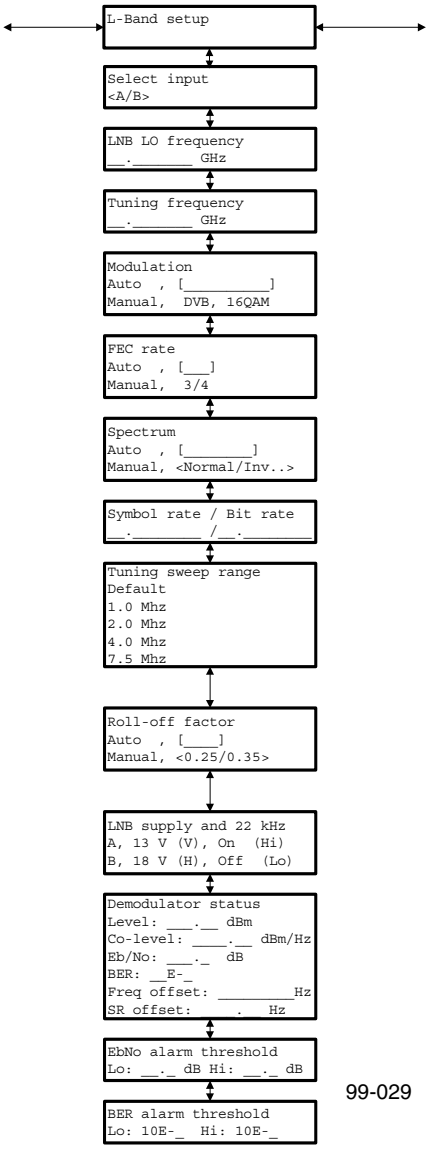
# L-band input

***Structure***

When you press the **L-band** shortcut key, the “L-Band setup” appears.

Each parameter is described in the following. For instructions on how to edit the parameters, see *Navigating and editing, p. 37.*

The menu has the following structure:




99-029

***Select input***

| | |
|---|---|
| Parameters | A, B. |
| Description | Two line inputs. |

***LNB LO frequency***

| | |
|---|---|
| Steps | 0.001 GHz. |

| | | |
|---|---|---|
| | Description | This is the local oscillator frequency of the satellite receiver or the down-converter. |
| ***Tuning frequency*** | Steps | 0.001 GHz. |
| | Description | This is the satellite frequency. If you subtract this frequency from the local oscillator frequency you get the L-band frequency. If you set the local oscillator frequency to 0 the satellite frequency equals the L-band frequency. |
| ***Modulation*** | Parameters | Auto,<br>Manual: DVB QPSK, DVB 8PSK, DVB 16QAM |
| | Description | The modulation is compatible with the DVB-S and DVB-DSNG standards. Spectrum efficiency can be increased by using 8PSK or 16QAM modulation. You may thus decrease space segment costs and/or increase the allowed bit rate. |
| | **Note!** | Selecting Auto results in an increased acquisition time. Auto is only available if you have the QPSK, 8PSK and 16QAM option installed. |
| ***FEC rate*** | Parameters | Auto,<br>Manual: 1/2, 2/3, 3/4, 5/6, 7/8, 8/9. |
| | Description | The FEC rate depends on the modulation. You may select the following:<br>Auto: 1/2, 2/3, 3/4, 5/6, 7/8, 8/9<br>DVB QPSK: 1/2, 2/3, 3/4, 5/6, 7/8, Auto<br>DVB 8PSK: 2/3, 5/6, 8/9, Auto<br>DVB 16QAM: 3/4, 7/8, Auto |
| | **Note!** | Selecting Auto results in an increased acquisition time. |
| ***Spectrum*** | Parameters | Auto,<br>Manual: Inverted, Normal. |
| | Description | When you use certain external RF to L-band converters, the spectrum may be inverted. If this is the case, select Inverted. |
| ***Symbol rate/Bit rate*** | Parameters | Symbol rate: 1 to 45 Mbaud.<br>Bit rate: 1 to 96 Mbit/s |
| | Description | Enter the symbol rate or the bit rate of the signal you want to demodulate. |
| | Steps | 1 baud/1 bit/s. |
| | **Note!** | The symbol rate, the code rate and the modulation type together define the transport stream bit rate:<br>TS rate = m* Baud * code rate,<br>where m is 2 for QPSK, 3 for 8PSK and 4 for 16QAM. Baud is the symbol rate, and code rate is the viterbi code rate e.g. 5/6.<br>The TS rate must not exceed the 96 Mbit/s limit for the decoder.<br>You will not be able to enter the bit rate when modulation and FEC rate is set to auto. Instead enter the symbol rate. |

| | | |
|---|---|---|
| ***Tuning sweep range*** | Parameters | Default (0)<br>1 MHz<br>2 MHz<br>3 MHz<br>4 MHz<br>7.5 MHz. |
| | Description | The tuning sweep range (acquisition range) denotes the search range to each side of the tuner frequency. The default acquisition range is ± 10% of the symbol rate for QPSK and 16QAM and ± 5% of the symbol rate for 8PSK. The larger the tuning sweep range the easier it is to lock to a signal out of frequency. A large tuning sweep range however, means that it takes a longer time to lock to the signal. |
| | **Note!** | The frequency tolerance of many down-converters exceeds the default tuning sweep range of the demodulator. You can use a synthesized converter or you can measure the spectrum of the L-band signal to ensure that the selected frequency of the demodulator matches the signal on the L-band input. |
| ***Roll-off factor*** | Parameters | Auto,<br>Manual: 0.25 or 0.35 |
| | Description | When you select “Auto”, the Stellar IRD MKII automatically sets the roll-off factor depending on the demodulation mode. The roll-off factor is automatically set to 0.35 when the demodulation mode is QPSK, and 0.25 in the remaining modes. When you select “Manual”, you can manually select 0.25 or 0.35. |
| ***LNB supply and 22 kHz*** | Parameters | Supply: Off, 13 V (Vertical), 18 V (Horizontal)<br>22 kHz: Off (Lo), On (Hi) |
| | Description | For each of the two inputs A and B you may enable or disable the LNB power supply. With the LNB supply enabled you can select polarization and band according to the universal LNB specification for ASTRA.<br>Vertical and horizontal polarization is selected by setting the output voltage to 13 V and 18 V respectively. High and low band is selected by enabling and disabling the 22 kHz tone respectively. |
| ***Demodulator status*** | Display | Level:<br>Co-level<br>EbN0:<br>BER:<br>Freq offset:<br>SR offset: |

| | | |
|---|---|---|
| | Description | Shows the demodulator status. To see a setting press arrow down to scroll through the list. You can see the following for the received signal:<br><br>the signal level (in dBm)<br>the Co-level density (in dBm/Hz)<br>the BER<br>the carrier frequency offset (in Hz) and<br>the symbol rate offset (in Hz) is reported. |
| | **Note!** | Level < -70dB and Eb/N0 > 15 dB are subject to great uncertainty. |
| ***$E_bN_0$ alarm threshold*** | Steps | 0.1 dB |
| | Description | HI: Set a value that represents a service degradation for your application. You cannot set the threshold to a lower value than the one selected for the low threshold.<br>LO: Set a value that represents a service loss for your application. |
| ***BER alarm threshold*** | Steps | 10E-9 to 10E-3 |
| | Description | LO: Set a value that represents a service degradation for your application. You cannot set the threshold to a higher value than the one selected for the high threshold.<br>HI: Set a value that represents a service loss for your application. |

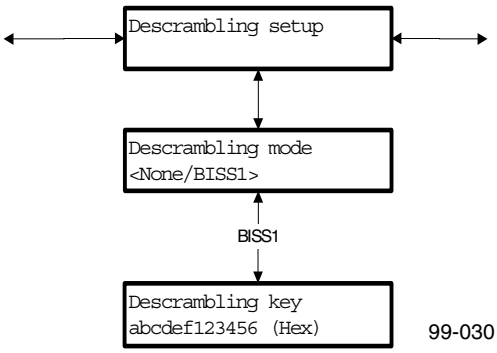
# Descrambling

***Structure***

When you press the **L-band** shortcut key and then the right arrow key, the “Descrambling setup” appears.

Each parameter is described in the following. For instructions on how to edit the parameters, see *Navigating and editing, p. 37.*

The menu has the following structure:




***Descrambling mode***

| | |
|---|---|
| Parameters | None or BISS1. |
| Description | The “BISS1” setting enables the DVB BISS mode 1 descrambling. |

***Descrambling key***

| | |
|---|---|
| Parameters | 12 hexadecimal characters. |
| Description | This is a 48 bit control word for the DVB BISS mode 1 descrambler. |
| **Note!** | The descrambling key must be exactly the same in the STELLAR IRD MKII and the SATURN MKII. Otherwise descrambling fails. |

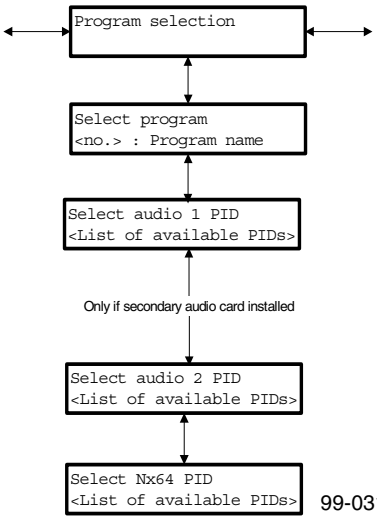
# Program selection

**Structure**

When you press the **Program** shortcut key, the “Program selection” appears.

Each parameter is described in the following. For instructions on how to edit the parameters, see *Navigating and editing, p. 37.*

The menu has the following structure:




**Select program**

Parameters — No.

Description — The number and name of the program to be decoded. You select the program to be decoded by pressing the Enter key and stepping through the list of available programs.

**Select audio 1 PID**

Parameters — PID selection list.

Description — The audio program to be decoded. A program may contain several audio signals. You select the audio program to be decoded by pressing the Enter key and stepping through the list of available audio programs. If you select “Auto” the STELLAR IRD MKII automatically decodes the audio program with the lowest PID not already in use. “Off” disables decoding. This is the primary audio output.

**Select audio 2 PID**

Parameters — PID selection list.

Description — The audio program to be decoded. Audio 2 PIDs can only be selected if an audio module is installed in the option slot. A program may contain several audio signals. You select the audio program to be decoded by pressing the Enter key and stepping through the list of available audio programs. If you select “Auto” the STELLAR IRD MKII automatically decodes the audio program with the lowest PID not already in use. “Off” disables decoding. This is an optional audio output.

***Select N x 64 PID***

Description

The PID of the N x 64 data channel to be decoded. You select the N x 64 kbit/s channel to be decoded by pressing the Enter key and stepping through the list of available PIDs. If you select “Auto” the STELLAR IRD MKII automatically decodes the N x 64 kbit/s channel with the lowest PID. “Off” disables decoding.

**Note!**

To decode a “stand-alone” N x 64 kbit/s data channel you click the Commands tab and type in the command **`PROG:Nx64:SEL=MAN,PID`**. The manual selection is particularly useful when you want to output an N x 64 kbit/s data signal which is in the transport stream but not in the program.

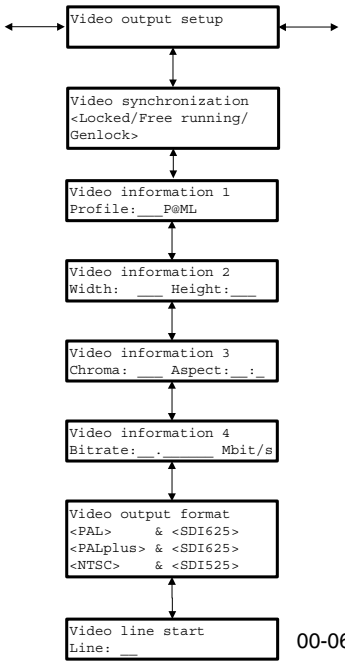
# Video output

### Structure

When you press the **Program** shortcut key and the right arrow the “Video output setup” menu appears.

Each parameter is described in the following. For instructions on how to edit the parameters, see *Navigating and editing, p. 37.*

The menu has the following structure:




00-060

### Video synchronization

Parameters: Locked, Free running, Genlock

Description:

**Locked** means that the video output is locked to the encoder video input frequency by using the PCR and PTS time stamps in the video stream.

**Free running** means that the video output frequency is not locked. Delay adjustments of both video and audio will be performed to maintain the synchronization between video and audio.

**Note!** This mode is useful if the STELLAR IRD MKII is always re-synchronizing in locked mode (because of faulty PCR values in the transport stream).

**Genlock** means that the video output is locked to an external reference which is a composite black and burst signal. The signal is applied at the REF IN connector at the connector panel (option).

**Note!** The SCH phase of the composite output is not locked to the external reference.

| | | |
|---|---|---|
| ***Video information 1*** | Display | Profile: Main or 4:2:2 |
| | **Description** | Displays the decoded profile. |
| ***Video information 2*** | Display | Width: 352, 704 or 720 pixels<br>Height: 576, 592 or 608 for 625 lines systems<br>480, 496 or 512 lines for 525 lines systems |
| | **Description** | Displays the number of horizontal pixels and the number of lines in the decoded picture. |
| ***Video information 3*** | Display | Chroma: 4:2:2 or 4:2:0<br>Aspect: 4:3 or 16:9 |
| | **Description** | Displays the chroma format and the aspect ratio of the decoded picture. |
| ***Video information 4*** | Display | Bit rate: 1.5 to 50 Mbit/s |
| | **Description** | Displays the measured video bit rate. |
| ***Video output format*** | Display | PAL, PALplus, NTSC<br>625, 525. |
| | Description | Displays the output format of the video program being decoded. |
| ***Video line start*** | Parameters | 6 to 23 for 635 lines systems, and 10 to 23 for 525 lines systems. |
| | Description | Keep the line start on 23 unless the encoder is set up to use extended picture area. Set the line start in the STELLAR IRD MKII to the same value as in the encoder. |
| | **Note!** | For the 4:2:0 profile there is no extended picture data. If you move the start of the picture lines up you get the equivalent number of blank lines in the bottom of the picture. |

# Audio 1 output (audio 2 output)

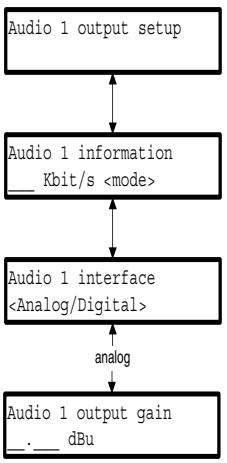
***Structure***

When you press the **Program** shortcut key and the right arrow key twice the “Audio 1 output setup” menu appears.

**Note!** If you have installed an audio module in option slot 1 a similar menu is displayed in the option slot menu to the right of the audio 1 output menu.

Each parameter is described in the following. For instructions on how to edit the parameters, see *Navigating and editing, p. 37.*

The menu has the following structure:




99-033

***Audio 1 information***

| | |
|---|---|
| Display | Bit rate: 64, 128, 192, 256 or 384 kbit/s.<br>Mode: Stereo, Joint, Dual, Mono. |
| Description | Displays the bit rate and mode as selected in the encoder. |

***Audio 1 interface***

| | |
|---|---|
| Parameters | Analog, Digital. |
| Description | Sets the output interface of audio 1 to analog or digital. |

***Audio 1 output gain***

| | |
|---|---|
| Parameters | -6 to 24 dBu. |
| Steps | 1 dBu. |
| Description | Sets the gain on audio 1, when analog interface is selected. You typically set the output gain to the same value as the clipping level in the encoder, so that there is 0 dB gain through the system. If you want a gain of say 6 dBm through the system you increase the maximum level by 6 compared to the value in the encoder. The legal range is from -6 to +21 dBm for 600 Ω output impedance and from -6 to 24 dBu for <20 Ω. |

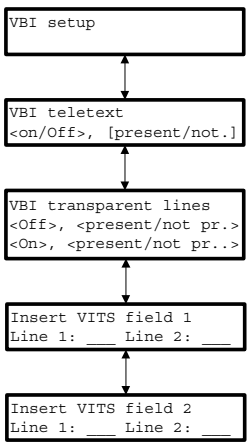
# VBI output

### Structure

When you press the **Preset** shortcut key and the left arrow key twice the “VBI setup” menu appears.

Each parameter is described in the following. For instructions on how to edit the parameters, see *Navigating and editing, p. 37.*

The menu has the following structure:




99-034

### VBI teletext

| | |
|---|---|
| Parameters | On, Off.<br>present, not present |
| Description | Enables or disables teletext. “present/not present” indicates whether teletext is detected in the incoming signal or not.<br>Teletext B and C are supported. |

### VBI transparent lines

| | |
|---|---|
| Parameters | On, Off<br>present, not present |
| Description | On enables the transparent VBI lines. Off disables the lines. “present/not present” are status fields displaying whether or not transparent VBI lines are detected in the input signal. |

### Insert VITS field 1

| | |
|---|---|
| Parameters | 625 lines systems: 0 or 6 to 22.<br>525 lines systems: 0 or 10 to 19 |
| Description | Set up the lines where the VITS will be inserted for field one. If you enter 0 no lines are inserted. For information on the contents of the lines according to ITU-R Rec. 473-5, see *Setting up the inserted VBI, p. 78.* |

### Insert VITS field 2

| | |
|---|---|
| Parameters | 625 lines systems: 0 or 318 to 335.<br>525 lines systems: 0 or 273 to 282 |
| Description | Set up the lines where the VITS will be inserted for field one. If you enter 0 no lines are inserted. For information on the contents of the lines according to ITU-R Rec. 473-5, see *Setting up the inserted VBI, p. 78.* |

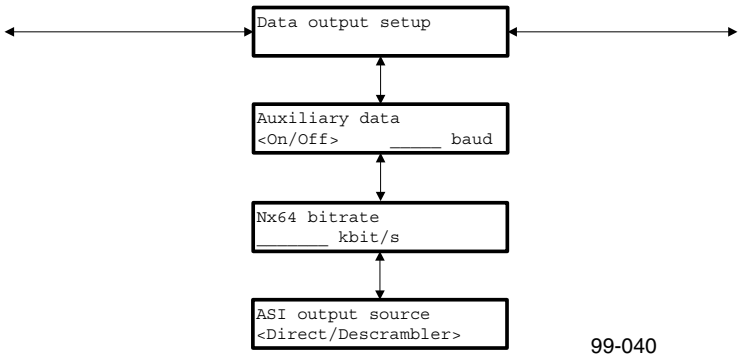
# Data output

**Structure**

When you press the **Preset** shortcut key and the left arrow key once the "Data output setup" menu appears.

Each parameter is described in the following. For instructions on how to edit the parameters, see *Navigating and editing, p. 37.*

The menu has the following structure:




99-040

**Auxiliary data**

| | |
|---|---|
| Parameters | On/Off |
| Steps | Baud: 600, 1200, 2400, 4800, 9600,19200 or 38400 (display field). |
| Description | You may enable or disable the RS-232 and RS-422 output and see the bit rate. |

**N x 64 bit rate**

| | |
|---|---|
| Parameters | 64, 128, 192, 256, 320, 384 |
| Description | Displays the bit rate of the incoming N x 64 kbit/s data signal |

**ASI output source**

| | |
|---|---|
| Parameters | Direct, Descrambling, Off |
| Description | Select whether the data on the ASI output is coming directly from the input or from the descrambler. The ASI output can also be turned off. |
| **Note!** | Only the active program is being descrambled. |

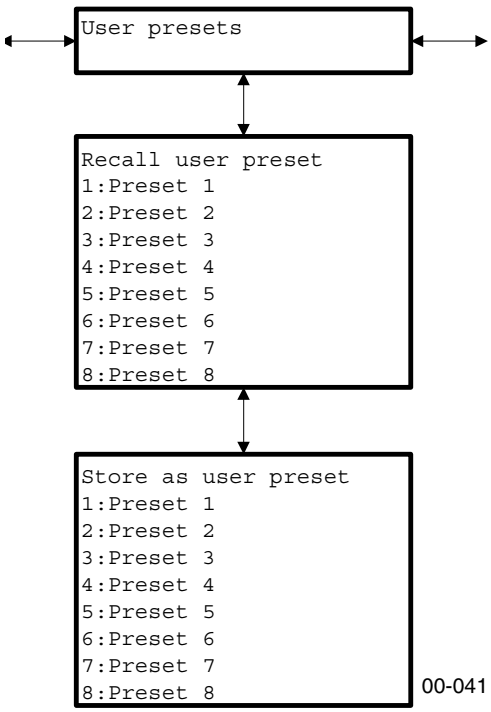
# User presets

***Structure***

When you press the **Preset** shortcut key the “User presets” menu appears.

For instructions on how to edit the parameters, see *Navigating and editing, p. 37.*

The menu has the following structure:




***Function***

Using the settings and the user preset menus you can store up to 8 configurations (presets) in the STELLAR IRD MKII. A preset contains the information necessary to decode a program, i.e. settings regarding input configuration and program selection.

Settings regarding configuration of outputs are not stored in the presets.

Presets are useful when you want to switch between different inputs and/or programs in a fast and simple manner.

***Implementation***

User presets are stored as macros in the STELLAR IRD MKII so that Preset 1 is stored in MACro 1 CLOSE and MACro 1 OPEN. Preset 2 is stored in MACro 2 CLOSE and MACro 2 OPEN and so on.

As the user preset is a macro it is also possible to recall it by using the Contact Control inputs. For more information on Contact Control, see *Connecting to the contact control interface, p. 31.*

**Note!** If both presets and macros are to be used simultaneously then be careful to avoid using macros that are already being used as presets and vice versa.

## Recalling a user preset

***To recall a user preset*** Do as follows to recall a user preset.

1. **Press the Preset shortcut key.**
   The User preset menu appears.
2. **Press arrow down.**
   The Recall user preset menu appears.
3. **Press Enter**
   The User preset No. 1 is flashing in the lower LCD display line.
4. **Press Enter or arrow down to the wanted preset.**
5. **Press Enter.**
   The text "`Recall in progress...`" is displayed while recalling the preset. Unless the preset recall is already in progress you may at any time abort it by pressing the escape key.

