1553-FGC 101 1400 Uen A

Ericsson SPR1100

Stream Processor

HANDBOOK

SPR11/CHASSIS/1AC, SPR11/CHASSIS/2AC, SPR11/CHASSIS/1DC,
SPR11/CHASSIS/2DC and Options

Software Version 6.0.11 (and later)

Preliminary Information

Scope of This Information

This topic defines who should use this information, and what equipment and options are covered.

About This Information

Tabulates the history of this information. Lists the templates and style sheets used to create the file.

Trademarks

List the trademarks and registered trademarks associated with the equipment.

Warning, Cautions and Notes

Defines the use and format of Warnings, Cautions and Notes throughout this information.

Contact Information

Gives contact information for Ericsson Customer Services, and Technical Training.

Compliance Statements

Compliance statements relating to EN55022/AS/NZS 3548 and FCC.

Scope of This Information

Who Should Use this Handbook

This guide is written for operators and users of the Ericsson SPR1100 and describes its functions and operation. It will assist in the installation and day-to-day care and operation of the unit. Maintenance information that requires covers to be removed is not included.

WARNING!

Do not remove the covers of this equipment. Hazardous voltages are present within this equipment and may be exposed if the covers are removed. Only suitably trained and experienced service engineers are permitted to service this equipment.

CAUTION!

Unauthorised maintenance or the use of non-approved replacements may affect the equipment specification and invalidate any warranties.

Equipment Covered by this Handbook

Equipment Models

Front View of the Ericsson SPR1100.

Rear View of the Ericsson SPR1100, single AC PSU variant.

Rear View of the Ericsson SPR1100, dual AC PSU variant

Rear View of the Ericsson SPR1100, single DC PSU variant.

Rear View of the Ericsson SPR1100, dual DC PSU variant.

Product Codes

This information covers products with the marketing codes shown in the following table

Marketing Code	Description	Summary of Features
SPR11/CHASSIS/1AC	Ericsson SPR1100 Chassis with single AC input	See Introduction>Base Chassis>Base Unit (AC)
SPR11/CHASSIS/2AC	Ericsson SPR1100 Chassis with dual AC input	See Introduction>Base Chassis>Base Unit (Dual AC)
SPR11/CHASSIS/1DC	Ericsson SPR1100 Chassis with single DC input	See Introduction>Base Chassis>Base Unit (DC)
SPR11/CHASSIS/2DC	Ericsson SPR1100 Chassis with dual DC input	See Introduction>Base Chassis>Base Unit (Dual DC)
SPR/HWO/MPM1	MPM1 HD/SD Transcoder Module	See Introduction>Transcoder Cards>MPM1 Transcoder

Firmware/Software Versions

This information covers the functionality of the firmware/software versions which are

contained within the Software Release Version 6.x.x .

This handbook continues to be relevant to subsequent build versions where the functionality of the equipment has not changed. Where the build standard changes the functionality, a new issue of this handbook will be provided.

About this Information

Revisions

Any revision of this information will be by a complete reissue.

Issues are listed below:

Issue	Date	Build Version	Comments
A	September 2011	6.0.11	Initial release.

Trademarks

General

All best endeavours have been made to acknowledge registered trademarks and trademarks. Any notified omissions will be rectified in the next issue. Some trademarks may be registered in some countries but not in others.

Registered trademarks and trademarks used are acknowledged below and marked with their respective symbols. However, they are not marked further within the text.

Copyright

Disclaimer

The contents of this document are subject to revision without notice due to continued progress in methodology, design and manufacturing. Ericsson AB shall have no liability for any error or damage of any kind resulting from the use of this document.

Registered Trademarks

Dolby® is a registered trademark of Dolby Laboratories Licensing Corporation.

DTS® is a registered trademark of Digital Theater Systems, Inc

Ethernet® is a registered trademark of Xerox Corporation.

Trademarks

Ethafoam™ is a trademark of The Dow Chemical Company.

Pozidriv™ is a trademark of European Industrial Services.

Reflex™ is a trademark of Ericsson AB.

Stratocell™ is a trademark of the Sealed Air Corporation.

Warnings, Cautions and Notes

Heed Warnings

All warnings on the product and in the operating instructions should be adhered to. The manufacturer can not be held responsible for injuries or damage where warnings and cautions have been ignored or taken lightly.

Read Instructions

All the safety and operating instructions should be read before this product is operated.

Follow Instructions

All operating and use instructions should be followed.

Retain Instructions

The safety and operating instructions should be retained for future reference.

WARNING!

Warnings give information which, if strictly observed, will prevent personal injury or death, or damage to personal property or the environment. They are boxed for emphasis, as in this example, and are placed immediately preceding the point at which the reader requires them.

CAUTION!

Cautions give information which, if strictly followed, will prevent damage to equipment or other goods. They are boxed for emphasis, as in this example, and are placed immediately preceding the point at which the reader requires them.

NOTE: Notes provide supplementary information. They are highlighted for emphasis, as in this example, and are placed immediately after the relevant text.

Contact Information

Ericsson Customer Services

Support Services

Our primary objective is to provide first class customer care that is tailored to your specific business and operational requirements. All levels are supported by one or more service performance reviews to ensure the perfect partnership between Ericsson and your business.

Warranty

All Ericsson Products and Systems are designed and built to the highest standards and are covered under a comprehensive 12 month warranty.

Levels of Continuing Ericsson Service Support

For stand-alone equipment, then Ericsson's BASIC Essential support is the value for money choice for you.

BASIC provides you with year-by-year Service long after the warranty has expired.

For systems support you can choose either Gold Business Critical support or Silver Business Advantage. These packages are designed to save you costs and protect your income through enlisting the help of our support specialists.

Call Ericsson Sales for more details.

Where to Find Us

Customer Services

Europe, Middle East and Africa	Tel:	+44 (0) 23 8048 4455	
	Fax:	+44 (0) 23 8048 4467	
	Email: tvsupportemea@ericsson.com		

Americas	Tel:	+888 671 1268	US and Canada
	Tel:	+678 812 6255	International
	Fax:	+678 812 6262	
	Email: tvsupportamericas@ericsson.com		Compression
	Email: tvsupport@ericsson.com		Software Support Centre

China	Tel:	+86 10 8476 8676	Beijing
	Fax:	+86 10 8476 7741	Beijing
	Tel:	+852 2590 2388	Hong Kong
	Fax:	+852 2590 9550	Hong Kong
	Email: tvsupportapac@ericsson.com		

Australia and New Zealand	Tel:	+612 (0) 9111 4027	
	Fax:	+612 (0) 9111 4949	
	Email: tvsupportanz@ericsson.com		

Internet Address	www.ericsson.com

Technical Training

Training Courses

Ericsson provides a wide range of training courses on the operation and maintenance of our products and on their supporting technologies. We can provide both regularly scheduled courses and training tailored to individual needs. Courses can be run either at your premises or at one of our dedicated training facilities.

Where to Find Us

For further information on the Ericsson training programme please contact us:

International   Tel: +44 (0) 23 8048 4229

                    Fax: +44 (0) 23 8048 4161

                    Email: tvglobaltraining@ericsson.com

Return of Equipment

Contact your regional Ericsson office who will issue directions on how and where to return a unit for service/repair/upgrade.

EN55022 and CISPR22

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the Handbook, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at ones own expense.

FCC Code of Federal Regulations (CFR) Title 47 – Telecommunications, Part 15: radio frequency devices, subpart B – Unintentional Radiators.

Read This First!

Personnel

Ensure the personnel designated to fit the unit have the appropriate skills and knowledge. If in any doubt, contact Customer Services (see Contact Information).

Installation

Installation of the product should follow these instructions, and should only use installation accessories recommended by the manufacturers. When rack mounted, this equipment must have shelf supports as well as being fixed at the front panel.

Mechanical Support

Do not use this product as a support for any other equipment.

Web Browser access

This product is designed to support control through Web browser access. The only supported browser is Microsoft IE8 (earlier versions of IE are not supported)

Introduction

The Unit is a flexible platform consisting of a base unit or chassis into which between one and six Media Processing Modules (MPMs) can be plugged. The base unit provides an Ethernet control interface, and Ethernet data interfaces, it also provides transport stream processing functionality. Other functionality such as video / audio transcoding, or other input or output interfaces are provided by the media processing modules.

License Keys

License Keys control the availability of some of the features accessible from the unit and are issued to a specific chassis, not a module, and are held within the chassis.

Base Chassis

This section introduces the chassis and describes the functions associated with the host controller.

Media Processing Module (MPM)

The following media processing module is available:

MPM1 HD/SD Transcoder

This provides high quality MPEG-2 and H.264 Video transcoding, and multi-standard audio transcoding.

License Keys

Overview

License Keys control the availability of some features and are issued to a specific base unit not a media processing module, even if the functionality being enabled is provided by a module.

Features

License Keys consist of a feature, and the number of instances of this feature that are allowed within the chassis.

License Keys are allocated on a 'first configured first served' basis within the chassis. If an attempt is made to enable a feature, but the required license key is not available then the feature is not enabled, and a log message is generated.

When a function that has a license associated with it is disabled, the license key is released within 1 second, and therefore available to be re-allocated .

Verifying which licenses are present in the Unit

Access to the transcoder web pages is necessary to verify the licenses that are enabled on the unit.

Navigate to Configure > Licenses. This page displays the marketing code, number of each license and a description of the feature enabled by the license.

Ordering Additional Licenses.

N.B. License keys are unit-specific. They cannot be loaded onto a different unit.

When ordering additional licenses for existing units the following information is needed:

1. Unique Chip ID of the unit is required to generate the key.

    This is retrieved by navigating to the following web page :

        Configure > System > Base Unit > Advanced

    The Chip ID value is displayed just beneath the diagram of the transcoder.

2. The TOTAL FINAL number of ALL types of license required (including licenses already

enabled on the unit) needs to be provided.

The above information is used to generate a new license key file, which then needs to be loaded onto the appropriate unit.

Entering License Keys

The keys are saved in an XML file (newlicensedetail.xml) ready to be entered onto the unit via the web page

Browse to: Configure > Licenses

In the license box enter the license filename and select upload.

NOTE: The front panel CANNOT be used to enter license keys!

Base Chassis

Overview

The base chassis provides the control interfaces, the data Ethernet ports, data routing between the Ethernet ports, control software running on the base chassis, and the modules slots. It also provides the ability to generate MPEG-2 transport streams from elementary streams received from the modules.

The following is a summary of the features of the base chassis:

- 19" 1 'RU' rack mount chassis.
- Front panel LCD and keypad for limited control and status reporting.
- Tri-colour LED to indicate chassis health.
- Dual redundant Ethernet control ports.
- Two pairs of dual redundant Ethernet ports for data input and output.
- Single or dual AC power supply variants.
- Single or dual DC power supply variants.
- 6 module slots (single AC or DC PSU chassis) or 4 module slots (dual AC or DC PSU chassis)
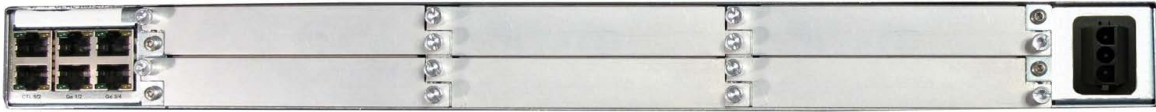- Modules are 'hot swappable'
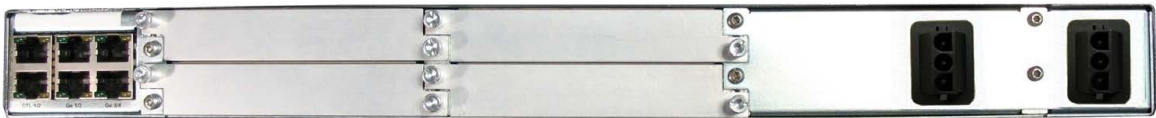

Ericsson SPR1100 Front Panel
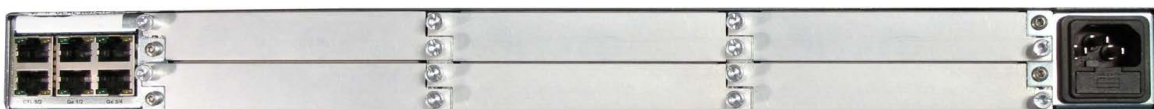
Ericsson SPR1100 Rear Panel - Single AC Chassis
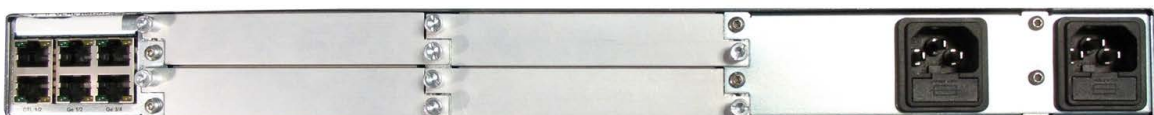
Ericsson SPR1100 Rear Panel - Dual AC Chassis

Ericsson SPR1100 Rear Panel - Single DC Chassis

Ericsson SPR1100 Rear Panel - Dual DC Chassis

NOTE: Refer to Installing the Equipment > External Interfaces > Base Chassis for more details of the items at the rear and front panels.

SPR11/CHASSIS/1AC 1U Base Chassis (AC)

Describes the single AC power supply base chassis.

SPR11/CHASSIS/2AC 1U Base Chassis (Dual AC)

Describes the dual AC power supply base chassis.

SPR11/CHASSIS/1DC 1U Base Chassis (AC)

Describes the single DC power supply base chassis.

SPR11/CHASSIS/2DC 1U Base Chassis (Dual AC)

Describes the dual DC power supply base chassis.

SPR11/CHASSIS/1AC 1U Base Chassis (AC)

Overview

The Ericsson SPR1100 consists of a base chassis, a single AC mains input and up to six modules. The base chassis is a 1 'RU' 19" rack mount chassis that provides the control interfaces, and two pairs of dual redundant Ethernet ports for data input and output.

The modules provide the video, audio and data processing functionality and can be 'Hot Swapped' i.e. inserted or removed whilst the chassis is powered.

Single AC PSU Base Chassis

Front Panel

SPR11/CHASSIS/1AC Front Panel Items

LCD

Control and status information is displayed on a 2 line by 40 character display.

Buttons

Six buttons are provided for navigating through the front panel menus.

Status LED

The status LED is green when there are no active alarms or warnings and red if there is a critical alarm.

The status LED is amber if there is an active warning, minor or major alarm.
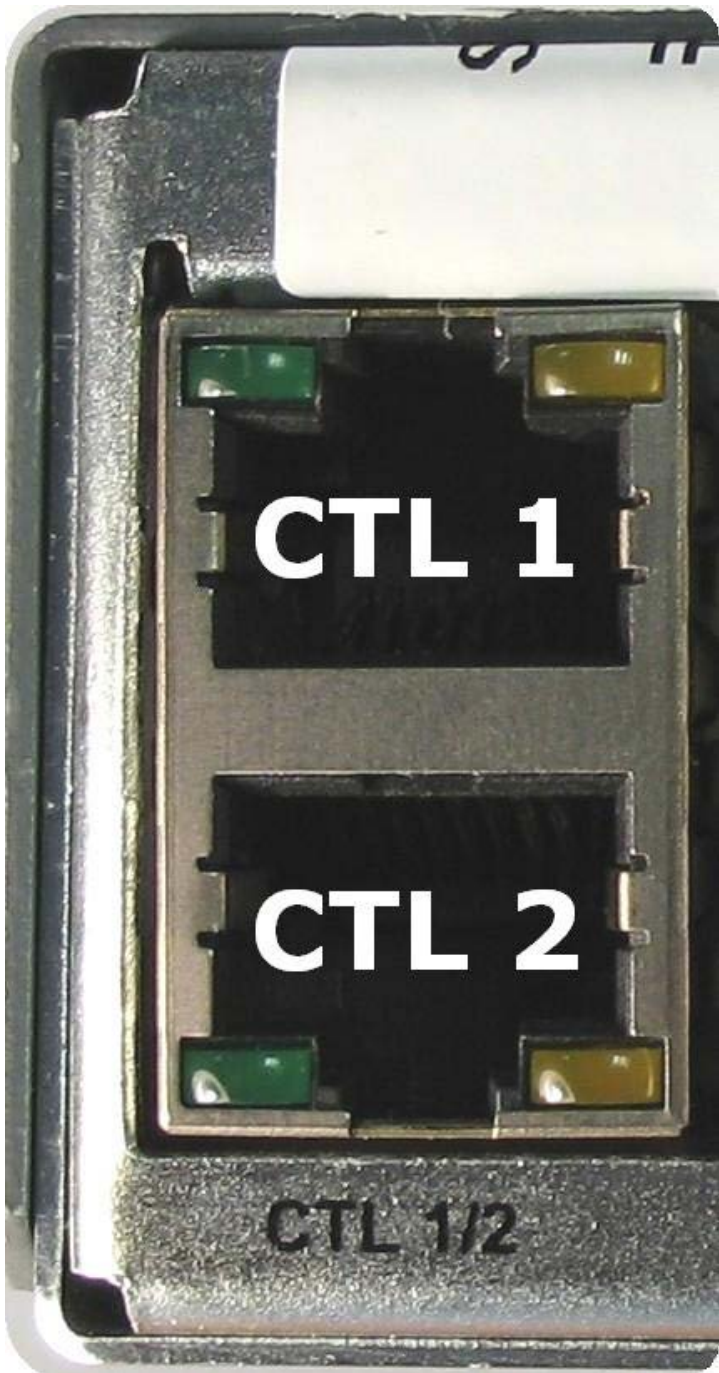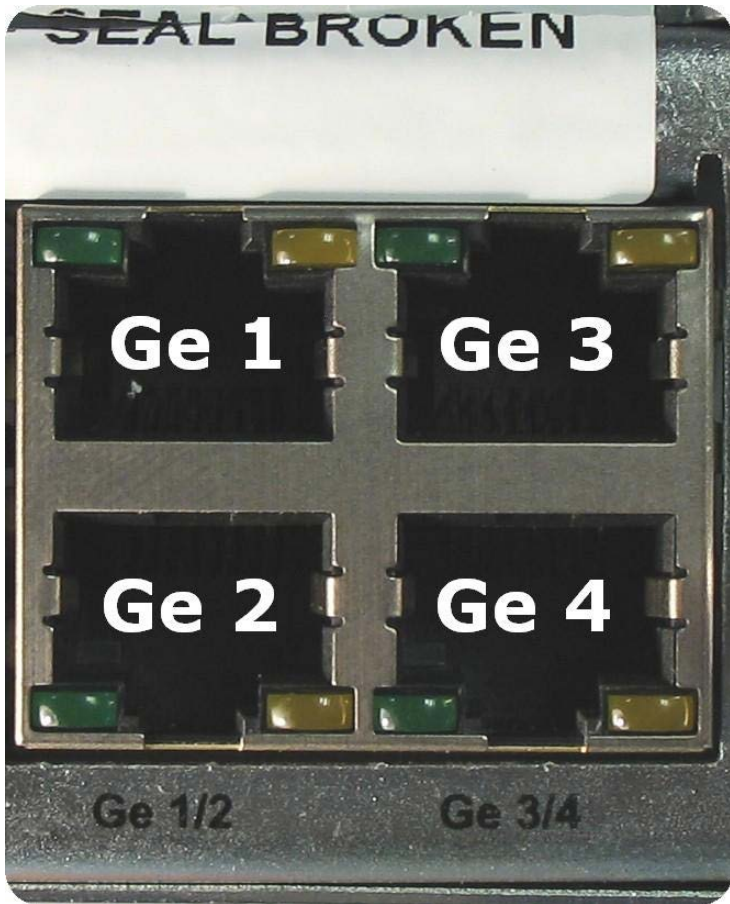
USB Connector

This is not for customer use.

Rear Panel

The modules, control Ethernet ports, data Ethernet ports, and the AC power input are all accessible at the rear of the base chassis.

SPR11/CHASSIS/1AC Rear Panel Items [Single AC Chassis]

CTL 1

CTL 2

CTL 1/2

Ethernet Port Numbering

SPR11/CHASSIS/2AC 1U Base Chassis (Dual AC)

Overview

The Ericsson SPR1100 consists of a base chassis, dual AC inputs and up to four modules. The base chassis is a 1 'RU' 19" rack mount chassis that provides the control interfaces, and two pairs of dual redundant Ethernet ports for data input and output.

The modules provide the video, audio and data processing functionality and can be 'Hot Swapped', i.e. inserted or removed whilst the chassis is powered.

Why Have Two Mains Connectors

Many broadcasting sites have two power supply chains, either from the master switchboard or, for major sites, from different points on the supply grid. As the most common cause of system failure is loss of power, feeding the chassis from the separate chains ensures reliability of supply and, therefore, continuity of service.

Dual AC PSU Base Chassis

Front Panel

SPR11/CHASSIS/2AC Front Panel Items

LCD

Control and status information is displayed on a 2 line by 40 character display.

Buttons

Six buttons are provided for navigating through the front panel menus.

Status LED

The status LED is green when there are no active alarms or warnings and red if there is a critical alarm.

The status LED is amber if there is an active warning, minor or major alarm.
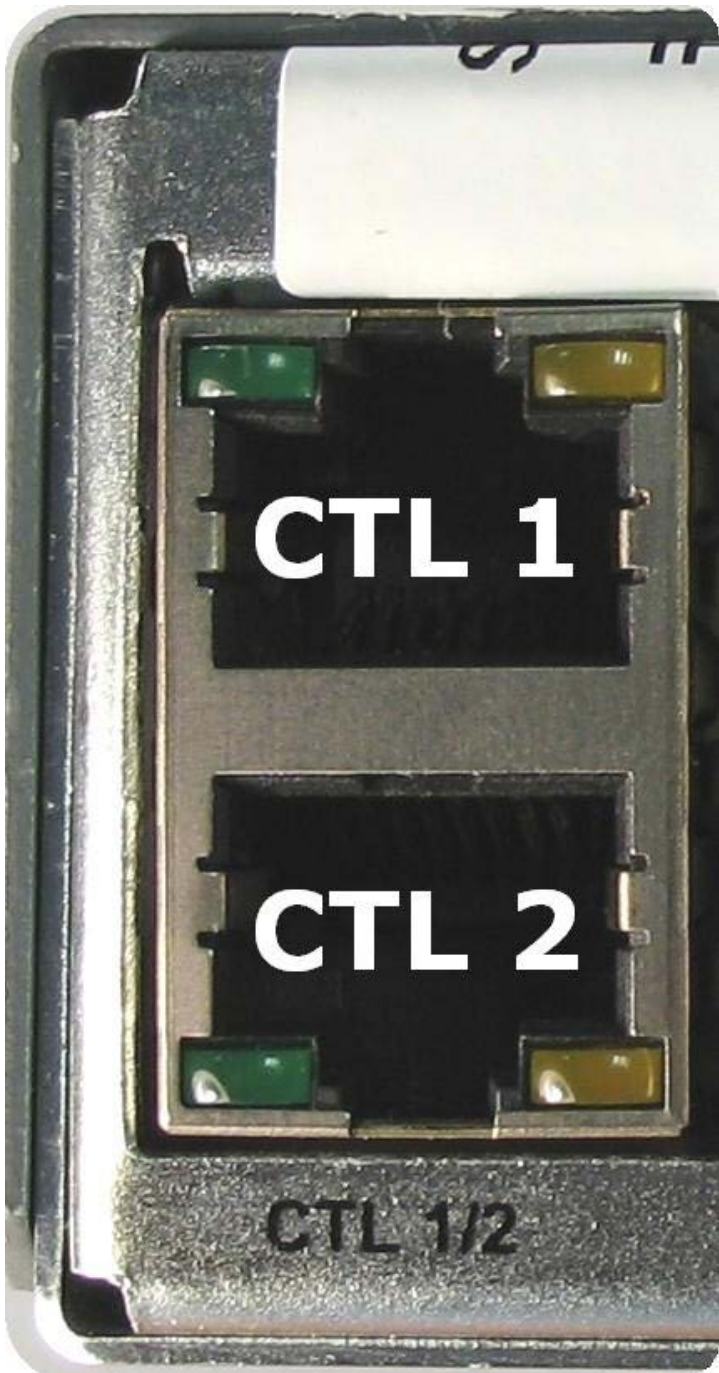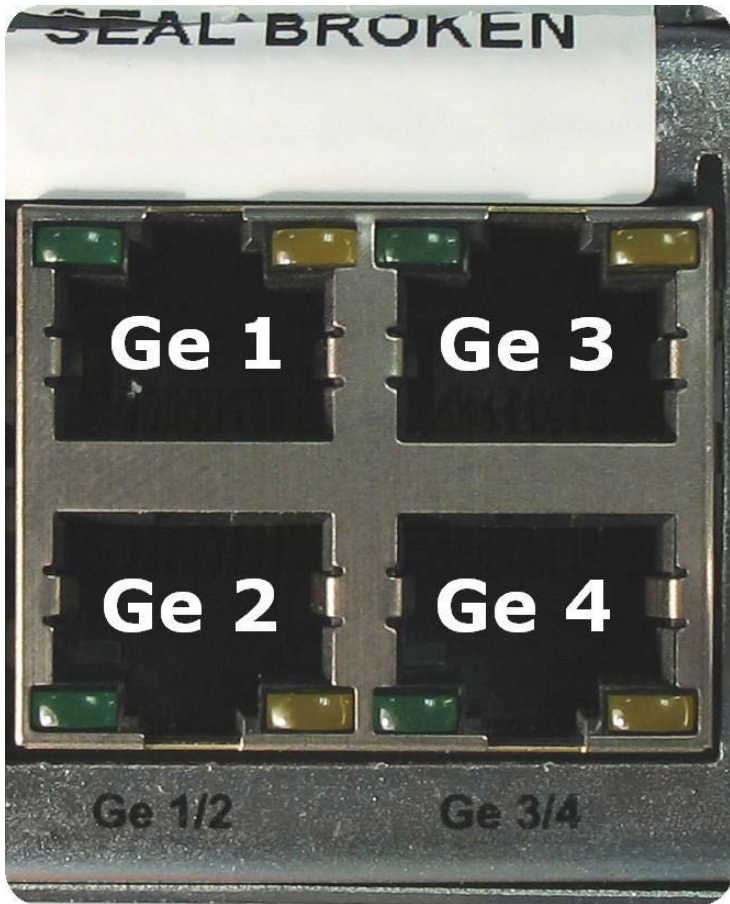
USB Connector

This is not for customer use.

Rear Panel

The modules, control Ethernet ports, data Ethernet ports, and the AC power input are all accessible at the rear of the base chassis.

SPR11/CHASSIS/2AC Rear Panel Items [Dual AC Chassis]

CTL 1

CTL 2

CTL 1/2

Ethernet Port Numbering

SPR11/CHASSIS/1DC   1U Base Chassis (DC)

Overview

The Ericsson SPR1100 consists of a base chassis, a single DC power input and up to six modules. The base chassis is a 1 'RU' 19" rack mount chassis that provides the control interfaces, and two pairs of dual redundant Ethernet ports for data input and output.

The modules provide the video, audio and data processing functionality and can be 'Hot Swapped' i.e. inserted or removed whilst the chassis is powered.

Single DC PSU Base Chassis

Front Panel

SPR11/CHASSIS/1DC Front Panel Items

LCD

Control and status information is displayed on a 2 line by 40 character display.

Buttons

Six buttons are provided for navigating through the front panel menus.

Status LED

The status LED is green when there are no active alarms or warnings and red if there is a critical alarm.