## Storing a user preset

***To store a user preset***

Do as follows to store a user preset.

1. **Use the Settings menus to set up the STELLAR IRD MKII as wanted.**
   See the list of settings which can be stored in presets below.
2. **Press the Preset shortcut key.**
   The User preset menu appears.
3. **Press arrow down twice.**
   The Store as user preset menu appears.
4. **Press Enter, and if necessary arrow down to the wanted preset.**
   The selected user preset (No. 1 to 8) is flashing in the lower LCD display line.
5. **Press Enter to store the preset.**
   "The text "Store in progress..." is displayed while storing the preset.

***Settings in presets***

The following list shows the settings which can be stored in presets:

- L-band input selection
- LNB LO frequency
- Tuning frequency
- Modulation
- FEC rate
- Spectrum
- Symbol rate
- Tuning sweep range
- Roll-off factor
- LNB supply and 22 kHz settings for both inputs
- Descrambling mode
- Descrambling key
- Program selection
- Audio 1 PID selection
- Audio 2 PID selection
- Nx64 PID selection

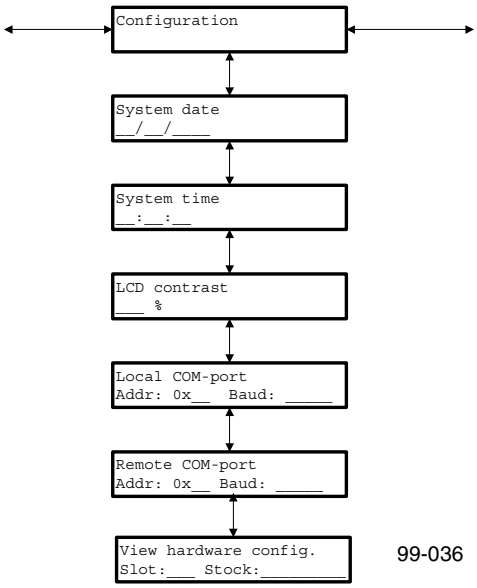
# Config – system settings

**Structure**

When you press the **Config** shortcut key the "Configuration" menu appears.

Each parameter is described in the following. For instructions on how to edit the parameters, see *Navigating and editing, p. 37.*

The menu has the following structure:




**System date**

| | |
|---|---|
| Parameters | DD/MM/YYY. |
| Description | Sets the system date. |

**System time**

| | |
|---|---|
| Parameters | HH/MM/SS. |
| Description | Sets the system time. |

**LCD contrast**

| | |
|---|---|
| Range | 0 to 100%. |
| Steps | 1%. |
| Description | Used to adjust the LCD contrast of the display. |

**Local COM port**

| | |
|---|---|
| Parameters | Addr: 1 to 7E<br>Baud: 9600, 19200, 38400 |
| Description | The address and baud rate on the front RS-232 communication port. This port is used for local ROSA control. |

**Remote COM port**

| | |
|---|---|
| Parameters | Addr: 1 to 7E<br>Baud: 300, 1200, 2400, 4800, 9600, 19200, 38400 |
| Description | The address and baud rate on the rear RS-485 communication port. This port is used for remote ROSA control. |

**View hardware config.**

| | |
|---|---|
| Parameters | Slot, Stock (display) |

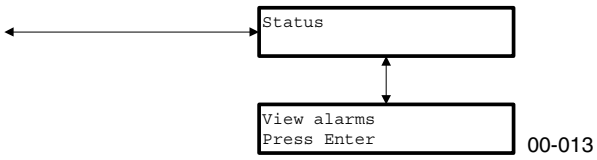
| | |
|---|---|
| Description | Shows the stock number of the modules installed in the various slots. Press ENTER and use the up/down arrow keys to scroll through the list of installed modules. |

## Status

**Structure**

Whenever one of the alarm-relays/LEDs are active, you may press the **Status** short-cut key to read the list of alarms present in the decoder. If there are active alarms the display shows "**`Press ENTER`**". Use the up/down arrow keys to scroll through the list of active alarms. If there are no active alarms the display shows "**`No active alarms`**".

The menu has the following structure:




**Possible alarms**

The STELLAR IRD MKII supports displaying the text of the following alarms:

- Active net input err
- Audio output err
- Inactive net input err
- MPEG PSI err
- Network output err
- Temperature alarm
- Video output err

If an alarm not listed above occurs, it is presented with a number in the display. For an explanation of the message number, see *ROSA messages, p. 110.*

**Syntax**

At the right most side of the display, a channel number may be displayed, for example:

```
View alarms             ch
36                      1
```

**Explanations and remedies**

The alarm text is an abbreviation of the ROSA message text. For further information on the explanations and remedies, see *ROSA messages, p. 110.*

**Note!**

The alarm list is not dynamically updated while you are in the list. You have to exit the list and enter it again to update the list.

# Setup example

***To set up the STELLAR IRD MKII***

The following example shows how to set up the STELLAR IRD MKII. First you set up the demodulator and then you set up the decoding.

***To set up the demodulator***

1. **Press the L-band shortcut key and select the input.**
2. **Set the LNB LO frequency.**
3. **Set the tuning frequency.**
   If you set the local oscillator frequency in step two to zero the L-band frequency equals the tuning frequency.
4. **Set the modulation.**
5. **Select automatic FEC rate detection.**
   Set the FEC rate manually if you want a faster acquisition time.
6. **Select automatic spectrum detection.**
7. **Set the roll-off factor to auto.**
8. **If necessary, set the LNB supply and 22 kHz for the selected input.**
9. **Set the symbol rate.**
10. **If necessary increase the acquisition range.**
    This may for example be necessary when using low symbol rates.

***To set up the decoding***

1. **If necessary, enable descrambling.**
   Type the descrambling key.
2. **Select the program to decode.**
   If the STELLAR IRD MKII displays “no PAT available” if there is input loss.
3. **Select the wanted Audio PID on the primary audio output.**
   The audio PID represents the audio program to be decoded.
4. **If relevant, select the wanted Audio PID on the optional audio output.**
   The audio PID represents the audio program to be decoded
5. **Set the audio interface to analog or digital.**
   Adjust the gain and set the impedance if the interface is analog.
6. **Check the video and audio output.**

# Setup and monitoring

# Getting started with ROSA

## Control modes

***Control modes***

The STELLAR IRD MKII can be controlled in the following modes:

- Remote mode via ROSA/COPERNICUS and RS-485
- Local mode via ROSA and RS-232,
- local mode via the front panel display
- Local mode via ROSA and RS-485, or
- Contact control mode

***Remote mode***

If a STELLAR IRD MKII is operated from a central control station with ROSA, the ROSA client controls the STELLAR IRD MKII via the COPERNICUS server using the remote RS-485 connection. This is the primary connection to the ROSA management system and is used during daily operation.

**Note!** If the remote ROSA logs off the COPERNICUS, the COPERNICUS still polls the STELLAR IRD MKII. This means that when the ROSA logs on again it will be able to display the messages from the STELLAR IRD MKII in the ROSA message view.

***Local mode via ROSA***

The local RS-232 connector is used for local control of the STELLAR IRD MKII by a ROSA system. In local mode you have full control over the codec, but cannot manage several STELLAR IRD MKII decoders in a network. The local control using the RS-232 connection is used for service and diagnostic purposes.

***Caution!***

Avoid using ROSA on both the local and the remote port simultaneously.

***Local mode via the front panel display***

The STELLAR IRD MKII can be operated in local mode from the front panel display. For further information,see *Front panel operation, p. 33.*

***Contact control mode***

The **contact control** from the contact closure interface contains macros to be effectuated on external command. The event of a contact closure is recorded in a message in ROSA.

## Installing ROSA and drivers

***Installation procedure***

Before you can set up your STELLAR IRD MKII you must proceed as follows:

1. **Install the ROSA/COPERNICUS.**
   You install the ROSA Device Configuration Shell on your PC or the COPERNICUS on the COPERNICUS server and ROSA on the client PC. For further information, see the ROSA or COPERNICUS User manual.
2. **Install the RCDS communication driver.**
   The communication driver enables communication between ROSA and the STELLAR IRD MKII. For further information, see the ROSA or COPERNICUS User manual.
3. **Install the device driver.**
   This is the driver which makes the COPERNICUS server recognize a STELLAR IRD MKII.
4. **Set the STELLAR IRD MKII address in the ROSA/COPERNICUS.**
   For further information *see, Setting up the STELLAR IRD MKII addresses in ROSA/Copernicus on the next page.*

## Setting the STELLAR IRD addresses in ROSA/COPERNICUS

***Addresses***

The STELLAR IRD has a device number and an address:

- The device number is unique for the unit type, for the STELLAR IRD C6 (hexadecimal), so ROSA recognizes the type of unit connected, and
- an unique remote address, so ROSA can communicate with each single unit.

***To give the Stellar IRD a unique remote address***

To give the STELLAR IRD a unique remote address do as follows:

1. **Connect the STELLAR IRD via its remote RS-485 port to the serial port of the COPERNICUS server and power it up.**
2. **Push the Receiving Attention button located to the right on the STELLAR IRD front for at least 3 seconds and release the button when it flashes with an interval of approximately one flash per second.**
   The communication speed and remote address is auto set between the STELLAR IRD and the server. After successful configuration the Receiving Attention LED will turn off unless the receiving attention situationan alarm is active.
   **Note!** If multiple STELLAR IRDS need to be configured, they can all be connected at once to the COPERNICUS. However, be aware that the remote installation procedure can only be performed for one STELLAR IRD at a time, meaning that you must not press more than one Receiving Attention button at the same time.

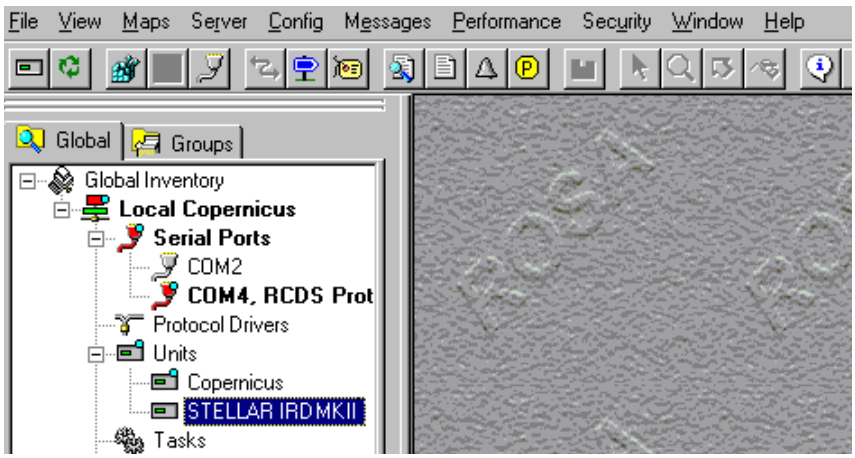
***Important!***

If you install new hardware or software options in the STELLAR IRD MKII you must restart the graphical user interface for the changes to be reflected in ROSA.

## Codec-specific user interface

***General***

The codec specific user interface is activated by right-clicking on the wanted unit from the COPERNICUS explorer window and selecting Properties.

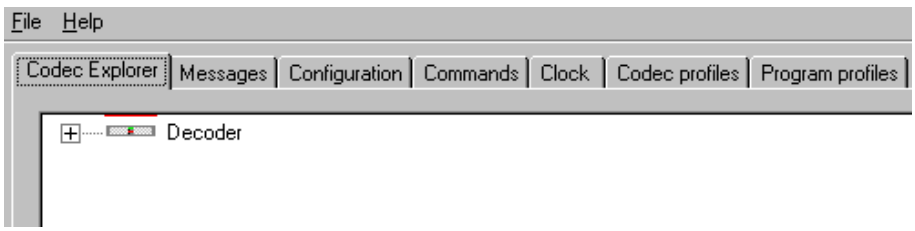



***Important!***

If you install new hardware or software options in the STELLAR IRD MKII you must restart the graphical user interface for the changes to be reflected in ROSA.

***Tab pages***

The codec specific user interface consists of a number of tab pages:




The function of the tab pages is as follows:

- **Codec Explorer**
  From this page you select the programs to activate, select program elements to decode, and set up the values of the program elements.
- **Messages**
  From this menu you set the various messages and alarms.
- **Configuration**
  From this page you view the hardware configuration.
- **Commands**
  From this page you may enter low level commands to the codec. For further information, see the MPEG-2 Command reference, 983756.
- **Clock**
  From this page you set the STELLAR IRD MKII clock and date.
- **Profile**
  From these pages you save the current STELLAR IRD MKII settings for later download to another STELLAR IRD MKII.

# General navigation rules

***Reload/apply***

As soon as you have made changes in the Codec explorer, you must send the new settings to the STELLAR IRD MKII to be effective. To do this, click on the **Apply** button. If the **Apply** button is grey, no changes have been made, and the settings in the user interface are the same as in the STELLAR IRD MKII.

If you want to read the current STELLAR IRD MKII settings and load them into the Codec Explorer, press **Reload**, and the COPERNICUS server/ROSA PC reads the settings from the STELLAR IRD MKII and displays them in the ROSA view for the STELLAR IRD MKII.

***Navigation rules***

The following actions exist in the Codec explorer and Configuration views:

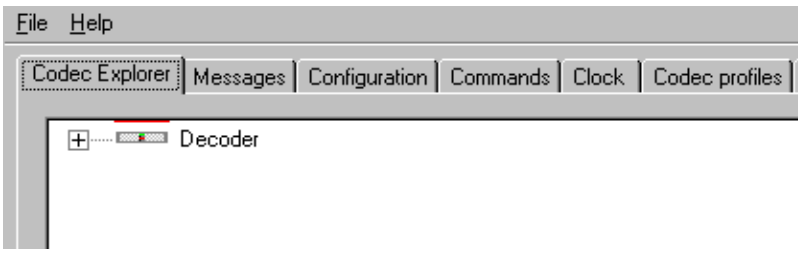
| **Action** | **Result** |
|---|---|
| Click on a “+” sign | Expands the view. |
| Click on a “-” sign | Collapses the view. |
| Double-click | Collapses/Expands the view. |
| Right-click | Displays a context-sensitive Properties page giving an overview of all the possible actions on the data element in question. |
| Alt. plus letter with underscore | Moves the cursor to the menu item denoted by the letter. |
| Tab | Moves the cursor to the next menu item. |

## Codec explorer hierarchy

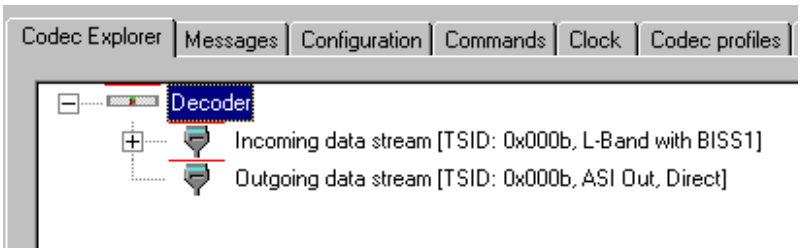
***To access the user interface***

To access the settings for the STELLAR IRD MKII, the ROSA PC must be connected to the unit, either using ROSA/COPERNICUS from a central control station or the ROSA Device Configuration Shell on a locally connected PC. Proceed as follows:

1. **Enter the COPERNICUS Explorer window and select Properties.**
2. **Right-click on the STELLAR IRD MKII icon in the COPERNICUS Explorer window and select Properties.**
   Now you have access to set all the parameters for the STELLAR IRD MKII:

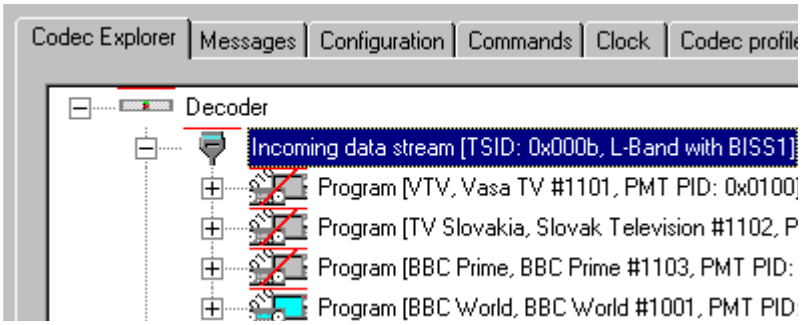



3. **Click on the plus sign to see the incoming and the optional outgoing data streams.**




For the data stream you see the transport stream ID and the network type.

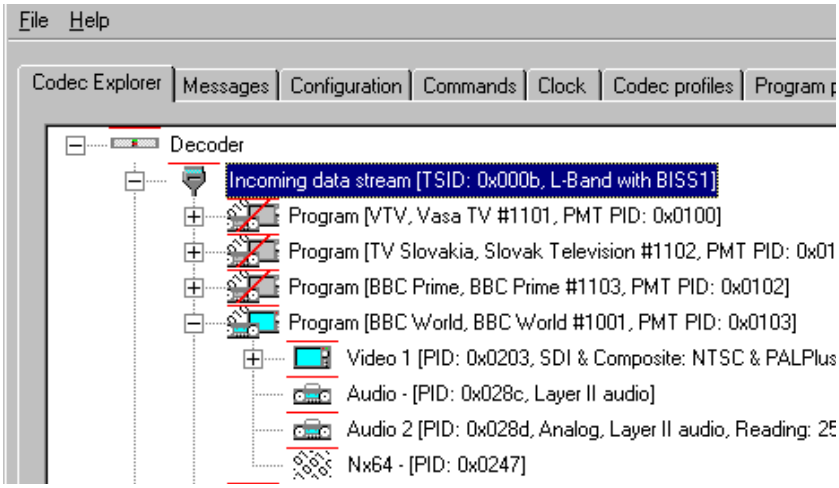
4. **Click on the plus sign to see the programs in the data stream.**




For each program you see the most important settings such as program name, program number and PMT PID. The red stroke across the program icons denotes that they are inactive.

**Note!** Only one program at a time can be active.
If you activate a program it will be decoded.

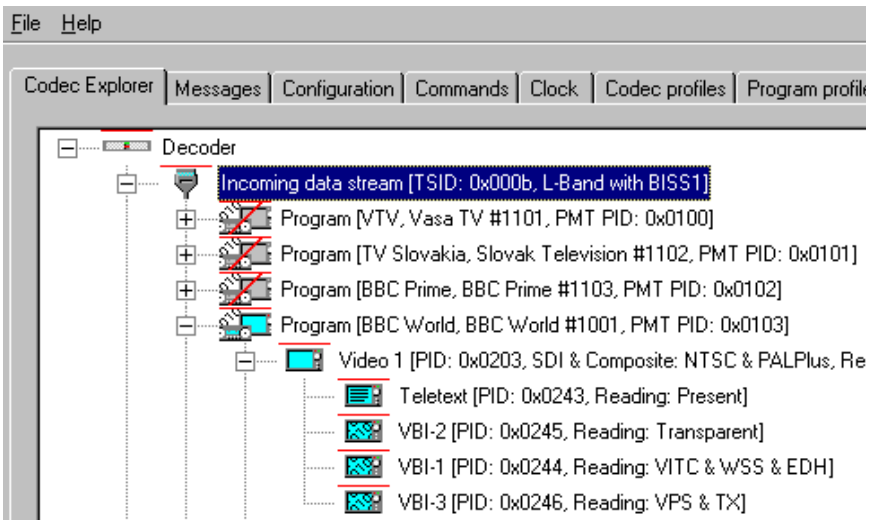
5. **Click on the plus sign to see the program elements in the programs.**




For each program element you see the most important settings:

| **Program settings** | |
|---|---|
| **Video** | **Audio** |
| Channel number. Note that if there is no number the program is not decoded. | Channel number. Note that if there is no number the program is not decoded. |
| PID | PID |
| Output (SDI and/or composite) | Type (Analog, Digital) |
| SDI: Type (525 lines or 625 lines) | Coding (Layer II or Linear) |
| Composite Format (PAL, PALplus or NTSC) | Audio bit rate |
| Video bit rate | |

6. **Click on the plus sign outside the video icon to see its elements.**




For each program element you see the most important settings such as VBI types and PIDs.

***To activate a program***

Do as follows to activate a program:

1. **Right-click on the program to activate.**
2. **Select Activate.**
   The selected program is activated. Any previously activated program is automatically deactivated.

***To deactivate a program***

Do as follows to deactivate a program:

1. **Right-click on the program to deactivate.**
2. **Select Deactivate.**

# Setting up the STELLAR IRD MKII

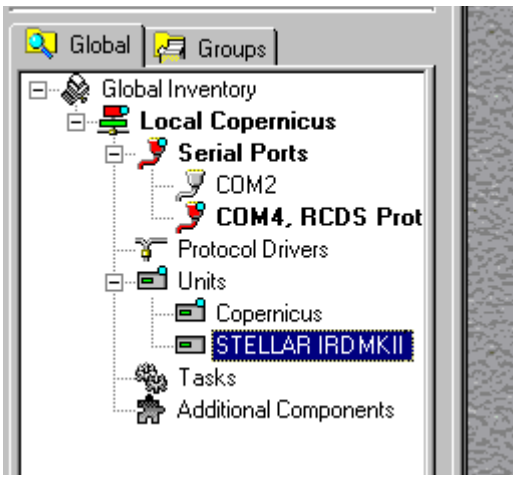
## Before you begin

***Useful hint***

Before you set up the STELLAR IRD MKII you can speed up the ROSA response time by disabling polling of the STELLAR IRD MKII.

Do as follows to disable polling of the STELLAR IRD MKII:

1. **Double-click on the Serial Ports icon in the COPERNICUS Explorer Window.**
2. **Right-click on the relevant COM port icon and select Properties.**




3. **Click on disable polling.**
4. **Click on Apply.**

   **Note!** Remember to enable the polling as soon as you have set up the STELLAR IRD MKII in order to be able to view messages, if any.

## Setting up the L-band input

### General

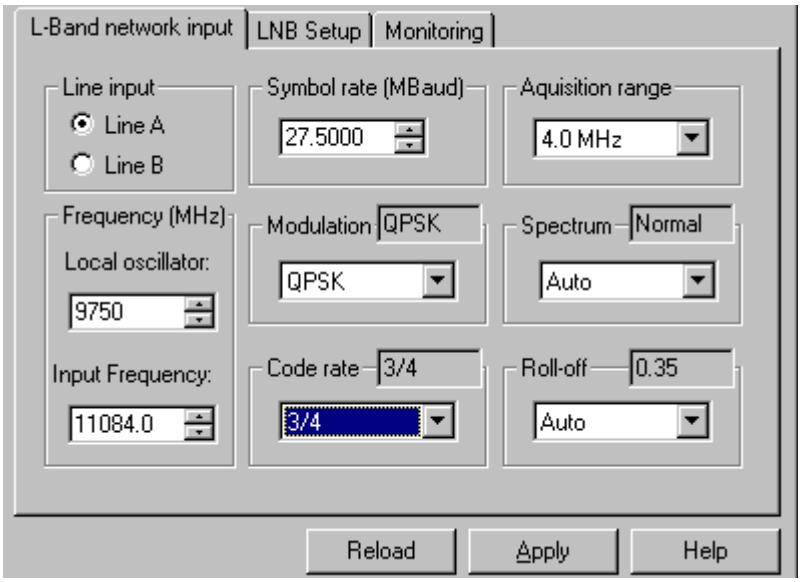
The demodulator features 2 inputs to allow easy switching between multiple feeds. For reasons of redundancy, satellite receiver systems may use double frequency or polarization. The demodulator operates in L-band (950 to 2150 MHz). A satellite receiver system requires a low-noise amplifier (LNA) and an external RF to L-band down-converter for the specific band in question (for example Ku or C band).

The STELLAR IRD MKII estimates BER and $E_b/N_0$ and may issue messages based on user-defined thresholds. For further information, see *BER and Eb/N0 estimates*, in *Setting up the monitoring, p. 74.*

### To set up the L-band input

Do as follows to set up the L-band input:

1. **From the Codec Explorer right-click on the icon representing the L-band input and select Properties.**




   ROSA automatically displays the actual modulation, code rate, spectrum and Roll-off if you select Auto in the corresponding fields.

2. **Click the Line Input you want to decode.**

   **Note!** Avoid mixing very strong and very weak signals on the two inputs to avoid that a strong signal leaks into a channel with a weak signal. If necessary, attenuate the strong signal.

3. **Type in the Local oscillator frequency.**
   This is the local oscillator frequency of the satellite receiver or the down-converter.

4. **Type the satellite frequency.**
   If you subtract this frequency from the local oscillator frequency you get the L-band frequency. If you set the local oscillator frequency to 0 the satellite frequency equals the L-band frequency.

5. **Set the symbol rate.**
   The legal range is from 1 to 45 MBaud. The maximum bit rate is 96 Mbit/s.

**Note!** You must insert the symbol rate and not the TS rate. For further information, see *TS rate on satellite links*, in *Setting up the monitoring, p. 74.*

6. **Select the modulation of the input signal.**
   You may select between QPSK, 8PSK, 16QAM or Auto. The modulation is compatible with the DVB-S and DVB-DSNG standards. Selecting Auto results in an increased acquisition time. Auto is only available if you have the QPSK, 8PSK and 16QAM option installed. Spectrum efficiency can be increased by using 8PSK or 16QAM modulation. You may thus decrease space segment costs and/or increase the allowed bit rate.

7. **Select the code rate of the input signal.**
   You may select between the following code rates:
   DVB QPSK: 1/2, 2/3, 3/4, 5/6, 7/8, Auto
   DVB 8 PSK: 2/3, 5/6, 8/9, Auto
   DVB 16 QAM: 3/4, 7/8, Auto

   Selecting Auto results in an increased acquisition time.

8. **Set the spectrum mode to Auto.**
   The STELLAR IRD MKII automatically detects the spectrum of the incoming signal. Note that using certain external RF to L-band down-converters the spectrum may be inverted.

9. **Change the acquisition range, if necessary.**
   The acquisition range denotes the search range to each side of the tuner frequency. The default acquisition range is ± 10% of the symbol rate for QPSK and 16QAM and ± 5% of the symbol rate for 8PSK. The larger the acquisition range the easier it is to lock to a signal out of frequency. A large acquisition range however, means that it takes a longer time to lock to the signal.
   **Note!** The frequency tolerance of many down-converters exceeds the default acquisition range of the demodulator. You can use a synthesized converter or you can measure the spectrum of the L-band signal to ensure that the selected frequency of the demodulator matches the signal on the L-band input.

10. **Set the roll-off factor to Auto.**
    When you select “Auto”, the STELLAR IRD MKII automatically sets the roll-off factor depending on the demodulation mode. The roll-off factor is automatically set to 0.35 when the demodulation mode is QPSK, and 0.25 in the remaining modes.

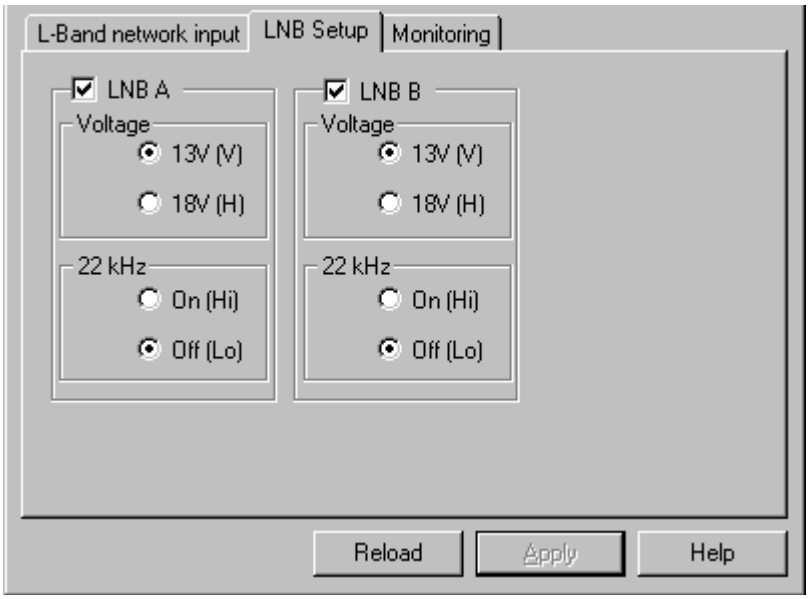
11. **Click Apply.**

## Setting up the LNB setup

***To set up the L-band input***

Do as follows to set up the LNB setup:

1. **From the Codec Explorer right-click on the icon representing the L-band input and select Properties.**



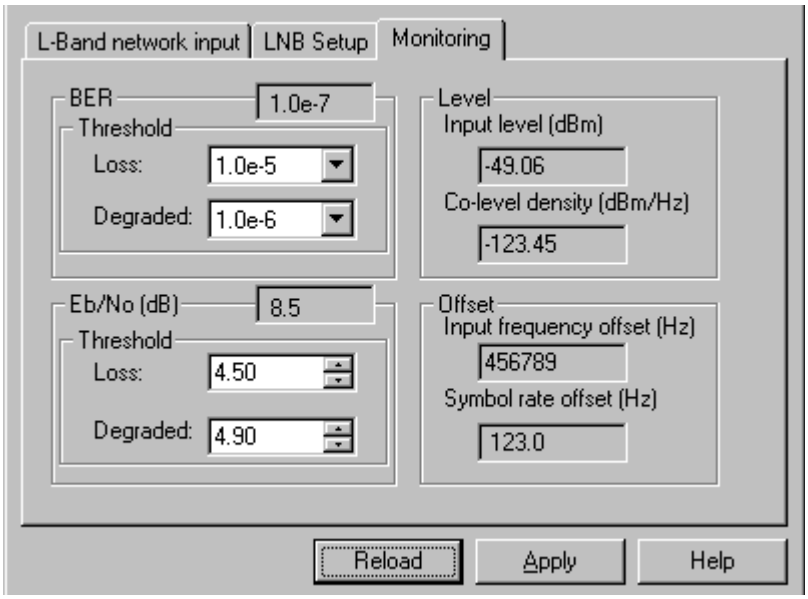

2. **Enable LNB supply for input A and B.**
   You do this by checking the LNB A or the LNB B box.
3. **Select the polarization.**
   You may select vertical (13 V) or horizontal (18 V) polarization.
4. **Select high or low band.**
   If you select the high band the 22 kHz tone is turned on.
5. **Click apply.**

# Setting up the monitoring

***To set up the monitoring***

Do as follows to set up the monitoring:

1. **From the Codec Explorer right-click on the icon representing the L-band input and select Properties.**




   ROSA automatically displays the measured
   - BER,
   - $E_b/N_0$ values,
   - the signal level in dBm,
   - the Co-level density in dBm/Hz
   - the carrier frequency offset in Hz and the symbol rate offset in Hz.

   **Note!** Level < -70dB and Eb/N0 > 15 dB are subject to great uncertainty. You have to press Reload to get the fields updated.

2. **Enter the BER alarm threshold in the loss field.**
   Enter a value that represents a service loss for your application. An alarm message is sent to ROSA if the loss threshold is reached.

3. **Enter the BER warning threshold in the degraded field.**
   Enter a value that represents a service degradation for your application. An alarm message is sent to ROSA if the degraded threshold is reached. You cannot set the threshold to a higher value than the one entered for the loss threshold.

4. **Enter the $E_b/N_0$ alarm threshold in the loss field.**
   Enter a value that represents a service loss for your application. An alarm message is sent to ROSA if the loss threshold is reached.

5. **Enter the $E_b/N_0$ warning threshold in the degraded field.**
   Enter a value that represents a service degradation for your application. You cannot set the threshold to a lower value than the one entered for the loss threshold.

6. **Click Apply.**

### BER and $E_b/N_0$ estimates

The STELLAR IRD MKII estimates BER and $E_b/N_0$ figures for the satellite channel. When you press Reload ROSA updates the figures in the BER and $E_b/N_0$ fields.

If you want to monitor the satellite channel you may enable message and alarms to be activated when the BER and $E_b/N_0$ thresholds are reached. Enter threshold values for BER and $E_b/N_0$ that provide the most sensible messages of service loss and degradation for the application in question. For information on how to enable alarms and messages, see *Alarms and messages, p. 90.*

Low $E_b/N_0$ figures and high BER figures may be caused by interference or excessive noise. It may be necessary to revise the link budget if the margin frequently is too low.

### TS rate on satellite links

The Transport Stream rate on the satellite link depends on the symbol rate (= Baud rate), the modulation and code rate according to the formula below. You must set up these three parameters identically at the encoder/modulator site and in the STELLAR IRD MKII.

TS rate = Rs * 188/204 * code rate * n

where:

Rs is the symbol rate in MBaud or Msymbols/sec,

the 188/204 refers to the outer Reed-Solomon coding

n = 2 for QPSK, 3 for 8PSK and 4 for 16QAM

and the code rate is the rate of the inner coding (1/2, 2/3, 3/4, 5/6, 7/8 or 8/9)

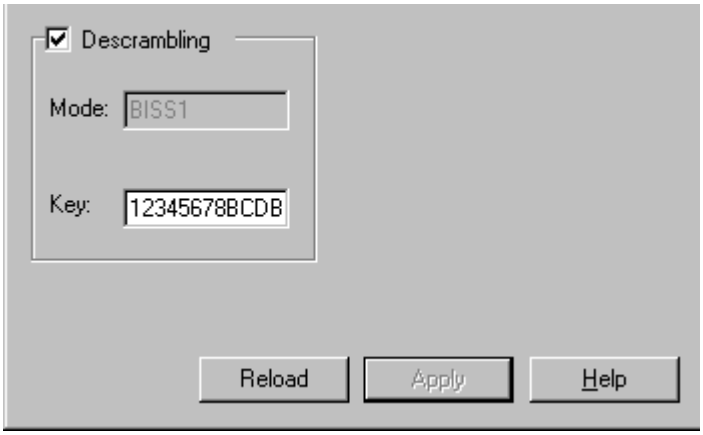
# Setting up the descrambling

***To set up the descrambling***

The input to the STELLAR IRD MKII may be scrambled by the encoder and has to be descrambled before it can be decoded.

Do as follows to set up the descrambling:

1. **From the Codec Explorer right-click on the icon representing the incoming data stream and select Descrambling.**




   To descramble the transmitted data the STELLAR IRD MKII decoder offers the BISS mode 1 scrambling system which is specified by DVB for use in DSNG applications. It is based on the DVB Common Scrambling Algorithm but all components in a program are scrambled by a fixed control word used during the entire transmission".

2. **Type the descrambling key.**
   The scrambling key must consist of 12 hexadecimal characters and be exactly the same in the SATURN MKII (or other BISS1-compatible encoder) and the STELLAR IRD MKII. Otherwise descrambling fails.

3. **Click Apply.**

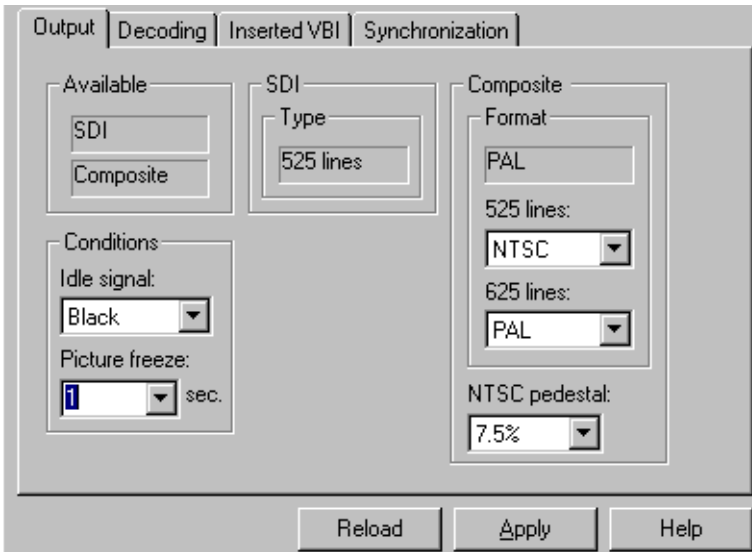
## Setting up the video output

***To set up the video output***

The video output may be SDI and/or Composite.

Do as follows to set up the video output:

1. **From the Codec Explorer right-click on the video you want to set up and select Properties.**




   ROSA automatically displays the video output format. Both the SDI and the Composite formats may be present simultaneously.
   If the output format is SDI the line type of the signal is automatically displayed. 625 lines is normally used in PAL and PALplus systems. 525 lines in NTSC systems.
   If the output format is Composite the Composite field shows the format which can be PAL, PALplus and NTSC.

2. **If the output format is NTSC, set the NTSC pedestal as required.**
   The NTSC pedestal can be set to 0, 2.5, 5, 7.5 or 10%.

3. **Click which type of idle signal you want in case of line input loss.**
   You can select between Black with sync or Grey with sync.
   If the output is composite you can select 0 V DC as well. When 0 V DC is enabled the composite output is completely quiet, i.e no sync, burst and video. The 0 V DC signal can, for example be used for controlling transmitters. If both the composite and the SDI formats are present and the idle signal is set to “0 V DC” it will be 0 V DC for the composite signal and Black for the SDI signal.

4. **Select the freeze time from the list if you want the output to be frozen in case of line input loss.**
   If the signal has not returned after the selected period the output signal returns to the idle signal setting. 0 means the idle signal is output immediately upon a video input or line input loss. “Unlimited” means that the picture freezes indefinitely upon a line input loss.

5. **Click Apply.**

# Setting up the video decoding

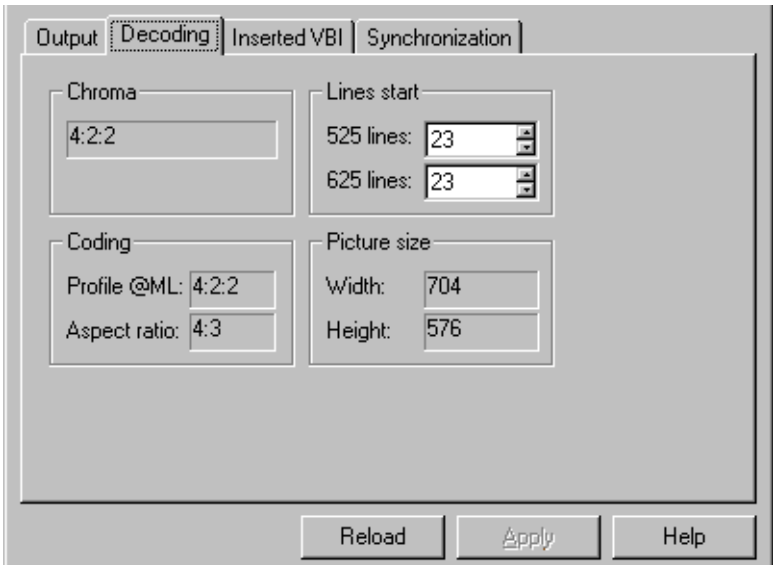
***To set up the video decoding***

From this picture you set up the decoding criteria for the video output signal.

ROSA automatically displays the Chroma format, profile, aspect ratio and picture size as set in the encoder.

Do as follows to set up the video decoding signal:

1. **From the Codec Explorer right-click on the video you want to set up and select Properties.**
2. **Click the Decoding tab.**




3. **Set the 525 lines start or the 625 lines start if required.**
   Keep the line start on 23 unless the encoder is set up to use extended picture area. Set the line start in the STELLAR IRD MKII to the same value as in the encoder. The legal range for 525 lines is 10 to 23 and for 625 lines 6 to 23.
   **Note!** For the 4:2:0 profile there is no extended picture data. If you move the start of the picture lines up you get the equivalent number of blank lines in the bottom of the picture.
4. **Click Apply.**

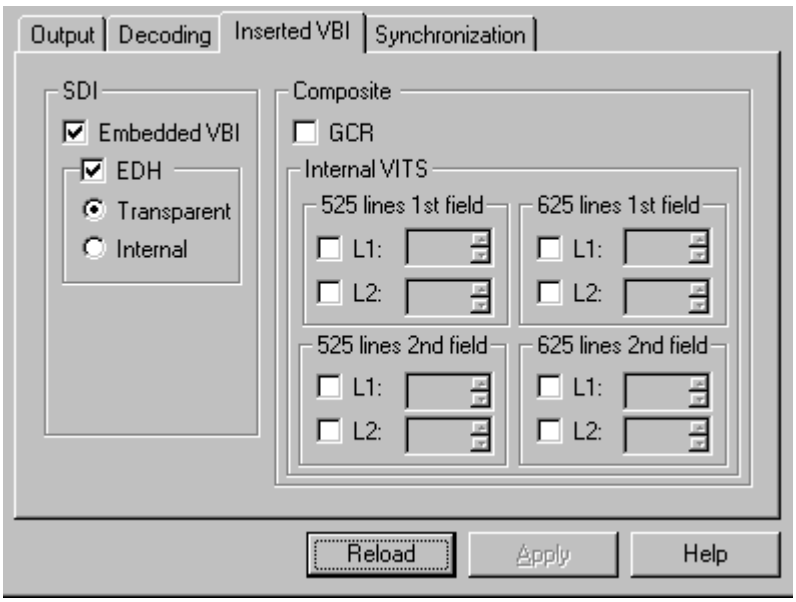
## Setting up the inserted VBI

***To set up the inserted VBI decoding***

From this picture you set up the VBI signals that the decoder should generate.