The status LED is amber if there is an active warning, minor or major alarm.
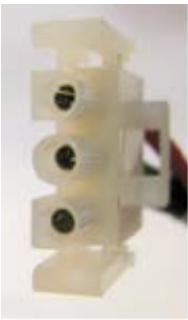
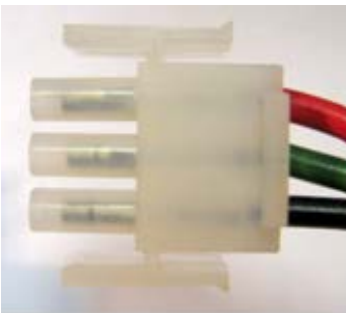USB Connector

This is not for customer use.

Rear Panel

The modules, control Ethernet ports, data Ethernet ports, and the DC power input are all accessible at the rear of the base chassis.

SPR11/CHASSIS/1DC Rear Panel DC Power Socket

SPR11/CHASSIS/1DC DC Power Connector (end view)

SPR11/CHASSIS/1DC DC Power Connector (side view)

CTL 1

CTL 2

CTL 1/2

Ethernet Port Numbering

SPR11/CHASSIS/2DC   1U Base Chassis (Dual DC)

Overview

The Ericsson SPR1100 consists of a base chassis, two DC power inputs and up to four modules. The base chassis is a 1 'RU' 19" rack mount chassis that provides the control interfaces, and two pairs of dual redundant Ethernet ports for data input and output.

The modules provide the video, audio and data processing functionality and can be 'Hot Swapped' i.e. inserted or removed whilst the chassis is powered.

Dual DC PSU Base Chassis

Front Panel

SPR11/CHASSIS/2DC Front Panel Items

LCD

Control and status information is displayed on a 2 line by 40 character display.

Buttons

Six buttons are provided for navigating through the front panel menus.

Status LED

The status LED is green when there are no active alarms or warnings and red if there is a critical alarm.

The status LED is amber if there is an active warning, minor or major alarm.

USB Connector

This is not for customer use.

Rear Panel

The modules, control Ethernet ports, data Ethernet ports, and the DC power inputs are all accessible at the rear of the base chassis.
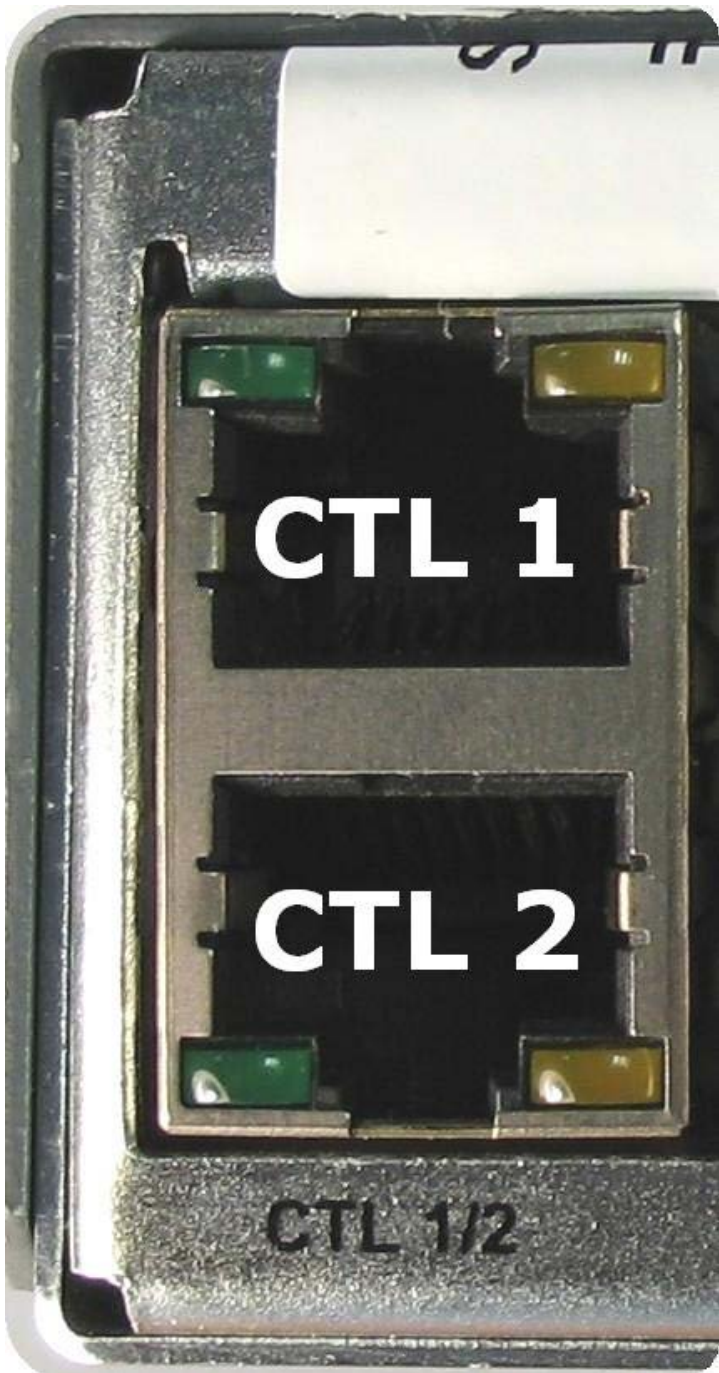

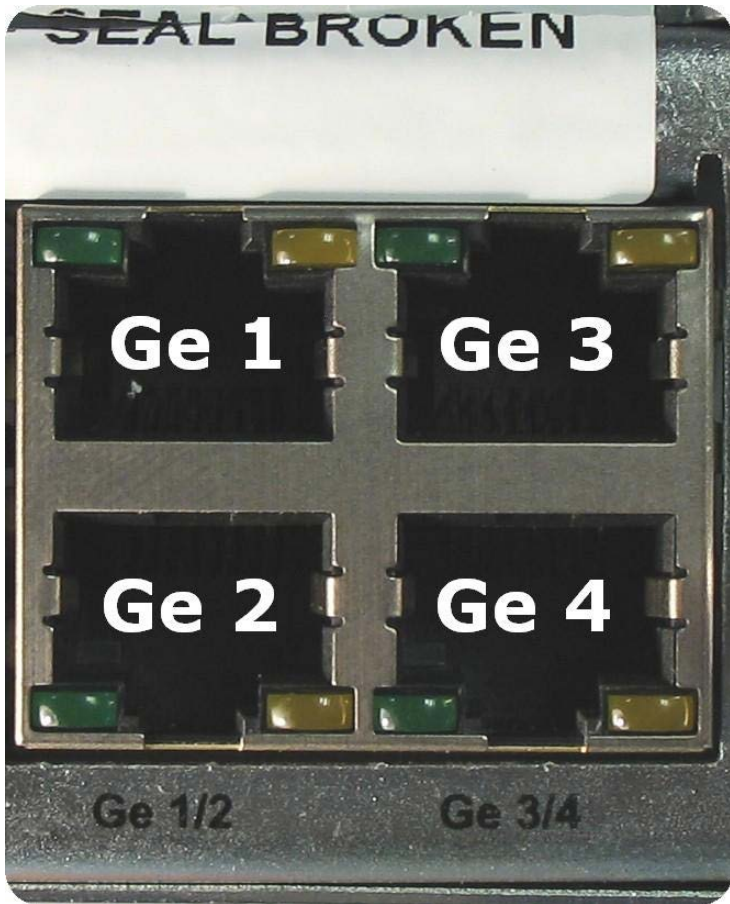*SPR11/CHASSIS/2DC Rear Panel DC Power Socket*
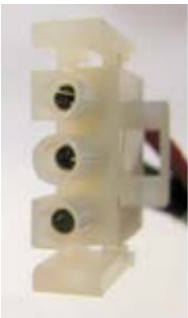
SPR11/CHASSIS/2DC DC Power Connector (end view)

SPR11/CHASSIS/2DC DC Power Connector (side view)

CTL 1

CTL 2

CTL 1/2
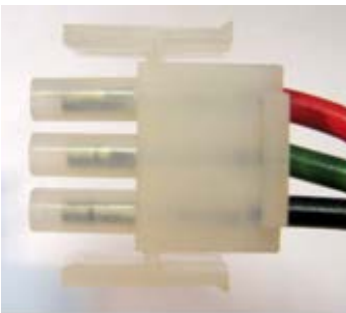
Ethernet Port Numbering

Transcoder Modules

The following transcoder module is supported in this release:

MPM1 HD/SD Transcoder (SPR/HWO/MPM1)

This card can transcode up to 12 standard definition or up to 4 high definition video inputs using MPEG-2 or H.264 encoding, and can compress up to 24 audio streams, depending on audio encoding mode.

Media Processing Module (MPM1)

The MPM1 Transcoder Card has a unique processing engine that extracts the maximum efficiency possible from the MPEG2 and H.264 specifications.

Summary of Features

Video Transcoding

Describes the Video processing functionality available in the MPM1.

Audio Transcoding

Describes the Audio Inputs and Coding Modes provided by the MPM1.

Data Processing

Describes the data extraction and processing capabilities of the MPM1

Summary of Features

Overview

The media processing module is a single slot solution which can transcode multiple MPEG-2 and/or H.264 video streams, at both SD and HD resolutions. Audio passthrough and transcode functionality is also supported.

The total maximum number of transcodes per module is related to the resolution.

At SD resolution, each MPM1 can perform 12 simultaneous transcodes.

Each transcode involving a HD-resolution stream on input and/or output reduces the number of possible SD transcodes by 3

Maximum number of SD-to-SD transcodes	Maximum number of HD transcodes
12	0
9	1
6	2
3	3
0	4

Video Formats

Profiles Supported

- MPEG-4 AVC (H.264) Main Profile @ Level 3 to Level 4.1 (0.500 to 12.5 Mbps)
- MPEG-4 AVC (H.264) High Profile @ Level 4.0 to Level 4.1 (1.000 to 20.0 Mbps)
- MPEG-2 MP@ML Video (1.000 to 15.0 Mbps)
- MPEG-2 MP@HL Video (2.000 to 30.0 Mbps)

SD Resolutions Supported

- 720 x 576 @ 25Hz
- 704 x 576 @ 25Hz
- 640 x 576 @ 25Hz
- 544 x 576 @ 25Hz
- 528 x 576 @ 25Hz

- 480 x 576 @ 25Hz

- 352 x 576 @ 25Hz

- 720 x 480 @ 29.97Hz

- 704 x 480 @ 29.97Hz

- 640 x 480 @ 29.97Hz

- 544 x 480 @ 29.97Hz

- 528 x 480 @ 29.97Hz

- 480 x 480 @ 29.97Hz

- 352 x 480 @ 29.97Hz

HD Resolutions Supported

- 1280 x 720 @ 50Hz

- 960 x 720 @ 50Hz

- 1920 x 1080 @ 25Hz

- 1440 x 1080 @ 25Hz

- 1280 x 1080 @ 25Hz

- 1280 x 720 @ 59.94Hz

- 960 x 720 @ 59.94Hz

- 1920 x 1080 @ 29.97Hz

- 1440 x 1080 @ 29.97Hz

- 1280 x 1080 @ 29.97Hz

- 1920 x 1080 @ 23.976Hz

Video PIP Formats

- MSTV

  - 128 x 96 @ 25Hz

  - 128 x 96 @ 29.97Hz

  - 96 x 96 @ 25Hz

  - 96 x 96 @ 29.97Hz

- non-MSTV

  - 192 x 192 @ 25Hz

  - 192 x 192 @ 29.97Hz

  - 144 x 144 @ 25Hz

  - 144 x 144 @ 29.97Hz

Audio Formats

- Supported audio decoding and encoding modes:

- MPEG-1 Layer II (32 kbps to 384 kbps)
- MPEG-2 Layer II (32 kbps to 384 kbps)
- Dolby Digital 2.0, 5.1 (56 kbps to 640 kbps)
- MPEG-4 AAC/AAC-LC/HE-AAC (16-256kbps)

Audio Transcoding

The MPM supports transcoding between any of the supported formats.

The maximum number of simultaneous transcodes per card is summarised in theAudio Transcoding page

VBI Passthrough

In addition to Audio and Video Transcoding, data may be passed through from Input to Output. Typically, this can include :

- Generic VANC carriage (SMPTE 2038)

- VBI in PID

- Teletext

- DVB Subtitles

- AFD

SCTE 35 Splicepoint Pass-Through

The MPM supports SCTE 35 pass-through. SCTE 35 may be added to any output stream by dragging the component to the appropriate stream in the Services Configuration page. The video will have the appropriate splice-points re-inserted at the right points on transcode.

MPM1 Video Transcoding

Inputs and Outputs

The MPM1 Transcoder has no external inputs or outputs. All data is passed into and out of the module via the internal connectors.

Overview

The MPM1 can transcode up to twelve SD-to-SD streams or up to four transcodes with HD streams on input and/or output, or a combination of both. Each high-definition stream reduces the maximum number of standard-definition streams by three

Video Compression Functionality

The supported formats and bit rates are summarised in the Coded Elementary Stream page

Any supported video format can be transcoded to any other supported video format, with the following exceptions:

- 720p outputs can only be transcoded from 720p inputs
- 1080PsF outputs can only be transcoded from 1080PsF inputs
- 720p inputs cannot be transcoded into 1080i outputs

Any supported PIP format can be generated from any supported input video format

Loss of Video Input

On loss of video input, the MPM1 can be configured to select one of the default test patterns or a freeze frame as the output.

MPM1 Audio Transcoding

Overview

Audio data comes to the MPM by way of the internal data connections, in just the same way as the video.

The maximum number of simultaneous audio transcodes that can be performed on a MPM is summarised below. It is possible to mix different audio transcodes on a module, in which case the maximum number of transcodes must be scaled accordingly.

Inputs	Outputs				
	MPEG-1L2	Dolby Digital 2.0	Dolby Digital 5.1	AAC/HE-AAC 2.0	AAC/HE-AAC 5.1
MPEG-1L2	24	12	n/a	24	n/a
Dolby Digital 2.0/5.1	18	12	6	12	6
AAC/HE-AAC 2.0/5.1	12	12	6	12	6

For example, per module, it is possible to transcode

    24 x MPEG L2 to MPEG L2
or 12 x AAC   to MPEG L2
or 18 x MPEG L2 to MPEG L2 and 3 x AAC to MPEG L2

Audio Pass-Through

Audio streams can be passed through directly from the input without re-encoding (pass-through mode). No audio licenses are required for this mode.

Data Processing

Data Component Pass-Through

Data of any type can be passed through from the Input Transport Stream to the Output Transport Stream.

| NOTE: | Closed-Caption Data is handled slightly differently from other data types, and will be automatically transcoded as necessary. |

Installing the Equipment

This chapter provides a guide to the suitability of an installation and gives detailed procedures for the preparation and installation of the equipment. Also details the external connectors and provides important safety information.

Preliminary Checks

Gives general information relating to Mechanical Inspection of the unit and how to move it safely.

Site Requirements

Describes the requirements for powering the unit and the need for lightning protection (if required).

Mounting in a Rack

Gives information associated with fixing the unit into a rack and the care and positioning of cables.

External Interfaces

Describes the connectors relating to the base chassis.

Preliminary Checks

Mechanical Inspection

When taking delivery of an Encoder, check the equipment items delivered against the enclosed delivery note. Inspect the equipment for damage-in-transit. If in doubt, please contact Customer Services.

WARNING!

Removing the covers of this equipment may invalidate any warranties, cause a safety hazard or/and affect the EMC performance. Check with Customer Services.

Moving the Equipment Safely

Do not place this product on an unstable cart, stand, bracket, or table. The product may fall, causing serious injury and serious damage to the product. Use only with a cart, stand, bracket or table recommended by Ericsson.

An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.

Do not move or carry the equipment whilst it is still connected to the supply or other leads, is live or is in operation.

See, also:

- The Handling and Lifting section in Read This First!
- Appendices > Handling Option Cards > Handling Option Cards

Site Requirements

This chapter provides a guide to the suitability of an installation and gives detailed procedures for the preparation and installation of the equipment. Also details the external connectors and provides important safety information.

AC Power Supply

Gives information relating to the AC power inlet and associated components.

DC Power Supply

Gives information relating to the DC power inlet and associated components.

Power Consumption

Details the power consumption of the base chassis and each transcoder module.

Protective and Technical Earths

Describes the requirements for earthing the unit.

Lightning Protection

This topic discusses the requirement of lightning protection (when appropriate).
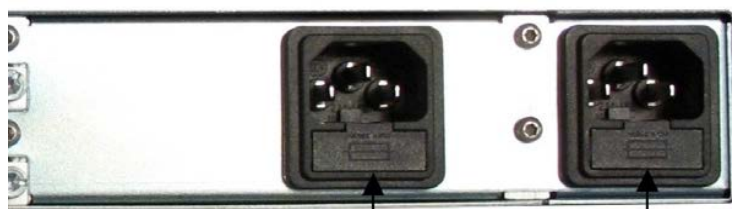
AC Power Supply

Variants

This Handbook covers two Base Chassis; a single AC PSU version, and a dual AC PSU version.

AC Power

Dual AC Power

[Single AC PSU]   [Dual AC PSU]

AC Power Receptacles

Specification

The equipment operates from an wide-ranging mains power supply (100-240 V AC 50/60 Hz nominal) and is designed for use in ambient air temperature in the range 0°C to +50°C. There are no links etc. to be altered for operation from different supply voltages. The full Technical Specification is given in Technical Specification > Chassis [Host] >Power Supplies.

WARNING!

The following points regarding power connection must be adhered to ensure safe operation of the equipment.

---

1. The equipment should only be operated from the type of power source indicated on the marking label. If you are not sure of the type to your business, consult your appliance dealer or local power company. Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.

2. The equipment is not fitted with an AC Power On/Off switch. Ensure the supply socket outlet is installed or located near the equipment so that it is accessible.

3. Remove both sources of mains power to the dual PSU version before removing covers or moving the equipment.

Supply Cord

A two-metre mains supply cord is supplied with this product. It is fitted with a moulded plug suitable for the USA, UK or mainland Europe as advised at the time of ordering.

Wire Colours

The wires in the supplied cord are coloured as follows:

	UK (BS 1363)	EUROPE (CEE 7/7)	USA (NEMA 5-15P)
Earth	Green and yellow	Green and yellow	Green
Neutral	Blue	Blue	White
Live	Brown	Brown	Black

Connecting the Equipment to the AC Power Supply

As there is no mains power switch fitted to this chassis, ensure the local AC power supply is switched OFF before connecting the supply cord.

Connect the mains lead to the equipment and then to the local supply.

DC Power Supply

Variants

This Handbook covers two types of DC Base Chassis; a single DC PSU version, and a dual DC PSU version.

DC Power Connector

Specification

The equipment operates from a -48V DC power supply and is designed for use in ambient air temperature in the range 0°C to +50°C. There are no links etc. to be altered for operation from different supply voltages. The full Technical Specification is given in Technical Specification > Chassis [Host] > Power Supplies.

WARNING!

The following points regarding power connection must be adhered to ensure safe operation of the equipment.

---

1. This equipment is Class 1 and must have a protective earth.

2. The equipment should only be operated from the type of power source indicated on the marking label. If you are not sure of the type to your business, consult your appliance dealer or local power company. Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.

3. The equipment is not fitted with an DC Power On/Off switch. Ensure the supply socket

outlet is installed or located near the equipment so that it is accessible.

4. Remove both sources of power to the dual PSU version before removing covers or moving the equipment.

Wire Colours

The wires in the supplied cord are coloured as follows:

Earth	Green and yellow
-48V	Blue
0V	Brown

Connecting the Equipment to the DC Power Supply

NOTE: This equipment is not intended for direct connection to centralised DC power systems in the USA or Canada.

This equipment does not have an input fuse. For protection of the DC wiring, a circuit breaker of maximum 16A is recommended.

For wiring DC power, a minimum wire size of $1.0mm^2$ (17AWG) is recommended. This may need to be increased for longer cable runs.

As there is no power switch fitted to this chassis, ensure the local DC power supply is switched OFF before connecting the supply cord.

Connect the power lead to the equipment and then to the local supply.

Power Consumption

Rated current 4.0 – 2.0 A

Power consumption: 350W (Actual power consumption is dependant on the hardware options selected, see Table of Typical Power Consumption).

Typical Power Consumption		
Item	Description	Power
SPR11/CHASSIS/1AC	1U Base Chassis (AC)	70 W
SPR11/CHASSIS/2AC	1U Base Chassis (Dual AC)	80 W
SPR/HWO/MPM1	MPM1 HD/SD Transcoders (6 cards)	250 W

 See also Technical Specification>Chassis>Power Supplies, Technical Specification>* Transcoder>Power Supplies.

Protective and Technical Earths

Protective Earth

<div align="center">

WARNING!

</div>

This unit must be correctly earthed as described below.

1. This unit must be correctly earthed through the moulded plug supplied. If the local mains supply does not have an earth conductor do not connect the unit. Contact Customer Services for advice.

2. Before connecting the unit to the supply, check the supply requirements.

Technical Earth

The terminal marked at the rear panel is a Technical Earth. Its use is recommended. This is NOT a protective earth for electric shock protection.

Technical Earth

The Technical Earth provides a suitable connection between the equipment and the

installation to give a low impedance path at normal operating frequencies.

The terminal is provided to:

1. Ensure all equipment chassis fixed within a rack are at the same technical earth potential.

2. Eliminate the migration of stray charges when connecting between equipment.

    To do this, connect a wire between the Technical Earth terminal and a suitable point on the rack.

CAUTION!

It is strongly recommended that the earth terminal at the rear panel of the equipment is connected to a site Technical Earth before any external connections are made and the equipment is powered. This limits the migration of stray charges.

Lightning Protection

WARNING!

If the equipment has been subject to a lightening strike or power surge, which has stopped it working, disconnect the power immediately, do not re-apply power until it has been checked for safety. If in doubt, contact Customer Services.

Where appropriate, ensure this product has an adequate level of lightning protection. Alternatively, during a lightning storm or when it is left unattended and unused for long periods of time, unplug it from the supply outlet and disconnect the output equipment. This prevents damage to the product due to lightning and power line surges.

Mounting in a Rack

Gives information associated with fixing the unit into a rack and the care and positioning of cables.

Installing the Equipment

Read This First: Read the information contained in this topic before beginning to install the equipment.

Care in Positioning

This topic describes what needs to be considered before fixing the unit into a rack.

Fixing

Provides information related to the fixing of the unit in a rack.

Cable Types/Installing Cables

Tabulates the recommended cables required to maintain EMC compliance. Also describes the care required when installing the cables.

Handling and Lifting

Handling the Equipment

The equipment must be handled and installed carefully and thoughtfully to prevent safety hazards and damage.

Lifting

In some circumstances the unit might be awkward to lift. In which case, do not attempt to lift or move it without proper assistance or equipment. If in doubt, seek assistance.

Electrostatic Handling

WARNING!

Static electricity can damage electronic components. To avoid damage, keep option cards in their static-protective package until you are ready yo install them.

Refer to Options Cards for information relating to the handling of Option Modules.

Installing the Equipment

Read the comments in Read This First before starting work.

Care in Positioning

Positioning the Unit

<div align="center">

CAUTION!

</div>

The following points must be taken in to consideration when positioning the unit.

---

1. The fans contained within this unit are not fitted with a dust/insect filter. Pay attention to the environment in which it is to be used.

2. Do not install units so that the air intake of one aligns with the outlet on another. Provide baffles and adequate spacing.

The equipment should never be placed near or over a radiator or other source of heat. It should not be placed in a built-in installation such as a rack unless proper ventilation is provided and the instructions have been adhered to.

Allow at least 40 mm free air-space at each side of the equipment to ensure adequate cooling.

Racks containing stacked equipment may need to be forced air-cooled to reduce the ambient temperature within the rack.

Protection from Moisture

Do not install this equipment in areas of high humidity or where there is a danger of water ingress.

Cooling

Side openings in the unit, as well as side-mounted cooling fans, are provided for ventilation. They ensure reliable operation of the product and protect it from overheating.
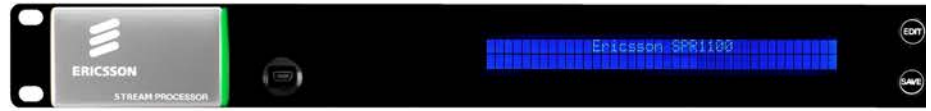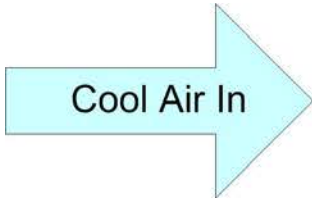
Airflow Through the Unit

WARNING!

The ventilation openings must not be blocked or covered.

Fixing

Overview

The equipment is designed for fixed use only and has been shipped with fixing brackets suitable for a standard 19-inch rack. When installed in a rack, it should be secured using the fixing brackets. In addition, support shelves must be used to reduce the weight on the brackets. Ensure it is firmly and safely located and it has an adequate flow of free-air.

Fixing the Unit

Slide the unit onto the chassis supports and affix to the rack by means of an M6 x 18 mm panhead screw in each corner.

A freestanding unit should be installed on a secure horizontal surface where it is unlikely to be knocked or its connectors and leads disturbed.

Cable Types/Installing Cables

Cable Types

The signal cable types (or similar) described in the following table are those recommended by Ericsson in order to maintain product EMC compliance.

Signal Type	Connector	Cable
Ethernet (Control)	RJ-45	Alcatel Data Cable FTP 7 x 0.16
Ethernet (Data)	RJ-45 Cat 5e	Belden Datatwist (S-FTP)

Installing Cables – Safely

Power supply cables should be routed so that they are not likely to be walked on or pinched by items placed upon or against them. Pay particular attention to cables at plugs, convenience receptacles, and the point where they exit from the appliance.

Do not run AC power cables in the same duct as signal leads.

Do not move or install equipment whilst it is still attached to the mains supply.

Ensure safety and ESD precautions are observed whilst inter-connecting equipment.

External Interfaces

Describes the connectors and visual indicators associated with each component of the equipment.

Base Chassis

Identifies and describes each connector and indicator associated with the Chassis.

Chassis/Host

General

Identifies the position of the connectors and indicators at the front and rear panels and what combinations of external interfaces are supported.

Control Ethernet

Identifies the Ethernet Control ports located at the rear panel of the chassis and tabulates the connectors' pinout. Describes the operation of each port, and the Status and Activity indicators.

Data Ethernet

Identifies the Ethernet Data ports located at the rear panel of the chassis and tabulates the connectors' pinout. Describes the operation of each port, and the Status and Activity indicators.

AC Input Connector

Shows the rear panel AC connector and provides fusing information.

DC Input Connector

Shows the rear panel DC connector.

USB Connector

Provides information associated with the USB connector located at the front panel.

General

1 'RU' Base Chassis Single PSU Rear Panel

WARNING!

It is strongly recommended that the terminal marked at the rear panel of the equipment is connected to a site Technical Earth before any external connections are made and the equipment is powered. This limits the migration of stray charges.

Location of the Ethernet and Single AC Connectors at the Rear Panel

All signal connections are made via the rear panel.

NOTE: Single AC PSU version shown.

Front Panel

Identifying Items Located at the Front Panel

The front panel provides a 2 line by 40 character display, 6 buttons, and a red/amber/green

tri-colour status LED.

Items on the Front Panel

LCD

Control and status information is displayed on a 2 line by 40 character display.

Buttons

Six buttons are provided for navigating through the front panel menus. See Front Panel Controls and Pushbuttons for more details.

Status LED

An LED located at the front panel gives an indication of the status of the unit.

LED State	Unit Status
Off	Unit not powered
Green	No active warnings or alarms
Amber	Active warning/s, minor or major alarm/s
Red	Active critical alarm/s

USB Connector

This is not for customer use. Please refer to USB connector.

1 'RU' Base Chassis Dual PSU Rear Panel

This chassis is the same as the 1 'RU' Base Chassis but with the dual PSU.

Data Ethernet

Control Ethernet

AC Input

Location of the Ethernet and Dual AC Connectors at the Rear Panel (Blanking Plates Fitted)

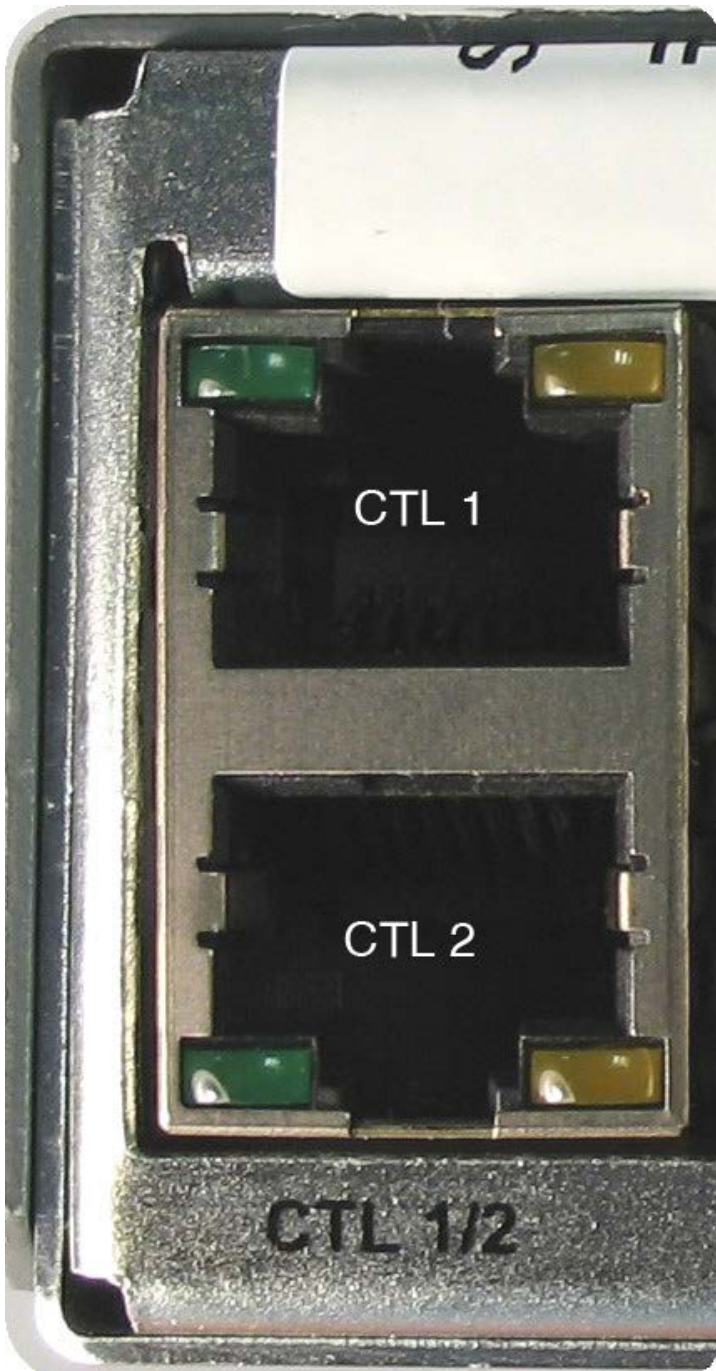A technical specification for the connections is given in Technical Specification > Base Chassis .

Control Ethernet

Overview

The Ethernet control ports are used to connect the equipment to a PC for access with a web browser.

Ethernet Ctrl Port Numbering

Both connectors share the same IP address, Ctrl1 is the Primary control port, and is by default the active control port. Control Port Ctrl2 should be considered as the secondary control network as it will not respond to the Control Port IP Address unless control has been passed to it either as a result of a redundancy switch, or via a user command. The active control port switches when Ctrl1 has no link (e.g. carrier), and Ctrl2 has the link.

Refer to:

Operation and Control >Basic Functions > Ethernet: Controlfor Control Port Parameters.

NOTE: This equipment can be controlled using a single control
          connection.

Item	Specification
Connector type	RJ-45 (100/1000 Base T)
Connector designation	Ctl 1/2
Pin outs (Unused pins are not connected)	Pin 1 - Tx Out(+) Pin 2 - TX Out (-) Pin 3 - Rx In (+) Pin 6 - RX Out (-)

Status and Activity Indication

Each Ethernet Control Port has a rear panel mounted status LEDs associated with it to indicate link status, activity and speed as follows:

Left (Green) LED			
Port Status	Link Speed	LED Status	
Active Port	No Link	Off	- - - - - - - - - - - - - - - - - - - -
	100 Mbps	Flash Off x 2	
	1000 Mbps	Flash Off x 3	
Spare Port	No Link	Off	- - - - - - - - - - - - - - - - - - - -
	100 Mbps	Flash On x 2	
	1000 Mbps	Flash On x 3	

The Right LED flash sequence period is 1 s, with the short flash duration being 100 ms.

| Right (Yellow) LED		
Link Activity	LED Status	
No Link	Off	- - - - - - - - - - - - - - - - -
Link	On	□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □
Activity	Flash	- □ - □ - □ □ □ □ □ - □ - □ □ - □ □ -

Data Ethernet

Overview

The unit has four Ethernet ports - two for data input, and two for data output and will respond to ARPs, pings and other low-level Ethernet traffic. The ports are accessible via RJ-45 connectors on the rear panel of the chassis. These are labeled Ge 1, Ge 2, Ge 3 and Ge 4.

Ge 1 and Ge 2 are used for data input, while Ge 3 and Ge 4 are data output.
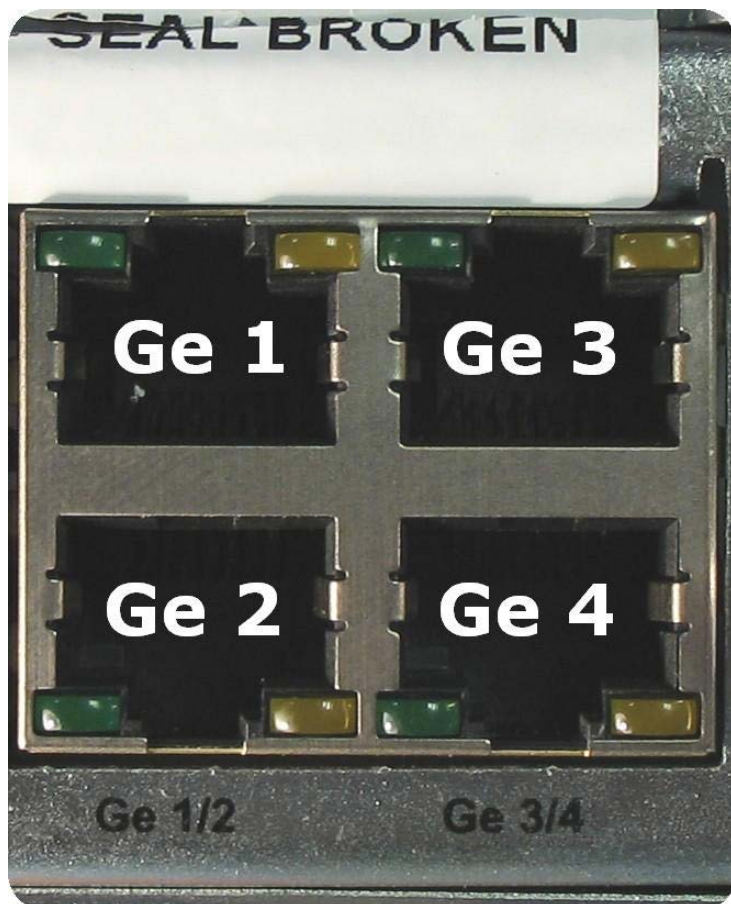
Data Port Numbering

Item	Specification
Connector type	RJ-45 (100/1000 Base T)
Connector designation	Ge 1 /2 Ge 3 /4
Pin outs (Unused pins are not connected)	Pin 1 - Tx Out(+) Pin 2 - TX Out (-) Pin 3 - Rx In (+) Pin 6 - RX Out (-)

Status and Activity Indication

Each Ethernet Data Port has a rear panel mounted status LED associated with it to indicate link status, activity and speed as follows:

Left (Green) LED		
Link Speed	LED Status	
No Link	Off	- - - - - - - - - - - - - - - - - -
100 Mbps	Flash Off x 2	- ▢ - ▢▢▢▢▢ - ▢ - ▢▢▢▢▢▢
1000 Mbps	Flash Off x 3	- ▢ - ▢ - ▢▢▢▢ - ▢ - ▢ - ▢▢▢▢▢

The left LED flash sequence period is 1 s, with the short flash duration being 100 ms.

Right (Yellow) LED		
Link Activity	LED Status	
No Link	Off	- - - - - - - - - - - - - - - - - -
Link	On	▢▢▢▢▢▢▢▢▢▢▢▢▢▢▢▢▢▢
Activity	Flash	- ▢ - ▢ - ▢▢▢▢▢ - ▢▢▢ - ▢▢▢

Refer to:

Operation and Control > Ethernet Data for Control Port Parameters.

Appendices > Technical Specification > Chassis (Host) > Data Ethernet Specification for the electrical characteristics.
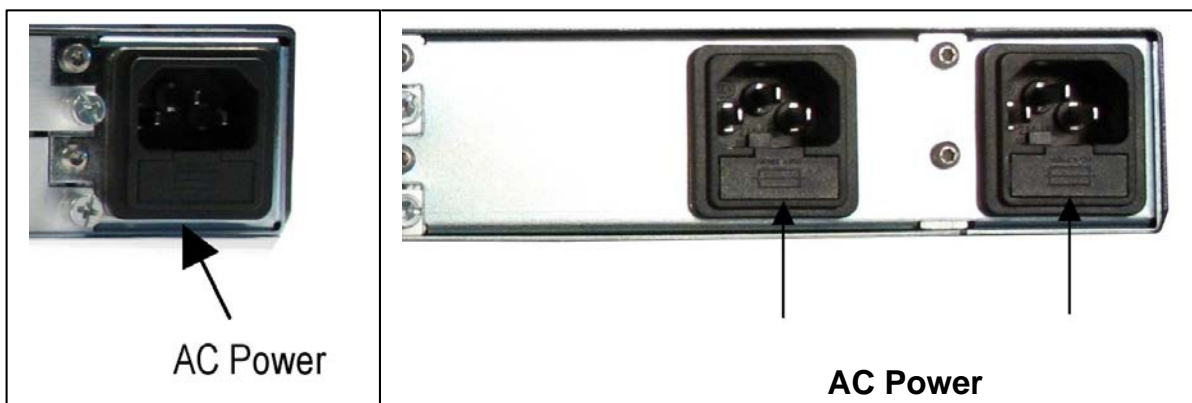
Power Requirements

AC Connector

The AC input connector is as follows:

Item	Description/Specification
Connector	Mains input filter with CEE 22/IEC320 plug
Fusing	Fuse in live conductor in mains input filter
Fuse type	Time delay (T) 1500 A High breaking capacity (HBC)

AC Power Inlets

AC Input

Refer to:

- Technical Specification > Base Chassis >Power Supply

- Installing the Equipment > Site Requirements >AC Power Supply

- Installing the Equipment > External Interfaces > Base Chassis >AC Input Connector

Power Requirements

DC Connector

The DC input connector is as follows:

Item	Description/Specification
Connector	AMP Universal MATE-N-LOK 1-480700-0 Molex MLX 50-84-1030
Fusing	Not fused.

DC Power Inlets

DC Input
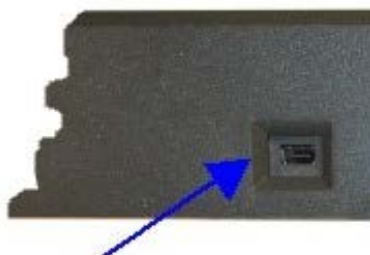
Refer to:

- Technical Specification > Base Chassis >Power Supply
- Installing the Equipment > Site Requirements >DC Power Supply

USB Connector

The USB connector on the front panel of the unit is not for customer use.

USB Connector

This connector is only used for Test/Maintenance purposes.

Home > SPR1100 Handbook > Getting Started

Getting Started

Before any communication can be made with the unit the Control IP address needs to be configured. The topics in this section will guide you through the process.

Setting the IP address

Describes how to set the required IP Address from the Front Panel.

IP address Ranges

This topic shows a table of allocated IP addresses adhering to the RFC3330 range of restrictions .

Manual configuration via the web pages

The unit has been designed to be configured and controlled by way of a web interface.

Setting the Required IP Address from the Front Panel

- Power on the unit

- Wait for initialisation to complete (approximately 1.5 minutes, depending on the number of options fitted in the chassis).

- Press the Right arrow pushbutton until the IP address is displayed, press edit and then use the up/down/right/left arrow pushbuttons to set the required IP address
  - Right/left pushbuttons will move the cursor between characters
  - Up/down pushbuttons will increase/decrease the number selected by the cursor

- Press save to store the new IP address.

- Continue and set the subnet mask and gateway address in the same way using the down pushbutton to reach each parameter.

NOTE: IP Address range 192.168.10.x (subnet 255.255.255.0) is used for internal unit communications, so should not be used for external communications.

Refer to Operation and Control > Front Panel for more details describing Front Panel features.

NOTE: A pushbutton is illuminated when there is functionality available. If a pushbutton is not illuminated, pressing it will have no effect.

IP Address Restrictions

IP Addresses on the unit must adhere to RFC3330 range of restrictions as listed in the following table of allocated IP addresses.

Address Block	Present Use	Reference
0.0.0.0/8	"This" Network	[RFC1700, p4]
10.0.0.0/8	Private-Use Networks	[RFC1918]
14.0.0.0/8	Public-Data Networks	[RFC1700, p181]
24.0.0.0/8	Cable Television Networks	---
39.0.0.0/8	Reserved but subject to allocation	[RFC1797]
127.0.0.0/8	Loopback	[RFC1700, p5]
128.0.0.0/16	Reserved but subject to allocation	---
169.254.0.0/16	Link Local	---
172.16.0.0/12	Private-Use Networks	[RFC1918]
191.255.0.0/16	Reserved but subject to allocation	---
192.0.0.0/24	Reserved but subject to allocation	---
192.0.2.0/24	Test-Net	---
192.88.99.0/24	6to4 Relay Anycast	[RFC3068]
192.168.0.0/16	Private-Use Networks	[RFC1918]
198.18.0.0/15	Network Interconnect Device Benchmark Testing	[RFC2544]
223.255.255.0/24	Reserved but subject to allocation	---
224.0.0.0/4	Multicast	[RFC3171]
240.0.0.0/4	Reserved for Future Use	[RFC1700, p4]

NOTE: The control network and data networks should not conflict. It is suggested that the ranges for these networks are in the Private-Use Networks as listed in the summary Table.
IP Address range 192.168.10.x (subnet 255.255.255.0) is used for internal unit communications, so should not be used for external communications.
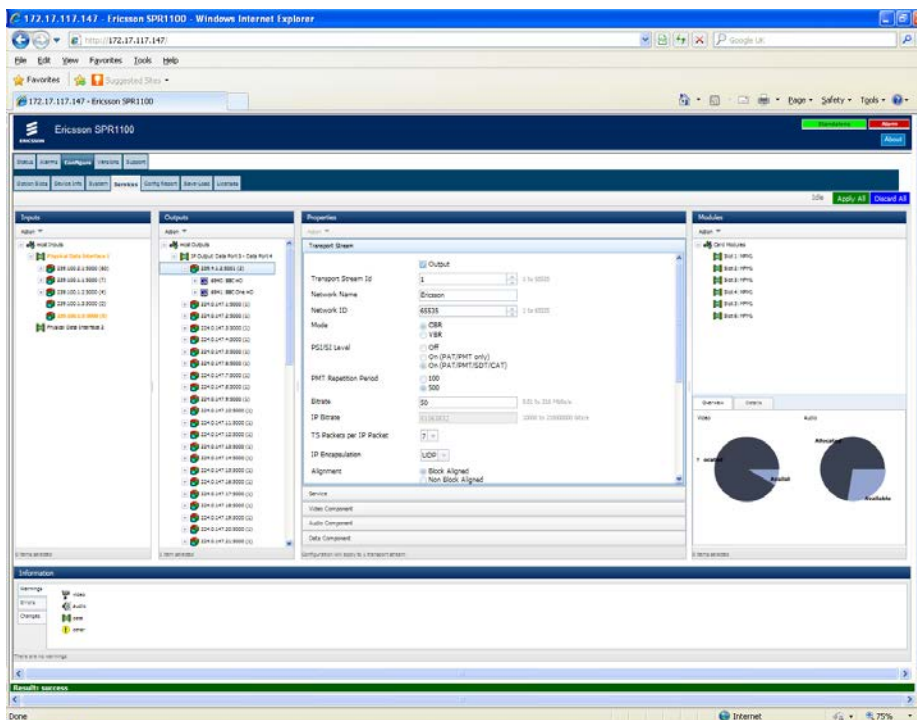
Manual Configuration via the Web Pages

The Ericsson SPR1100 has been designed to be configured and controlled by its own web interface, which is described here.
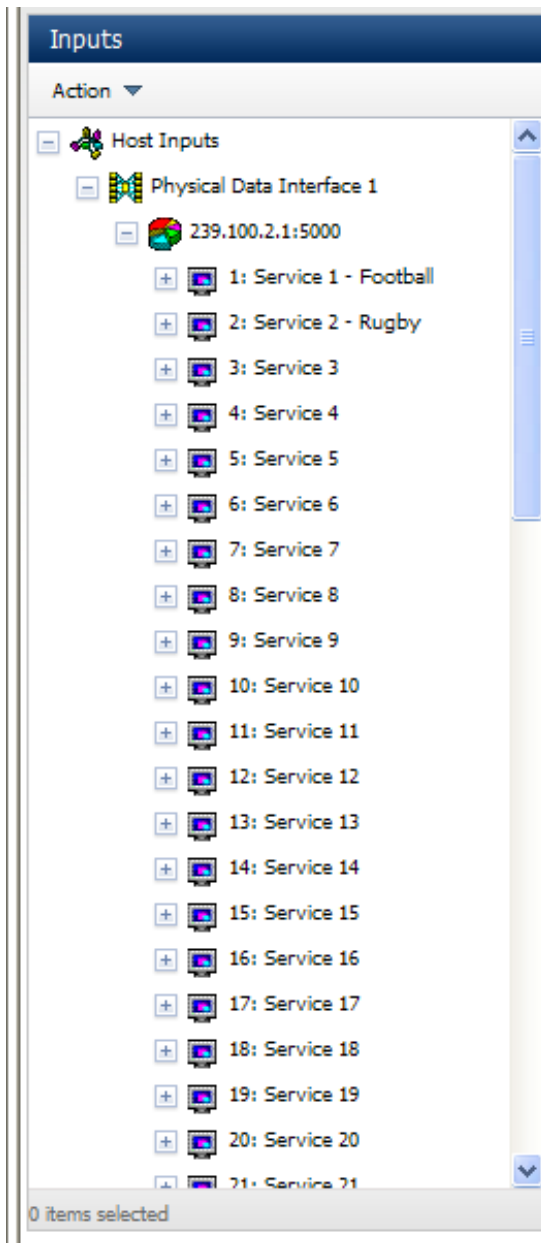
The main Transcode Configuration page can be found by the following navigation :

Configure > Services

1) Configure Input Streams

The left-hand panel of the Transcode page defines the input Transport Streams to be processed by the unit.

Transport Streams are grouped by Physical Interface. Each Transport Stream is defined by its IP address and port number. Multiple services can reside within each transport stream, with multiple components within each service.

The tree of input streams is navigated by expanding and contracting items using the ⊞ and ⊟ buttons alongside. All entries within an item can be expanded by right-clicking on that item and selecting Expand All .

Selecting an item (by clicking on it) causes the relevant properties for that item to be displayed in the "Properties" panel. Properties that cannot be edited will be "greyed out".

Transport streams may be added to a Data Interface by right-clicking on the interface entry and selecting Add transport stream .

2) Configure Output Streams

The second panel from the left defines the output Transport Streams that will be produced

by the unit.
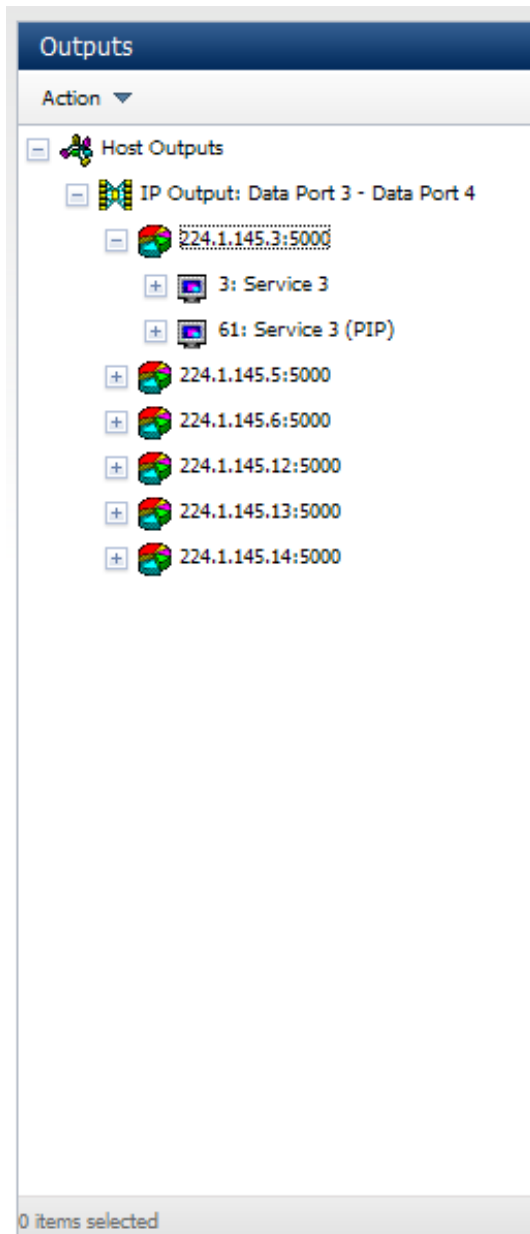
Transport Streams are again grouped by Physical Interface. Each transport Stream has an IP address and port number, and can contain multiple services, with multiple components in each service.

Transport Streams may be added in several ways:

- Right-clicking the Output Interface and selecting Add transport stream .
- Dragging streams or services from the Inputs panel and dropping them onto an appropriate place in the heirarchy of the Outputs panel.

NOTE: Each input service may be used in up to two independent (and different) transcode operations. This is achieved by dragging the same input service to multiple output multicasts. Each transcode will require a separate license.

Output services can be duplicated up to four times, so that the same transcode operation can be included in up to four output Transport Streams. This is achieved by right-clicking on

the output service and selecting "Duplicate Selected on output".
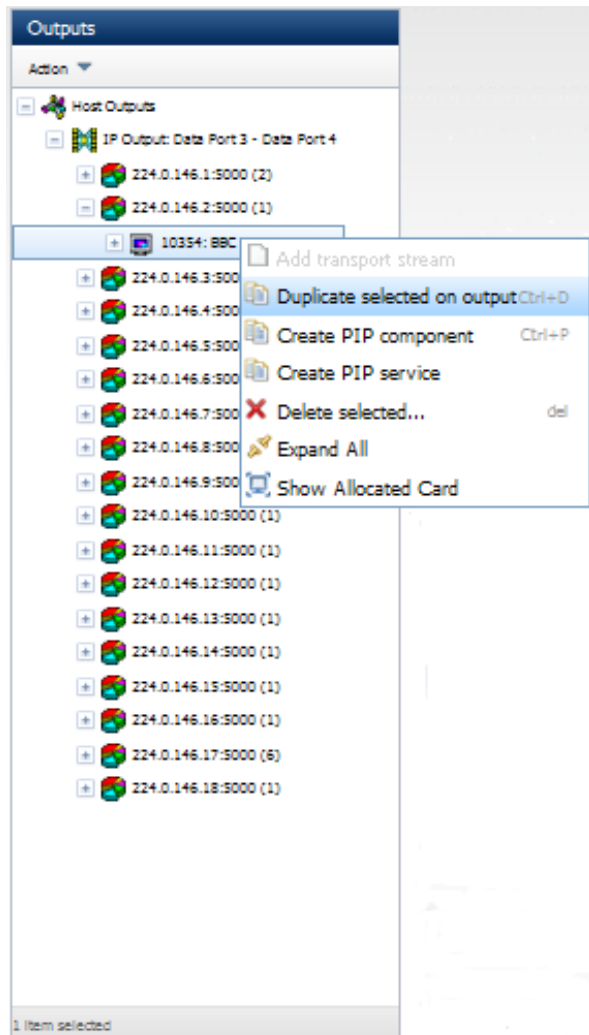
3) Configure the Transcode Operations

Each item in the Outputs panel can be configured at its position in the heirarchy. This allows
the operator to configure all dependent items together; for example, selecting a transport
stream would allow all services within that transport stream to be configured together.
Individual components can also be altered if a common configuration is not desired.
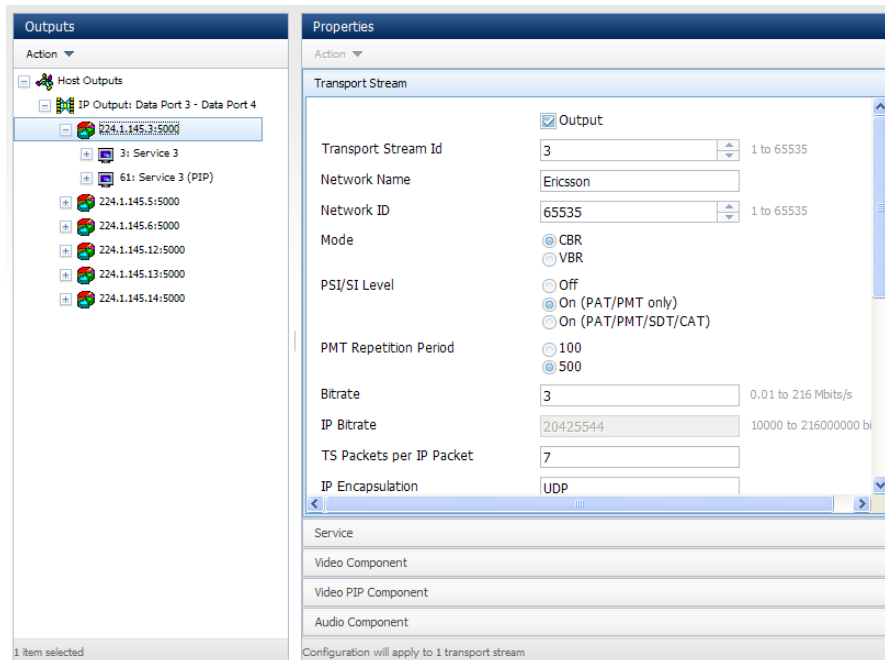
For each item selected, a number of panes will appear in theProperties panel. These include:

- Transport Stream
- Service
- Video Component
- Video PIP Component
- Audio Component

Not all of these will be available for every component.