Do as follows to set up the inserted VBI decoding:

1. **From the Codec Explorer right-click on the video you want to set up and select Properties.**
2. **Click the Inserted VBI tab.**




3. **Click GCR.**
   This enables Ghost Cancellation Reference signals. GCR is inserted in line 318 in PAL systems and lines 19 and 282 in NTSC systems.
   Ghost Cancellation Reference is only available for PAL and NTSC outputs, and for SDI outputs if embedded VBI is enabled.
4. **Click Embedded VBI if you want to embed VBI in the SDI signal.**
   Enabling Embedded VBI results in all composite VBI data being embedded into the SDI output.
   The individual VBI elements can be enabled/disabled from their individual pictures.
5. **Click EDH if you want to include EDH in the SDI signal.**
   Transparent EDH means that the EDH flag is transferred transparently from the encoder to the decoder; i.e. the encoder EDH flags are untouched. If the decoder does not receive any EDH flags from the encoder it sets all flags to UES. (Unknown Error Status).
   Internal means that EDH signals are generated in the decoder and all EDH flags are cleared. For further information on STELLAR IRD MKII and EDH flags, see *Error Detection and Handling (EDH), p. C-1.*

6. **Click and enter the first and second VITS lines you want to insert.**
   The VITS lines are internally generated by the decoder. If you set up the decoder to insert VITS in lines already containing VBI (inserted by the encoder) the VBI inserted by the encoder takes precedence.
   For 625 lines systems you can use the following lines:

| **625 lines systems** | | |
|---|---|---|
| **Fields** | **Contents acc. to ITU-R Rec. 473-5** | **Selectable lines** |
| 1st field L1 | VITS line 17 | Lines 6 to 22 |
| 1st field L2 | VITS line 18 | Lines 6 to 22 |
| 2nd field L1 | VITS line 330 | Lines 319 to 335 |
| 2nd field L2 | VITS line 330 | Lines 319 to 335 |

   For 525 lines systems you can use the following lines:

| **525 lines systems** | | |
|---|---|---|
| **Fields** | **Contents acc. to ITU-R Rec. 473-5** | **Selectable lines** |
| 1st field L1 | VITS line 17 | Lines 10 to 19 |
| 1st field L2 | VITS line 17 in a monochrome version. | Lines 10 to 19 |
| 2nd field L1 | VITS line 280 | Lines 273 to 282 |
| 2nd field L2 | VITS line 280 in a monochrome version. | Lines 273 to 282 |

7. **Click Apply.**

# Setting up the synchronization of the video output

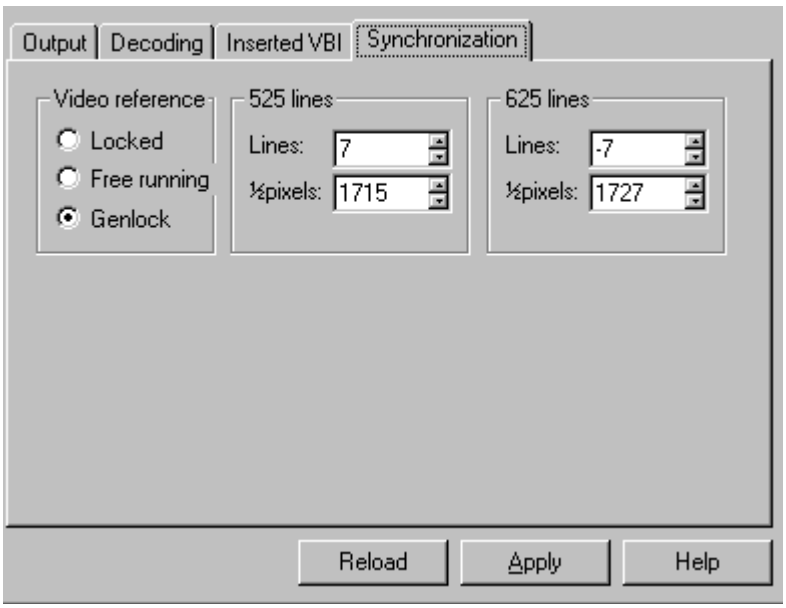
***To set up the genlock of the video output***

From this picture you set up the synchronization of the video output.

Do as follows to set up the synchronization of the video output:

1. **From the Codec Explorer right-click on the video you want to set up and select Properties.**

2. **Click the Synchronization tab.**




3. **Click the relevant video reference.**
   **Locked** means that the video output is locked to the encoder video input frequency by using the PCR and PTS time stamps in the video stream.
   **Free running** means that the video output frequency is not locked. Delay adjustments of both video and audio will be performed to maintain the synchronization between video and audio.
   **Note!** This mode is useful if the STELLAR IRD MKII is always re-synchronizing in locked mode (because of faulty PCR values in the transport stream).
   **Genlock** means that the video output is locked to an external reference which is a composite black and burst signal. The signal is applied at the REF IN connector at the connector panel (option).
   **Note!** The SCH phase of the composite output is not locked to the external reference.

4. **If you have clicked genlock set up the Lines and 1/2 pixels.**
   You set up the vertical adjustment in the Lines box and the horizontal adjustment in the 1/2 pixels box.
   This adjusts the phase of the video output relative to the external reference.
   For 525 lines the lines can be adjusted +/- 7 and the 1/2 pixels from 0 to 1715.
   For 625 lines the lines can be adjusted +/- 7 and the 1/2 pixels from 0 to 1727.
   One line and one 1/2 pixel correspond to:

| | **525 lines** | **625 lines** |
|---|---|---|
| **Line** | 63.49 µs | 64 µs |
| **1/2 pixel** | 37 ns | 37 ns |

   You can use a oscilloscope with a video trigger to make sure that the decoder output and the external reference are in phase.

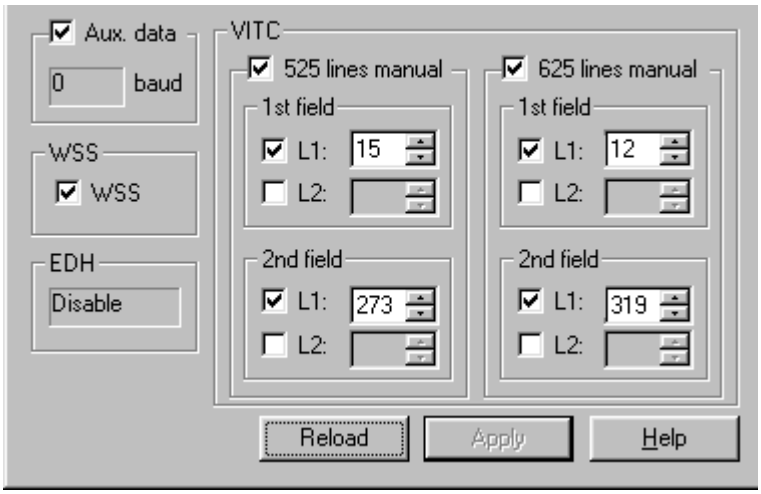
## Setting up the AUX, WSS, EDH and VITC output (VBI 1)

***To set up the AUX, WSS, EDH and VITC***

A video signal often contains various types of ancillary data such as Wide Screen Signaling (WSS) and Vertical Interval Time Codes (VITC). The VBI 1 picture also controls the enabling of auxiliary data.

Do as follows to set up the VBI 1 output.

1. **From the Codec Explorer right-click on the icon representing the VBI 1 you want to set up and select Properties.**




   If Error Detection and Handling (EDH) is detected in the incoming SDI signal ROSA automatically displays the type of EDH which can be transparent, internal or none. EDH is controlled from the Inserted VBI picture. For further information, *Setting up the inserted VBI, p. 78.*

2. **If relevant, enable the Auxiliary data.**
   ROSA automatically displays the Baud rate of the incoming auxiliary data.

3. **If relevant, enable the WSS.**

4. **Set up the VITC lines to be output.**
   If you do not click Manual the VITC lines are output in the same lines as they were extracted from in the encoder.
   If you click Manual you may select up to two lines in each field where VITC will be inserted. For 625 lines systems first fields can be 0 or 6 to 22 and second fields first fields can be 0 or 318 to 335. For 525 lines systems first fields can be 0 or 10 to 19 and second fields can be 0 or 273 to 282. If you enter 0 no lines are transferred.

5. **Click Apply.**

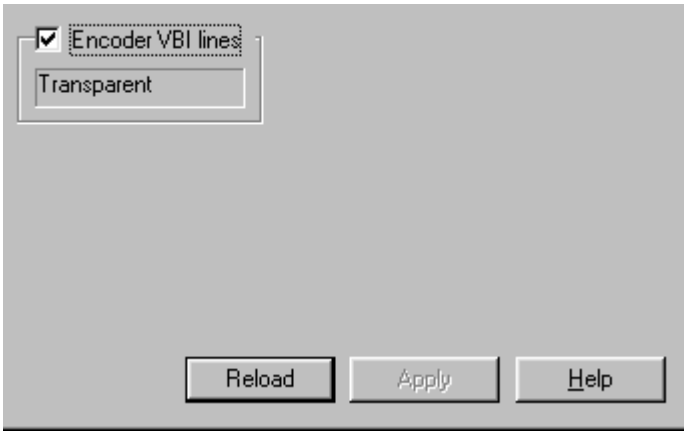
## Enabling the encoder VBI lines (VBI 2)

***To enable the transparent lines***

The VBI lines received from the SATURN MKII can be output at the composite output of STELLAR IRD MKII.

Do as follows to enable the transparent lines.

1. **From the Codec Explorer right-click on the icon representing the VBI 2 (transparent lines) you want to enable and select Properties.**




   ROSA automatically displays the type of lines transferred from the SATURN MKII to the STELLAR IRD MKII.

2. **Click Encoder VBI lines.**
3. **Click Apply.**

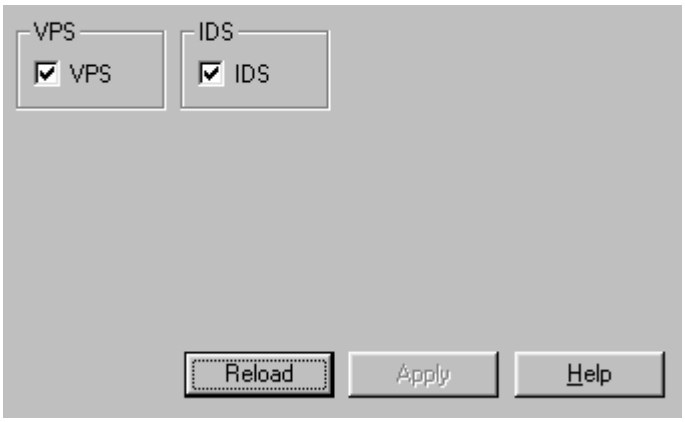
## Setting up the IDS and VPS lines (VBI 3)

***To set up the IDS and VPS lines***

The IDS and VPS lines generated at the SATURN MKII can be output at the composite output of the STELLAR IRD MKII.

Do as follows to set up the Insertion Data Signal (IDS) and Video Program Signal (VPS) lines.

1. **From the Codec Explorer right-click on the icon representing the VBI 3 (IDS and VPS lines) you want to set up and select Properties.**




**Note!** The text explaining the VBI 3 icon in the codec explorer window shows the presence of VPS or IDS.

2. **To enable VPS click VPS.**
3. **To enable IDS click IDS.**
4. **Click Apply.**

## Enabling the teletext

***To enable the teletext***

Teletext lines transferred from the SATURN MKII can be output by STELLAR IRD MKII.

Do as follows to enable the teletext.

1. **From the Codec Explorer right-click on the icon representing the teletext you want to enable and select Properties.**


2. **Click Teletext.**
3. **Click Apply.**

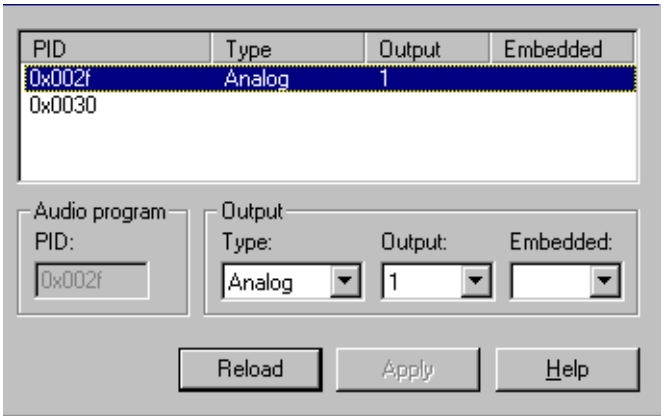
## Setting up the audio output resource

***To set up the audio to decode***

A program may contain several audio signals. Of these signals up to two stereo channels can be decoded by the STELLAR IRD MKII.

Do as follows to set up the audio to output.

1. **From the Codec Explorer right-click on the icon representing the program containing the audio you want to set up and select Audio Resources.**




2. **Select the audio signal to be decoded from the upper list.**
   Initially the available audios in the upper list only have a PID. ROSA automatically displays the PID of the selected audio program in the "Audio program" field.

3. **Select in the Type field whether you want to output the signal as Analog or Digital AES/EBU.**
   The STELLAR IRD MKII outputs the signal in the selected format. ROSA automatically displays the type selection in the upper list.

4. **Select whether you want the output on Output 1 or 2 in the Output field.**
   Output 1 and 2 are represented by the connectors labelled Audio 1 respectively Audio 2. ROSA automatically displays the output selection in the upper list.
   **Note!** If you set output to none the audio is not decoded at all. Only the audio PID is displayed in the upper list.

5. **If relevant, embed the audio in the SDI signal.**
   The two decoded audio channels can be placed in any of the 8 possible embedded audio channels. The embedded audio channels are each represented by a packet (1 to 4) and a pair (1 or 2). Selection 1:1 represents packet 1 pair 1, 1:2 packet 1 pair 2 and so on.
   **Note!** If you set Embedded to none the audio is not embedded.

   ROSA automatically displays the embedded selection in the upper list.

6. **If required repeat the procedure for the other audio channel.**

7. **Click Apply.**

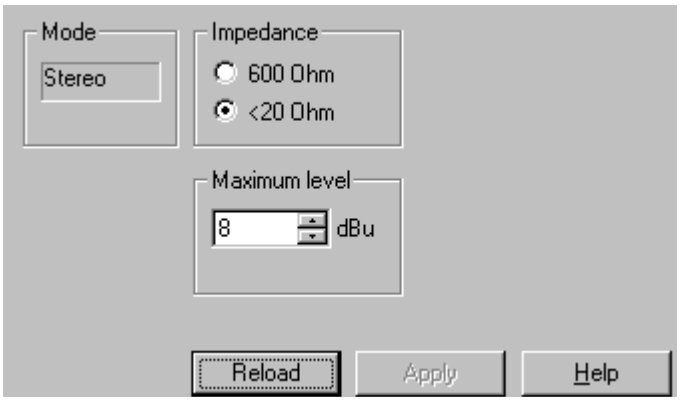
# Setting up the analog audio output

***To set up the analog audio output***

From this picture you set the output impedance and the output level.

Do as follows to set up the analog audio:

1. **From the Codec Explorer right-click on the icon representing the audio you want to set up and select Properties.**




   ROSA automatically displays the audio mode of the signal.

2. **Set the STELLAR IRD MKII's audio output impedance to 600 Ω or <20 Ω.**
   You set the output impedance to the value required by the equipment connected to the STELLAR IRD MKII. Typically you set the output impedance to 600 Ω if the input impedance of the external equipment receiving the output is 600 Ω. Set the STELLAR IRD MKII's output impedance to <20 Ω if the external equipment receiving the output is high impedance (>12 kΩ).

3. **Set the maximum output level.**
   You typically set the maximum level to the same value as the clipping level in the encoder, so that there is 0 dB gain through the system. If you want a gain of say 6 dBm through the system you increase the maximum level by 6 compared to the value in the encoder. The legal range is from -6 to +21 dBm for 600 Ω output impedance and from -6 to 24 dBu for <20 Ω.

4. **Click Apply.**

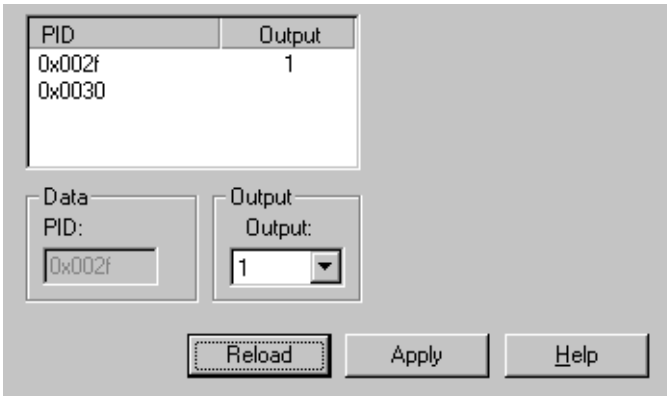
## Setting up the N x 64 kbit/s data output resources

***To set up the N x 64 kbit/s data to decode***

A program may contain several N x 64 kbit/s data signals or the N x 64 kbit/s data signal may be placed outside the program in the transport stream.

Do as follows to set up the data output.

1. **From the Codec Explorer right-click on the icon representing the program containing the N x 64 kbit/s data you want to set up and select Properties.**




2. **Select the N x 64 kbit/s data signal to be decoded from the upper list.**
   The upper list contains the available PIDs from the active program. ROSA automatically displays the PID of the selected N x 64 kbit/s data in the “PID” field.

3. **Alternatively, set the PID manually in the commands field.**
   You click the Commands tab and type in the command `PROG:Nx64:SEL=MAN,PID`. The manual selection is particularly useful when you want to output an N x 64 kbit/s data signal which is in the transport stream but not in the program.

4. **Select Output 1 from the Output list.**
   The N x 64 kbit/s data is output on the N x 64 kbit/s connector. ROSA automatically displays the output selection in the upper list.
   **Note!** If you set output to None the N x 64 kbit/s data is not decoded at all. Only the N x 64 kbit/s data PIDs are displayed in the upper list.

5. **Click Apply.**

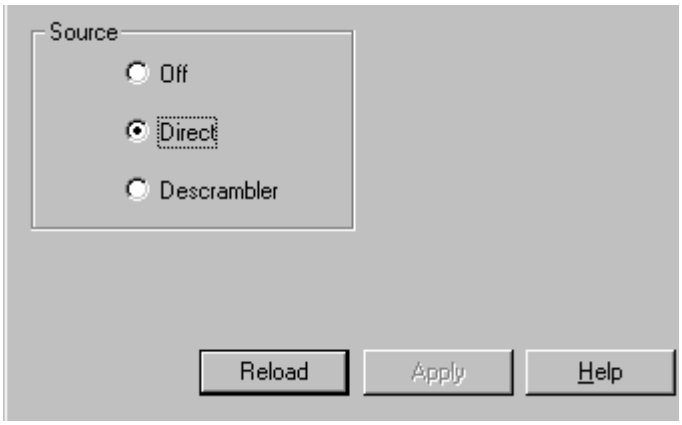
# Setting up the ASI TS output

***To set up the ASI TS output***

When installed with the ASI TS output option the STELLAR IRD MKII can relay the input to the ASI TS output either directly or via the descrambler.

Do as follows to set up the ASI output:

1. **From the Codec Explorer right-click on the ASI output icon and select Properties.**




2. **Select “Direct”, “Descrambler” or “Off”.**
   “Direct” means that the data on the ASI output is coming directly from the input. “Descrambler” means that data comes from the descrambler and is descrambled with the descrambling keyword. The ASI output can also be turned off.
   **Note!** Only the active program is being descrambled.
3. **Click Apply.**

# Alarms and messages

## Alarms and message setup

### Overview

The COPERNICUS server reads the messages from the STELLAR IRD MKII.

If you connect a PC locally, the alarm messages are queued and sent to the local PC as soon as the local PC takes control over the STELLAR IRD MKII.

In order to be able to read the messages, you must make sure that polling is enabled in ROSA. Do as follows:

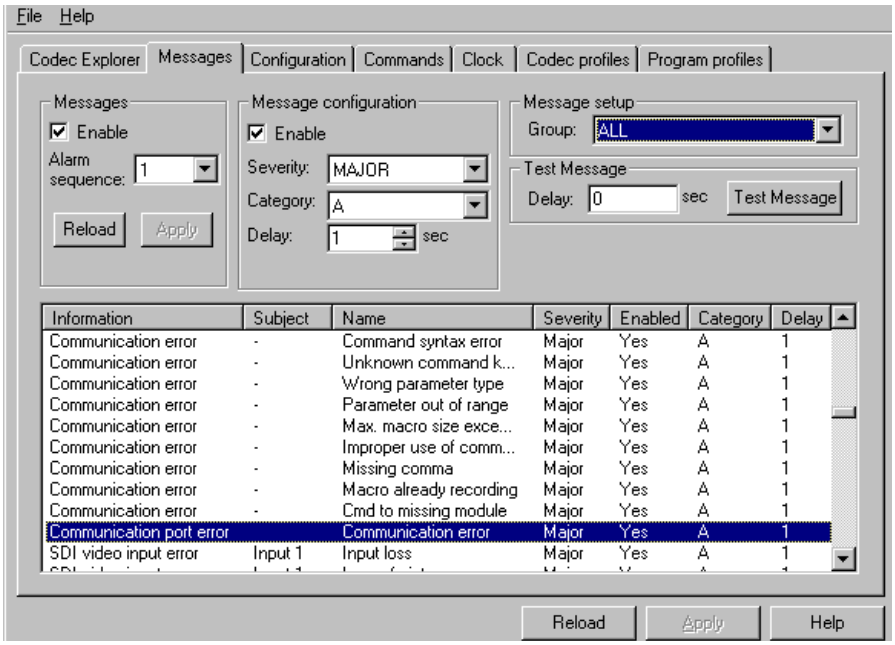
1. **From the COPERNICUS Explorer, right-click on the COM-port and select Properties.**
2. **Select the Settings tab.**
3. **Check the Poll Units box.**

When the STELLAR IRD MKII is not connected to ROSA, the messages from the STELLAR IRD MKII are queued in the decoder. This may result in some messages being acknowledged without being reported to the ROSA management system. The STELLAR IRD MKII may contain up to 256 messages. When the message buffer is full the new messages overwrite the oldest ones.

### Message setup window

Messages are set up in the messages setup window of the STELLAR IRD MKII explorer.

When you click the Messages tab and reload a message (using the right mouse button) the Message setup window is updated. The following screen is an example of a Message setup window. For a list of all the potential messages in the STELLAR IRD MKII, see *ROSA messages, p. 110.*




The messages are displayed in groups, each group can have several messages belonging to the group. The window displays:

- The message text, including explanatory details,
- the origin of the message,
- the message severity,
- whether the message is enabled or not,
- the selected alarm category, which is used to control the relay contacts, and
- the message delay.

# Setting up the general message parameters

***To set up the general message parameters***

The general message parameters influence the whole message system and are thus common to all messages. Do as follows to set up the general message parameters:

1. **Check the Messages enable box.**
   This means that messages are displayed in the ROSA Message View. The STELLAR IRD MKII does not generate messages if you un-check the Messages Enable box. This is valuable in a service situation, where the unit is being reconfigured.

2. **Select Alarm Sequence 1, 2 or 3 from the Sequence scroll list.**
   The alarm sequences control the alarm relays and the alarm LEDs on the front panel in different ways:

| Alarm Sequence | Press front panel button for Receiving Attention | When the alarm is no longer present |
|---|---|---|
| 1 | For each active alarm press Receiving Attention. | press Receiving Attention again for each alarm cleared. |
| 2 | Half automatic. For each active alarm press Receiving Attention. | the alarm is automatically cleared. The alarm LEDs on the front panel turn off. |
| 3 | Automatic. Pressing receiving attention has no function. | the alarm is automatically cleared. The alarm LEDs on the front panel turn off. |

   For further information on alarm sequences and Receiving Attention, see *Alarm handling, p. B-1.*

***Change of alarm sequence***

If you change the alarm sequence to one with fewer categories, the alarms will behave according to the new sequence as shown in the table below.

| Sequence change | Category behavior |
|---|---|
| 3 to 1 | Categories D and E behave as category A |
| 3 to 2 | Categories C, D and E behave as category A |
| 1 to 2 | Category C behaves as category A |

**Note!** Such a sequence change does not affect the previously stored categories. This means that if you, by accident, change your alarm sequence you get the stored categories back by reverting to the original alarm sequence.