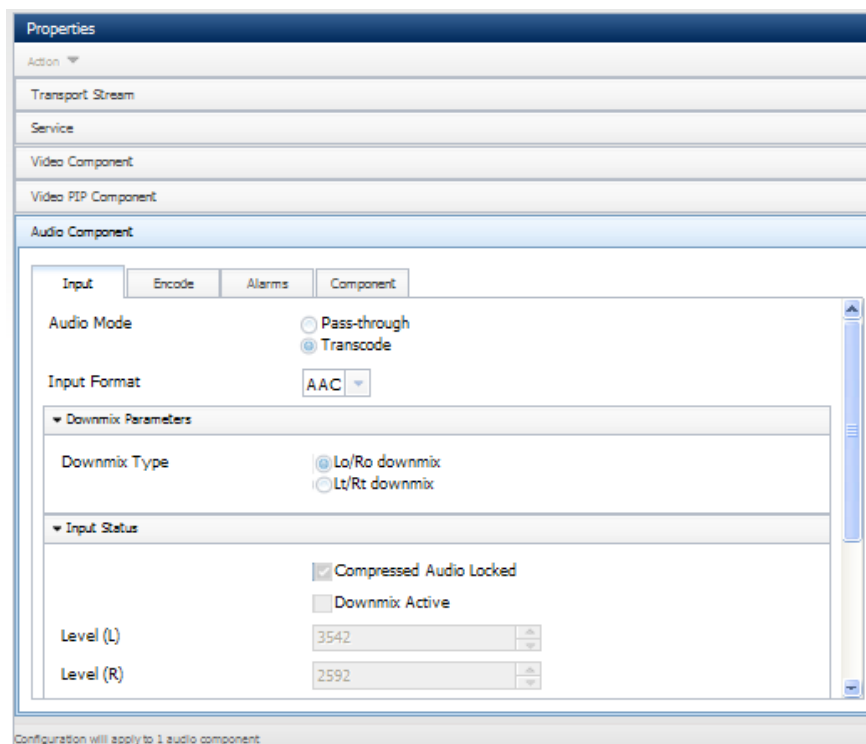Each pane of the configuration may have several sets of parameters that may be configured. These are arranged in a tabbed interface within the pane.

4) Warnings, Errors and History

At the bottom of the Services Configuration page is an "Information" panel. This can show Warnings, Errors, or Change History according to the tab selection on the left hand side

5) Allocation Status

With the very dense transcode configurations possible with the Ericsson SPR1100, it is all too easy to lose track of exactly how much of the unit's resource has been used.

To assist the operator in managing the total allocation usage, the Services Configuration page has an Allocation pane to show the amount of resource allocated or available with the configuration currently set up on the page.
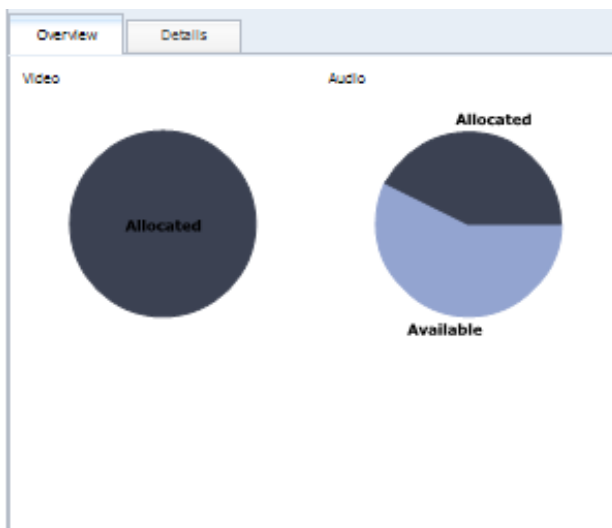
If more detail is required, the panel has a "Details" tab which will show the allocated/available breakdown for each transcode type.
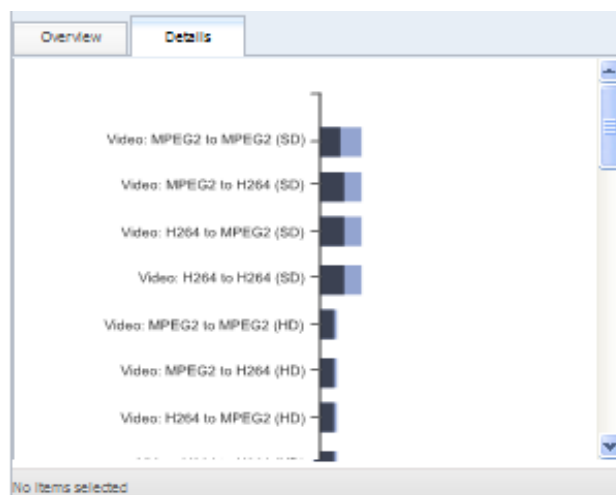
6) Apply Configuration

All configuration changes initially only occur in the User Interface. The Ericsson SPR1100 does not change its behaviour until the operator presses the "Apply All" button.

Apply All

Once the configuration is applied, the unit is updated with the new configuration.

NOTE: Changing the configuration may cause output glitching. This is kept to a minimum; transcoder units which do not need reconfiguration will not be interrupted. Additionally, changing the output bit rate willnot cause a glitch.

Transport Stream Output

Output

Gives information relating to the Transport Stream from the unit.

Transport Stream

Gives information relating to the components of the transport stream.

Transport Stream Output Overview

Gives the extent of MPEG-2 compliancy and an overview of the Transport Streams.

Describes the TS IP Output Parameters, and states the Transport Stream and Output Data rates.

IP Port

Gives an overview of the IP Encapsulator functional block.

Pro-MPEG FEC

Gives a brief explanation of Pro-MPEG FEC

Transport Stream Output Overview

MPEG-2 Compliancy

The encapsulated transport stream packets (video, audio, VBI/ANC data and PCR - 188 bytes), are fully compliant MPEG-2 transport streams (all relevant fields completed, continuity counters, PTS/DTS, adaptation fields etc.).

Transport Streams

The system can form up to 128 output transport streams, with each stream mirrored on the two physical output interfaces.

Transport Streams are encapsulated in either a UDP or a UDP and RTP packet and can have added Pro-MPEG FEC packets before being transmitted out of the assigned Data Ethernet port(s).

ProMPEG FEC

ProMPEG FEC (Forward Error Correction) as per SMPTE 2022 1/2 can be added to the MPEG-2 Transport Stream to improve the reliability over IP networks if the relevant license (SPR/SWO/PROFEC) has been purchased. One license instance is required per Transport Stream.

NOTE: The ProMPEG FEC functionality is not yet available on this product. Please contact Customer Services for more details.

TS IP Output Parameters

The user can configure the following parameters for a transport stream to be IP encapsulated and output.

Parameter	Value	Description
TS packets per UDP packet	1 to 7 [Default 7]	Defines the number of transport stream packets encapsulated in a UDP packet
TS Mode	CBR	Constant bit rate output
Output Enable	Off [Default]	IP Output is disabled
	On	IP Output is enabled if the IP destination can be resolved
Dest. IP Address	aaa.bbb.ccc.ddd	The destination IP address
Source IP Port	0 to 65335 [default = 5500]	Source IP Port number
Dest. IP Port	0 to 65335 [default = 5500]	Destination IP Port number
Type Of Service	0 to 255 [Default = 4]	ToS value for inclusion in the IP header
Time To Live	0 to 240 [Default = 15]	TTL value for inclusion in the IP header
Encapsulation Type	UDP [Default]	UDP encapsulation of TS packets
	RTP	UDP/RTP encapsulation of RTP Packets
	RTP/FEC Column	UDP/RTP encapsulation of RTP Packets with added one-dimensional FEC
	RTP/FEC Column and Row	UDP/RTP encapsulation of RTP Packets with added two-dimensional FEC

Output Data Rate

The system is designed to support a maximum output data rate of 216 Mbps per transport stream, up to a total of 900 Mbps (nominally 1 Gbps) per chassis.

The bit rate of each output transport stream can be individually controlled with a resolution of 1 kps.

IP Port

Overview

The IP Encapsulator within the Host Card encapsulates transport stream packets in either a UDP or a UDP and RTP packet before transmitting them out of the assignedData Ethernet port(s).

Technical Specification

Refer to Technical Specification > IP Output Transport Stream for the technical specification.

ProMPEG FEC

NOTE: This feature is not yet available.

FEC Parameters

FEC is set up on a per-transport stream basis. The following description applies to the graphical user interface.

If the user has the appropriate license installed to use FEC then these are the parameters which can be set (with itemised lists of available values where appropriate):

Parameter	Values	Description
IP Encapsulation	UDP	UDP encapsulation of TS packets
	RTP	RTP encapsulation of TS packets
	RTP/FEC Column	UDP/RTP encapsulation of RTP Packets with added one-dimensional FEC
	RTP/FEC Column and Row	UDP/RTP encapsulation of RTP Packets with added two-dimensional FEC
Number of Rows	4 - 20	An integer between 4 and 20. See FEC constraints section for allowable ranges.
Number of Columns	1 - 20	An integer between 1 and 20. See FEC constraints section for allowable ranges.
Alignment	Block Aligned	
	Non Block Aligned	

Constraints on FEC Parameters

To promote interoperability and simplify implementation, limits are specified for values of the L (number of columns) and D (number of rows) parameters. ProMPEG FEC requires equipment manufacturers to support all combinations of values of L and D within these limits. The specified limits are:

Columns Only: $(L*D <= 100)$ and $(1 <= L <= 20)$ and $(4 <= D <= 20)$

Rows and Columns: $(L*D <= 100)$ and $(4 <= L <= 20)$ and $(4 <= D <= 20)$

Background

Forward Error Correction or FEC, enables packets lost during transmission over IP networks to be recovered by adding extra information to the transmitted data. The particular type of FEC used on the unit is that specified by SMPTE 2022 1/2.

The key features of ProMPEG FEC are:

• Open standard FEC scheme.

• Increased robustness of transmission.

• Increases network reach through FEC on high loss links.

• Highly configurable depending on bandwidth vs. robustness.

• FEC transmitted separately to media stream.

• Independent of video compression standard (MPEG-2, MPEG-4).

ProMPEG FEC can help to solve the problems caused by missing packets. It is an open standard for protection of contribution broadcast real-time transmissions over IP networks by facilitating real-time lost packet recovery at the receive units. It permits flexible configurations for optimisation requirements. The scheme uses an RTP layer which adds timing information for sequence correction. FEC packets are transmitted in separate IP packets. It uses a matrix of media packets to calculate the FEC packets. The matrix size defined by columns (L) and rows (D). FEC packets are calculated along columns and rows using the XOR function. FEC can be 1D (Column Only) or 2D (Column and Row). Media and FEC packets are transmitted on separate IP streams with the Column FEC stream offset from media stream and has a UDP port number which is the media port number +2. The Row FEC stream is offset from Media stream and has UDP port number which is the media port number +4. This arrangement means that non-enabled FEC receivers can simply ignore FEC streams and decode the media packets. The FEC data stream is off-set from the media stream to protect against burst error loss and jitter. At the receiver, lost packets recovered using the FEC data packets. The Column FEC protects against burst errors and the Row FEC protects against random errors. ProMPEG FEC recovers lost packets using column and (optionally) row FEC packets using the XOR function on the remaining packets. Depending on the distribution and severity of the pack loss not all errors are recoverable.

The overhead which results from ProMPEG FEC transmitting extra packets depends on whether column or column and row FEC is selected and how many columns and rows there are. (Note that L = number of columns, D = number of rows.)

Column FEC: 1D FEC Overhead = (L+(D*L))/(D*L) = 1/D + 1

Worst case, 4 rows = 25%

Best case, 20 rows = 5%

Column and Row FEC: 2D FEC Overhead = (D+L+(D*L))/(D*L)

Worst case, 4 x 4 = 50%

Best case, 10 x 10 = 20%

FEC offers two methods of block alignment (also referred to as FEC linearisation) for use when generating FEC packets: Non Block Aligned and Block Aligned. Both are guaranteed of being able to correct L errors, sometimes more. The Block Aligned method can however correct 2L+2 errors; this never happens with Non-Block Aligned.

Non-Block Aligned can in theory have a lower latency at the decoder if it can be guaranteed that the mode of operation will never change.

Block Aligned linearisation is dealt with in Annex B of the ProMPEG Code of Practice. In Block Aligned column FEC packets are sent every D'th frame and the L Column FEC packets are played out every D slots. They are therefore evenly spread over the D*L matrix period.

Non Block Aligned linearisation is dealt with in Annex A of the ProMPEG Code of Practice. In Non Block Aligned the matrix is 'skewed' for the column calculation. The L column FEC packets are played out at the end of every column plus a constant. For 'square' matrices (diamonds) where L=D then these column packets will emerge at regular intervals. For 'rectangular' diamonds they will not. In the case of a 4 column by 20 row matrix the 4 FEC packets will emerge within 16 slots, followed by a gap of 64 slots before the next 4. It therefore produces a less linear spread of packets.

Receivers which do not have FEC capability can simply ignore the FEC packets and just make use of the media packets.

Transport Stream

Gives information relating to the components of the transport stream.

Services

This topic gives an overview of how the Service Information is formed and the Service Information Tables (MPEG-2 SI) available from the MPMs. General information about repetition rates for SI packets is also given.

Coded Elementary Stream

Supported Profiles and the Output Bit Rate are given. Describes the use of PCR Placeholders.

Audio Output

Gives information on Transcoding and associated delay and lip sync.

Describes the use of PCR Placeholders in audio packets.

Transport Packets

General information on packetised elementary stream (PES) Packets. Also some specific information relating to video Streams. Talks about PIDs used in Transport Packet Headers.

VBI Data on a Separate PID

States the conditions for VBI on a separate PID.

PID Assignment

Describes the assignment of PID values.

Services

Overview

The system is capable of forming up to 72 services divided between the output transport streams.

Each service can contain a maximum of 18 elementary streams, consisting of a maximum of 8 data components, 8 audio components, one main video and one PIP video component.

An elementary stream can be included in up to four services. Only one main video elementary stream can be assigned to a service, and the audio delay will be matched to the video. A PIP Video stream may also be added. Only one PCR can be associated with a service.

Service Information Tables

The SI tables that the system generates for each individual output transport stream can be selected. The following table shows the available levels.

SI Level	Description
Off	Elementary streams only
On (PAT/PMT Only)	PAT/PMT are generated
On (PAT/PMT/SDT/CAT)	The listed tables are generated. The CAT will be empty as Conditional Access is not supported in this release.

Some users may not require ETR 290 compliance, so it is possible to set the PMT repetition rate to either 100 ms (default) or 500 ms.

Formation of SI

SI packet formation and play out is the responsibility of the host card. However it is the Media Processing Module's responsibility to provide SI data fields related to the stream that it is generating.

Repetition Rate

The repetition rate of SI packets must take into account the output transport stream rate, otherwise the jitter introduced by the multiplexing of packets to form the transport stream can lead to the SI repetition rate being too long.

Coded Elementary Stream

Overview

The compressed output streams from the module are in the form of MPEG-2 transport packets that have been encapsulated into a transport stream packet.

Supported Profiles

The SD/HD MPM1 Transcoder supports the following profiles:

Profile	Specification
MPEG-2 Main profile @ Main level (MP@ML)	ISO/1EC 13818
MPEG-2 Main profile @ Highlevel (MP@HL)	ISO/1EC 13818
H.264 Main @ Level 3.0	ITU-T H.264 or ISO/IEC MPEG4 AVC
H.264 High @ Level 3.0	ITU-T H.264 or ISO/IEC MPEG4 AVC
H.264 Main @ Level 4.1	ITU-T H.264 or ISO/IEC MPEG4 AVC
H.264 High @ Level 4.1	ITU-T H.264 or ISO/IEC MPEG4 AVC

Output Bit Rate

The output rate of the transport packets is derived from the 27 MHz reference clock and is accurate to within 1 kbps of the configured transport bit rate.

The output video bit rate of the MPM is configurable within ranges dictated by the operating mode. These ranges are listed in the MPM1 Feature Summary page. The configured video rate means the transport stream rate.

The module supports bit-stuffing to maintain configured bit rate if the operating mode requires it.

The output of a module never exceeds the configured bit rate (or bit rate ceiling).

PCR

The MPM will insert a PCR in each video stream header. See Appendices > Clock and Timing > Program Clock Reference (PCR).

Transport Packets

The MPM supports adaptation field stuffing of transport packets for the alignment of PES packets to transport packet boundaries. Valid continuity counter values are inserted into the transport packet headers.

Audio Output

Transcoding

The audio transcoder supports transcoding at 48 kHz only.

The audio output is formed of fully compliant MPEG-2 transport packets encapsulated into a transport stream packet. The module runs in aligned mode where there are an integer number of audio frames fitted into a PES packet, therefore a PES packet will be the start of an audio packet.

The audio output rate is derived from the 27MHz reference clock.

Lip Sync

The Video Transcoder ensures that lip sync is maintained between the limits of audio leading video by 10 ms to video leading audio by 30 ms.

PID Assignment

The module enables a PID to be assigned to each audio channel separately, which includes the ability to assign separate PID's to every mono channel. The PID value is configurable.

PCR Placeholders

The module enables a PCR placeholder to be put in the adaptation field of every audio PID stream. See Appendices > Clock and Timing > Program Clock Reference (PCR)

Transport Packets

Packetised Elementary Stream (PES) Packets

The Video Encoding module supports adaptation field stuffing of transport packets for the alignment of PES packets to transport packet boundaries. PES streams carry the stream_id = 0xE0.

Transport Packet Headers

PIDs used in the transport packet headers are configurable and have valid continuity counter values inserted.

Packetised Video Elementary Streams

The compressed video data is packetised within MPEG-2 PES packets which are configurable to be per picture or per GOP.

VBI Data on a Separate PID

The VBI data is packetised within MPEG-2 PES packets as specified in ETSI ETS 300-472 (teletext), ETSI EN 301 775 or SCTE 127 for all other VBI data.

The Transcoder modules support adaptation field stuffing of transport packets for the alignment of PES packets to transport packet boundaries.

PID Assignment

Assigning PIDs

If a PID has not been assigned a value (or is a value of 0) a unique PID will be allocated to that component.

Duplicate PIDs

If a PID is given a value that is already in use, a Duplicate PID alarm is raised in the logs that identifies the transport stream and PID.

 NOTE: There is no facility to automatically re-assign duplicate PIDs to a unique value

Operation and Control

Front Panel

Describes the operation of the front panel.

User Access

Gives information on User Authentication.

Ethernet Control Ports

Describes how to configure the Ethernet Control Ports.

Ethernet Data Ports

Describes how to configure the Ethernet Data Ports.

Transcode GUI

Describes how to configure the unit using the Trancode Graphical User Interface (GUI).

Current Configuration

Describes how the current configuration is held.

Temperature Monitoring

Information on supported Protocols:

SNTP

SNMP

XPO

Front Panel

Describes various aspects associated with the front panel display and controls.

Introduction

Introduces the elements located on the front panel. Also describes how to reset the unit.

Navigate Mode

Describes the meaning and use of Navigate Mode.

Edit Mode

Describes the meaning and use of Navigate Mode.

Front Panel Menus

Illustrates the menus available using the front panel display and pushbuttons.

Introduction

Location on the Front Panel

The following illustration shows the controls and Indications located on the front panel.

Front Panel

Operating the unit from the Front Panel is via a set of six pushbuttons.

Four pushbuttons are used to navigate the menu displayed in the LCD Display.

The Edit and Save pushbuttons allow the user to edit the remote control port settings.

Only illuminated pushbuttons link to additional pages of information

NOTE: See Operation and Control > Front Panel > Front
         Panel Menus for details of the menus displayed
         using the LCD Display.

System Reset

The unit can be reset by simultaneously pressing the Edit and Save pushbuttons for approximately two seconds.

Navigate Mode

Navigate mode allows the user to move between menus and pages within menus.

The pushbuttons contain LEDs which are updated to indicate which pushbutton presses are valid as each navigation event is processed.

For example, an illuminated Up arrow pushbutton indicates there are pages above the current one, whilst a pushbutton that is not illuminated does not link to any additional pages or information.

Action	Result
Up arrow Pushbutton Pressed	Go to page given by uplink of current page.
Down arrow Pushbutton Pressed	Go to page given by down link of current page.
Left arrow Pushbutton Pressed	Go to page given by left link of current page.
Right arrow Pushbutton Pressed	Go to page given by right link of current page.
Edit Pushbutton Pressed	Enter Edit mode at current page (if permitted else no effect)
Save Pushbutton Pressed	No effect

Edit Mode

Edit mode edits the right display area and allows the user to alter control parameters that define the unit behaviour.

To enter Edit mode press the Edit pushbutton when on a page containing an editable control parameter (edit pushbutton illuminated) and the front panel is the controlling user interface.

The Front Panel returns to Navigate mode either when Edit is pressed again (abort edit with no save) or when Save is pressed (save modified parameter values).

Action	Result
Up arrow Pushbutton Pressed	Increases value of current edit parameter by one unit.
Down arrow Pushbutton Pressed	Decreases value of current edit parameter by one unit.
Left arrow Pushbutton Pressed	Moves cursor one edit parameter/parameter digit to the left (making that the current edit parameter)
Right arrow Pushbutton Pressed	Moves cursor one edit parameter/parameter digit to the right (making that the current edit parameter)
Edit Pushbutton Pressed	Aborts edit (no save/action of any parameters) and returns to Navigate mode.
Save Pushbutton Pressed	Save/action new parameter values and returns to Navigate mode.

Pushbutton LEDs are updated to indicate which pushbutton presses are still valid as each Edit pushbutton press event is processed. For example, when the Left arrow pushbutton LED is lit it indicates there are additional editable parameters to the left of the current cursor position.

There is a maximum idle period of five minutes when Edit mode will time out and return to Navigate mode.

Front Panel Menus

To navigate to the next level of menus press the right arrow key.

The front panel menu structure is as follows:

Top Level Menu To navigate to the next level of menus press the right arrow key.	To return to the top level menu press the left arrow key.	Use the up and down arrow keys to move between these menus.	To access these parameters press the right arrow key, and then the up and down arrow keys to move between parameters.	
IP address & Service name(s)				
	> System			
		> Remote Control…		
			> IP Address	Set up the IP parameters for the Ethernet Control ports using the edit and up and down arrow keys.
			> Subnet Mask	
			> Gateway Address	
		> Alarms…		Lists currently active alarms.
		> Versions…	Host Version	The versions list gives the overall build versions of the Host chassis, (Software Version), Assembly Date of the chassis and the Serial number.
		> HW Config		This menu allows the current hardware

				configuration, i.e. the transcoder modules fitted, to be accepted as the expected hardware configuration.

Status LED

Please refer to Looking After the Unit> Troubleshooting> Handling Alarms>Alarms.

User Access

User Authentication

The unit supports user authentication as defined in the XPO Specification. The default for this is set to off. When set to on a username and password are required to access the web pages.
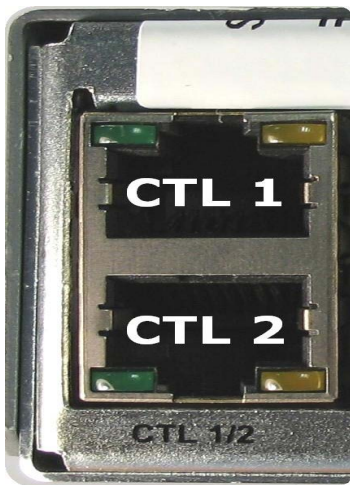
The default username (engineer) and password (password) can be changed by the user.

Ethernet: Control

Overview

The Base Chassis has two Ethernet control ports that support IEEE 802.3 100BASE-TX and 1000BASE-T protocols. The control ports are accessible via RJ-45 connectors mounted on the rear panel of the unit.

Ethernet Control Port Numbering

The Ethernet control ports are used to connect the unit to a web browser or the control system (nCompass Control [V6.5 onwards]).

Ethernet Control Port Parameters

NOTE: Control via the Data input ethernet ports is not supported.

A single IP port is defined for all ethernet control of the chassis. The physical ports used for ethernet control are by default the control ethernet ports. The control ports can raise an alarm during abnormal operational conditions, (see Looking After the Unit > Troubleshooting > Handling Alarms > Alarms - Control Port).

The parameters defining the control ethernet port are as shown in the following table

Parameter	Values	Description	Comments
Control Port Parameters			
Primary Port	Ctrl1	Primary control port	
	Ctrl2	Secondary control port	
	Auto	Automatic selection of control port	
Auto-revert delay	0 seconds	No automatic switch back to primary network	
	1 to 999 seconds [default 120]	Duration n seconds of how long the primary link must be restored for, before the control will switch back to it	
Default MAC Address	aa:bb:cc:dd:ee:ff	Control ports MAC address as defined by P790. (This cannot be changed by the user)	Read only parameter for information
Control Port IP Configuration			
IP Address	aaa.bbb.ccc.ddd	IP address of the control port	
Subnet Mask	0.0.0.0 [default]	Subnet mask for the control port	
	aaa.bbb.ccc.ddd		
Gateway Address	0.0.0.0 [default]	No defined gateway	
	aaa.bbb.ccc.ddd	Gateway address for packets outside the defined control subnet	

Manual Configuration of Transport Streams via the Web Pages

Each Transport Stream has several parameters which may be adjusted by the user

Each parameter has the following meaning :

Parameter	Meaning
Output	Whether the stream is enabled in the output
Transport Stream Id	Numeric ID for this stream
Network Name	Network name for this stream
Network ID	Numeric ID for this network
Mode	Constant Bit rate or Variable Bit rate
PSI/SI Level	Level of PSI/SI table information to include in the stream
PMT Repetition Period	Time between repetitions of PMT table, in ms
Bit rate	Required bit rate in the stream
IP Bit rate	Bit rate of the resulting IP stream
TS Packets per IP Packet	Number of Transport Stream packets in each IP packet
IP Encapsulation	Type of IP packet in use
destIPAddress	IP Destination address
destUDPPort	Destination port for IP stream
srcIPAddresss	Source IP address contained within outgoing packets
srcMacAddress	MAC address contaioned within outgoing packets
srcUDPPort	Source Port of outgoing packets
ttl	Time To Live value of outgoing packets
tos	Type of Service, as defined ni RFC 2474
actualSrcIPAddress	Actual IP address of output interface
actualSrcMACAddress	Actual MAc address of output interface

Note that not all of these parameters will always be present, nor will they all be user-editable

Manual Configuration of Service Information via the Web Pages

Each Service has several parameters which may be adjusted by the user

Each parameter has the following meaning :

Parameter	Meaning
Provider	The organisation who created this service
Name	The name of the service
ID	Unique service ID in PMT
Type	Type of service
PMT PID	The PID that holds the PMT describing this service
Logical Channel	Grouping of services into channels within the Multicast

Note that not all of these parameters will always be present, nor will they all be user-editable

Manual Configuration of Video Information via the Web Pages

The Video Component Properties panel has five tabbed panes :

- Input
- Format Conversion
- Encode
- Output
- Component

Each of these is described in the following pages.

Manual Configuration of Video Input parameters via the Web Pages

The Video Input pane permits the user to set the expected input standard, the action on video loss, and the severity of the alarms associated with vide input.

The Ericsson SPR1100 will attempt to detect the input Video format according to the PSI table information in the input stream. If this is not available, or if the operator wishes to override the auto-detected setting, this screen will allow manual configuration of the video type.

Manual Configuration of Video Format Conversion parameters via the Web Pages

Each Service has several parameters which may be adjusted by the user

Each parameter has the following meaning :

Parameter	Meaning
Default Aspect Ratio Conversion	The default aspect ratio of the output video if AFD is not available on the input stream or if the "Use Input AFD" checkbox is not selected.
Action on AFD lost	Action to be taken in the event that AFD is lost
AFD Sustain	The behaviour of AFD on the output if AFD on the input is lost
AFD Sustain Timeout	How long to maintain AFD on the output if "Off After Timeout" is selected in the "AFD Sustain" parameter

Note that not all of these parameters will always be present, nor will they all be user-editable

Manual Configuration of Video Encode Properties via the Web Pages

the Video Encode operation has several parameters which may be adjusted by the user

Each parameter has the following meaning :

Parameter	Meaning
Profile	Profile / Level of encoding format to be used
Resolution	Required output resolution
Bit rate	Bandwidth of output stream to be used for this component
Aspect Ratio	Force output aspect ratio, or follow input ratio
GOP Length	Number of frames in each GOP
GOP Structure	Type of GOP
Scene Cut Detection	Detect Scene Cuts. This should normally be selected to improve picture quality across scene changes
Delay	Delay of output video. This is a status value only.
MCTF	Enable Motion-Compensated Temporal Filtering
Closed GOPs	Ensure that GOPs have no external references

Note that not all of these parameters will always be present, nor will they all be user-editable

Manual Configuration of Video Output Properties Information via the Web Pages

The Video Output has several parameters which may be adjusted by the user
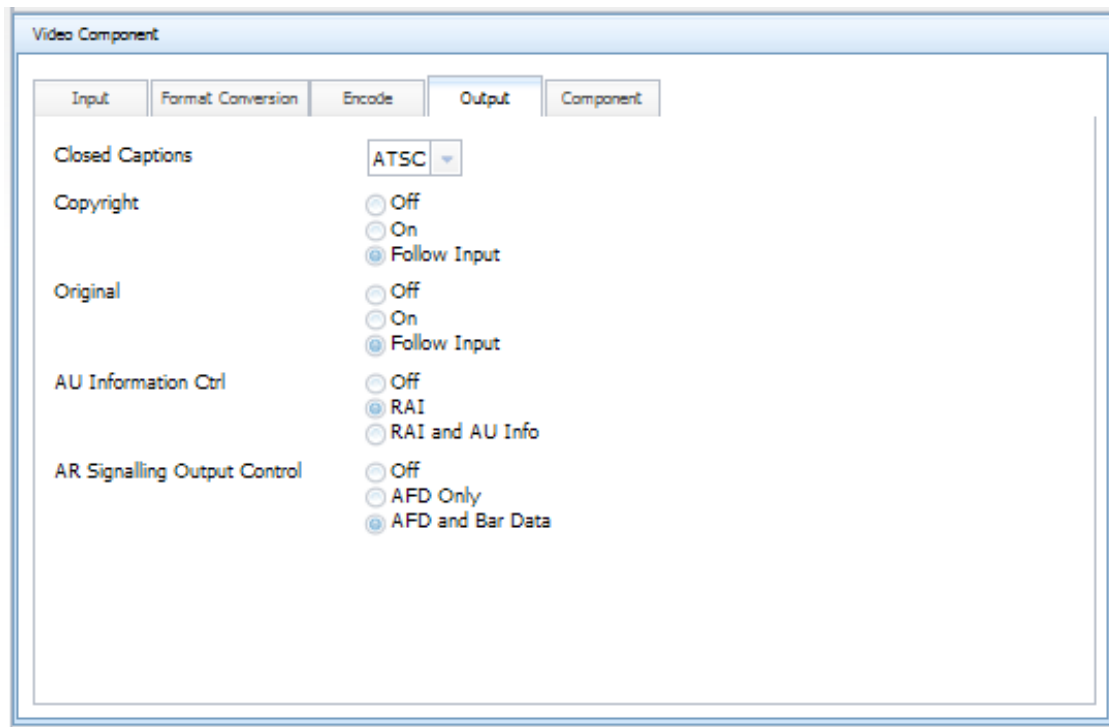
Each parameter has the following meaning :

Parameter	Meaning
Closed Captions	Type of Closed Caption data to be included
Copyright	Behaviour of Copyright flag in the output stream
Original	Behaviour of Original flag in the output stream
AU Information Control	Enable additional information to be placed in the Adaptation Field for "Trick Mode"
AR Signalling Output Control	Control how the Aspect Ratio is signalled in the output Transport Stream

Note that not all of these parameters will always be present, nor will they all be user-

editable

Manual Configuration of Video Component Properties via the Web Pages

Each Video Component has several parameters which may be adjusted by the user
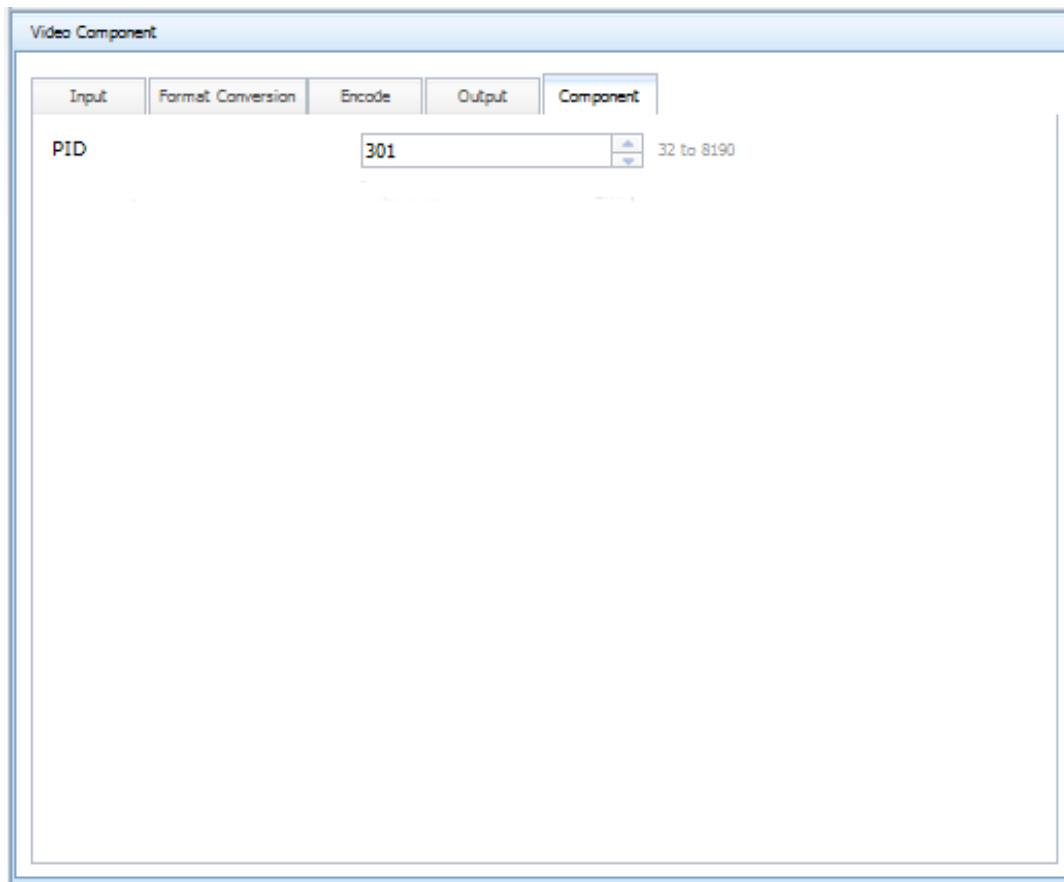
Each parameter has the following meaning :

Parameter	Meaning
PID	PID of the Video Component in the output Transport Stream

Note that not all of these parameters will always be present, nor will they all be user-editable

Manual Configuration of Video PIP Properties via the Web Pages

Each Video PIP service has a reduced set of parameters in comparison to the main Video component.

Each parameter has the following meaning :

Parameter	Meaning
Profile	Type of PIP component
Resolution	Size of PIP
Bit rate	Bandwidth used by PIP component
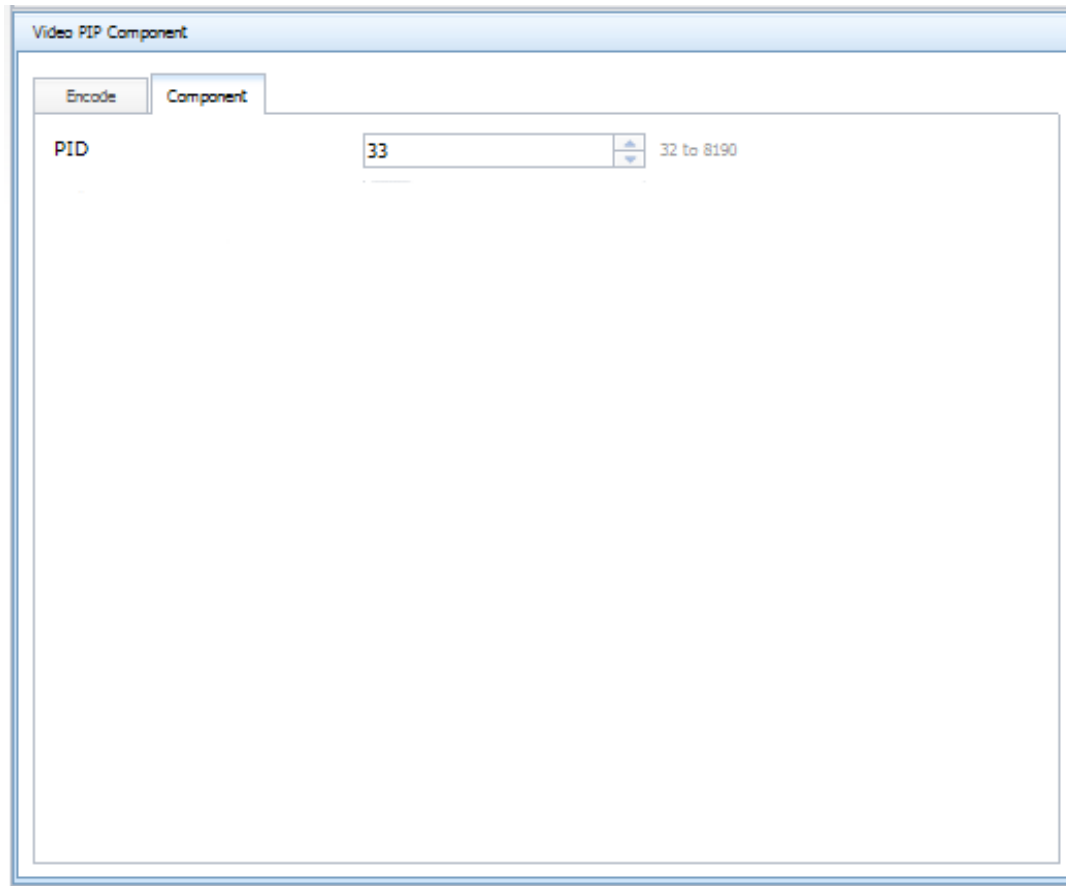
Parameter	Meaning
PID	PID used for PIP component in the Transport Stream

Note that not all of these parameters will always be present, nor will they all be user-editable

Note that the GOP structure and length will be the same as for the main video.

Manual Configuration of Audio Information via the Web Pages

The Audio Component Properties panel has four tabbed panes :

- Input
- Encode
- Alarms
- Component

Each of these is described in the following pages.

Manual Configuration of Audio parameters via the Web Pages

The Audio Input pane permits the user to set the input standard, the Pass-through/Transcode mode, and the downmix type of the audio input. It also displays the status of the current audio input.

The Input Format will be auto-detected by the unit, but the operator may over-ride that detection here if desired.

Manual Configuration of Audio Encode parameters via the Web Pages

The Audio Encode pane permits the user to set various parameters controlling the audio encoding.

Parameter	Meaning	
Coding Standard	MPEG Layer II	MPEG Layer II encode. Requires one SPR/SWO/MIL2 license for each stereo pair to be encoded.
	Dolby Digital	Dolby Digital encode. Requires one EMSP/SWO/DOLBY/AC3 license for each stereo pair to be encoded. Three licenses are required for 5.1 encoding.
	AAC LC	Low complexity AAC encode. Requires one EMSP/SWO/AAC license for each stereo pair to be encoded. Three licenses are required for 5.1 encoding.
	HE-AAC	High efficiency AAC encode (AAC with Spectral Band Replication). Requires one EMSP/SWO/AAC license for each stereo pair to be encoded. Three licenses are required for 5.1 encoding.
Bit rate	Bit rate of output audio stream	
Coding Mode	Output channel mode selection (mono, stereo, or 5.1 as appropriate to the Coding Standard in use)	
Metadata override type	Specify which parameters in the metadata to override with those on the selected Dolby metadata preset	
Metadata preset type	Specify metadata to use on loss of incoming metadata	
AU Information Ctrl	Enable embedding PTS in the Adaptation Field for "Trick Mode"	
Encapsulation	Container Format used for AAC	
TNS (Temporal Noise Shaping)	Enable/disable AAC TNS tool	
SBR Signalling	Method of signalling Spectral Band Replication	
Lip Sync Offset	Timing advance/retard to correct audio/video synchronisation	
Gain	allows a manual gain correction between +/- 6 dB (in 0.1 dB) steps to be applied to the audio output.	
MPEG Version	Sets whether MPEG-1 or MPEG-2 stream type is signalled in the PMT.	
Language	Sets the language signalled in the PMT descriptor	

Note that not all of these parameters will always be present, nor will they all be user-editable

Manual Configuration of Audio Alarm parameters via the Web Pages

The Audio Alarms pane permits the user to set the severity of any audio alarm conditions.

Manual Configuration of Audio Component parameters via the Web Pages

The Audio Encode pane permits the user to set various parameters relating to the audio encoding.
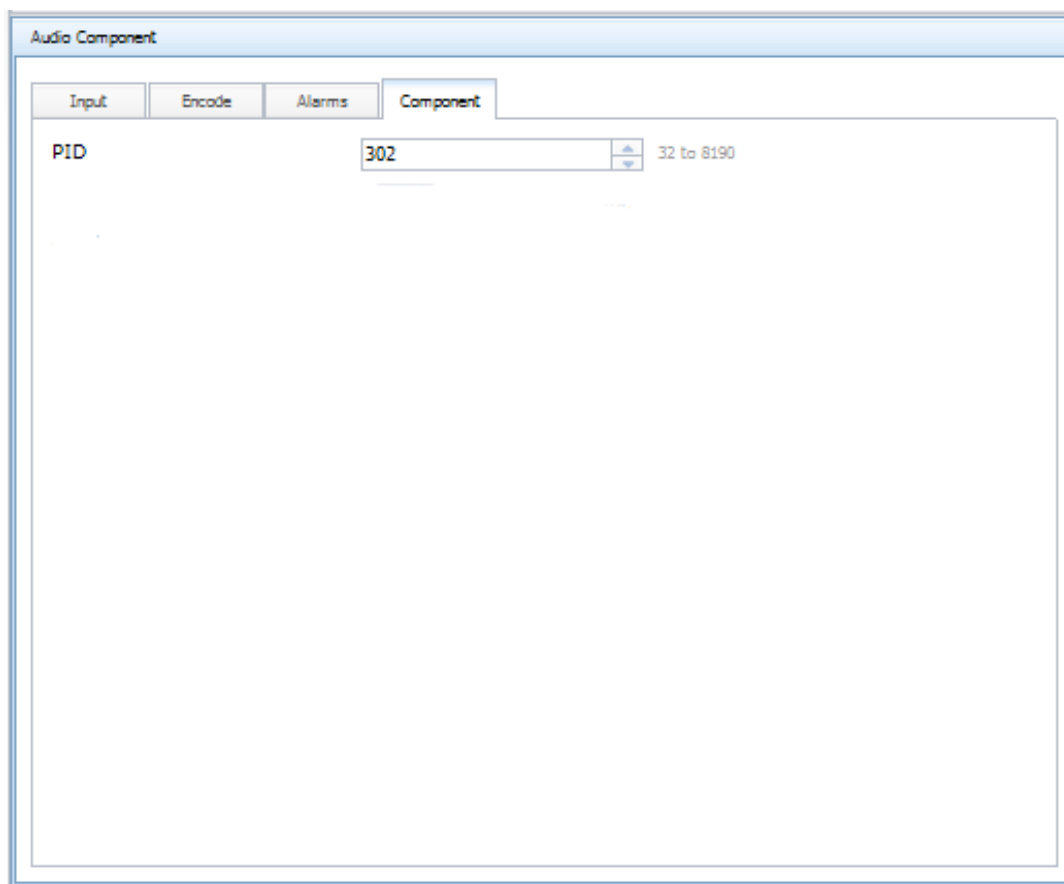
Parameter	Meaning
PID	PID of audio component in output Transport Stream

Importing Transport Stream Information from a Spreadsheet

For rapid import of input Transport Stream information, the Ericsson SPR1100 provides a mechanism to import from a spreadsheet or text file

The process is available by right-clicking on the "Host Inputs" line in the Inputs panel, and then selecting "Import Transport Streams"
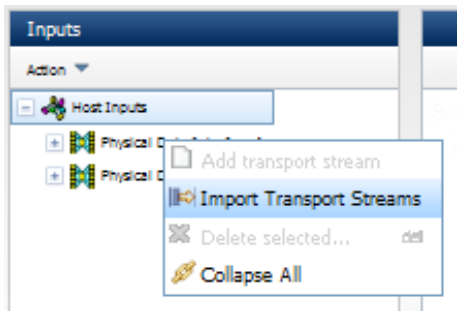
A window will then pop up offering the user the ability to download a template, either as a spreadsheet (.xls) or a text file (.txt).
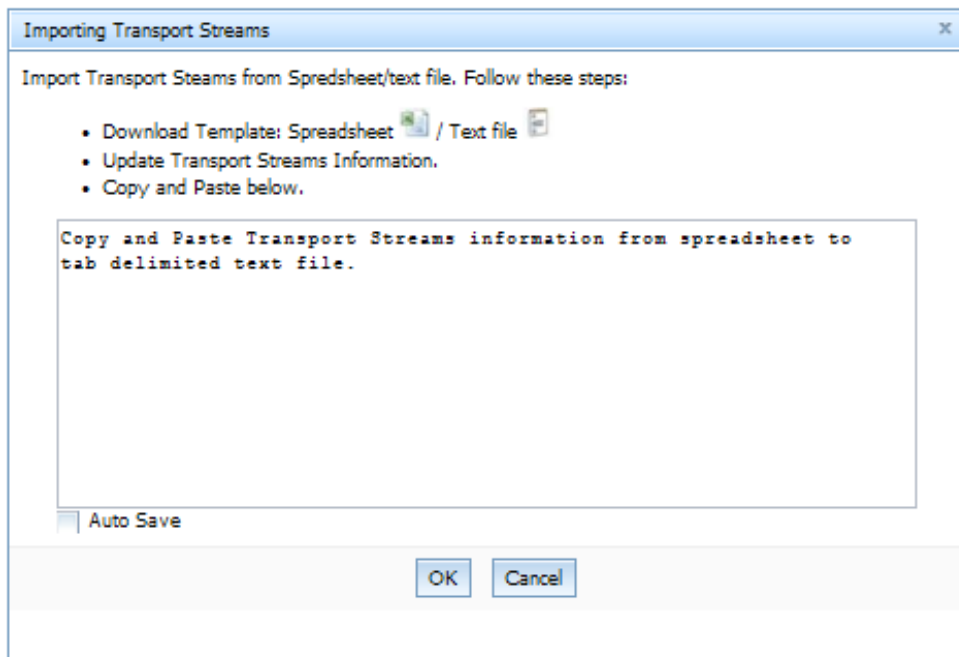
This template can be edited on the operator's computer to incorporate the streams desired.

Once editing is complete, the data can be pasted back into the popup window. Be careful to preserve TAB characters in the data during this process.

Pressing the "OK" button will transfer the data to the Inputs panel, and pressing "Cancel" will cancel the operation.

If the "Auto Save" box is checked, the Ericsson SPR1100 will be updated immediately on import.

Configuration Report

Once the Ericsson SPR1100 has been configured, the current state of the unit can be determined from the Config Report page
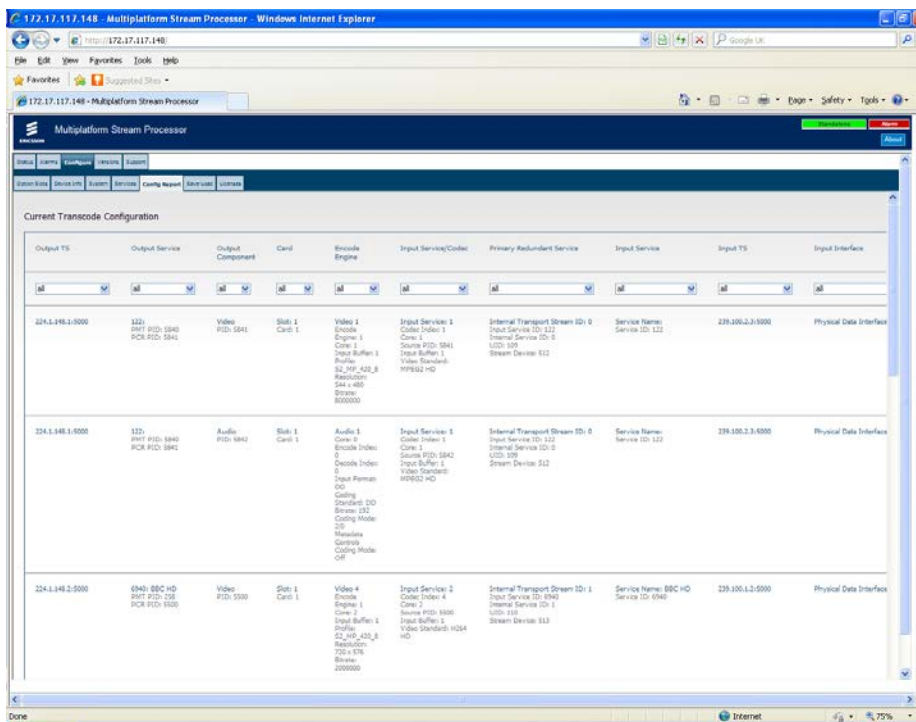
The initial view shows each component of each service. The report indicates all known data about the component, and also to which card and encode engine the component has been allocated.

The drop-down boxes towards the top of the form enable the user to filter which elements he wishes to see. In this way, particular components can be found rapidly and accurately, enabling stream faults to be found with ease.

Excluding Encoder Cards / Forced Reallocation

Each Encoder Card may be manually excluded from the encode process. This will cause services to be allocated to other cards, enabling the removal of the card in question. In this way, essential maintenance can be carried out with minimum disruption.

To use the automatic reallocation system, it must first be turned on. This action is performed with a checkbox in the "Action" drop-down menu in the "Modules" panel:
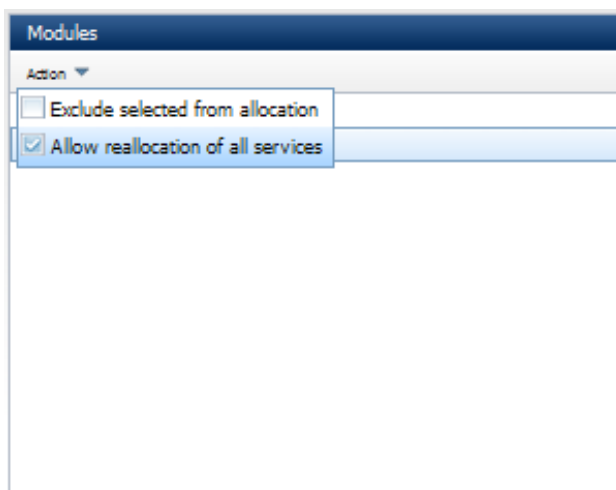
To change the exclusion settings for a card, right-click that card in the "Modules" panel or select the card by clicking on it and use the "Action" drop-down menu again..
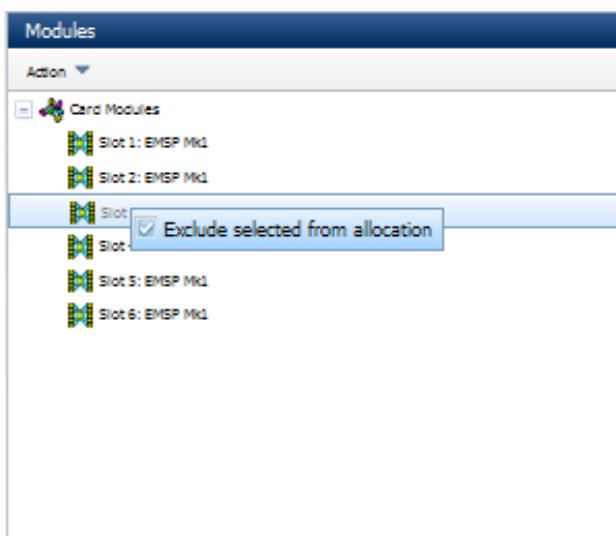
Checking the box excludes the card, unchecking it re-enables that card.

Transcode Input Redundancy

The Ericsson SPR1100 has three modes of redundancy which apply to input Transcode Streams:

- Same Multicast. Each Physical Data Interface carries the same multicast(s). Each service can have a "Primary" and a "Secondary" source. In the event of the Primary failing, the secondary will be selected automatically.
- Different Multicast, Same Network. One Physical Data Interface can carry several multicast streams, some of which will be marked as "Secondary" to the "Primary" multicasts. In the event that the Primary multicast fails, the secondary will automatically be selected to take over.
- Different Multicast, Different Network. One Physical Data Interface will carry the "Primary" multicasts, with the other Physical Data Interface carrying the "Secondary" ones. Again, the Secondary multicasts will be selected if the Primaries fail.

Multicasts can be added as "Secondary" in the Properties panel for a Physical Data Interface. Select the "Select" checkbox for the multicast to be the Secondary, then right-click on the Primary multicast. A popup menu will allow the operator to make the checkbox-selected multicast into a Secondary :

A new Multicast Transport Stream can be created from the same menu, if that is desired.