## Setting up the individual message parameters

***To set up the individual message parameters***

The individual message parameters only influence the selected message(s). Do as follows to set up the individual message parameters:

1. **Select the relevant message group from the Group scroll list.**
   Only the messages belonging to the selected group are displayed.
2. **Right-click on the mouse and select Reload Group.**
   This means that all messages belonging to the group are read from the STELLAR IRD MKII and displayed in the list.
3. **Select from the scroll list the message you want to set up.**
4. **Select Enable or Disable.**
   Disable means that the message is not shown in the ROSA message system nor as an alarm in the alarm system (no relay contact is pulled).
5. **Select the severity of the message from the Severity scroll list.**
   For each message you can select a message severity. The following categories are available:
   - Critical
   - Major
   - Warning
   - Cleared
   - Information
   - Indeterminated
6. **Select the alarm category from the Category scroll list.**
   Classify each alarm according to its importance. The alarm category denotes which relay contact is activated. The A alarm is the most important and the E alarm the least important one. For each of the three alarm sequences, each alarm can be given a category to classify the alarm or it can be disabled.

| Alarm sequence | Available categories (relays) |
|---|---|
| 1 | A, B, C, Disable |
| 2 | A, B, Disable |
| 3 | A, B, C, D, E, Disable |

7. **Select the delay for the message from the Delay scroll list.**
   You can set a delay for each message in the range of 0 to 255 seconds. The delay is common for the message and the relay. If you set the delay to 10 seconds you get a message and the relays are only switched if the error condition has persisted for more than 10 seconds. Likewise, the error condition must have been gone for at least 10 seconds for the message to disappear and the relay to become inactive.
8. **Right-click the mouse button and select Apply.**
   You may apply the “Selected Messages”, “Current Group” or “Changed Messages”.

## Right mouse button features

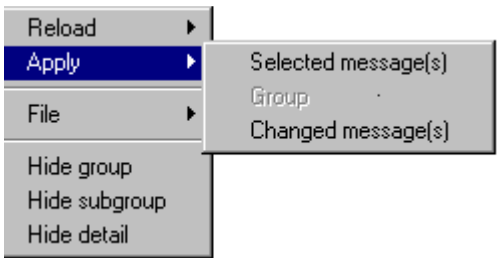
### Overview

ROSA provides additional features which are available by using the right mouse button. You may manipulate the selected messages, the message group or the changed messages. You select messages by using the Ctrl or Shift keys. Whenever you make a change to a message the message line is yellow.

The right mouse features are listed below:

### Apply message settings to the STELLAR IRD MKII

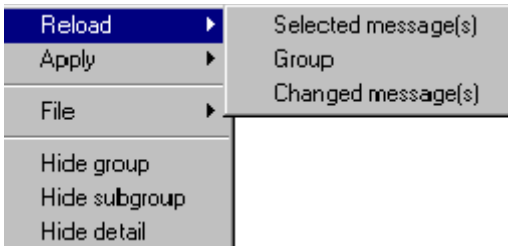
The following picture shows the right mouse button menus to use when you want to apply changes to the message setup.




You may apply the selected message(s), the whole group of messages or the changed messages to the STELLAR IRD MKII. The applied messages are stored in the STELLAR IRD MKII.

### Reload messages from the Stellar IRD MKII

The following picture shows the right mouse button menus to use when you want to reload messages from the STELLAR IRD MKII.

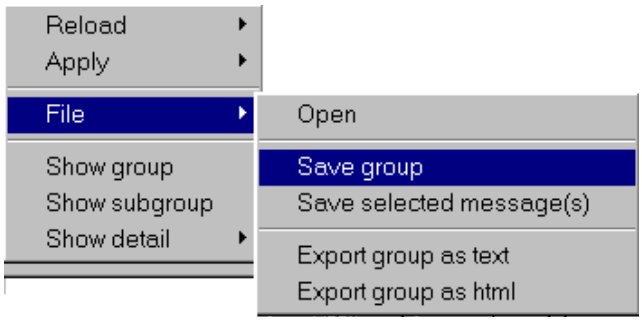



You may reload the selected message(s), the whole group of messages or the changed messages from the STELLAR IRD MKII.

**Note!** It may take several minutes to reload all messages from the STELLAR IRD MKII.

***Save and open message settings***

The following picture shows the right mouse button menus to use when you want to save or open message setting files.



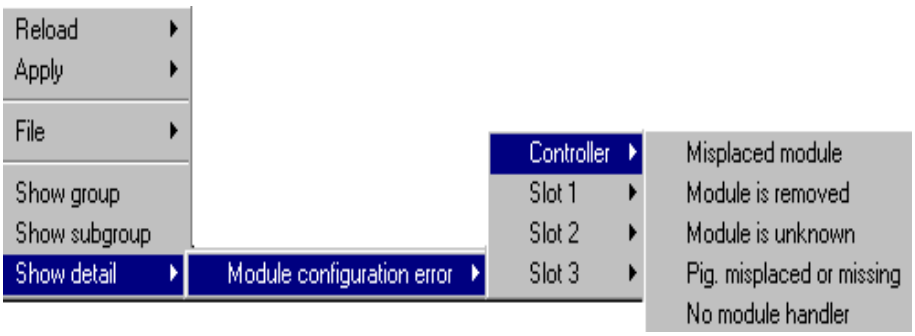

You may save the selected settings or all the settings in the current group **to a file** on the hard disk or a floppy disk.

You read a settings file into ROSA by selecting “File, Open message settings...” and the file in question.

You download the settings file to the STELLAR IRD MKII by selecting “Apply”.

***Show/hide detailed message***

The following picture shows the right mouse button menus to use when you want to display a particular detailed message. You must place the cursor on the message before right-clicking on the mouse.

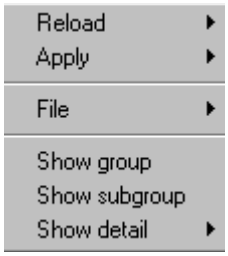


The Show function shows the details for the selected message. You use this function when you want to change the settings for a specific detailed message.

The corresponding Hide function hides all details for the selected message. The hide function is particularly useful when you want to change a message with all its belonging detail messages.

***Show/hide all***

The following picture shows the right mouse button menus to use when you want to show or hide message details.




Normally you hide all message details and only show the message details for a particular message using the Show menu.

# Viewing messages

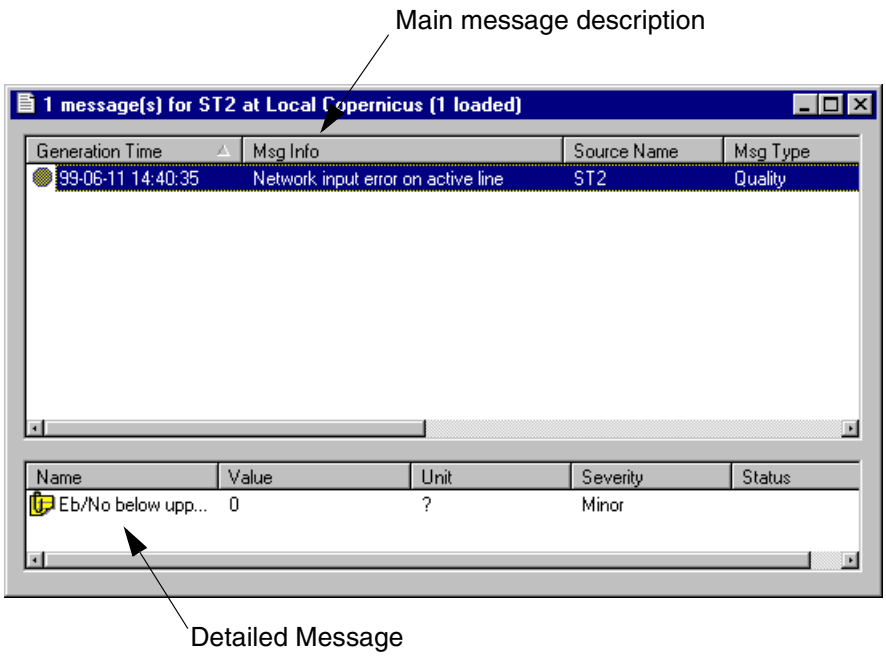
***Overview***

When viewing messages you can specify which columns to show for each message and the order in which they are shown. For further information, please see the ROSA manual.

***To view the messages***

Do as follows to view the messages:

1. **Right-click on the STELLAR IRD MKII icon from the COPERNICUS Explorer window.**
2. **Select All messages or Pending messages.**
   If you select pending messages you will only see the active alarms.
3. **Select the message you want to investigate.**
4. **Right-click and select Toggle Detail from the menu.**
   This displays a detailed description of the error message in question.




***Important message columns***

The following table shows the most important message columns:

| Heading | Meaning |
|---|---|
| Msg. Info | The main message description |
| Name | The detailed message description |

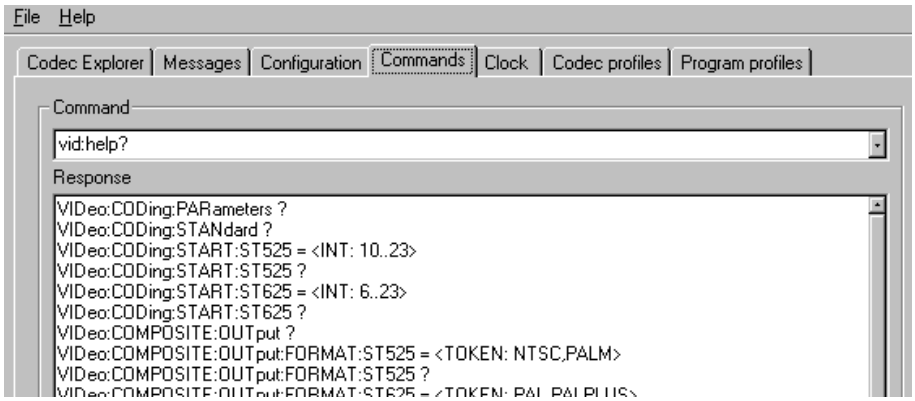
# Using commands

## To use commands

***To issue a command***

The STELLAR IRD MKII can be set up by issuing commands to it. Likewise you can get the status of the STELLAR IRD MKII by issuing query commands.

Consult the command reference manual 983756 to get a complete description of all commands and their syntax.




Do as follows to issue a command:

1. **Select the commands tab from the codec explorer.**
2. **Type in the command in the Commands field.**
   Alternatively you may select one of the previously issued commands from the scroll list.
3. **Press Enter.**

# Macro commands

***Useful macro commands, example***

To use the contact closure macros, the following procedure can be used.

1. **Select the Commands tab.**
2. **Type "MACRO LIST?" and press Enter.**
   This command lists the existing macros on screen. If nothing is displayed no macros are currently defined.
3. **Type "MACRO <number> <contact> REC" and press Enter.**
   This command indicates the start of a new macro.
   "Number" is the desired contact input number (1 to 8).
   "Contact" is the desired transition of the input (OPEN or CLOSE).
   **Note!** Defining a new macro automatically overwrites an existing old macro, if any.
   **Note!** Be aware that the commands are performed when typing in the macros. To record a macro without executing the commands during the recording phase use the command "**`MACRO <number> <contact> STORE`**".
4. **Type in the commands you want the macro to perform. Press Enter after each line.**
   **Note!** If the macro contains a query the response will be returned to the interface that requested the macro execution. If the macro is executed from the contact closure, you will not get any response.
5. **Type "MACRO END" and Press Enter.**
   This command indicates the end of the macro.

***Note!***

Each contact closure input corresponds to two macros, OPEN and CLOSE. Please also be aware that the macros are edge triggered, not level triggered.

***To switch between two video programs***

In a STELLAR IRD MKII you want to switch between decoding of two video programs from the input transport stream, program 1 and 2.

1. **Connect two push button switches to contact closure inputs 1 and 2 respectively (they have common ground).**
2. **Type in the below macro and Press Enter after each line.**

```
MACRO 1 CLOSE REC
PROGSEL=MAN,1
MACRO END
MACRO 2 CLOSE REC
PROGSEL=MAN,2
MACRO END
```

***To switch between programs using a switch***

In stead of two push buttons you can use a switch. One position selects program 1, the other selects program 2.

1. **Connect the switch between contact closure 1 and ground.**
   In the “program 2" position the contact is open, in the “program 1" position it is closed.
2. **Type in the below macros and press Enter after each line.**

```
MACRO 1 OPEN REC
PROGSEL=MAN,1
MACRO END
MACRO 1 CLOSE REC
PROGSEL=MAN,2
MACRO END
```

***Useful hints for macro writing***

The following hints are useful when writing macros.

- If desired, a macro can contain several command lines.
- Force-execute a macro by typing “MACRO <number> <contact>” and pressing Enter.

***Force-executing a macro, example***

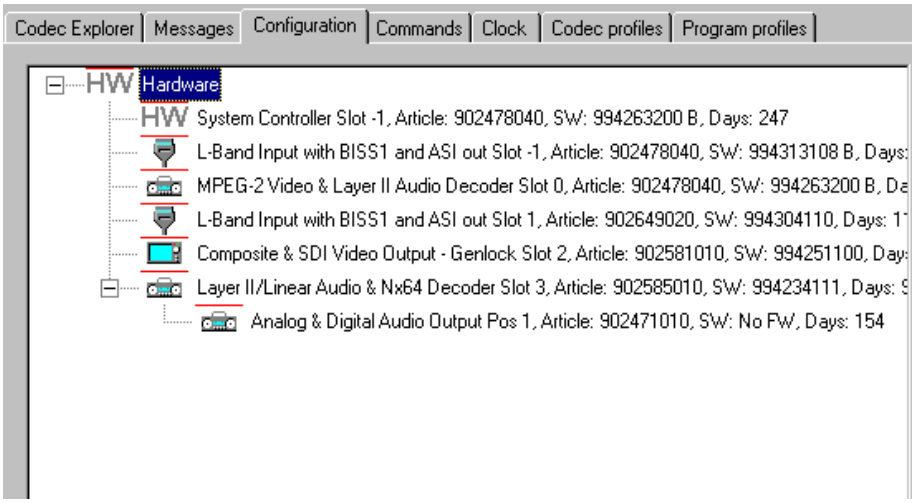
Executing the “MACRO 1 OPEN” command with the above macro causes the STELLAR IRD MKII to activate program 1, while executing the “MACRO 1 CLOSE” command causes the STELLAR IRD MKII to activate program 2.

# Configuration clock and profiles

## Viewing the configuration

***Overview***

The configuration window shows the hardware configuration.

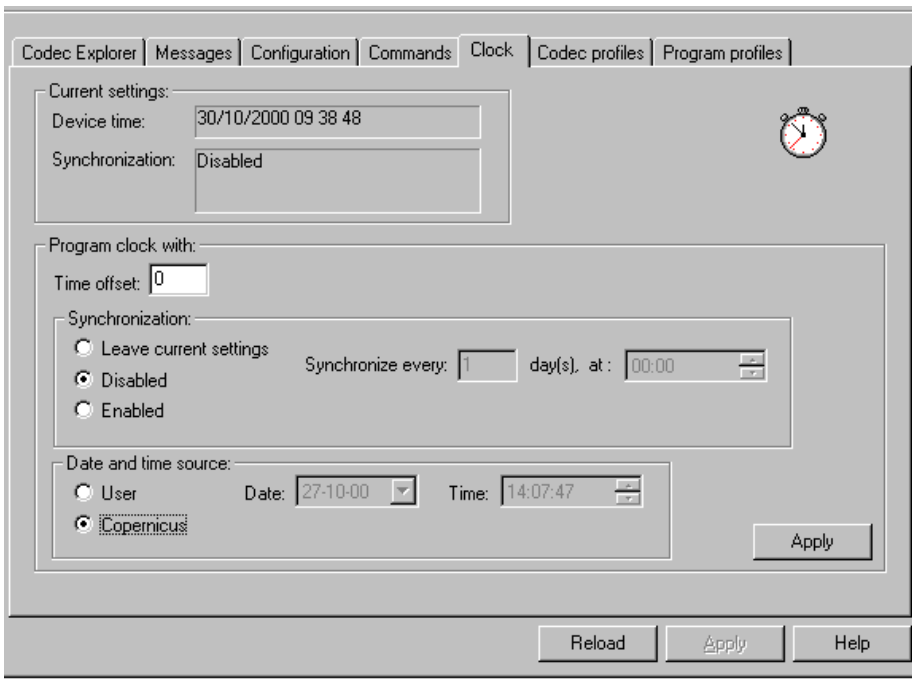



For each installed module the **hardware configuration** shows the name, slot location, article number, belonging software article and the number of days the module has been in operation.

# Setting the STELLAR IRD MKII clock

***Overview***

The STELLAR IRD MKII **clock** page has the following properties.




The **Date and time** field shows the STELLAR IRD MKII clock. You can set the clock manually or let the COPERNICUS server/ROSA PC set the clock.

***To set the STELLAR IRD MKII clock manually***

Do as follows to set the clock manually:

1. **Select User as the date and time source.**
2. **Type the new STELLAR IRD MKII date and time.**
   The syntax in the date field is DD/MM/YYYY. The syntax in the time field is HH:MM:SS.
3. **Click Apply.**

***To set the STELLAR IRD MKII clock, automatically***

Do as follows to use the COPERNICUS server/ROSA PC to set the clock:

1. **Select the COPERNICUS as the date and time source.**
   The COPERNICUS/ROSA PC clock is automatically downloaded to the codec.
2. **If wanted, select Enable synchronization and type in day and time.**
   This means that the COPERNICUS/ROSA PC clock is automatically downloaded to the codec at the specifieed interval.
3. **If relevant, type in the Time offset.**
   This feature is used when the COPERNICUS is placed in a different timezone from the codec. You may type whole hours in the range from -23 to 23.
4. **Click Apply.**

# Setting up the profiles

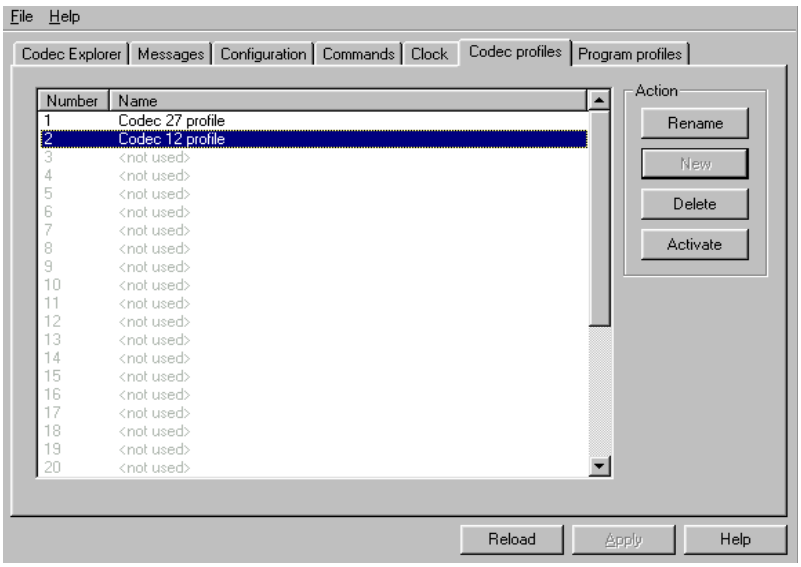
***To set up the profiles***

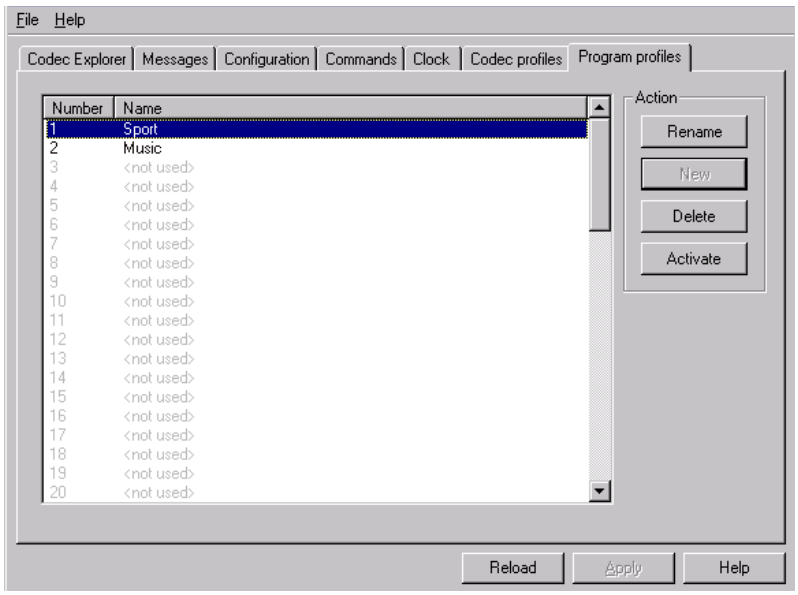
You may record codec and program profiles for later download to the STELLAR IRD MKII. Codec and program profiles contain all the settings of the STELLAR IRD MKII apart from individual message and alarm settings.

**Note!** The Codec profiles can only be downloaded to (activated in) the STELLAR IRD MKII from which it originally was stored. This is unlike Program profiles which can be used to copy settings from one STELLAR IRD MKII to another.