Manual redundancy

A manual switch can be selected by right clicking on the secondary stream, and selecting "Activate". Secondaries may only be activated if they contain services used in current transcode operations.
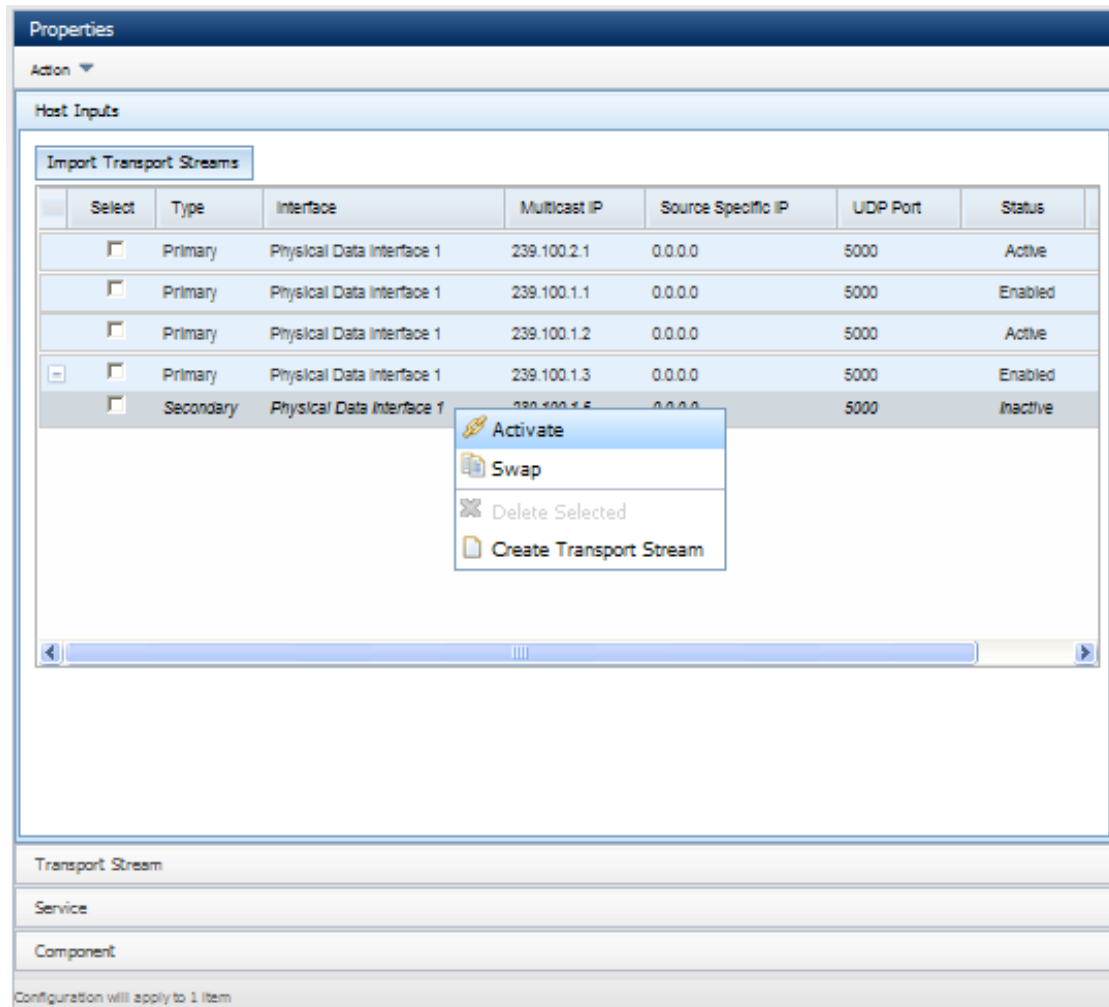
NOTE: This function, unlike almost everything else in the interface, takes effect immediately. The "Apply All" button is not required.

Similarly, the Primary/Secondary roles can be swapped over by right-clocking either multicast and selecting "Swap".

Automatic redundancy

Automatic redundancy is triggered by loss of transport stream lock.

Once a switch to the backup has taken place, a manual revert is possible by right clicking on the primary stream and clicking "Activate".

Ethernet Data Ports

Four gigabit Ethernet ports are provided for data input and output.

Data Ethernet

Describes the physical Ethernet ports, and how the ports can be configured.

Data Input

Describes the message type supported.

Data Output

IP encapsulated transport streams can be transmitted from the unit.

Ethernet: Data

Overview

Four gigabit Ethernet ports are provided for data input and output.
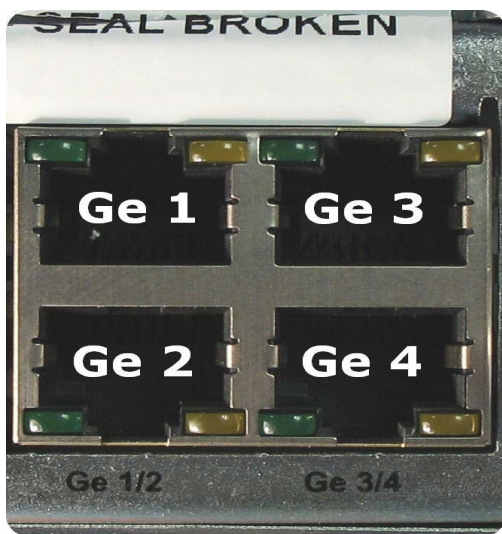
Ethernet Data Port Numbering

Ethernet Data Port Parameters

The data ethernet ports are configured by the parameters listed in the following table.

Parameter	Values	Description	Comments
Default MAC Address	aa:bb:cc:dd:ee:ff	Gex port's MAC address (This cannot be changed by the user)	Read only parameter
Link Status	Link Up (1000)	Link up and link speed 1000 Mbps	Read only parameter
	Link Up (100)	Link up and link speed 100 Mbps	
	Link Down	Link Down	
Link Up Time	days : hours : mins : secs	The length of time that the link has been up. If the link goes down this value is reset to 0	Read only parameter
TX Packets		Number of IP packets transmitted	Read only parameter
RX Packets		Number of IP packets received	Read only parameter
IP Address	aaa.bbb.ccc.ddd	IP address of the control port	
Subnet Mask	0.0.0.0 [default] aaa.bbb.ccc.ddd	Subnet mask for the control port	
Default Gateway	0.0.0.0 [default]	No defined gateway	
	aaa.bbb.ccc.ddd	Gateway address for packets outside the defined subnet	

The data Ethernet ports Ge 1 and Ge 2 are paired together, and accept data input. Ge 3 and Ge 4 are also paired together, and are the data output. Each port of the output pair transmits the same multicasts.

If the IP address, or subnet mask of a secondary port is set to 0.0.0.0, then it will be assumed that it is operating in a mirrored redundancy mode with the primary port, and therefore has the same IP address and subnet mask.

Data Input

The unit can receive one or more transport streams via the Ethernet Data ports 1 and 2 and route them to the transcoder cards fitted.

For more information on IP input redundancy, see here

Data Output

The unit can generate one or more output transport streams from the components produced by the transcoder cards fitted. The output transport stream packets are encapsulated in IP packets prior to being transmitted via Ethernet Data ports 3 and 4. The base chassis does not provide any other interface by which to output a transport stream.

The data output redundancy is described here.

IP Encapsulation of MPEG Transport Streams

This topic describes how an MPEG-2 transport stream is carried over an IP link.

1 to 7 MPEG Transport Stream Packets
RTP Header (optional)
UDP (User Datagram Protocol)
IP (Internet Protocol)
Ethernet (IEEE 802)

Between one and seven MPEG transport stream packets are carried in a UDP packet. The UDP packet may optionally also contain an Real Time Protocol (RTP) header, which adds additional information such as a sequence number and a timestamp, which can help in the detection of packet loss across a network.

The UDP header is 8 bytes long, and the RTP header is 12 bytes long.

The network layer protocol is IPV4, which adds a 20 byte header to every packet.

The physical link layer is then Ethernet at either 100 Mbps or 1000 Mbps.

IP output redundancy

Output redundancy settings can be found under the Network Configuration / Data Interface Group 3-4 menu

Parameter	Range	Comments
IP Redundancy Mode	Read only	IP Redundancy mode. Set to Active-Standby
Index	Read only	
Auto Revert Delay	0 - 255	Time delay between link up detection, and revertion to that interface
Active Interface	Read only	Current active interface
Line Speed	Auto / 100 Mbps / 1 Gbps	Ethernet line speed
Duplex Mode	Auto / Full Duplex / Half Duplex	Full duplex allows bidirectional simultaneous communications. Half-duplex allows asynchronous bidirectional communication.
Default Virtual MAC Address	Read only	Virtual MAC address of the two ports
IP Address	0.0.0.0 to 255.255.255.255	IP address of the two ports
Subnet Mask	0.0.0.0 to 255.255.255.255	Subnet mask of the two ports
Gateway Address	0.0.0.0 to 255.255.255.255	Gateway address for the two ports

Current Configuration

The Host Controller maintains a copy of the current system configuration in flash memory. On system re-start, this current system configuration is restored, so the system returns to its previous state.

The parameters associated with each transcoder module slot are stored, so that if a transcoder module is removed, and then a module of the same type is plugged in to the slot, the system will attempt to apply the previous configuration for the module in that slot.

The current configuration of the unit can be extracted from the chassis in the form of an XML file.

Temperature Monitoring

Overview

Temperatures are reported to the user in degrees Celcius (° C) and degrees Fahrenheit (° F).

Host Card Monitoring

The die temperature of the main components on the Host card are monitored, and reported to an accuracy of ±2 ° C.

A host card temperature alarm threshold can be set that, if exceeded, causes a 'System Over Temperature' Alarm to be generated.

Transcoder Module Monitoring

General

Transcoder modules monitor the die temperature of their main components, and report these temperatures to an accuracy of ±2 ° C. If a transcoder module reports die temperatures, it allows an alarm threshold to be defined for each temperature, which if exceeded causes an alarm to be generated.

MPMs

The controlling processor monitors the core temperatures of the main components and passes this information back to the host card via the back plane for monitoring.

Temperature thresholds can be set to cause a warning or an alarm. The warning level is configurable by the user, whereas the alarm level is hard coded.

Fans

The fans fitted to the chassis are speed controllable, and are a user configurable parameter fan speed control.

Parameter	Setting	Description
Fan speed control	Full speed	The fans run at the configured speed.
	Auto speed	Fan speed is related to the temperatures measured in the chassis.

See Basic Fault Scenarios > Fans Not Working/Overheating for further information.

SNTP

Overview

The unit can obtain the current time from a network time server using SNTPv4 (RFC 4330) and is capable of working with Microsoft Windows Time, (SNTP as defined in RFC 1767).

SNTP Time Server

If an SNTP Time Server is selected, and communications are established with it, then the unit uses the time obtained to correct the system's real time clock, and the user cannot set the clock.

If a time server has been configured, but it fails to respond, then an 'SNTP Server Failed To Respond' alarm is generated.

Simple Network Management Protocol [SNMP]

Supported Protocols

SNMP versions 1, 2c and 3 are supported, primarily for alarm trap handling. The General EricssonTelevision MIB is also supported.

NOTE: The unit does not support control via SNMP, all remote control is via HTTP or HTTPS.

Operation

The unit's SNMP functionality can be enabled or disabled, with up to five IP addresses assigned for any SNMP Trap message to be sent. The default is 000.000.000.000, which causes the SNMP traps to be sent to the last SNMP master. The SNMP community name can also be set.

The user can control which SNMP traps are generated. The options are;

- Start Messages only

- Fail and Start Messages only

- All Traps

SNMP Interface Parameters

Parameter	Description
SNMP Read Community	The SNMP community name for read access. default = public
SNMP Location	Textual description of the location of the unit
SNMP Contact	Name of the person responsible for this unit
SNMP Trap Community	The SNMP community name for read access. default = private
SNMP Trap Destination	The destination IP address for SNMP trap messages. Up to five destinations can be defined, but by default none are assigned
SNMP Trap Alarm Level	Defines what events trigger the generation of an SNMP trap message. The options are: 'Start Messages Only', i.e. only system start up events. 'Fail and Start Messages only' i.e. start-up events and critical

	alarms.'All traps' i.e. start-up events and all alarms and warnings.

XPO

The unit supports an HTTP/HTTPS interface that is XPO2 compliant for configuration and status monitoring. At least three simultaneous HTTP/HTTPS sessions can be supported. HTTP access can be enabled or disabled.

Individual parameters can be controlled via XPO2. It does not require the complete XML configuration to be sent to change a single parameter.

NOTE: The legacy XPO standard is not supported.

The web pages provide a service orientated control menu structure.

Looking After The Unit

This section details routine maintenance tasks to be performed by the operator and provides general servicing advice and fault-finding information. It also provides information regarding warranty and maintenance available from Customer Services and gives relevant disposal information.

Preventive Maintenance

This section provides the schedules and instructions, where applicable, for routine inspection, cleaning and maintenance of the equipment which should be performed by an operator.

Troubleshooting

This section provides some basic fault-finding procedures to follow in the event of a suspected failure.

Software and Firmware Upgrades

Describes the mechanism for upgrading the system firmware and software.

Disposal

Gives general information relating to the disposal of this equipment and specific information relating to Lithium batteries.

Preventive Maintenance

This section provides the schedules and instructions, where applicable, for routine inspection, cleaning and maintenance of the equipment which should be performed by an operator. There are also some basic fault-finding procedures to follow in the event of a suspected failure.

Routine Inspection and Cleaning

Gives general information relating to Routine Inspection (specifically the Cooling Fans) and Cleaning.

Servicing

Lists damage which might lead to a Service requirement. Discusses the restrictions relating to Replacement Parts.

Gives a reminder concerning the checks that might be required on completion of servicing

Maintenance and Support Services

Describes the levels of continuing product support services available from Ericsson.

Routine Inspection and Cleaning

Routine Inspection - Cooling Fans

The fans on the unit can be temperature controlled so may not be on if the ambient temperature is low. Refer to Technical Specification for more information.

NOTE: Failure to ensure a free flow of air around the unit may cause overheating. This condition is detected by a temperature sensor on the Host Card or a Transcoder Module and causes the alarm to be raised.

Cleaning

Unplug the unit from the wall outlet before cleaning the exterior with a damp cloth. Do not use liquid cleaners or aerosol cleaners.

NOTE: Only the exterior of the case should be cleaned.

Servicing

Damage Requiring Service

WARNING!

Do not attempt to service this product as opening or removing covers may expose dangerous voltages or other hazards. Refer all servicing to service personnel who have been authorised by Ericsson.

Unplug the equipment from the wall outlet and refer servicing to qualified service personnel under the following conditions:

1. When the power supply cord or plug is damaged

2. If liquid has been spilled, or objects have fallen into the product

3. If the product has been exposed to rain or water

4. If the product does not operate normally by following the operating instructions

5. If the product has been dropped or the case has been damaged

6. When the product exhibits a distinct change in performance

Replacement Parts

When replacement parts are required, be sure the service technician has used parts specified by the manufacturer or which have the same characteristics as the original part. Unauthorised substitutions may result in fire, electric shock or other hazards.

Checks on Completion of Servicing

Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in a safe operating condition. Also, performance and EMC checks may be required.

Maintenance and Support Services

Introduction

Ericsson is a leader in the design, integration and implementation of digital broadcasting products and systems. It has a large team dedicated to keeping our customers on air 24 hours a day, 365 days a year.

With regional offices worldwide, and ultra-modern specialist service facilities in the US, UK, and Asia, Ericsson covers the world. There is a customer service centre open round the clock, every day of the year.

Years of design and support experience enable Ericsson to offer a range of service options that will meet your needs at a price that makes sense.

Warranty

All Ericsson Products and Systems are designed and built to the highest standards and are covered under a comprehensive 12 month warranty.

Levels of Continuing Ericsson Service Support

For standalone equipment, then Ericsson's BASIC Essential support is the value for money choice for you. BASIC provides you with year-by-year Service long after the warranty has expired.

For systems support you can choose either Gold Business Critical support or Silver Business Advantage. These packages are designed to save you costs and protect your income through enlisting the help of Ericsson support specialists.

Call Ericsson Sales for more details.

Troubleshooting

It is the objective of this chapter to provide sufficient information to enable the operator to rectify apparent faults or else to identify the suspect module, where possible.

Troubleshooting Philosophy

States the objective of the Troubleshooting section and the level of information provided.

Preliminary Checks

Provides first-line checks in the event of a problem.

AC User Accessible Fuse Replacement

Gives the information required for fuse replacement.

Managing Alarms

This topic describes how the unit handles alarms.

Basic Fault Scenarios

Describes basic troubleshooting techniques for various common situations.

Log Files

Describes the log associated with events such as power-on, alarm assertion and de-assertion etc.

Troubleshooting - Philosophy

It is the objective of this section is to provide sufficient information to enable the operator to rectify apparent faults or else to identify the suspect module, where possible. Some basic procedures are provided to follow in the event of a suspected Encoder failure. It is assumed that fault-finding has already been performed at a system level and that other equipment units have been eliminated as the possible cause of the failure (see the relevant System Manual).

WARNING!

Do not remove the covers of this equipment. Hazardous voltages are present within this equipment and may be exposed if the covers are removed. Only Ericsson Television trained and approved service engineers are permitted to service this equipment.

CAUTION!

Do not remove the covers of this equipment. Unauthorised maintenance or the use of non-approved replacements amy affect the equipment specification and invalidate any warranties.

This handbook does not include any maintenance information or procedures which would require the removal of covers.

If the following information fails to clear the abnormal condition, call a Service Engineer or contact Ericsson Customer Services.

Troubleshooting Preliminary Checks

Always investigate the failure symptoms fully, prior to taking remedial action. Fault diagnosis for the equipment operator is limited to the following tasks, since the operator should NOT remove the covers of the equipment:

1. Check the front panel alarm/status LED. If this is not lit:

a) Replace the fuse in the power connector at the rear panel (see AC User Accessible Fuse Replacement).

 NOTE: Only replace the fuse once. If it blows again contact Ericsson Customer Services.

b) Replace external equipment, power source and cables by substitution to check their performance.

2. Confirm that the equipment hardware configuration is suitable for the purpose and has been correctly installed and connected (see Installing the Equipment).

3. Confirm that inappropriate operator action is not causing the problem, and that the equipment software set-up is capable of performing the task being asked of it. If the validity of the configuration, set-up or operation is in doubt, check it (see Operation and Control).

4. Check that the fans are unobstructed and working correctly.

When the failure condition has been fully investigated, and the symptoms are known, proceed with fault-finding according to the observed symptoms. If the fault persists, and cannot be rectified using the instructions given in this handbook, contact Ericsson Customer Services. Switch off the equipment if it becomes unusable, or to protect it from further damage.

AC User Accessible Fuse Replacement

The fuse(s) are held in integral fuse carriers in the AC power inlet(s) on the rear panel. In the case of dual power supply chassiss, there are two fuses.

 NOTE: Refer to Technical Specification > Power Supplies for information about the fuse.

WARNING!

Before replacing the rear panel fuse, disconnect the unit from the supply. Failure to do so may expose hazardous voltages. Unplug the unit from the local supply socket.

To replace the AC power fuse:

1. Ensure that power is turned off and the power cable is disconnected from the AC power inlet.

2. Ease out the fuse carrier by placing a small, flat-bladed screwdriver in the notch at the top of the carrier.

CAUTION!

When replacing the power input fuse, always ensure that a fuse of the correct type and rating is fitted. Failure to do so results in inadequate protection.

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3. Replace the fuse in the carrier.

4. Insert the fuse carrier back in the AC power inlet.

AC Power

Position of AC Fuse Carrier

If the replacement fuse also blows, do not continue. Disconnect the equipment and contact Ericsson Television Limited Limited Customer Servicesfor advice.

Managing Alarms

Alarms

Describes how an alarm can be assigned a level of severity and how it is treated in the unit.

The Alarm Manager function is described, as is the use on an SNMP Trap.

Alarms - Control Port

This lists the alarms that could be raised by the control port during abnormal operational conditions.

Alarms - Data Port

This lists the alarms that could be raised by the data input during abnormal operational conditions.

Transcoder Card Alarms

Lists the alarms sent back to the host card from the Transcoder cards. It also describes how the module self-monitors.

Alarm Status Menu

Describes the use of alarm status information.

Alarms

The chassis can report any error condition by generating an alarm event. Alarms are reported on the web page of the chassis, and can also be reported by the generation of SNMP traps.

Every alarm event type is assigned a severity level, the possible alarm severity levels are: masked, warning, minor, major, and critical.

If an alarm is masked, the alarm event causes no action.

The highest severity level of any active alarm is indicated by the Alarm LED on the front panel of the chassis. This is red if there are any active critical alarm, orange if the highest severity active alarm is major, or green if there are no active alarms, or active alarms or warnings are masked.

Alarm Levels

The health of the system will be signalled by alarm events. An alarm event can be set to one of the following possible levels by the operator for each of the cards fitted to the chassis.

Alarm	Front Panel Status LED	Description
Masked	Green	Any change of state of the alarm is logged, but no further action is taken.
Warning	Amber	Any change of state of the alarm is logged. When active, the alarm is reported on the Alarm Status menu. An SNMP trap may optionally be generated for Warnings.
Minor	Amber	Any change of state of the alarm is logged. When active, the alarm is reported on the Alarm Status menu. An SNMP trap may optionally be generated for Minor alarms.
Major	Amber	Any change of state of the alarm is logged. When active, the alarm is reported on the Alarm Status menu. An SNMP trap is generated.
Critical	Red	Any change of state of the alarm is logged. When active, the alarm is reported on the Alarm Status menu. An SNMP trap is generated.

| | | A control system will assume that the associated transcoder module has failed, and will perform a card level redundancy switch. |

Alarm Treatment

Alarms are associated with either a Transcoder Module or the Host. A Transcoder Module informs the Host of the alarms that it can generate as part of its capabilitiesxml file. The Host reads this file when the Transcoder Module is detected.

Alarms are treated as parameters, and are thus stored in the Parameter Store.

If the state of an alarm changes, the source of the alarm, i.e. the Transcoder Module, or the Host System Manager generates a broadcast message to the systems internal Alarm IP Port to notify all interested applications of the new state of the alarm. It will also generate a syslog message so that the event is recorded in the systemlog file.

Alarm Manager

The Alarm Manager application listens on the Alarm Port, and maintains a history of all changes of alarm states, which it can provide to the web page manager if the alarm history is requested to be displayed.

The Alarm Manager also controls the overall alarm state of the chassis. This is used by both the TTv Health MIB, and the front panel driver. The overall alarm state can be either, no alarms, warning, or alarm.

SNMP Trap

The SNMP Handler application also listens on the Alarm Port, and if SNMP Trap messages on alarms have been enabled, it will generate the required trap messages for any change in alarm states.

The IP address to send SNMP trap messages to can be configured by the operator (see Operation and Control: SNMP).

The list of currently active alarms can also be accessed via the front panel.

Alarms - Control Port

The control ports can raise an alarm during abnormal operational conditions.

Alarm	Description
Ctrl x: Link Down	No link has been established on this Ethernet Control Port
Ctrl x: Duplicate Control IP Address Detected	Another device has responded to an ARP request for this Control port IP address

Alarms - Data Port

The data ports can raise an alarm during abnormal operational conditions.

Alarm	Description
Data x: Link Down	No link has been established on this Ethernet Data Port
Data x: Duplicate IP Address	Duplicate IP Address Detected; Another device has responded to an ARP request for the IP address of this port

MPM1 Transcoder Card Alarms

Alarm Handling

The MPM1 Transcoder Card provides the following alarms back to the Host card.

- Loss of video (from any source)
- Loss of audio (from any source)
- Loss of VBI data
- Invalid Parameter (indicating which area video/audio/VBI/ANC data)
- Critical alarm (card has malfunctioned, internal log holds nature of failure)
- Over temperature (including a warning level as well as an critical level)

All masking of alarms is handled by the Host card.

Self-monitoring

The MPM1 endeavours to self monitor itself for correct operation and correct any inconsistencies it finds. This includes the resetting of malfunctioning sub-systems or the whole card if necessary. The module attempts to maintain correct operation to minimise the effects of faults. All such actions are reported through the alarms/status/logging back to the host card.

Module Responses

The Host card monitors all responses back from the module and resets the module if appropriate. This includes initiating redundancy switches if this results in limiting the error period. All actions are logged by the Host card.

Manual Response to Alarms

Certain alarm conditions will require manual intervention from the user. This may occasionally mean the need to know which MPM1 encoder card is performing the transcode of any particular service.

To assist the user, the Ericsson SPR1100 has a Configuration Report page. This allows the user to see the mapping of services to cards.

Alarm Status Menu

Current Alarms

The alarm status of the chassis is available on the web GUI: Alarms > Current. All currently active alarms will be displayed on this page, along with details of the time and date that the alarm was raised, the severity and description of the alarm and which module the alarm is associated with.

Alarm History

A complete history of all alarms raised and cleared since the last power cycle is displayed on the web GUI: Alarms > History.

Masking Alarms

The severity of the alarms that can be raised by each module can be edited if required on the we GUI: Alarms > Set Masks page. All possible alarms are listed, and the user can change the severity to be a warning, minor, major, critical or masked.

NOTE: If the alarm is masked it will not be displayed on any of the reporting interfaces, and will not produce an SNMP trap message.

Basic Fault Scenarios

Unit Not Working

Gives high level information relating to an inactive unit.

Fans Not Working/Overheating

What to do if the unit overheats.

Unit not Working

If the unit appears not to be working (e.g. Status LED unlit), fault-find the problem as detailed in the following table.

Step	Action	If Result of Action is Yes...	If Result of Action is No...
1	Is the unit still working but the LED/LCD display inactive?	If the unit is clearly working normally then the LED/LCD Display itself is probably at fault. Call a Service Engineer.	Proceed to next step.
2	Check Power Source. Connect a known, working piece of equipment to the power source outlet. Does it work?	The problem lies within the unit or power cable. Proceed to next step.	The problem lies with the power source. Check building circuit breakers, fuse boxes, etc. If problem persists, contact the electricity supplier.
3	Check Power Cable and Fuse. Unplug the power connector from the unit and try it in another piece of equipment. Does it work?	The problem lies within the unit. Proceed to next step.	The problem lies with either the cable itself, or with the fuse in the plug. Replace the fuse or try to substitute another cable.
4	Check PSU Module and Fuse. Ensure the power connector is unplugged. Remove the fuse from the rear panel connector and inspect it. Has the fuse blown?	Replace the fuse with one of the correct type and rating (see Technical Specification > Power Supplies). If the PSU still does not work, unplug the power cable and call a Service Engineer.	Possible problem with the PSU module. Call a Service Engineer.

Fan(s) Not Working/Overheating

The fans can be disabled at low temperatures to allow the unit to quickly attain operational temperature. In the event of overheating problems, refer to the following table.

Step	Action	If Result of Action is Yes...	If Result of Action is No...
1	Check Fan Rotation. Inspect the fans located at the sides of the enclosure. Are the fans rotating? Check Base Board temperature and fan (see nCompass information).	Check that the unit has been installed with sufficient space allowed for air flow (see Installing the Equipment > Mounting in a Rack > Care in Positioning). If the ambient air is too hot, additional cooling may be required.	Possible break in the dc supply from the PSU module to the suspect fan(s). Call a Service Engineer.

NOTE: Failure to ensure a free air flow around the unit may cause overheating. This condition is detected by a temperature sensor on the Host Card which may be used to trigger an automatic alarm.

Log Files

Overview

The unit stores a log of events such as power-on, alarm assertion and de-assertion etc. Every event in the log has a UTC time and date stamp attached to it to a resolution of 1 second.

Log Operation

The event log is stored on the Host Controller Card (HCC). A log file is generated with a file format as defined by RFC3164. Once the log has filled the space allocated to it, the oldest entries in the log file are over-written.

Events that are logged include power-on, power on self test (POST) results, warning and alarm assertions and de-assertions, user log ins and log outs. Each event has a UTC time and date stamp appended to it, with a time resolution of one second.

The various system log files are accessible from the web pages. The system log can be exported as a comma separated list, so that it is easy to import it in to a spreadsheet, where it can be easily filtered or sorted.

Time and Date

Any changes to the time and date are recorded in the system log.

Software and Firmware Upgrade

Generally an Upgrade Wizard will be provided to upgrade the unit software and firmware via the Ethernet control port.

In the event of a failed upgrade, it is possible to "re-boot" the system to such a level to allow software and firmware to be loaded on to it. In this case, contact Customer Support for assistance.

Equipment Disposal and Recycling

General

Dispose of this equipment safely at the end of its life. Local codes and/or environmental restrictions may affect its disposal. Regulations, policies and/or environmental restrictions differ throughout the world. Contact your local jurisdiction or local authority for specific advice on disposal.

Equipment Disposal

"This product is subject to the EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE) and should not be disposed of as unsorted municipal waste."

Lithium Batteries

The equipment uses the Dallas Semiconductor NVRAM DS1746WP which contains a Dallas DS9034PCX Power Cap Lithium battery. This cell is not a USA Environmental Protection Agency listed hazardous waste. It is fully encapsulated and should not be tampered with.

Recycling

Ericsson SA TV Recycling has a process facility that enables customers to return Old and End-of-Life Products for recycling if it is required.

Ericsson provides assistance to customers and recyclers through our Ericsson and SATV Recycling eBusiness Portal.

This can be reached at: https://ebusiness.ericsson.net/.

To gain access to the Recycling site, you must be set up with a unique login and password.

To request the login, please contact tvtechpubs@ericsson.com, and include the information below:

• First/Last name

• Password request (6 numbers/characters). If you do not include this information one will be created for you.

• Phone

- Location (Country)

- Company

- Work Area (select one of the below)

  - Executive Management
  - Marketing and Sales
  - Planning/Engineering
  - Procurement/Supply
  - Project & Programme
  - Implementation
  - Operations and Maintenance
  - R&D
  - Other

Technical Specification

Base Chassis

Details the technical specification of the basic chassis.

MPM1 Transcoder Card

Details the technical specification of the Transcoder card.

Base Chassis

Physical Details

Details the physical dimensions of the unit.

Power Supplies

Lists the parameters relating to the unit's power supply.

IP Output Transport Stream

Lists the controllable parameters for each IP Output transport stream for each output port or ports,

Control Ethernet Specification

Gives information relating to the Control Port parameters and MAC Address. Also lists the IP parameters.

Data Ethernet Specification

Gives information relating to the Data Port parameters and MAC Address. Also lists the IP parameters.

Physical Details

Item	Specification
Height	44.5 mm chassis
Width	442.5 mm excluding fixing brackets
Overall width	482.6 mm including fixing brackets
Depth	550 mm excluding rear connector clearance
Rack mounting standard	1U x 19 inch (1U = 44.45mm)
Approximate weight	7.5 kg (16.5 lbs)

Power Supplies

AC Mains Input

This equipment is fitted with a wide-ranging power supply. It is suitable for voltages of 100-240 VAC -10% +6% at 50/60 Hz nominal.

Specification

Item	Specification
Power distribution system	Type TN ONLY (EN 60950-1 Annex V): Power distribution system which is directly earthed, the parts of the equipment required to be earthed by Protective Earthing Conductors. This equipment must NOT be used with single-phase three-wire and PE, TT or IT Type Power distribution systems.
Connection to supply	Pluggable Equipment Type A (EN 60950-1 para 1.2.5): Equipment which is intended for connection to the building power supply wiring via a non-industrial plug and socket-outlet or a non-industrial appliance Coupler or both. Correct mains polarity must always be observed. Do not use reversible plugs with this equipment.
Class of equipment	Class I Equipment (EN 60950-1 para 1.2.4): electric shock protection by basic insulation and protective earth.
Rated voltage range	100-240 V AC (single phase)
Operating voltage range	90-254 V AC (single phase)
Voltage selection	Wide ranging
Rated frequency range	50-60 Hz
Operating frequency range	48-63 Hz
Rated current	4.0 – 2.0A
Input connector	CEE 22/IEC 3-pin male connector

Fuse	Fuse in live conductor in power input filter at rear of chassis. Do not use reversible plugs with this equipment.
Fuse type	Bussmann S505 Littelfuse 215 5x20 mm time delay (T) 1500 A breaking capacity (HBC) IEC/EN 60127-2 Sheet 5
Fuse current rating	5 A 250 V T HBC
Power consumption	40 W – 350 W (Depending on Options fitted)

DC Power Input

This equipment is suitable for voltages of -40 V to -60 V. Correct polaritymust be observed.

 NOTE: This equipment is Class 1 and must have a protective earth.

Specification

Item	Specification
Rated Voltage	For Connection to -48 V supplies only. (PSU input tolerance -40 V DC to -60 V DC). Correct polarity must always be observed.
Rated Current	9 A
DC Input Connector Details	For connection to the 48v input connector, the following parts from AMP or Molex should be used: AMP Universal MATE-N-LOK Housing: AMP no. 1-480700-0 Female terminal (3 needed per housing): AMP no. 926901-1 Molex MLX Housing: Molex no. 50-84-1030 Female terminal (3 needed per housing): Molex no. 02-08-1002
Power consumption	40 W – 350 W (Depending on Options fitted)

Technical Earth

A technical earth terminal is located at the rear panel of the chassis.

IP Output Transport Stream

The following parameters are controllable for each IP Output transport stream for each output port or ports depending on the redundancy mode that is selected:

Parameter	Description/Range	Comment
Source IP Address	aaa.bbb.ccc.ddd	Source IP address
Subnet Mask	aaa.bbb.ccc.ddd	Source Subnet address
Source UDP Port	0 to 65535	Source IP Port Number
Destination IP Address	aaa.bbb.ccc.ddd	Destination IP address
Destination UDP Port	0 to 65535	Destination IP Port Number
Time To Live	0 to 240	TTL value for inclusion in the IP header
Type Of Service	0 to 255	ToS value for inclusion in the IP header

Control Ethernet Specification

Overview

The system has two Ethernet control ports, that support IEEE 802.3 100BASE-TX and 1000BASE-T Ethernet protocols. The Control ports are accessible via RJ-45 connectors on the rear panel of the chassis and support IEEE 802.3u auto-negotiation and parallel detection. Also, the ports support Auto-MDIX.

Item	Specification
Connector type	RJ-45 (100/1000 Base T)
Connector designation	Ctrl 1/2
Pin outs (Unused pins are not connected)	Pin 1 - Rx/Tx A(+) Pin 2 - Rx/Tx A (-) Pin 3 - Rx/Tx B (+) Pin 4 - Rx/Tx C (+) Pin 5 - Rx/Tx C (-) Pin 6 - Rx/Tx B (-) Pin 7 - Rx/Tx D (+) Pin 8 - Rx/Tx D (-)

IP Parameters

It is possible to configure the following IP parameters for the Control Port

Parameter	Description
IP Address	xxx.xxx.xxx.xxx (Ipv4)
Network Mask	xxx.xxx.xxx.xxx (Ipv4)
Gateway Address	xxx.xxx.xxx.xxx (Ipv4)

NOTE: The front panel always provides a way of changing these settings to prevent all control interfaces being disabled.

MAC Address

The MAC address of each Ethernet Control port can be assigned via the Static Parameters table.

Data Ethernet Specification

Overview

The Ethernet Data ports support IEEE 802.3u auto-negotiation and parallel detection. The auto-negotiation function can be disabled to force the line speed to be either 100 Mbps or 1000 Mbps.

These ports support Auto-MDIX. This function can be disabled.

Item	Specification
Connector type	RJ-45 (100/1000 Base T)
Connector designation	Ge 1/2 Ge 3/4
Pin outs (Unused pins are not connected)	Pin 1 - Rx/Tx A(+) Pin 2 - Rx/Tx A (-) Pin 3 - Rx/Tx B (+) Pin 4 - Rx/Tx C (+) Pin 5 - Rx/Tx C (-) Pin 6 - Rx/Tx B (-) Pin 7 - Rx/Tx D (+) Pin 8 - Rx/Tx D (-)

Data Port Parameters

The transport streams output via the IP Outputs contains 188 byte long transport stream packets.

The time that a port has had a link established is recorded to an accuracy of ± 1 second, and the information made available to the user.

The Ethernet Data Ports always respond to ICMP Echo requests to any source IP address assigned to an output transport stream currently being transmitted on that port.

The Ethernet Data Ports respond to all ARP requests

There is hardware filtering of received packets (i.e. a hardware 'firewall') to protect the ports from malicious interference.

IP Parameters

It is possible to configure the following IP parameters for the Data Port. See also Technical Specification: IP Output Transport Stream

Parameter	Description
IP Address	xxx.xxx.xxx.xxx (Ipv4)
Network Mask	xxx.xxx.xxx.xxx (Ipv4)
Gateway Address	xxx.xxx.xxx.xxx (Ipv4)

The default values for source IP address, subnet mask are those assigned to the ethernet port, or in the case of mirrored mode, those assigned to the primary IP port.

MAC Address

The MAC address of each Ethernet Control port can be assigned via the Static Parameters table. It is not possible to set the MAC addresses of each of the Ethernet Data ports to the same value.

Appendices

A Brief Introduction to Audio Coding Standards

Gives an overview of some of the different audio coding standards available.

IP Encapsulation of Transport Streams

Describes the layers involved and the associated overheads.

Transcoder Modules

Lists the available Transcoder Modules and gives information related to the handling of the cards.

Compliance Statements

States the standards with which the unit complies.

Clock and Timing

This section describes the use of real time clocks throughout the unit.

Redundancy Modes

This section gives information relating to the various redundancy functions available.

Alarm Lists

Provides information about the alarms that can be generated by the unit.

A Brief Introduction to Audio Coding Standards

Where appropriate, the output transport stream can be made compliant with ATSC A53(E) ATSC Digital Television Standard and DVB 101-154 v1.7.7.

MPEG

The Moving Pictures Experts Group (MPEG) was formed in 1988 to generate compression techniques for audio and video. In the first version, ISO/IEC 11172-3 MPEG-1 audio, has a selection of two separate algorithms. MPEG-1 Layer I and II were implementations of the MUSICAM algorithm and MPEG-1 Layer III (mp3) was an implementation of the ASPEC algorithm. The algorithms have since been improved and extended with other versions of MPEG.

MPEG-1 Layer I/II

This algorithm is similar to MUSICAM and only really differs in the structure of the frame headers. Layer I is a restricted version of the full algorithm to allow a reduced decoder to be developed. Hence, over time as the processing power of decoders have increased by orders of magnitude, Layer I is no longer used for broadcast.

The algorithm creates 3 frames of 384 samples. Each small frame is divided into subbands and these subbands can be coded for each frame or for all 3. There is limited ability to allocate bits to different bands and there is no entropy coding of the encoded samples so a relatively high bit rate is required to obtain a reasonable quality.

Dolby Digital

Dolby Digital is an algorithm from Dolby that forms part of both the ATSC and DVB standard for digital broadcasting. It is marketed under the name of Dolby Digital.

The encoder includes a psychoacoustic model to improve the quality. The signal is divided into 32 multiple subbands, which correspond to the critical bands of the human ear. The number of bits is fixed for each subband but there are additional bits that can be allocated to any subband where encoding quality has suffered. Dolby recommends stereo signals may be coded at 192 kbit/s, and 5.1 at 448 kbit/s, but other rates can be used if required.

The encoders have the ability to encode stereo and equivalent modes, and will also pass through pre-compressed Dolby Digital (both stereo and multi-channel).

When in Dolby Digital Pass-through mode, glitch suppression is supported, where the coding module monitors the encoded bitstream and if the framing structure is incorrect, a valid silence frame or the last good frame is inserted in its place. If this state occurs for more than a second, the encoder signals that the Dolby Digital bitstream is corrupted.

Dolby Digital Plus

Dolby Digital Plus offers enhanced performance over Dolby Digital. Some of the algorithm improvements are:

Transient pre-noise processing - to reduce "pre-noise" artifacts before sharp transients.

Enhanced channel coupling – which maintains phase relationships between channels, and improves performance of matrix decoders.

Adaptive hybrid transform processing – an improved bit allocation and quantization algorithm

SMPTE 302M: Mapping of AES3 Data into an MPEG-2 Transport Stream

Though not specifically a coding standard, this does define a method of carrying AES3 uncompressed audio streams in an MPEG-2 transport stream. The AES stream can contain non-audio data as well as uncompressed audio. This mechanism can be used to carry Linear PCM audio, or Dolby E data.

Dolby E

Dolby E was developed by Dolby Laboratories. It allows up to 8 channels of Dolby E compressed audio to be distributed over an existing 2 channel digital infrastructure. The compression applied is less than that for consumer codecs (i.e. Dolby Digital), so is better quality and the audio can be decompressed and re-compressed several times. The Dolby E stream can also include metadata and timecode.

Dolby E frame duration is either equal to or double the duration of a video frame. For interlaced formats the duration matches a video frame, but is double the frame duration for progressive formats. This facilitates easier editing of video and audio in the digital domain. Dolby E frames are generally aligned to video frames.

Dolby Metadata Presets

Eight Dolby Metadata Presets can be configured.

By default, presets 1 - 4 have the same configuration recommended by Ericsson.

Presets 5 - 8 are by default configured to the Dolby defaults for "Stereo Film", "Stereo Music", "Surround Film" and "Surround Music" respectively.

To configure the presets, please navigate through the GUI as follows :-

System Tab -> Slots -> Slot 1 -> Audio Module -> Dolby Metadata Presets

Then select the desired preset number.

Note: Navigating away from the main Services Configuration page will lose any changes that have not yet been saved/applied.

All of the parameters in the presets can changed to the users requirements. Any of these presets can then be applied to any audio channel encoding audio in the Dolby Digital format. The table lists the parameters for each preset.

Selected Option	Description
Preset name	Name of the preset (for user information)
Dialogue normalization level	Used by a decoder to determine the level of adjustment required to achieve this the set level.
Bitstream mode	Flags the type of service in the bitstream.
Line mode compression profile	Alters the dynamic range for line output.
RF mode compression profile	This alters the dynamic range for RF output. The overall level is raised by 11dB.
Center mix level	Indicates the downmix level when there is no centre speaker. This is applied to left and right channels only.
Surround mix level	Surround downmix level for the front left and right channels when consumer has no surround speakers.
Dolby Surround mode	Flags if a two channel encoded stream contains information for a Dolby Pro-logic decode (Lt/Rt)
Audio production information exists	This indicates whether the Mixing Level and Room Type parameters exist within the bitstream.
Mixing level	Indicates the acoustic sound pressure level of the dialogue level during the final audio mixing session.

Selected Option	Description
Room type	Type and calibration of the mixing room used for the final audio mixing session.
Copyright flag	Indicates if the material is copyright protected
Original bitstream flag	Indicates if source is the original or a copy
Enable extended bitstream information	Flags if additional information is available for downmixing.
Preferred downmix mode	Indicates if the producer would prefer a Lt/Rt or a Lo/Ro downmix. Can be over-ridden by the decoder.
Lt/Rt center mix level	Indicates the required level reduction of the center channel when mixed with the L& R channels for a Lt/Rt downmix. Similar to 'Center mix level'.
Lt/Rt surround mix level	Indicates the required level reduction of the surround channels when mixed for a Lt/Rt downmix. Similar to Surround mix level'.
Lo/Ro center mix level	Indicates the required level reduction of the center channel when mixed with the L& R channels for a Lo/Ro downmix. When present this replaces the value set for the 'Center mix level'
Lo/Ro surround mix level	Indicates the required level reduction of the center channel when mixed for Lo/Ro downmix. When present this replaces the value set for the 'Surround mix level'.
Dolby Surround EX mode	Flags if the stream has been encoded in 'Surround Ex'. Only used if surround channels are present.
A/D converter type	Indicates type of A/D conversion used.
Digital de-emphasis	To meet the Dolby Digital encoding algorithm specification the audio must not have pre-emphasis applied. If the input signal does have pre-emphasis applied, a de-emphasis filter must be applied prior to encoding.
DC high pass filter enable	Removing the DC component can lead to more efficient encoding, but there is a risk that signals that do not reach 100% PCM may exceed this after filtering and therefore must be clipped.
Bandwidth low-pass filter enable	Remove high frequency signals before encoding. The filter removes frequencies that would not normally be encoded.
Low-frequency effects low pass filter enable	Apply a 120 Hz low pass filter prior to an encode. Should only be switched off if it is known that there are no frequencies above 120 Hz.
Surround attenuation enable	Attenuate surround channels by 3 dB before encoding. Theatrical and consumer mixing rooms use different levels for the surround channels, and this can be used to compensate.
Surround phase shift enable	Apply a phase shift of 90 degrees to the surround channels. This simplifies the decode process for producing a 'Lt/Rt' downmix.

Transcoder Modules

Available Transcoder Modules

Tabulates the Transcoder Modules available at this release.

Handling Option Cards

This section gives information relating to the handling of Option Modules as they are inserted/removed from the unit.

Option Card Hot Swap

This section gives an overview of the way the host checks the availability of an option module.

Option Card Plug and Play

This section gives an overview of the plug and play concept used in the unit.

Available Transcoder Modules

Only one type of transcoder module is supported at this release.

Marketing Code	Name	Description
SPR/HWO/MPM1	MPM1 HD/SD Transcoder Card	This provides premium quality MPEG-2 and H.264 compression of multiple HD and SD video streams, and audio compression

Transcoder modules form the core of the unit and are required to provide the desired functionality.

Handling Option Cards

This section gives information relating to the handling of Option Modules as they are inserted/removed from the unit.

Handling Option Cards

Gives guidance relating to the care and handling of Option Cards.

Adding an Option Card

Gives information relating to adding an Option Module and how to check the operation was successful.

Removing an Option Card

This page details what to do when it is desired to remove (and not replace) an option card.

Replacing an Option Card

Gives information relating to the replacing of an Option Module and how to check the operation was successful.

Handling Option Cards

Physical Handling

WARNING!

CARE MUST BE TAKEN IN INSERTING OR WITHDRAWING ANY OPTION CARD.

UNDERSIDE COMPONENTS MAY BE PHYSICALLY DAMAGED BY CARELESS HANDLING.

Cards must be inserted and withdrawn slowly whilst ensuring that the card is kept orthogonal (at 90 degrees to the rear of the unit):
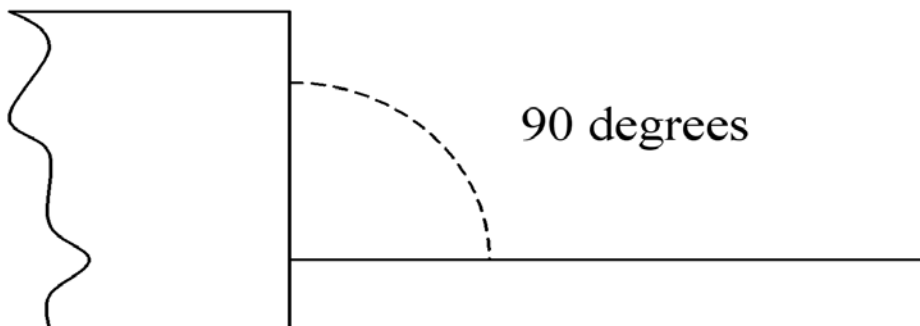
WARNING!

OPTION CARDS SHOULD NOT BE PLUGGED IN WITH EXCESSIVE FORCE.

IF ANY SIGNIFICANT RESISTANCE TO INSERTING A CARD IS FELT, THE OPERATOR SHOULD WITHDRAW THE CARD SLIGHTLY AND CHECK FOR ANY OBSTRUCTIONS.

Electrostatic Discharge

WARNING!

Static electricity can damage electronic components. To avoid damage, keep option cards in their static-protective package until you are ready to install them.

To reduce the possibility of electrostatic discharge, observe the following precautions:

- Where possible ensure that antistatic protection is worn by the user (for example an earthed antistatic wrist strap, an ankle or heel strap).

- Handle the Option Card carefully, holding it by its edges or its rear panel.

- Do not touch solder joints, pins, or exposed printed circuitry.

- Do not leave the Option Card where others can handle and possibly damage it.

- While the Option Card is still in its anti-static package, touch it to an unpainted metal part of the system unit for at least two seconds. (This drains static electricity from the package and from your body.)

- Remove the Option Card from its package and install it directly into your base chassis without setting it down. If it is necessary to set the Option Card down, place it in its static-protective package.

- Take additional care when handling components during cold weather, because heating reduces indoor humidity and increases static electricity.

Adding an Option Card

Overview

- A new card can be inserted when the chassis is off or on.

- Once inserted and powered the chassis will determine the option card capabilities and make it available for configuration.
  - Initially a default set of parameters will be in place.

- As long as there are licenses available for the features required, the option card can then be configured and used immediately.

WARNING!

Refer to "HANDLING OPTION CARDS" to miniise risk of damage to option cards or base chasis.

Procedure

An option card can be added to a unit with the base chassis either powered or un-powered. The procedure is as follows:

1. Remove the blanking plate from the option card slot in which the new card is to be fitted.

2. Carefully remove the new option card from its anti-static package, and insert it in to the base chassis, slotting the card edges in to the card guides.

3. Push the card home, so that the rear panel is flush with the rear of the base chassis.

4. Tighten the two captive retaining screws.

5. Connect any external cables to the new option card.

6. When the chassis detects a new card fitted, it will be displayed on the option slots web page, and an alarm will be raised. If all options are reported correctly, the "accept option slot configuration" needs to be applied. This will accept the new hardware configuration and clear the alarm.

Removing an Option Card

<div align="center">

WARNING!

</div>

Refer to "HANDLING OPTION CARDS" to minimise risk of damage to option cards or base chasis.

An option card can be removed, and does not need to be replaced.

1. Disconnect any cables from the option card to be replaced.

2. Loosen the two captive screws that retain the option card in the base chassis.

3. Holding the captive screws, pull the option card from the unit and place it in suitable anti-static packaging, (observe the handling precautions).

4. Fit a blanking panel in place of the removed option card.

5. When the unit detects a card is no longer present, it will be displayed on the option slots web page, and an alarm will be raised. If all options are reported correctly, the "accept option slot configuration" needs to be applied. This will accept the new hardware configuration and clear the alarm.

Replacing an Option Card

A failed option card can be replaced without powering down the base chassis, i.e. can be 'hot-swapped'.

1. To perform a hot-swap the option cards should only be unplugged or inserted when the chassis is fully booted and configured.

2. Only ONE option card should be plugged in at a time, to prevent problems due to inrush current, and to ensure that the host recognises and configures the new card.

3. If more than one option card is being fitted, a wait time of approximately 10s should be allowed between inserting each option card.

WARNING!

Refer to "HANDLING OPTION CARDS" to minimise risk of damage to option cards or base chasis.

The process to replace an option card is as follows:

1. Disconnect any cables from the option card to be replaced.

2. Loosen the two captive screws that retain the option card in the base chassis.

3. Holding the captive screws, pull the option card from the unit, (observe the handling precautions).

4. Carefully remove the replacement option card from its anti-static package, and insert it in to the base chassis, slotting the card edges in to the card guides.

5. Push the card home, so that the rear panel is flush with the rear of the base chassis.

6. Tighten the two captive retaining screws.

7. Connect any external cables to the replacement option card.

NOTE: If the replacement card is of the same type as the failed card, then it will be automatically configured to the same settings as the failed card.
If the replacement card is of a different type then an alarm will be generated.

Option Card Hot Swap

The unit regularly monitors to verify option card presence and to detect if a card has been removed or added.

When a new card is inserted it will start-up and attempt to link to the host controller. When this link has been established the process of identifying the card and its capabilities begins. Once this is established, the card will be configured with the same configuration as the card that has been replaced (assuming that the replacement card has the same capabilities).

Transcoder Module Plug and Play

The unit is designed around a 'Plug and Play' concept to make it as easy as possible to add new transcoder modules and functionality. This means that the chassis and Host controller card provide a base level of functionality, while any specific functionality associated with a transcoder module is contained on the transcoder module itself.

A good example of this is MPEG SI generation. The Host controller provides the functionality to generate and play out the SI required by a transport stream. However a MPM is required to provide any descriptors required for any elementary stream types that it generates.

Compliance Statements

The following Compliance statements are given in this section:

- [CE Marking](#)
- [C-Tick Marking](#)
- [Electromagnetic Compatibility](#)
- [Environmental](#)
- [Equipment Disposal and Recycling](#)
- [Materials Declaration](#)
- [Packaging](#)
- [Safety Compliance](#)

CE Marking

The CE mark is affixed to indicate compliance with the following directives:

DIRECTIVE 2006/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits.

DIRECTIVE 2004/108/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 15 December 2004 on the approximation of the laws of the Members States relating to electromagnetic compatibility.

1999/5/EC of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity. (If fitted with telecom type interface modules).

C-Tick Mark

The C-Tick mark is affixed to denote compliance with the Australian Radiocommunications (Compliance and Labelling – Incidental Emissions) Notice made under s.182 of Radiocommunications Act 1992.

Electromagnetic Compatibility (EMC)

The equipment has been designed and tested to meet the following:

EN 55022 and CISPR22	European International	Emission Standard Limits and methods of measurement of radio frequency interference characteristics of information technology equipment - Class A.
EN 61000-3-2	European	Electromagnetic Compatibility (EMC), Part 3 Limits; Section 2. Limits for harmonic current emissions (equipment input current up to and including 16 A per phase)
EN 61000-3-3	European	Electromagnetic Compatibility (EMC), Part 3. Limits; Section 3. Limitation of voltage fluctuations and flicker in low voltage supply systems for equipment with rated current up to and including 16 A.
EN 55024	European	Information technology equipment - Immunity characteristics - Limits and methods of measurement.
FCC	USA	Conducted and radiated emission limits for a Class A digital device, pursuant to the Code of Federal Regulations (CFR) Title 47 Telecommunications, Part 15: Radio frequency devices, subpart B - Unintentional Radiators.

Environmental

General

The Encoder is for use in non-hostile environments, (i.e. designed for indoor use only with no protection against dust or water ingress).

Item	Specification
Operational	
Temperature	−10°C to +50°C (14°F to 122°F) ambient with free air-flow. It may require a 10 minute warm-up period before all clocks are within specification if the ambient temperature is less than 0°C.
Relative humidity	0% to 95% (non-condensing)
Cooling requirements	Cool air input from left side of unit, exhaust from right side of unit. See Care in Positioning
Handling/movement	Designed for stationary or fixed use when in operation
Transportation (Packaged)	
Temperature	-40°C to +70°C (-40°F to 158°F)
Relative humidity	0% to 95% (non-condensing)
Storage	
Temperature	-25°C to +70°C (-13°F to 158°F)
Relative humidity	0% to 95% (non-condensing)

Handling and Packaging

The product requires no special handling or packaging other than normal procedures for EricssonTelevision equipment and is suitable for lifting by one person.

Materials Declarations

Ericsson products are designed and manufactured in keeping with good environmental practise. Our component and materials selection policy prohibits the use of a range of potentially hazardous materials. In addition, we comply with relevant environmental legislation.

For the European Union

For product sold into the EU after 1st July 2006, we comply with the EU RoHS Directive. We also comply with the WEEE Directive.

For China

For product sold into China after 1st March 2007, we comply with the "Administrative Measure on the Control of Pollution by Electronic Information Products". In the first stage of this legislation, content of six hazardous materials has to be declared together with a statement of the "Environmentally Friendly Use Period (EFUP)": the time the product can be used in normal service life without leaking the hazardous materials. Ericsson expects the normal use environment to be in an equipment room at controlled temperatures (around 22°C) with moderate humidity (around 60%) and clean air, near sea level, not subject to vibration or shock.

Where Ericsson product contains potentially hazardous materials, this is indicated on the product by the appropriate symbol containing the EFUP. For Ericsson products, the hazardous material content is limited to lead (Pb) in some solders. This is extremely stable in normal use and the EFUP is taken as 50 years, by comparison with the EFUP given for Digital Exchange/Switching Platform in equipment in Appendix A of "General Rule of Environment-Friendly Use Period of Electronic Information Products". This is indicated by the product marking:

It is assumed that while the product is in normal use, any batteries associated with real-time clocks or battery-backed RAM will be replaced at the regular intervals.

The EFUP relates only to the environmental impact of the product in normal use, it does not imply that the product will continue to be supported for 50 years.

Packaging

Packaging Statement

The Stratocell or Ethafoam 220 polyethylene foam inserts can be easily recycled with other low density polyethylene (LDPE) materials.

Packaging Markings

The symbols printed on the outer carton are described below:

Handle with care

This way up

Fragile

Protect from moisture

See CE Marking

See C-Tick Mark

Defines country of origin

The packaging is reusable per GB 18455-2001

This symbol guarantees that packaging with this symbol is recyclable and will be accepted by cardboard recyclers

Recyclable per GB 18455-2001

Safety Compliance

General

This equipment has been designed and tested to meet the requirements of the following:

- EN 60950-1 European Information technology equipment - Safety.
- IEC 60950-1 International Information technology equipment - Safety.
- UL 60950-1 USA Information Technology Equipment - Safety.