Do as follows to record the settings:

1. **From the Codec Explorer click on the Codec profile tab to record a codec profile or the Program profile tab to record a program profile.**



2. **Select one of the unused lines from the list and click the New button.**
3. **Type in the name of the recording and click the OK button.**
   The codec file is stored locally on the ROSA PC. In a ROSA/COPERNICUS system the program profile is stored on the COPERNICUS server.
4. **Click Apply.**

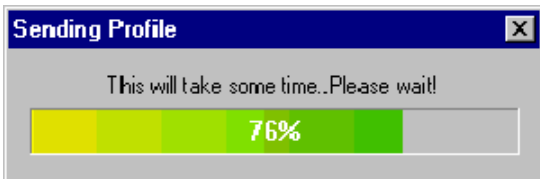
***To download settings***

Do as follows to download settings to the STELLAR IRD MKII:

1. **From the Copernicus Explorer right click on the STELLAR IRD MKII to update and select properties.**
   **Note!** The decoder to which you are downloading settings must have the same hardware configuration as the one from which you have uploaded the settings.
2. **Click on the relevant profile tab.**
   Use the Codec profile tab to download settings from a local ROSA PC, or click on the Program profile tab to download settings from the COPERNICUS server.
3. **Select the profile to download.**
4. **Click Activate.**

***Profile download***

During download of a profile, the following window may appear:




Wait until the download has completed before you operate the PC.

Chapter 5

# Service and maintenance

# Service and maintenance

## Introduction

***General service information*** This section gives general service guidelines. Furthermore you find some trouble shooting information.

***Adjustments and calibration*** The STELLAR IRD MKII does not require regular adjustments or calibrations.

***Software update*** New software can be downloaded into the STELLAR IRD MKII using the control interfaces. Only trained service personnel should perform software updates. Software can be updated on site.

***Saving configurations*** Using ROSA you can save the current configuration for the STELLAR IRD MKII to a file on the PC or in the COPERNICUS, and later load the settings into a STELLAR IRD MKII with the same hardware configuration.

# Replacing the fans

***Service rule***

To ensure proper cooling of the STELLAR IRD MKII you should replace the fans every fourth year.

***Before you start***

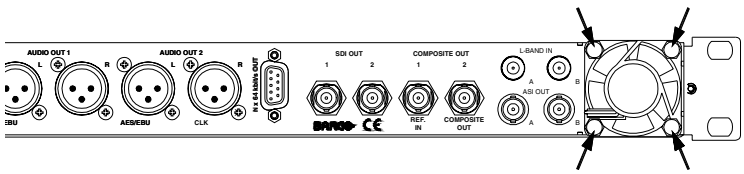
You need following tool and acessory:

| Item | BarcoNet article number |
|---|---|
| Screwdriver, pozi drive 1 | n/a |
| Pincers | n/a |
| Fan for active cooling | 580306 |

***To replace the fans***

Do as follows to replace the fans:

1. **Switch off the power to the Stellar IRD MKII**.
2. **Unscrew the four screws holding the fan.**




3. **Pull the fan towards you over the stay bolts.**
4. **Unplug the connector to the fan.**
5. **Mount in reverse order.**

**Note!** You can use pincers to mount the connector.

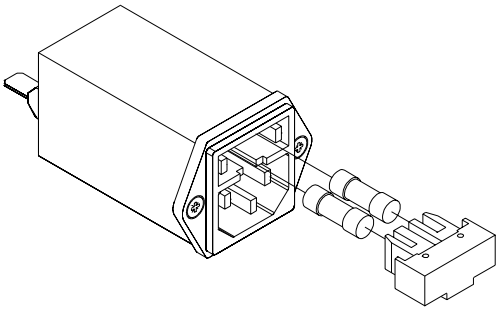
6. **Dispose of the old fans.**
   Do not dispose of the old fans through the household garbage collection system, but follow your local regulations.

## Replacing an AC fuse in the power supply

***To replace an AC fuse***

**Caution!** There is a fuse in both phase conductors.

To replace an AC fuse do the following:



98-017

1. **Turn off the power to the STELLAR IRD MKII.**
   Remove the power cord from the STELLAR IRD MKII.
2. **Open the lid holding the fuses.**
   Use a flat bladed screwdriver.
3. **Pull out the lid.**
4. **Remove the blown fuse(s).**
5. **Insert a new fuse with the same rating.**
   **Caution!** For continued protection against risk of fire replace only with same type and rating of fuse.
6. **Reinsert the lid.**

# Message system

## Overview

### General

The status of the STELLAR IRD MKII and its immediate surroundings are reported to ROSA in the form of messages and alarms. In ROSA you can enable or disable messages, give them a severity and attach an alarm and an alarm sequence to each message.

### Types of messages

The messages are categorized into various types according to what they signal. Some messages are used for reporting status changes in connection with the installation of the STELLAR IRD MKII whereas others are used for reporting hardware or software errors.

The major message types are:

| Type | Example |
|---|---|
| Communication | If a wrong/illegal command or parameter is used. |
| Hardware | A malfunctioning module. |
| Software | A software error. |
| Operational | A missing or unstable input or output signal. |
| User interaction | A macro or a download session has been started. |

## ROSA messages

**Before you start**

Messages from the STELLAR IRD MKII are shown in the COPERNICUS explorer window.

**STELLAR IRD MKII message list**

The following shows an alphabetical list of the available ROSA messages and their default status and an explanation to the messages.

| No. | Information | Name | Enabled | Severity | Category | Explanation/Remedy |
|---|---|---|---|---|---|---|
| 25 | Audio output error | Audio decoding error | On | Major | A | There is no valid audio output due to decoding errors. Check the source and the condition of the input signal |
| 6 | Communication error | Cmd to missing module | Off | Information | Disable | A command was issued for a module that is not present. |
| | | Command not supported | Off | Information | Disable | The software of the decoder does not support this command. |
| | | Command syntax error | Off | Information | Disable | A syntax error is found in a command to the decoder. |
| | | Improper use of command | Off | Information | Disable | A module does not support the command, or the command has been issued to a module that is not present. |
| | | Macro already recording | Off | Information | Disable | A macro is already being recorded. Wait recording another macro unil the present recording has finished. |
| | | Max. macro size exceeded | Off | Information | Disable | You have tried to record more than the maximum 256 characters. Try making the macro shorter or divide your instructions into two macros. |
| | | Missing comma | Off | Information | Disable | A comma is missing in a command. Check the command reference. |
| | | Parameter out of range | Off | Information | Disable | A parameter within a decoder command exceeds the range specified for the command. |
| | | Unknown command keyword | Off | Information | Disable | A keyword in a command is unknown to the decoder. |
| | | Value truncated | Off | Information | Disable | An input parameter has been truncated. You may get the actual setting by reloading the relevant ROSA window or by a query. |
| | | Wrong parameter type | Off | Information | Disable | A parameter within a decoder command has a wrong type. |

| No. | Information | Name | Enabled | Severity | Category | Explanation/Remedy |
|---|---|---|---|---|---|---|
| 7 | Communication port error | Communication error | On | Information | Disable | Check the terminal settings. |
| 2 | Contact closure occurred | Close | On | Information | Disable | One of the contact closure contacts has closed and thereby activated a macro. Reload the ROSA windows to get the actual settings from the decoder. |
| | | Open | On | Information | Disable | One of the contact closure contacts has opened and thereby activated a macro. Reload the ROSA windows to get the actual settings from the decoder. |
| 34 | Device software error | General software error | Off | Information | Disable | A software error has occurred. When persistent, contact your local BARCO sales office for further assistance. |
| | | RTK related SW error | Off | Information | Disable | A software error has occurred. When persistent, contact your local BARCO sales office for further assistance. |
| 36 | Hardware failure | Demodulator HW fail | On | Information | A | A hardware error has been detected on the demodulator and it must be replaced. |
| | | Module hardware error | On | Information | A | Replace the module in question. |
| | | Module selftest error | On | Information | B | The self-test has failed. Replace the module in question. |
| 37 | Module configuration error | Misplaced module | On | Major | B | A module was missing at power-up or a known module was misplaced. |
| | | Module is removed | On | Major | B | A module is missing. Replace the module or make a new configuration. |
| | | Module is unknown | On | Major | B | The module is not known by the system controller. The module stock number may be lost or your system controller software is too old to handle the module. |
| | | No module handler | On | Major | A | The stock number of the module is not known to the system controller. Check the stock number and slot position of the module. Check if the firmware supports the module. |
| | | Pig. misplaced or missing | On | Major | B | The reference check of the piggy-back module failed, indicating that the module is either misplaced or missing. |

| No. | Information | Name | Enabled | Severity | Category | Explanation/Remedy |
|---|---|---|---|---|---|---|
| 7 | Communication port error | Communication error | On | Information | Disable | Check the terminal settings. |
| 2 | Contact closure occurred | Close | On | Information | Disable | One of the contact closure contacts has closed and thereby activated a macro. Reload the ROSA windows to get the actual settings from the decoder. |
| | | Open | On | Information | Disable | One of the contact closure contacts has opened and thereby activated a macro. Reload the ROSA windows to get the actual settings from the decoder. |
| 34 | Device software error | General software error | Off | Information | Disable | A software error has occurred. When persistent, contact your local BARCO sales office for further assistance. |
| | | RTK related SW error | Off | Information | Disable | A software error has occurred. When persistent, contact your local BARCO sales office for further assistance. |
| 36 | Hardware failure | Demodulator HW fail | On | Information | A | A hardware error has been detected on the demodulator and it must be replaced. |
| | | Module hardware error | On | Information | A | Replace the module in question. |
| | | Module selftest error | On | Information | B | The self-test has failed. Replace the module in question. |
| 37 | Module configuration error | Misplaced module | On | Major | B | A module was missing at power-up or a known module was misplaced. |
| | | Module is removed | On | Major | B | A module is missing. Replace the module or make a new configuration. |
| | | Module is unknown | On | Major | B | The module is not known by the system controller. The module stock number may be lost or your system controller software is too old to handle the module. |
| | | No module handler | On | Major | A | The stock number of the module is not known to the system controller. Check the stock number and slot position of the module. Check if the firmware supports the module. |
| | | Pig. misplaced or missing | On | Major | B | The reference check of the piggy-back module failed, indicating that the module is either misplaced or missing. |

| No. | Information | Name | Enabled | Severity | Category | Explanation/Remedy |
|---|---|---|---|---|---|---|
| 40 | MPEG PSI error | PCR accuracy error | On | Major | A | The PLL cannot lock to the PCR values due to inaccuracy (for example excessive jitter or frequency error). Set the Video Synchronization mode to "Free Running". |
| | | Program not in PAT | On | Warning | B | The selected program is not found in the PAT. Check the source and select the correct program. |
| 19 | Network input error on active line | BER exceeds lower level | On | Minor | C | The BER is higher than the lower level. Check the external satellite receiver equipment. It may be necessary to revise the link budget. |
| | | BER exceeds upper level | On | Minor | B | The BER is higher than the upper level. Check the external satellite receiver equipment. It may be necessary to revise the link budget. |
| | | Eb/No below lower limit | Off | Major | Disable | The Eb/No is below the lower limit. Check the external satellite receiver equipment. It may be necessary to revise the link budget. |
| | | Eb/No below upper limit | Off | Minor | Disable | The Eb/No is below the upper limit. Check the external satellite receiver equipment. It may be necessary to revise the link budget. |
| | | Input loss | On | Major | A | There is no network input signal. Check the source or the settings in ROSA. |
| | | RF level too high | On | Minor | B | The RF level is too high. Decrease the level to avoid interference. |
| | | TS sync loss | On | Major | A | Synchonization is lost for the incoming transport stream. Check the condition of the input signal. |
| 21 | Network input has autoswitched | Network input autoswitch | Off | Information | Disable | The L-band input has autoswitched. Check the input source. |
| 33 | Power supply failure | +15 V error | Off | Major | Disable | The supply rail is not within the legal range. It may compromise the operation. |
| | | +3.3 V error | Off | Major | Disable | The supply rail is not within the legal range. It may compromise the operation. |
| | | +5.0 V error | Off | Major | Disable | The supply rail is not within the legal range. It may compromise the operation. |
| | | -15 V error | Off | Major | Disable | The supply rail is not within the legal range. It may compromise the operation. |

| No. | Information | Name | Enabled | Severity | Category | Explanation/Remedy |
|---|---|---|---|---|---|---|
| 51 | System configuration error | Alarm queue lost | On | Information | Disable | All messages from previous session(s) are lost. |
| | | Configuration error | On | Information | A | The detected configuration is different from what has been defined. Revise your module configuration. |
| | | Default lost | On | Information | C | The user-defined default settings are lost. The decoder starts with the factory defaults. Change the settings, if necessary. |
| | | Product check failed | On | Information | B | A module is found in a place where it is not allowed. Remove the module. |
| | | SW options lost | On | Information | B | The software options codes must be re-installed. Use the command SYStem : OPTion : INSTall. |
| 54 | System event | Download started | Off | Information | Disable | The decoder has entered the download mode. Download to a module has started. |
| 55 | Temperature limit | Elevated temperature | On | Warning | C | The internal temperature is high and operation may be affected. Check the internal fan and the ambient temperature at the installation site. |
| | | Excessive temperature | On | Major | B | The internal temperature is too high and the decoder has entered a power saving mode to prevent damage. Decoding has stopped and it will be necessary to reset or power cycle the decoder to resume normal operation. The likely cause is fan malfunction or excessive ambient temperature. Replace the fan or lower the ambient temperature before the IRD is put into operation again. |
| 1 | Test message | Test message | Off | Information | Disable | Whenever you press the "Test Message" button in the "Alarms and Messages" setup window the equipment generates this message. This is an easy way to test that the equipment can generate messages. |
| 16 | Video output error | Genlock ref. input loss | Off | Warning | Disable | There is no genlock reference. The video output runs at the nominal frame rate. Check your genlock reference feed. |
| | | Video decoding error | On | Major | A | There is no valid video output due to decoding errors. Check the source and the conditions of the input signal |

# Appendices

# Technical specifications

# TS and Network inputs

## L-Band demodulator

| | | |
|---|---|---|
| ***Inputs*** | Input frequency | 950 to 2150 MHz |
| | Signal level | C0 + 10 log(sat. baud rate) |
| | Signal level density (C0) | -130 to -105 dBm/Hz |
| | Total input level | -25 dBm max |
| | Connector | F-type IEC 169-24 female connector |
| | No. of inputs | 2 |
| | Nominal impedance | 75 Ohm |
| ***Modulation and coding*** | Modulation | QPSK, 8PSK and 16QAM acc. to ETS 300 421 and EN 301 210 |
| | Inner coding | |
| | QPSK | Convolutional acc. to EN300421 |
| | 8PSK and 16QAM | Pragmatic Trellis Coded Modulation acc. to EN 301 210 |
| | Code rates | |
| | QPSK | 1/2, 2/3, 3/4, 5/6 and 7/8 |
| | 8PSK | 2/3, 5/6 and 8/9 |
| | 16QAM | 3/4 and 7/8 |
| | Deinterleaving | Acc. to ETS 300 421 |
| | Outer coding | Reed-Solomon 188/204 acc. to ETS 300 421 |
| ***Performance*** | Symbol rate | 1 to 45 MBaud[1)] |
| | Carrier acquisition range | ± 3 MHz |
| | Symbol acquisition range | ± 200 ppm relative to symbol rate |
| | BER performance, | |
| | Required $E_b/N_0$ for BER <10e$^{-7}$ | |

| | < 20 MBaud | > 20 MBaud |
|---|---|---|
| QPSK 1/2 | 3.9 dB | 3.9 dB |
| QPSK 2/3 | 4.4 dB | 4.5 dB |
| QPSK 3/4 | 4.9 dB | 5.1 dB |
| QPSK 5/6 | 5.4 dB | 5.8 dB |
| QPSK 7/8 | 5.8 dB | 6.4 dB |
| 8PSK 2/3 | 6.3 dB | 6.5 dB |
| 8PSK 5/6 | 8.3 dB | 8.8 dB |
| 8PSK 8/9 | 8.8 dB | 9.8 dB |

1) Up to a maximum bit rate of 96 Mbit/s. For further information on TS rates on sattelite links, see *TS rate on satellite links, p. 74.*

| | | |
|---|---|---|
| 16QAM 3/4 | 8.4 dB | 8.6 dB |
| 16QAM 7/8 | 10.1 dB | 11.1dB |

### LNB requirements

| SSB phase noise | **Phase-locked LNB**<br>QPSK < 5 Mbaud<br>8PSK < 22 Mbaud<br>16QAM < 6 Mbaud | **DRO LNB**<br>QPSK > 5 Mbaud<br>8PSK > 22 Mbaud<br>1 QAM > 6 Mbaud |
|---|---|---|
| At 1 kHz | < -65 dBc/Hz | < -50 dBc/Hz |
| At 10 kHz | < -75 dBc/Hz | < -75 dBc/Hz |
| At 100 kHz | < -85 dBc/Hz | < -85 dBc/Hz |

### LNB power and control

| | |
|---|---|
| Max. current | 350 mA |
| Voltage | 13 V ±0.5 V (vertical polarisation)<br>18 V ± 0.5 V (horizontal polarisation) |
| Band selection | 22 kHz tone ± 4 kHz |

# TS and Network output

## ASI output

| | | |
|---|---|---|
| **ASI output** | ASI format | Packet or Byte mode |
| | Number of outputs | 2 |
| | Connector type | 75 Ω BNC female |
| | Output Impedance | 75 Ω according to EN 50083-9 |
| | Eye opening | According to EN 50083-9 |
| | Data amplitude | 800 mV ± 10% peak-peak according to EN 50083-9 |
| | Output transport stream bit rate | 1 to 96 Mbit/s |
| | Transport Stream formats | 204 bytes without Reed Solomon |

# Video out

## Video decoder specifications

| | | |
|---|---|---|
| ***General*** | Number of channels | 1 |
| | Decoding engine | According to MPEG-2, main level, main profile or 4.2:2 profile. |
| | Frame types | I, P, and B frames. |
| | Video data bit rate | 4:2:0 Chroma: 1.5 to 15 Mbit/s.<br>4:2:2 Chroma: 5 to 50 Mbit/s. |
| | Video resolution | 8 bits per sample Component 4:2:0 or 4:2:2 |
| | Chrominance resolution | Component 4:2:0 or 4:2:2 |
| | Picture format | Decoder will follow encoder |
| | Video aspect ratios | Both 16:9 and 4:3. |
| | Video line rates | Both 525 and 625 lines. |

# Composite video output

| | | |
|---|---|---|
| ***Composite video formats*** | Composite Video I/F | PAL systems B, G, H, I<br>NTSC system M<br>According to ITU-R Report 624-4, 1990 |
| ***Composite video output*** | Number of outputs | 2 |
| | Connector type | BNC |
| | Nominal output impedance | 75 Ω |
| | Isolation between outputs | > 40 dB, 10 Hz to 5.5 MHz |
| | Return loss | > 35 dB, 10 Hz to 5.5 MHz |
| | Nominal output level | 0 dBV |
| | Difference between black and blanking level | 0 to 10% of 100 IRE. Selectable in 2.5% steps. |
| | Non-useful DC-component | < ±30 mV |
| | Recovery time after | |
| | 50 ms of input loss to decoder | < length of GOP plus 50 ms |
| | 3 s of input loss to decoder | < 2000 ms |
| | Switch on input | < 2000 ms |
| ***Sync and burst characteristics*** | Horizontal and Vertical Synchronization Characteristics | |
| | Shaping and sequence all video formats | Acc. to ITU-R rep. 624-4, 1990, SMPTE 170M |
| | Color Subcarrier Burst Characteristics | |
| | Shaping of color subcarrier burst | Acc. to ITU-R rep. 624-4, SMPTE 170M |
| | Amplitude accuracy of color subcarrier burst | ± 2% |
| ***Test and idle signals*** | Video idle signals | |
| | Sync. mode | 50% gray or black (selectable), incl. Correct sync. and burst pulses according to the selected video format |
| | Zero volt DC mode | Constant DC (< 30 mV) without sync and burst |
| ***Output video stability*** | SCH phase jitter, jitter free input | < 2 $degr_{pp}$ |
| | Line time jitter, jitter free input | < ±2.5 $ns_{pp}$ |
| | Maximum color sub-carrier frequency deviation from input frequency | PAL and NTSC: 0.045 ppm[2)]<br>measurement time > 0.2 s |
| | Maximum sub-carrier frequency | |

2) This corresponds to 72 deg/s for 4.43 MHz PAL systems and 58 deg/s for NTSC.

| | | |
|---|---|---|
| | change rate | 0.1 Hz/s, PAL system I and NTSC<br>measurement time > 0.2 s |
| | Burst amplitude variation | < $2\%_{PP}$ |
| ***Video performance***[3] | Gain | |
| | Insertion gain | 0 dB ±0.2 dB<br>3 dB ±0.2 dB (-3 dB input level) |
| | Level stability | ±0.10 dB / 1 hour<br>±0.15 dB / 24 hour |
| | **Noise** | |
| | Quantization Noise, unified weighted acc. to [567] | < -60 dB RMS relative to 0.7V |
| | **Non-linear distortion** | |
| | Differential Gain | ≤ 1% peak to peak |
| | Differential Phase | ≤ 1° peak to peak |
| | Linear distortion | |
| | 2T pulse response | $K_{2T} \leq 1.0\%$ |
| | 2T pulse to bar | 98% to 102% ($K_{P/B} \leq 0.5\%$) |
| | 2T bar response | 99.5% to 100.5% |
| | 50 Hz square wave response | 99% to 100% |
| | Bounce | Peak-overshoot ≤ 1% |
| | Chrominance luminance inequality | |
| | Gain, 20 $T_C$ pulse | ≤ ±2% |
| | Delay, 20 $T_C$ pulse | ≤ ±10 ns |
| | SCH phase error | < ±5° |
| | Steady state characteristics | |
| | Frequency response (relative to white bar) | ±0.2 dB, 10 Hz to 5.75 MHz<br>≥ -3 dB, 6 MHz<br>≤ -24 dB, 6.75 MHz<br>≤ -40 dB, 8 MHz to 27 MHz |
| | Group delay response (reference at 500 kHz) | ≤ ±20 ns, 10 Hz to 5.5 MHz |

3) Measured with a POLARIS encoder, 4:2:2 chroma and video bit rate > 17 Mbit/s.

## VBI specifications

| | | |
|---|---|---|
| **Teletext system B** | Data specifications | |
| | General | Teletext B, according To ITU-R Rec.653-2 |
| | Usable lines 625 lines systems | 7 to 22, 320 to 335 |
| | Number of lines | Maximum 16 lines per field |
| | Delay relative to video | Zero |
| | Line code | NRZ |
| | Number of bits per line incl. run-in | 360 bits |
| | Frame word, byte 3 | 11100100 |
| | Output Specifications | |
| | Data positioning (rel. to sync ref.) | Bit 13 at 12 ms ± 0.1 ms, |
| | Data amplitude | 0: Black level (±15 mV)<br>1: 462 mV (±40 mV) |
| | Output bit rate | 6.9375 Mbit/s ±25 ppm |
| | Output eye-height | > 95% |
| | Output eye-width | > 95% |
| | Bandwidth limitation | ≥ -3 dB, 6 MHz<br>≤ -12 dB, 6.75 MHz<br>≤ -40 dB, 8 MHz to 27 MHz |
| **Teletext system C** | Data specifications | |
| | General | Teletext C, according to CCIR Rec.653-2 |
| | Usable lines 525 lines systems | 10 to 22, 272 to 285 |
| | Number of lines | 13 in field 1, 14 in field 2 |
| | Delay relative to video | Zero |
| | Line code | NRZ |
| | Number of bits per line including run-in | 288 bits |
| | Frame word, byte 3 | 11100111 |
| | Output Specifications | |
| | Data positioning (relative to sync reference) | 10.48 ms ± 0.34 ms |
| | Data amplitude | 0: 0 IRE (±2 IRE)<br>1: 70 IRE (±6 IRE) |
| | Output bit rate | 5.727272 Mbit/s, 364 x line frequency |
| | Output eye-height | > 90% |
| | Output eye-width | > 90% |
| **VITC** | General | Acc. To IEC 461 |
| | Usable lines 625 lines systems | 6 to 22, 319 to 335 |
| | Usable lines 525 lines systems | 10 to 20, 273 to 282 |
| | Number of lines | ≤ 2 per field |
| | Line code | NRZ |
| | Output Specifications | |
| | Data positioning (rel. to sync ref.) | Half amplitude of first bit: 11.5 ms ± 0.3 ms |
| | Data amplitude 625 lines systems | 0: Black level (± 25 mV) |

| | | |
|---|---|---|
| | | 1: 550 mV (± 25 mV) |
| | Data amplitude 525 lines systems | 0: Black level (± 25 mV) |
| | | 1: 570 mV (± 25 mV) |
| | Output bit rate 625 lines systems | 1.8125 Mbit/s, 116 x $f_H$, ± 200 bit/s |
| | Output bit rate 525 lines systems | 1.7897725 Mbit/s, 455/4 x $f_H$, ± 200 bit/s |
| | Data shaping | Rise time: 200 ns ± 50 ns |
| | Output eye-height | > 95% |
| | Output eye-width | > 95% |
| | Bandwidth limitation | ≥ -3 dB, 6 MHz<br>≤ -12 dB, 6.75 MHz<br>≤ -40 dB, 8 MHz to 27 MHz |
| ***Transparent VBI*** | Lines usable in 625/50 | 6-22, 319-335 |
| | Lines usable in 525/60 | 10-19, 273-282 |
| | Number of lines | ≤ 4 per field |
| | Signal type | Sampled signal, 13.5 MHz<br>Synchronization pulse and burst are regenerated in the output. |
| ***Inserted VITS*** | VITS can be inserted locally at the decoder. | |
| | Lines usable in 625/50 | 6-22, 319-335 |
| | Lines usable in 525/60 | 10-19, 273-282 |
| | Number of lines | ≤ 2 per field |
| ***Inserted GCR*** | GCR can be inserted locally at the decoder. | |
| | Lines usable in 625/50 | 318 |
| | Lines usable in 525/60 | 19 and 282 |

## SDI video output

| | | |
|---|---|---|
| ***System*** | Video Formats | |
| | Signal form | Y, CR, CB |
| | Sampling structure | 4:2:2 |
| | Line numbers/field rates | 525/60 Hz, 625/50 Hz |
| | Bit rate | 270 Mbit/s ± 10 ppm according to ITU and SMPTE standard, also in case of input loss |
| | Line code | NRZI (Non Return to Zero with Inversion) |
| | Video data word size | 8 bit, 10 bits driven. |
| ***Steady state characteristics*** | Frequency response (rel. to white bar) | ± 0.1 dB, 10 Hz to 6 MHz |
| ***Serial 4:2:2 output*** | Number of outputs | 2 |
| | Connector type | BNC |

| | | |
|---|---|---|
| | Output level | 800 mVpp ± 10% (into 75 Ω) |
| | Nominal Impedance | 75 Ω |
| | Return loss | ≥ 15 dB in the range 5 to 270 MHz |
| | Isolation between outputs | 26 dB in the range 5 to 135 MHz<br>20 dB in the range 135 to 270 MHz |
| | Rise and fall times (between 20% to 80%) | 0.40 to 1.50 ns, however \| trise-tfall \| < 0.5 ns |
| | Overshoot of the rising and falling edges of the waveform | ≤ 10% of the amplitude |
| | Output jitter | ≤ ±10% of clock period, as determined over a period of one line. |
| ***Test and idle signals*** | Video Idle Signals<br>Sync. mode | <br>50% gray or black (selectable) |
| ***Embedded audio*** | Formatting of audio packages | According to SMPTE 272M. |
| | Audio sampling frequency | 48 kHz sampling locked to the video according to SMPTE 272M. |
| | Resolution | 20 bit (16 bits + 4 silent LSBs when Layer II decoding is used) |
| | Number of channels | 2 stereo channels. |
| ***EDH*** | Format of packages | As defined by SMPTE RP165 |
| | Error detection areas | Active picture, full field, and ancillary data |
| | Enable/Disable | Can be bypassed, i.e. no insertion in the decoder |
| ***Embedded VBI*** | Teletext B | Sample values on output |
| | 4 transparent lines | Luminance only |
| | IDS | Sample values on output |
| | VPS | Sample values on output |

## Genlock

| | | |
|---|---|---|
| ***Interface specification*** | Type of reference | PAL/NTSC composite sync with black and burst |
| | Accepted line frequency tolerance | ±0.1 Hz, both NTSC and PAL |
| | Type of connector | BNC |
| | Number of reference inputs | One high-impedance allowing loop-through via external T-connector. Termination to be done externally. |
| | Return loss using external 75 Ω termination | > 35 dB, 10 Hz to 5.5 MHz, with or without power |
| | Nominal input level | 0 dBV |
| ***Video performance*** | Synchronization method | Drop or repeat a video frame |
| | Delay adjustment | Up to ±7 lines in steps of one 27 MHz clock period. |
| ***VBI performance*** | Synchronization method | Drop or repeat VBI for the video frame being dropped or repeated respectively. |
| ***Audio performance*** | Steady-state delay relative to video | -20 to +40 ms on primary audio output<br>±5 ms on secondary Layer II audio output |
| | Delay relative to video when repeating or dropping a video frame<br>On secondary Layer II output | Primary output: Defined by decoder chip.<br>±45 ms up to 200ms (TBC) after video genlock. Hereafter steady-state delay is required. |
| ***Linear audio performance*** | Steady-state delay relative to video | ±5 ms |
| | Delay relative to video when repeating or dropping a video frame | ±45 ms up to 200ms (TBC) after video genlock. Hereafter steady-state delay is required. |

# Audio out

## Layer II audio decoder specifications

| | | |
|---|---|---|
| ***General*** | Number of channels | Two including optional audio channel. |
| | Decoding format | MPEG-1 layer II or MPEG-2 when limited to MPEG-1 layer II functionality |
| | Program types | Stereo, joint stereo, mono and dual mono |
| | Audio data bit rate | All MPEG-1 specified rates |
| | Sample frequencies | 32, 44.1, and 48 kHz |

## Linear audio decoder specifications

| | | |
|---|---|---|
| ***General*** | Transmission format | Acc. to SMPTE 302M |
| | Number of channels | Two including optional audio channel. |
| | Audio resolution | Transmission of 20 bit samples |
| | Sample frequency | 48 kHz locked to the STC |

## Audio output

| | | |
|---|---|---|
| ***Analog audio output*** | Number of outputs | Two including optional audio channel (either two stereo pairs or up to four mono channels).<br>Single channel mono signals are output on two connectors. |
| | Connector type | 3pin XLR male. |
| | Output impedance | < 20 Ω or 600 Ω balanced, selectable. |
| | Maximum output level | |
| | < 20 Ω (Load > 1 MΩ) | -6 to +24 dBu, in 1 dB increments, selectable |
| | 600 Ω (Load 600 Ω) | -6 to +21 dBm, in 1 dB increments, selectable |
| | Return loss | > 30 dB, 20 Hz to 20 kHz, 600 Ω |
| | Output symmetry | > 46 dB, 20 Hz to 20 kHz |
| | Output short circuit time | Unlimited |
| | DC output offset | < 50 mV |

| | | |
|---|---|---|
| | Sampling frequency | 32, 44.1 and 48 kHz |
| | Resolution | ≥ 16 bits per sample |
| | Insertion gain | ±0.2 dB |
| | Pass band frequency response | ±0.15 dB rel. 1 kHz |
| | 32 kHz sample rate | 20 to 14,500 Hz |
| | 44.1 and 48 kHz sample rate: | 20 to 20,000 Hz |
| | Amplitude non-linearity at 1,020 Hz, relative to clipping level | |
| | -20 dBm0 | ± 0.10 dB |
| | -40 dBm0 | ± 0.25 dB |
| | -60 dBm0 | ± 1.0 dB |
| | THD at 1,020 Hz, Layer II | < -80 dB, 3 dB below clipping level |
| | THD at 1,020 Hz, linear audio | < -85 dB, 3 dB below clipping level |
| | SINAD at 1,020 Hz, Layer II | > 60 dB, 3 dB below clipping level |
| | SINAD at 1,020 Hz, linear audio | > 80 dB, 3 dB below clipping level |
| | Idle channel noise, Layer II | < -60 dBq0ps, weighted acc. to ITU-R Rec. 468<br>< -67 dBq0, unweighted acc. to ITU-R Rec. 468<br>< -71 dBm0, unweighted RMS acc. to ITU-R Rec. 468 |
| | Idle channel noise, Linear audio | < -80 dBq0ps, weighted acc. to ITU-R Rec. 468 [15]<br>< -85 dBq0, unweighted acc. to ITU-R Rec. 468 [15]<br>< -90 dBm0, unweighted RMS acc. to ITU-R Rec. 468 [15] |
| | Crosstalk | < -80 dB, 20 Hz to 20 kHz |
| | Difference in gain between channels | 0.2 dB, 20 Hz to 20 kHz |
| | Difference in phase between channels | < 3°, 20 Hz to 20 kHz |
| | Delay relative to video | -5 to 10 ms |
| | Recovery time after | |
| | Input loss to decoder | < 2500 ms |
| | Switch from one channel to another | < 1000 ms |
| ***Digital audio output*** | Interface type | AES/EBU balanced |
| | Number of outputs | Two including optional audio channel. |
| | Connector type | Male XLR |
| ***Digital audio output performance*** | Signal format | AES/EBU |
| | Line rate | ± 10 ppm |
| | Line coding | Bi-phase-mark |
| | Return loss | ≥ 21 dB, 0.1 to 6.0 MHz |
| | Nominal data amplitude | 3.0 to 7.0 Vpp |
| | Maximum data amplitude | 10 $V_{pp}$ |
| | Resolution | 16 bit |

# Data output

## Auxiliary data output

| | | |
|---|---|---|
| ***Auxiliary data output*** | Number of outputs | 2 |
| | Connector type | 9-pole sub-D female (DCE) |
| | Type of output | Uni-directional, asynchronous RS-232-E and RS-422 |
| | Handshake | |
| | RS-232 | CTS, RTS active, DTR, DSR passive |
| | RS-422 | None |
| | Baud rates | 600, 1200, 2400, 4800, 9600,19200, 38400 |
| | Data format | 8N1, no parity |

## Synchronous N x 64 kbit/s data output

| | | |
|---|---|---|
| ***N x 64 kbit/s data output*** | Bit rates | N x 64 kbit/s. N = 1, 2, 3, 4, 5 or 6. |
| | Electrical Interface | Acc. to RS-422 |
| | Number of outputs | 1 |
| | Connector | 9 pole Sub-D female |
| | Output clock rate | Locked to data input on encoder |
| | Operating mode | Only DCE |
| | Output impedance | < 20 Ω |

# System interfaces

## Scrambling

| | | |
|---|---|---|
| ***General*** | Scrambling algoritm | According to Basic Interoperable Scrambling System, EBU Tech. Spec. 3290, March 2000. |
| | Modes supported | Modes 0 and 1 |
| | Control word | 48 bit fixed |

## Remote PC control interface

| | | |
|---|---|---|
| ***connector panel, remote control connector*** | Type of connector | 9-pin sub-D male |
| | Signal type | Asynchronous RS-485 |
| | Baud rate | 300, 1200, 2400, 4800, 9600, 19200, 38400 baud, user-selectable |
| | Max. number of codecs in ring | 31 |
| | Protocol | BarcoNet-defined, RCDS |

## Local PC control interface

| | | |
|---|---|---|
| ***Front panel, local control connector*** | Type of connector | 9-pin sub-D female (DCE) |
| | Signal type | Asynchronous RS-232-E |
| | Handshake | |

| Signal | Use |
|---|---|
| DSR | A static indication that the codec is powered up. |
| DTR | Unused. |
| CTS | To signal that the codec can listen to commands. |
| RTS | To stop output from the codec. |

| | | |
|---|---|---|
| | Baud rate | 300, 1200, 2400, 4800, 9600, 19200, 38400 baud, user-selectable |
| | Data format | 8N1, no parity |
| | Protocol | BarcoNet-defined, RCDS |

## External alarm system

| | | |
|---|---|---|
| ***Alarm relay contact*** | Number of outputs | 5, each having one set of contacts closed and one set open during normal operation. Alarms are signalled by reversing the polarity of the two contact sets. |
| | Type of connector | 15-pin miniature sub-D female |
| | Max. voltage | 30 V AC/DC |
| | Max. current | 1 A |
| | Max. power | 30 W (resistive) |

## Contact control interface

| | | |
|---|---|---|
| ***Contact closure*** | Connector type | 9-pin sub-D female |
| | Max. duration of event, guaranteed not to be detected | 45 ms |
| | Min. dur. of event guaranteed to be detected | 110 ms |
| | Max. delay from change of state to start running the macro | 200 ms |
| | Max. on generator impedance | 100 Ω |
| | Min. off generator impedance | 100 kΩ |
| | Max. macro size | 256 characters |
| | Number of macros | 16 (8 for contact close, 8 for contact open) |
| | Event on contact make | User-defined |
| | Event on contact break | User-defined |

# Power and general specifications

## Power

| | | |
|---|---|---|
| ***AC power input*** | Number of inputs | 1 |
| | Type of connector | Standard 3-pin IEC with filter, no switch |
| | Input voltage | 100 to 240 V AC |
| | Input power consumption | < 55 W fully equipped |
| | Input frequency | 47 to 63 Hz |
| | Fuse | 1 AT fuse in each conductor |

## General

### General specifications

| | |
|---|---|
| Mechanics | |
| Rack system | IEC 297-3 |
| Height | 1 U (44.5 mm) |
| Width | 19” (482 mm) |
| Depth | 12” (375 mm) |
| Installation depth | 18.5” (470 mm) |
| Weight | < 5 kg |
| Connector access | Rear. Local control connector on front |
| Grounding stud | M5 screw, non-detachable at rear panel |
| Environment | |
| Transportation shock | According to ETS 300 019-1-2 class T 2.3 public transportation, IEC 68-2-29 |
| Temperature | -20 to +70 °C |
| Relative humidity | 5 to 95% non-condensing |
| Operating shock | According to IEC 68-2-27 |
| Operating Vibration | According to IEC 68-2-64 |
| Operating temperature | 0 to +45° C, to be powered only in non-con-densing conditions |
| EMC | EN 55 022, EN 55 024, EN 61000-3-2, EN 61000 3-3 |
| CE approved and marked | Yes |
| Cooling | Fan based |
| Safety | According to IEC 950, EN 60950 and UL 1950 |

# Alarm handling

# Introduction

### Alarm reporting

To monitor long-term stability for changes in the operational parameters (audio signal loss, network frame loss, AIS etc.), the STELLAR IRD MKII is equipped with an alarm reporting facility.

There are several reasons for an alarm condition: External events detected by the STELLAR IRD MKII hardware or, in very rare cases, hardware or software malfunction. To give network supervisory designers enough flexibility to handle their task, the STELLAR IRD MKII offers several alarm reporting strategies:

- Alarm status reported by relays.
- Alarm status reported by LEDs.
- Alarm status reported by ROSA messages.

### Definitions

The following terms are used in this section:

| Term | Explanation |
|---|---|
| Event | A change of state in the STELLAR IRD MKII, or a codec response to a user interaction. A change of state could be that the input has autoswitched or that there is input loss. The user interaction could be a command sent to the STELLAR IRD MKII using the command line feature in ROSA. Such changes are reported to ROSA as messages, and if desired they can be reported by relays and LEDs as alarms. |
| Message | Every event in the STELLAR IRD MKII is reported by ROSA as a message. All messages are displayed in the ROSA message list unless disabled. |
| Alarm | Some of the events are of such a severity that you also want an alarm relay to be pulled, and for the major alarms (A and B) a LED on the front panel to light. |

### Alarm sequences, LEDs and relays

The BarcoNet codecs have two alarm LEDs, one button with a LED and 5 relays that are used to indicate alarms. The LEDs and relays can be used in three different alarm sequences depending on your needs.

Sequence 1 originates from the British Telecom requirements, and sequence 2 originates from the Deutsche Telecom requirements. Sequence 3 is a mapping where the two alarm LEDs and the five alarm relays are used to signal alarm.

For information on how to select the alarm sequence suitable for your needs, see *Which alarm sequence do I select?, p. B-8.*

### Alarms and ROSA messages

All events can be assigned both to an alarm relay category and to a message. You can disable the alarm relay or the message.

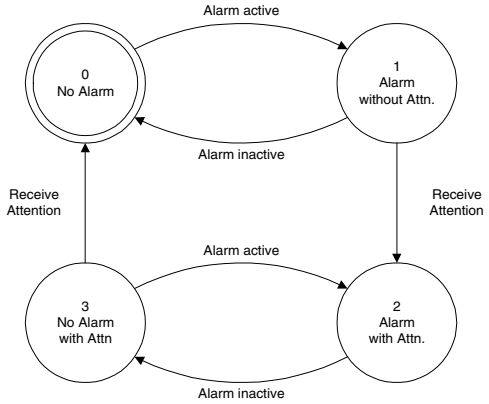
**Note!** Be careful not to assign information messages to alarm relays/LEDs since once they go active they never go inactive again.

The delay you can set to filter out brief alarm conditions applies both to messages and relay control.

# Alarm sequence 1

### Alarm states in sequence 1

The following figure shows the various states in alarm sequence 1.




Alarm Sequence 1
Active alarms require attention.
Alarm with attention require a new attention to be removed.

| | |
|---|---|
| Alarm LED A | = A alarm(s) in state 1 or 2 |
| Alarm LED B | = B alarm(s) in state 1 or 2 |
| Rec. Attn. LED | = No alarms in state 1 AND alarm(s) in state 2 or 3 |
| A relay | = A alarm(s) in state 1 |
| B relay | = B alarm(s) in state 1 |
| C relay | = C alarm(s) in state 1 |
| Rec. Attn. Relay | = alarm(s) in state 2 or 3 |
| Clear relay | = alarm(s) in state 3 |

### Behavior

The following table shows the behavior of LEDs and relays in alarm sequence 1:

| LED or relay | Indication |
|---|---|
| Alarm LEDS | Active alarms. |
| Alarm relays | Active alarms with attention. |
| Receiving Attention relay | The presence of alarms, active or inactive, that have been given attention. |
| Clear relay | The presence of inactive alarms that were given attention when they were active. |

### Alarm sequence 1 characteristics

The following table shows the characteristics of alarm sequence 1:

| Alarm sequence 1 characteristics | |
|---|---|
| Relays indicate unserviced alarms | Yes |
| Relays indicate all alarms | No |
| One relay indicates alarms with attention | Yes |
| One relay indicates cleared alarms with attention | Yes |
| Tight control over alarms with attention | Yes |
| Clear relay indication of alarms with or without attention | No |
| Relays are used to switch to backup systems during alarm conditions | No |

### Reference

Alarm sequence 1 complies with the British Telecom requirements.

### LEDs and Relays, 1 alarm

The following table shows the state of the front LEDs and alarm relays for one alarm in different states. For further information on the definition of active and inactive relays, see

| Condition | | Front LEDs | | Alarm relays | | |
|---|---|---|---|---|---|---|
| | | **A or B** | **Rec. Att** | **A, B or C** | **Rec. Att** | **Clear** |
| 1 | No fault | ❍ | ❍ | ❍ | ❍ | ❍ |
| 2 | Fault X occurs | ● | ❍ | ● | ❍ | ❍ |
| 3 | You press the Receiving Attention button | ● | ● | ❍ | ● | ❍ |
| 4 | Fault X clears | ❍ | ● | ❍ | ● | ● |
| 5 | You press the Receiving Attention button | ❍ | ❍ | ❍ | ❍ | ❍ |
| 6 | Fault X clears after 2 | ❍ | ❍ | ❍ | ❍ | ❍ |
| ●= active relay, LED lit, ❍= inactive relay, LED not lit | | | | | | |

***LEDs and Relays, 2 alarms***

The following table shows the state of the front LEDs and alarm relays for two alarms in different states.

| Condition | | Front LEDs | | | Alarm relays | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | A | B | Rec. Att | A | B | C | Rec. Att | Clear |
| 1 | No fault | ❍ | ❍ | ❍ | ❍ | ❍ | ❍ | ❍ | ❍ |
| 2 | First fault. Digital audio input loss (B-alarm) | ❍ | ● | ❍ | ❍ | ● | ❍ | ❍ | ❍ |
| 3 | You press the Receiving Attention button | ❍ | ● | ● | ❍ | ❍ | ❍ | ● | ❍ |
| 4 | Fault clears after 3 | ❍ | ❍ | ● | ❍ | ❍ | ❍ | ● | ● |
| 5 | You press the Receiving Attention button after 4 | ❍ | ❍ | ❍ | ❍ | ❍ | ❍ | ❍ | ❍ |
| 6 | Second fault. Network input loss (A-alarm) after 3 | ● | ● | ❍ | ● | ❍ | ❍ | ● | ❍ |
| 7 | You press the Receiving Attention button after 6 | ● | ● | ● | ❍ | ❍ | ❍ | ● | ❍ |
| 8 | First fault clears after 7 | ● | ❍ | ● | ❍ | ❍ | ❍ | ● | ❍ |
| 9 | First fault clears after 6 | ● | ❍ | ❍ | ● | ❍ | ❍ | ● | ● |
| 10 | You press the Receiving Attention button after 9 | ● | ❍ | ● | ❍ | ❍ | ❍ | ● | ❍ |
| ●= active relay, LED lit, ❍= inactive relay, LED not lit | | | | | | | | | |

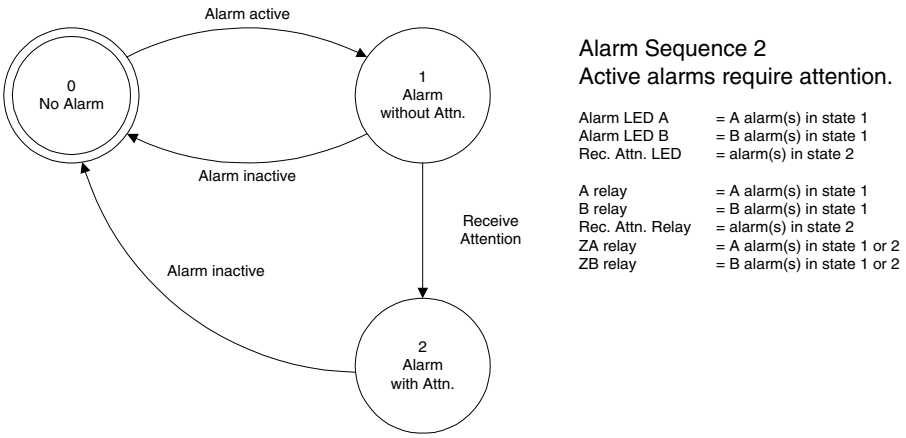
***Comments***

Condition 6 shows that if a second alarm occurs after you have pressed the receiving attention button to the first fault the Receiving Attention LED turns off. This enables you to acknowledge the new alarm by pressing the receiving attention button once more.

# Alarm sequence 2

***Alarm states in sequence 2***

The following figure shows the various states in alarm sequence 2:




***Behavior***

The following table shows the behavior of LEDs and relays in alarm sequence 1:

| LED or relay | Indication |
|---|---|
| Alarm LEDS | Active alarms without attention. |
| Alarm relays | Active alarms without attention. |
| Receiving Attention relay | Active alarms with attention |
| $Z_A$ or $Z_B$ | Active or inactive alarms |

***Alarm sequence 2 characteristics***

The following table shows the characteristics of alarm sequence 2:

| Alarm sequence 2 characteristics | |
|---|---|
| Relays indicate unserviced alarms | Yes |
| Relays indicate all alarms | Yes |
| One relay indicates alarms with attention | Yes |
| One relay indicates cleared alarms with attention | No |
| Tight control over alarms with attention | No |
| Clear relay indication of alarms with or without attention | Yes |
| Relays are used to switch to backup systems during alarm conditions | Yes |

***Reference***

Alarm sequence 2 complies with Bw 7R (FTZ 15281 Pfl 1) specified by Deutsche Telekom.

***LEDs and relays, 1 alarm***

The following table shows the state of the front LEDs and alarm relays for one alarm in different alarm situations. For further information on the definition of active and inactive relays, see *Connecting to an external alarm system, p. 24.*

| Condition | | Front LEDs | | Alarm relays | | |
|---|---|---|---|---|---|---|
| | | A or B | Rec. Att. | A or B | Rec. Att. | $Z_A$ or $Z_B$ |
| 1 | No fault | ❍ | ❍ | ❍ | ❍ | ❍ |
| 2 | Fault X occurs | ● | ❍ | ● | ❍ | ● |
| 3 | You press the Receiving Attention button | ❍ | ● | ❍ | ● | ● |
| 4 | Fault X clears | ❍ | ❍ | ❍ | ❍ | ❍ |
| 5 | Fault X clears after 2 | ❍ | ❍ | ❍ | ❍ | ❍ |
| ●= active relay, LED lit, ❍= inactive relay, LED not lit | | | | | | |

***LEDs and relays, 2 alarms***

The following table shows the state of the front LEDs and alarm relays for two alarms in different alarm states:

| Condition | | Front LEDs | | | Alarm relays | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | A | B | Rec. Att | A | B | Za | Rec. Att | Zb |
| 1 | No fault | ❍ | ❍ | ❍ | ❍ | ❍ | ❍ | ❍ | ❍ |
| 2 | First fault. Digital audio input loss (B-alarm) | ❍ | ● | ❍ | ❍ | ● | ❍ | ❍ | ● |
| 3 | You press the Receiving Attention button after 2 | ❍ | ❍ | ● | ❍ | ❍ | ❍ | ● | ● |
| 4 | Fault clears after 3 | ❍ | ❍ | ❍ | ❍ | ❍ | ❍ | ❍ | ❍ |
| 5 | Second fault. Network input loss (A-alarm) after 3 | ● | ❍ | ● | ● | ❍ | ● | ● | ● |
| 6 | You press the Receiving Attention button after 5 | ❍ | ❍ | ● | ❍ | ❍ | ● | ● | ● |
| 7 | First fault clears after 6 | ❍ | ❍ | ● | ❍ | ❍ | ● | ● | ❍ |
| 8 | First fault clears after 5 | ● | ❍ | ❍ | ● | ❍ | ● | ❍ | ❍ |
| ●= active relay, LED lit, ❍= inactive relay, LED not lit | | | | | | | | | |

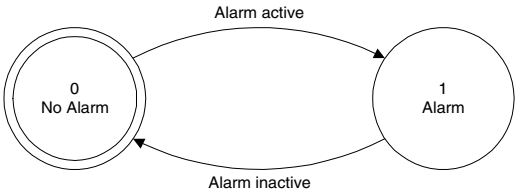
***Comments***

The $Z_A$ and $Z_B$ relays in sequence 2 signal the presence of an A or B alarm respectively. Unlike the LEDs and the A and B relays, these relays are not influenced by the Receiving Attention button.

## Alarm sequence 3

### Alarm states in sequence 3

The following figure shows the various states in alarm sequence 3:




Alarm Sequence 3
No attention.

| | |
|---|---|
| Alarm LED A | = A alarm(s) in state 1 |
| Alarm LED B | = B alarm(s) in state 1 |
| Rec. Attn. LED | = no use |
| A relay | = A alarm(s) in state 1 |
| B relay | = B alarm(s) in state 1 |
| C relay | = C alarm(s) in state 1 |
| D relay | = D alarm(s) in state 1 |
| E relay | = E alarm(s) in state 1 |

### Behavior

Alarm sequence 3 has no attention function. You just have 5 independent alarm relays and 2 alarm LEDs. In sequence 3 the A alarm LED lights and the A relay becomes active when there is an active A alarm. When there is an active B C, D or E alarm the B alarm LED lights and the relevant B, C, D or E relay gets active.

### Alarm sequence 3 characteristics

The following table shows the characteristics of alarm sequence 3:

| Alarm sequence 3 characteristics | |
|---|---|
| 5 independent relays | Yes |
| No attention function | Yes |

## Which alarm sequence do I select?

### To select the most suitable alarm sequence

Use the following rules when you select the alarm sequence:

- If you have a national or organizational standard for alarm sequences, select that.
- If you want a Receiving Attention function, select alarm sequence 1 or 2. Otherwise select alarm sequence 3.
- If you want to have a relay indication of cleared alarms with attention, select sequence 1.
- If you want relay indication of all active alarms no matter whether they have attention or not, select sequence 2.

# Error Detection and Handling (EDH)

# General on EDH

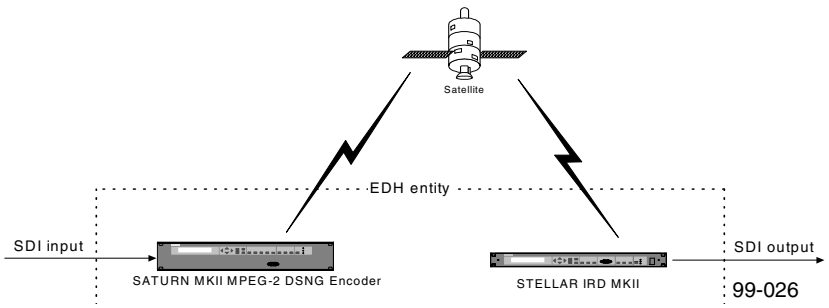
**Reference**

The SATURN MKII and STELLAR IRD MKII support EDH (Error Detection and Handling) for 625 lines SDI according to SMPTE RP 165.

**Background**

EDH is used for recognizing errors and inaccuracies in the SDI signal. You may use EDH as a tool to help pinpointing sources of errors in a chain of SDI equipment, including video codecs with SDI interfaces.

Conceptually, the SATURN MKII and the STELLAR IRD MKII is one EDH entity.




The SATURN MKII analyzes the EDH data from the SDI input, and checks for CRC errors. The flags are manipulated, if necessary. The EDH data is then transmitted in the TS.

The STELLAR IRD MKII outputs the EDH data it receives. Alternatively, if the codec is the first “EDH node” in an installation, the user may wish to let the STELLAR IRD MKII output EDH data with all flags cleared. This feature is supported by the STELLAR IRD MKII.

**EDH flags**

EDH includes the following flags for each field:

- IDH Internal error Detected Here
- IDA Internal error Detected Already
- EDH Error Detected Here
- EDA Error Detected Already
- UES Unknown Error Status

**Picture groups**

There are three picture groups, that each includes the above flags:

- ANC (ANCillary data)
- AP (Active Picture)
- FF (Full Field)

**SATURN MKII and STELLAR IRD MKII behavior**

All flags for all groups are supported by the SATURN MKII and STELLAR IRD MKII. However, detection of internal errors in the sense of EDH is not supported. Therefore, the codec never **sets** the IDH flags, but always **clears** the IDH flags, and only

uses the status of the incoming IDH flags to influence the status of the outgoing IDA flags.

***References***

The SATURN MKII Multichannel Encoder, Operator and service manual, order no. 983743, explains the EDH flags in details.

***BARCO data broadcasting ID***

The EDH data between the encoder and IRD MKII is sent as BARCO data broadcasting sub_id 0x01.

## EDH control commands in the STELLAR IRD MKII

**General**

EDH is as default enabled in the STELLAR IRD MKII so that it outputs EDH data received from the encoder.

**EDH commands**

You may, however, control EDH in the STELLAR IRD MKII by using the ROSA control and management system where the following modes exist:

| Parameter | Explanation |
|---|---|
| OFF | The STELLAR IRD MKII does not analyze the EDH data and does not output EDH on the SDI output. |
| Transparent | The received EDH data is retransmitted without changes. In that case the encoder and STELLAR IRD MKII together are one EDH entity. If no EDH data is received, either due to a Transport Stream loss or when EDH is disabled in the encoder, the STELLAR IRD MKII sets the UES flags active and clears all other flags. This is the default mode of the STELLAR IRD MKII. |
| Internal | The STELLAR IRD MKII does not analyze the incoming EDH, but outputs an SDI signal with all flags cleared. The status flags from the SATURN MKII, if any, are ignored. This is used for applications where the STELLAR IRD MKII is the first node in an SDI chain, which could be the case if the SATURN MKII has a composite input. |

The STELLAR IRD MKII generates a correct CRC-word and outputs it together with the EDH flags.

**Example**

When the SDI input signal has CRC errors in the active picture, the SATURN MKII sets the EDH flag for the “AP” group, and issues the message “EDH flag activated here” to ROSA. The STELLAR IRD MKII forwards the EDH data in the SDI output signal with the EDH flag set indicating that the codec detected an error. A new, correct CRC-word is inserted by the STELLAR IRD MKII, and the SDI signal may now continue in a chain of SDI equipment with EDH support.

# Equipment and accesso-ries

# Accessory kit for the STELLAR IRD MKII

### Accessory kit for the STELLAR IRD MKII with AC supply

The accessory kit for the STELLAR IRD MKII with AC supply, is included in the delivery. It has the order number 906578 and includes the following articles:

| Article | Description |
|---|---|
| 615303, **or** | Line cord, 2.5 m, 230 V, European version |
| 615304, **or** | Line cord, 2.5 m, 230 V, UK version |
| 615403 | Line cord, 2.4 m, 115 V, US version |
| 983765 | Operator and Service Manual, STELLAR IRD MKII |
| 997031 | ROSA Release Package for version 3.0 including online manual. |

### Accessory kit for Genlock

The accessory kit for the STELLAR IRD MKII with Genlock reference input has the order number 906565 and includes the following articles:

| Article | Description |
|---|---|
| 800533 | BNC resistor plug, 75 Ohm |
| 800534 | BNC T-connector, 75 Ohm |

# Module options

**Module options**

The following module options are available:

| Article | Description |
|---|---|
| 906869 | Analog and Digital Audio Output (plug-in module to 902585) |
| 902479 | Composite & SDI Video Output module |
| 902581 | Composite and SDI Video output, genlock |
| 902585 | Layer II/Linear Audio and Nx64 output |
| 902647 | Demodulator interface with BISS descrambling |
| 902649 | Demodulator interface with BISS descrambling and ASI output |
| 969029 | L-band demodulator |
| 911208 | AC power supply |

# Optional accessories

**Optional accessories**

The following optional accessories are available:

| Article | Description | To be used |
|---|---|---|
| C9825860 | RS-232 to RS-485 Converter | The interface converter can be used to connect a PC with RS-232 interface to the remote connector on the connector panel. |
| 580306 | Fan | Active air cooling |
| 983756 | MPEG-2 Command Reference | Programming reference for building a network management system. |
| 906565 | Accessory kit decoder. BNC T-connector and 75 Ohm termination | Termination for video output module with genlock. |

# References

## Applicable documents

| | |
|---|---|
| ***AES3-1992*** | AES recommended practice for digital audio engineering. |
| ***EIA/TIA-232-E, 1991*** | Interface between data terminal equipment and data circuits. |
| ***CCIR Report 624-4, 1990*** | “Characteristics of Television Systems”. |
| ***EBU3267*** | “EBU Interfaces for 625-line digital video signals at the 4:2:2 level of CCIR Recommendation 601". |
| ***EN 301 210 V1.1.1 (1999-03)*** | Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for Digital Satellite News Gathering (DSNG) and other contribution applications by satellite |
| ***EN 50083-9, 03/97*** | Interfaces for CATV/SMATV headends and similar professional equipment. |
| ***EN 55022*** | Limits and methods of measurements of radio disturbance characteristics of information technology equipment. |
| ***EN 55024*** | Information technology equipment - Immunity characteristics - Limits and method of measurement. |
| ***EN 60950*** | Safety of information technology equipment. |
| ***EN 61000-3-2*** | Limits for harmonic current emission. |
| ***EN 61000-3-3*** | Limitations of voltage fluctuations and flicker. |
| ***ETR 211, 08/97*** | Digital Video Broadcasting (DVB); Guidelines on implementation and usage of Service Information (SI). |
| ***ETR 162, 10/95*** | Digital Video Broadcasting (DVB); Allocation of Service Information (SI) codes for DVB systems. |
| ***ETR 154, 10/97*** | Digital Video Broadcasting (DVB); Implementation guidelines for the use of MPEG-2 Systems; Video and Audio in satellite, cable and terrestrial broadcasting applications. |
| ***ETS 300 119-4*** | European telecommunication standard for equipment practise. |

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| ***ETS 300 294*** | Television systems; 625-line television wide screen signalling. |
| ***ETS 300 421, 1994*** | Digital broadcasting systems for television, sound and data services; Framing structure, channel coding and modulation for 11/12 GHz satellite services. |
| ***ETS 300 468, 1994*** | Digital Video Broadcasting (DVB); Specification for service information (SI) in (DVB) systems. |
| ***ETS 300 472*** | Digital Video Broadcasting (DVB); Specification for conveying ITU-R System B Teletext in DVB bitstreams. |
| ***IEC 68-2-1*** | Basic Environmental Testing Procedures. |
| ***IEC 461, 1986*** | “Time and control code for video tape recorders” (VITC). |
| ***IEC 950, 1991*** | Safety of information technology equipment. |
| ***IRT 8 R 4, 1986*** | Richtlinie ARD/ZDF Fernsehtext Spezifikation. |
| ***ISO/IEC 13818-1, 1994*** | Generic Coding of Moving Pictures and Associated Audio: Systems. |
| ***ISO/IEC 13818-2, 1993*** | Generic Coding of Moving Pictures and Associated Audio: Video. |
| ***ISO/IEC 13818-3, 1994*** | Generic Coding of Moving Pictures and Associated Audio: Audio. |
| ***ITU-R BT. 1124-1, 1995,*** | Reference Signals for Ghost Cancelling in Television. |
| ***ITU-R Rec. 468-4, 1986*** | Measurement of audio-frequency noise voltage level in sound broadcasting. |
| ***ITU-R Rec. 473-5, 1990*** | Insertion of test signals in the field-blanking interval of monochrome and colour television signals. |
| ***ITU-R Rec. 567-3, 1990*** | Transmission performance of television circuits designed for use in international connections. |
| ***ITU-R Rec. 647*** | A digital audio interface for broadcasting studios. |
| ***ITU-R Rec. 653-2, 1994*** | Teletext Systems. |
| ***prTS 101 192*** | Digital Video Broadcasting (DVB); DVB specification for data broadcasting. |
| ***prTR 101 202, 12/97*** | Digital Video Broadcasting (DVB); Guidelines for the implementation and usage of the DVB data broadcasting specification. |
| ***SMPTE 170M,*** | “Television - Composite Analog Video Signal NTSC for Studio Applications”. |
| ***SMPTE 259M, 1997*** | “10 Bit 4:2:2 Component and 4fsc Composite Digital Signals - Serial Digital Interface”. |

| | |
|---|---|
| ***SMPTE 302M*** | "SMPTE 302M for Television - Mapping of AES3 Data into MPEG-2 Transport Stream" |
| ***TL5805, October 1993.*** | Deutsche Bundespost Telekom, TL 5805-3169, "Digitales Ton- und Fernsehübertragungssystem für 34 Mbit/s (Tn/TV-Codec 34)". |
| ***UL 1950*** | Safety of information technology equipment. |

# Glossary

## List of abbreviations

The following is a list of the abbreviations used in this manual.

| | |
|---|---|
| AIS | Alarm Indication Signal |
| AUX | AUXiliary data |
| DSNG | Digital Satellite News Gathering |
| DTR | Data Terminal Ready |
| EDH | Error Detection and Handling |
| EMC | Electro-Magnetic Compatibility |
| ESD | ElectroStatic Discharge |
| GCR | Ghost Cancellation Reference |
| Genlock | Generator lock. |
| I/O | Input/Output |
| IDS | Insertion Data Signal. This signal is an EBU specified identification code used within the European network. IDS is inserted in the field blanking period in lines 16 and 329. |
| LAN | Local Area Network |
| NTSC | National Television Systems Committee. The American TV transmission standard, which uses an interlaced 525-line 30-frames per second picture. |
| PAL | Phase Alternating Line. (European TV transmission standard, found in several variants. Uses an interlaced 625-line 25-frames per second picture, except PAL-M (only in Brazil) which uses an interlaced 525-line 30-frames per second picture). |
| PCR | Program Clock Recovery |
| PCR | Program Clock Reference |
| PID | Program ID , |
| PTS | Presentation Time-Stamp |
| RI | Ring Indicator |
| RxD | Received Data |
| SDI | Serial Digital Interface. 270 Mbit/s digital video format. |
| Teletext | A digital data broadcasting service transmitted in the field blanking interval of the television signal. Teletext is intended to display text or pictorial material on television receivers equipped with a Teletext decoder. |

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|---|---|
| TxD | Transmitted Data |
| VBI | Vertical Blanking Interval. The VBI is the first 22 lines in each field of a PAL signal (15 lines in an NTSC signal). These lines are used for field synchronization purposes. The VBI is also used for transmission of teletext, VITS, and VITC. |
| VITC | Vertical Interval Time Codes. A form of time code in which the time code is converted to data and placed on a line in the vertical blanking interval of the video signal. |
| VITS | Vertical Insertion Test Signal |
| VPS | Video Program System is a program identification system that facilitates programming of video recorders. The video recorder is programmed with the program identification code (from the TV program). |
| WAN | Wide Area Network |
| WSS | Wide Screen Signaling |

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