Clock and Timing

Real Time Clocks

Describes the units real time clock and the associated user configurable parameters. Also, information relating to the SNTP Server is given.

Real Time Clock

Overview

The Host Controller card has a real time clock, which is battery powered when the chassis is unpowered, so that the time and date is maintained. This clock is designed to be accurate to ±1 minute per month. The battery is capable of powering the clock for over two years.

User Configurable Parameters

The user configurable parameters associated with the clock are defined below

Parameter	Values	Description
Local Time	hh:mm:ss	Current local time in hours minutes and seconds
Local Date	dd:mm:yyyy	Current date in day month and year

SNTP Server

An SNTP server can be configured to update the clock and calendar or else the user can update the time and date. Any changes to the time and date are recorded in the system log.

The real time clock is used to set the time and date when the unit is started, but then its own time and date is maintained, unless a change to the time and date parameters occur, when it will be updated to the new settings.

The system can set or correct its system clock from information received from an SNTP Time Server. More specifically it supports SNTP V4 and also Microsoft Windows Time (W32Time), which means that it supports NTP V3.

The user can enter the IP address of the SNTP server to be used, thedefault address is 000.000.000.000, which indicates to the system that no SNTP server has been defined, and therefore SNTP is disabled.

If an SNTP server is defined, and it fails to respond, then anSNTP Server Timeout alarm will be raised. This alarm will be de-asserted either when an SNTP response is received, or the SNTP functionality is disabled.

Redundancy Modes

Redundancy Overview

Gives a general overview of redundancy operation.

Control Network Redundancy

Gives an overview and describes the operation of the Control ports. Information is given relating to the Automatic Redundancy Mode.

Data Network Redundancy

Describes the data redundancy modes in some detail.

Transcode Input Redundancy

Describes the transcode input redundancy modes in some detail.

1+1 Multi-Unit Redundancy

Describes the multi-unit mode in some detail.

Redundancy Overview

Redundancy Switching

The Ericsson SPR1100 can provide chassis level and network level redundancy.

Input Transport Stream Redundancy

In the event of a network, failure, the Ericsson SPR1100 can gather its data from a different input. This can be the same content as the original Transport Stream, or different, at the operator's discretion. See the Transcode Input Redundancy section for more detail.

Chassis Critical Alarm

If a Chassis Critical alarm is asserted, the Ericsson SPR1100 can hand off all transcodes to a secondary unit using the 1+1 Redundancy Setup

Control Network Redundancy

Overview

The control network is assigned to the physical Ethernet ports Ctrl1 and Ctrl2. The lower number port of the pair is considered to be the primary port, and the other the spare.

Operation

If both ports have a link up, and the Control Port Selection is set toAutomatic Redundant, then the primary port will respond to network traffic, but the spare port will not.

However, if the link goes down on the primary port, then the spare port will start to respond to network traffic.

Automatic Redundancy Mode

In automatic redundancy mode the primary port is used as default. If the primary port link fails, control passes to the secondary port. However, if the primary port link is restored then control passes back to the primary after theAuto-Revert delay period.

The behavior of the system when the primary link is re-established depends on the Control Port Auto-Revert Time setting.

If the Control Port Auto-Revert Time is set to 0, then the spare port remains the active control port until its link goes down.

Otherwise, after the primary port has had a link present for the defined period of time, it will resume being the active control port, and the spare port will cease responding to network traffic.

Auto Revert Delay

If the control port selection = Automatic, then the Auto-Revert Delay defines the period for which the primary port must have resumed a link up state before it automatically becomes the active port.

The Auto-Revert Delay period is set in the range 0 to 999 seconds, with 2 seconds being the default value.

If this is set to 0 then there is no automatic switch back to the primary port

Data Network Redundancy

Redundancy

The Ericsson SPR1100 has two Ethernet data ports operating as paired outputs. These are designated Ge3 and Ge4.

Each port may have a different IP address, MAC address, subnet mask and default gateway, providing output network redundancy. Only one port is active at any time, with the other port in "standby" mode. If the "active" interface should fail, the "standby" interface takes over.

If both ports are configured to be on the same subnet, only one port will respond to ICMP messages.

The data ports can raise an alarm during abnormal operational conditions, (see Looking After the Unit > Troubleshooting > Handling Alarms >Alarms - Data Port).

1 + 1 Redundancy

This section describes the behaviour and configuration of 1 + 1 Redundancy.

Introduction

Introduces the 1 + 1 Redundancy system, describes uses cases and behaviour.

Configuration

Describes the main features of 1 + 1 Redundancy configuration.

Adding A Secondary

Describes the steps required to add a Secondary unit to an existing Standalone configuration.

Hints and Tips

Provides some hints and tips for using the 1 + 1 Redundancy system.

1 + 1 Redundancy Introduction

Overview

1 + 1 Redundancy allows a second unit to be configured as a redundant spare. A 1 + 1 Redundancy Group consists of a "Primary" unit and a "Secondary" unit. The configuration settings of each unit is automatically replicated to its peer. Each unit is expected to be connected to the same input and output networks. Each unit will be performing the same transcodes, however only one unit will be "Active", meaning only one unit will be outputting multicast packets.

Terminology

Primary	The main unit within a 1 + 1 Redundancy group. This unit is normally expected to be Active (broadcasting).
Secondary	The backup unit within a 1 + 1 Redundancy group. This unit is normally expected to be Passive (not broadcasting), but will go Active (start broadcasting) if the Primary unit fails.
Standalone	The "Primary" unit can also operate in a Standalone role. In this case the Primary will always be Active.
Active	The Active unit is the one that is currently broadcasting. There will normally be exactly one Active unit (although both units can become active under certain circumstances). In this case, the MGP protocol should suppress once of the units output.
Passive	The Passive unit is the unit that is performing transcodes, but not broadcasting. The unit is in a state where it is ready to take over broadcasting.

Pairing

Pairing is the process of the units in the redundancy group checking that the configuration forms a valid redundancy group, synchronising state and configuration. On entering the paring process a unit signals to its peer to also enter the paring process. The following are checked:

- The role of both units (the roles must be "Primary" or "Secondary" and must not be

the same on both units).
- The IP address that the peer has configured for "Peer IP Address". For a valid configuration the "Peer IP Address" setting on the other unit should refer to this unit's control IP address.

Hardware configuration and software version numbers are also compared. If these do not match an alarm is raised, although the units continue to pair.

If during the pairing process the peer unit cannot be successfully pinged for 30 seconds, then it is assumed that the peer is not available. In this case the unit will become Active.

Once a successful configuration has been established, the Active unit will be determined. For this the current Active state and the previous Active state are used. If the unit has just been powered up, the current active state will be Passive.

- If one of the units is Active and the other is Passive then the Active unit remains Active and the Passive unit remains Passive. The configuration of the Active unit is copied to the Passive unit.
- If both of the units are Active then the "Conflicting Status" alarm is raised, and both units remain Active. A "Configuration Mismatch" alarm is also raised to indicate that the configuration of the 2 units could not be synchronised automatically.
- If both of the units are Passive then the previous state is examined.
  - If one unit was previously Active and the other unit was previously Passive, then the previously Active unit becomes Active, the previously Passive unit remains Passive, and the configuration is copied from the previously Active unit to the previously Passive unit.
  - If both units were previously Active or both units were previously Passive, then the "Conflicting Status" alarm is raised, and both units remain Passive. A "Configuration Mismatch" alarm is also raised to indicate that the configuration of the 2 units could not be synchronised automatically.

Automatic Redundancy Switching

Under certain circumstances an automatic redundancy switch will take place. Normally automatic redundancy switches will only occur if the Primary unit is Active (i.e. there is no auto-revert back from Secondary the Primary). The exception to this is when the timed license on the Secondary unit expires.

When the Primary is Active an automatic redundancy switch will occur when:

- A critical alarm is present on the Primary and no critical alarm is present on the Secondary for more than the time specified by "Alarm Primary to Secondary Delay"
- The Secondary is unable to ping the Primary for more than the time specified by "Ping Primary to Secondary Delay"

When the Secondary is Active an automatic redundancy switch will occur when:

- The Secondary timed license expires

Configuration Synchronisation

When configuration changes are made to one unit in a redundancy group they are automatically replicated to the other unit. The GUI of the other unit should be reloaded to see any changes made. This occurs for most parameters, although a few so called "Box Parameters" are unique to a unit and are not replicated. Examples of parameters that are

not replicated are IP address settings and 1 + 1 Redundancy configuration settings.

It is recommended that the Primary unit web GUI is used the majority of the time, with the Secondary unit web GUI only used to configure settings unique to the Secondary unit. This includes using the Secondary unit web GUI to configure the 1 + 1 Redundancy settings.

If a configuration change cannot be replicated on the peer (e.g. due to control network failure), then a "Configuration Mismatch" alarm will be raised on the unit on which the change was made. Once the network problem has been rectified, a manual configuration copy should be performed so that both units are correctly configured.

ICMP and RPC Ping

There are 2 levels of network ping that are used to determine whether the peer device can be contacted. Firstly, ICMP ping is used to determine whether low level network communication can be achieved. The second level is RPC ping, where an RPC is executed on the peer. This gives a higher level of confidence that the peer is operating correctly than the ICMP ping.

The current ping result is shown on the 1 + 1 Redundancy GUI. It is also used to determine when certain configuration and status information can be pushed to or retrieved from the peer. Ping failure could indicate that the peer has failed, so is also used to trigger an automatic redundancy switch.

Manual Controls

There are a number of manual controls available. These allow configurations to be copied between units and also allow manual redundancy switches between Primary and Secondary units. The manual control are intended to be used to resolve conflicts (e.g. configuration changes that were made when the control network connection was lost, or to allow the user to select the active unit in case the pairing process cannot). The manual control is the only way to switch from Secondary to Primary unit (the exception to this is that if the Secondary license expires and automatic revert to the primary is attempted).

Secondary Timed License

A Secondary unit should be delivered with a 30 day timed license. This license is split into 2 sections, a 3 day temporary section and a 27 day permanent section. The 3 day section is used first and will be reset when the Secondary unit goes Passive. The 27 day section is remembered and does not get reset when the Secondary goes Passive. This mechanism allows the Secondary unit to be used multiple times for up to 3 days each time without any permanent license erosion. If the secondary is used for more than 3 days then the permanent license will be eroded.

If this value reaches 0, then the multicast output of the Secondary will be disabled and an automatic revert to the Primary will be attempted. In this case contact support to renew your Secondary timed license.

An alarm will be raised when there are less than 7 days of timed license remaining. Another alarm will be raised when the license expires.

Multicast Guard Protocol (MGP)

If both units become Active, they will both be broadcasting the same multicast to the downstream equipment. This can happen if the control connection between the units is lost (the Secondary thinks the Primary has failed, so goes Active). To prevent this the MGP protection mechanism should be employed. It is recommended that MGP is always enabled when 1 + 1 Redundancy is in use to protect against this scenario.

MGP will prevent one unit broadcasting when another MGP enabled unit is already broadcasting on the same multicast. In the scenario outlined above, MGP will prevent the Secondary broadcasting. The 1 + 1 Redundancy state of the Secondary will still be Active, however the multicast output is suppressed.

1 + 1 Redundancy Configuration

Overview

The 1 + 1 Redundancy configuration GUI allows configuration and control of a 1 + 1 Redundancy group. It can be accessed by opening the web GUI, selecting "Configure", selecting "System", then selecting "Standalone 1 + 1 Redundancy"

The GUI comprises of the following:

- Standard Buttons ("Back", "Up", "Refresh", "Apply Changes")
- Actions Buttons ("Manual Configuration Copy" x 2, "Set Primary Active", "Set Secondary Active")
- "1 + 1 Redundancy" Configuration Settings
- "Primary Device" Status
- "Secondary Device" Status

Standard Buttons

These behave as elsewhere in the GUI.

Action Buttons

Action buttons fall into 2 categories.

- Manual configuration copy buttons perform a copy of all configuration settings from one unit to another unit. Any configurations on the unit that is being copied to will be overwritten and permanently lost. Box specific parameters, such as IP addresses and 1 + 1 Redundancy configuration settings are not copied. Care should always be taken to ensure that the copy is performed in the correct direction. It may be worthwhile using the "Save Configuration to File" option on the "Save-Load" configuration tab to make a backup copy of the settings of both units before using this feature.
- "Set Primary Active" and "Set Secondary Active" buttons will set the relevant unit into the "Active" state, meaning it will try to broadcast. The other unit will be set to "Passive".

"1 + 1 Redundancy" Configuration Settings

These settings configure the 1 + 1 Redundancy group.

The "Device Role" setting can be either "Standalone", "Primary" or "Secondary". Depending on the type of the unit a subset of these options will be available. On a Primary unit, "Standalone" and "Primary" are available. On a Secondary unit, this setting is fixed to "Secondary". A "Standalone" unit is not operating as part of a redundancy group. It will not push configuration to a peer. It will always be Active. "Primary" and "Secondary" units will attempt to join a 1 + 1 redundancy group.

The "Peer IP Address" setting should be set to the control IP address of the peer unit in this redundancy group. On the peer unit this field should hold the control IP address of this unit.

The "ICMP Ping Period" and "RPC Ping Period" settings allow the time between consecutive pings to be altered.

The "Availability" setting allows the operator to declare that a unit is not available as part of the 1 + 1 redundancy group. This raises a critical alarm, which prevents the 1 + 1 Redundancy system from automatically switching to that unit.

On a Secondary device there are 2 additional settings. These are "Alarm Primary to Secondary Delay" and "Ping Primary to Secondary Delay". These settings specify the delay when performing a redundancy switch. A redundancy switch will result in a few seconds disruption to the outputs. At least 5 seconds delay is recommended to avoid switching on spurious trigger conditions, although smaller number can be used.

"Primary Device" Status and "Secondary Device" Status

These areas show status information relating to each of the devices in the 1 + 1 Redundancy group. Most of the fields are self-explanatory.

NOTE: The last update time can be set by either unit. If the clocks of the 2 units are not synchronised this could cause a time difference to show in this information It is recommended that an SNTP server is used to synchronise the clocks on the 2 units.

Adding a Secondary to an existing Standalone configuration

Overview

This page describes the process that should be followed to add a Secondary backup unit to an existing Standalone system.

1. Create a backup of the Primary configuration settings just in case anything goes wrong. This can be done by clicking on "Configure", then "Save-Load", then right click on the link to save the configuration.
2. Ensure that the secondary is disconnected from the network, and apply power to the secondary unit.
3. Configure the control IP address for the secondary unit using the front panel.
4. Connect the secondary to the control network. Do not connect the data networks at this point.
5. Open the web GUI for the Secondary unit and configure the remaining network settings (control, data input and data output).
6. On the Secondary web GUI click "Configure", then "System", then "Standalone 1 + 1 Redundancy". Enter the control IP address of the Primary in the "Peer IP Address" setting and click "Apply Changes", then OK on the popup dialog.
7. Open the web GUI for the Primary unit and click "Configure", then "System", then "Standalone 1 + 1 Redundancy". Enter the control IP address of the Secondary in the "Peer IP Address" setting, select "Primary" as the "Device Role" and click "Apply Changes", then OK on the popup dialog.
8. On the Primary unit web GUI click "Set Primary Active", then OK on the popup dialog.
9. On the Primary unit web GUI click "Manual Configuration Copy From Primary to Secondary" (ensure you click the correct button!), then OK on the popup dialog.
10. On the Primary unit web GUI click "Configure", then "System", then "MGP Support". Set "MGP Mode" to "On", click "Apply Changes", then OK on the popup dialog.
11. Wait for 60 seconds for the units to stabilise.
12. As a final check, click on the "Configure" on the Secondary web GUI. The services configuration will be displayed. Compare this with the services configuration of the primary and make sure they are the same.
13. Connect the data networks to the Secondary unit.

1 + 1 Redundancy Hints and Tips

This page provides a few hints and tips for using 1 + 1 redundancy.

Enable MGP

It is possible for the 1 + 1 Redundancy system to have both units Active. This can happen if the control connection between the units fails. In this case the secondary thinks the primary has failed, and becomes Active. This could cause duplicate multicast packets on the output data network. To prevent this it is recommended that MGP is always enabled in a 1 + 1 Redundancy system.

To enable MGP, open the web GUI and click "Configure", then "System", then "MGP Support". Set "MGP Mode" to "On", click "Apply Changes", then OK on the popup dialog.

Use SNTP to Synchronise Time

It is recommended that SNTP is used to ensure that the system clock on each unit reports the same time. This can be configured from the web GUI by clicking "Configure" then "Device Info" and setting the "SNTP Server" setting.

Beware of changing the "Device State (setmode)"

When a redundancy switch is performed (either manual or automatic), the "Device State (setmode)" may be changed, overriding any manual change to this configuration.

If you need to manually adjust this setting it is recommended that you set the 1 + 1 Redundancy "Availability" setting to "Unavailable" on both units prior to making any change. This will prevent the 1 + 1 Redundancy system from performing an automatic redundancy switch.

Power down unused secondaries

If a Secondary unit is not being used, but is connected to power it will attempt to contact its peer. After 30 seconds of not being able to, it will go Active. At this point the 30 day timed license will start being consumed. If the unit is left in this state for 30 days, it will be rendered useless until the license is renewed. For this reason a secondary unit that is not being used should be disconnected from the power supply.

Resolving "Configuration Mismatch" alarm

The configuration mismatch alarm indicates that the configuration on the 2 units may not be identical. This alarm is triggered if a configuration change is made on one unit whilst the other unit is not contactable. It is also triggered if the pairing process is unable to work out which unit should be Active. In this situation the user should manually decide which unit has the most up to date configuration. The "Last Updated" value may be useful to determine this, however since communication was lost, this may not reflect the correct value for the other unit. You should check the Primary "Last Updated" time using the Primary web GUI

and the Secondary "Last Updated" time on the Secondary web GUI.

Once you have decided which unit has the correct configuration, you should use the corresponding button on the GUI to copy the configuration from that unit to the other unit. This will clear the alarm.

Resolving "Conflicting Status" alarm

This alarm indicates that the pairing process was not able to determine which unit should be active and which unit should be passive. When this alarm is raised either both units will be Active or both units will be Passive.

Firstly you should resolve the "Configuration Mismatch" alarm (this will always accompany the "Conflicting Status" alarm).

If both units are Passive:

- if are no problems with the Primary unit, you should use the web GUI to make the Primary unit active
- else use the web GUI to make the Secondary unit active. Repair the Primary and switch back to is as soon as possible.

If both units are Active, and assuming that you have MGP enabled, MGP will decide which unit is actually broadcasting and suppress the data output of the other unit. You should determine which unit is actually broadcasting and make that the Active unit. To do this, open the web GUI for each unit (in separate browser tabs/windows) and click "Configure", then "System", then "MGP Support" on each web GUI. Observe the value of "Unit Level MGP State" on each unit. One of the units will show "R1 On air". Use the web GUI to make this unit the Active unit. If you have just made the Secondary the Active unit, you should switch back to the Primary when it will cause the least disruption to your broadcasting services.

License Remaining is Rounded Up

The reported value for "License Remaining" is rounded up when displayed in the GUI. When the value reported shows 1 day you have between 0 and 24 hours until the license expires. The Secondary unit will go offline immediately when the value reaches zero.

IP Encapsulation of Transport Streams

Mapping of MPEG-2 TS Packets

The mapping of MPEG-2 TS packets into IP data frames is done according to the protocol stack shown in the following illustration.
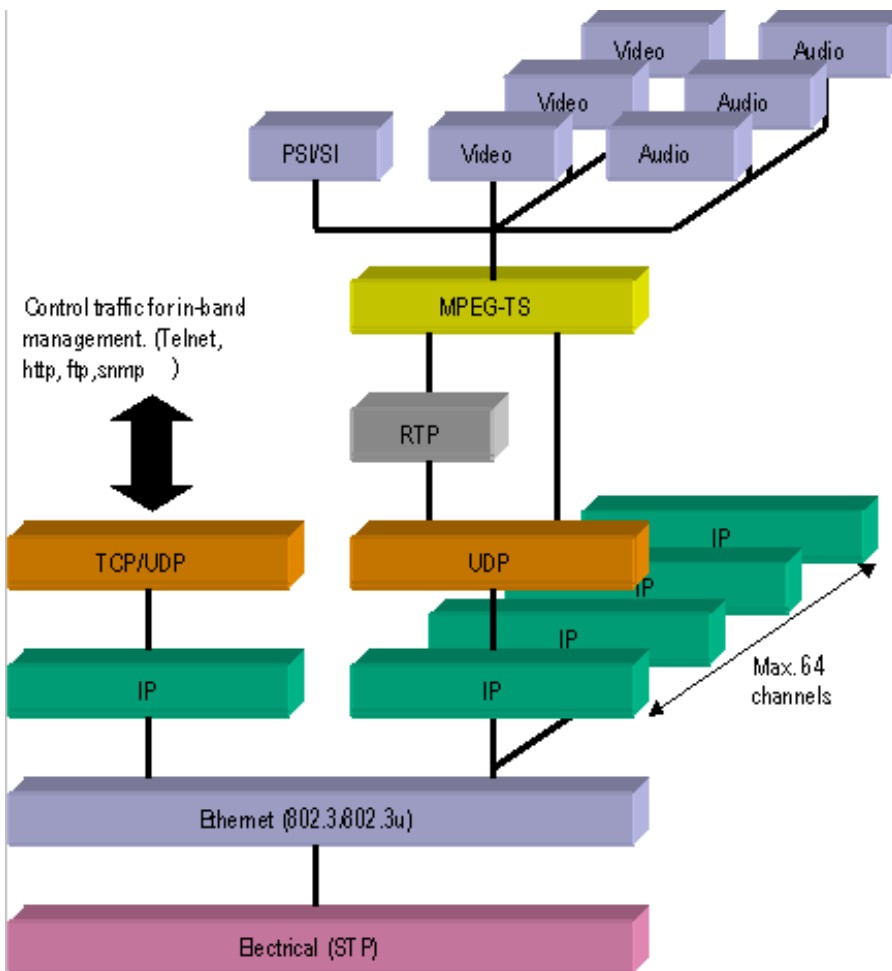
MPEG Layer

The MPEG-2/DVB layer is specified in ISO/IEC IS 13818 "Generic Coding of Moving Pictures and Associated Audio". The main functionality of this layer is to transform MPTS (Multi-Program Transport Streams) into a number of SPTS (Single-Program Transport Streams). A transport stream carrying multiple programs is in this way split into a number of 'mini' transport streams, each carrying a single program. This ensures that the video can be passed through limited bandwidth links such as ADSL further down the transmission path.

RTP Layer

The RTP layer is optional, and will add an 8-byte RTP header to the new packet. This header contains a sequence number and a time stamp.

UDP Layer

The UDP layer is according to RFC768 "User Datagram Protocol". The user can control the target UDP port number for the MPEG-2 stream. A configurable number of 188-byte long MPEG-2 TS packets are mapped straight into an UDP frame with no additional overhead. The MTU for Ethernet is usually 1500 bytes. This limits the number of MPEG-2 TS packets per UDP frame to lie within 1 to 7. The following illustration shows the mapping of MPEG-2 transport streams into UDP packets.
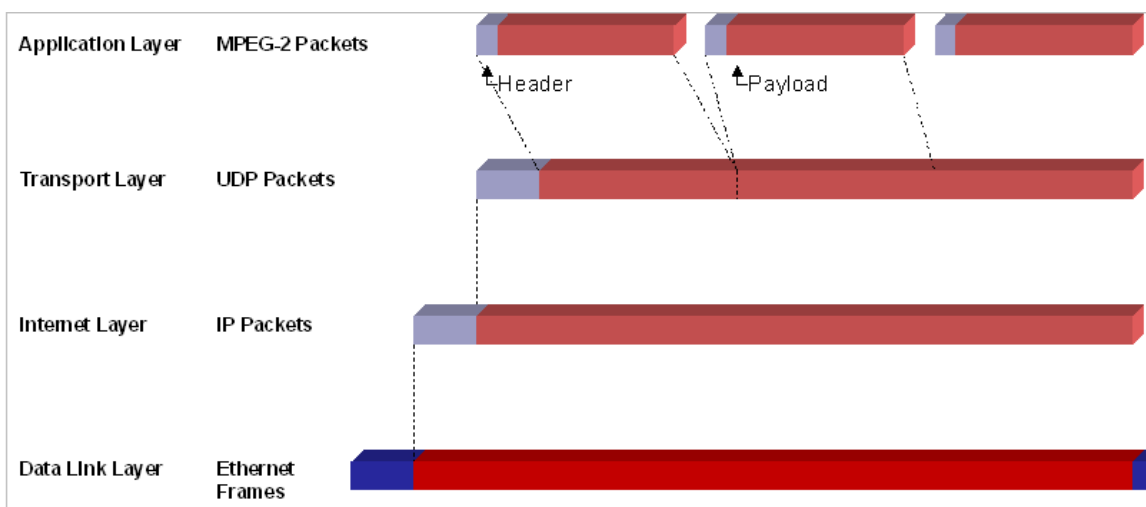
IP Layer

The IP layer is according to RFC791 "Internet Protocol Specification". The user is allowed access to the following IP header fields: IP source address, IP destination address, Time-To-Live field, Type-Of-Service field. Performing static mapping between class-D IP addresses and the corresponding Ethernet multicast MAC addresses supports limited IP Multicasting (Type 1).

Ethernet Layer

The data link layer is Ethernet according to IEEE 802.3/802.3u (auto sensing 10/100 Mbps, Twisted Pair, RJ-45 connector).

IP Overhead

The IP overhead calculation when mapping MPEG-2 TS packets into IP frames is shown in the following table.

	Overhead factor	Comments
MPEG-2 TS	1.0	

	Overhead factor	Comments
UDP	1324/1316 = 1.006	UDP header=8 bytes
IP	1344/1324 = 1.015	IP header=20 bytes
Ethernet	1358/1344 = 1.010	Eth header=14 bytes

Total overhead factor becomes: 1.006 x 1.015 x 1.010 = 1.031 or 3.1% overhead.

NOTE: The number of MPEG-2 TS packets one can map down into each UDP frame is variable (between 1 and 7). Usually 7 is used for minimum overhead. This is also used in the above calculation.

Alarm Lists

[Base Unit](#)

[MPM1](#)

Base Chassis Alarms

The following table lists the alarm and failure identifiers generated within the Host Controller of the chassis.

Name	ID (hex)	ID (dec)	Type	Description
Ethernet interface Ctrl1 link down on Control network	00000401	1025	output	"Ethernet interface Ctrl1 link down on Control network".
Ethernet interface Ctrl2 link down on Control network	00000402	1026	output	"Ethernet interface Ctrl2 link down on Control network".
Fan Failure	00000441	1089	internal	"Permanent damage may be caused by running the unit whilst the fans are not working.".
Over Temperature	00000443	1091	internal	"Failure to take action may cause permanent damage to the unit. Please switch off and refer to Customer Support.".
Internal Hardware Issue	00000449	1097	internal	"An Internal Hardware Issue has occured. The system may not function properly.".
Host Build Version Mismatch	0000044A	1098	internal	"Host software is not at an officially released version. Host function may not be affected.".
System Clock Not Locked	0000044B	1099	internal	"The system 27 MHz VCXO is not locked. Check if the Mux SCR Source is valid.".
Chassis Identity Not Programmed	0000044C	1100	internal	"The chassis identity of the host could not be read correctly.".
Selected Mux SCR Source is not present	0000044D	1101	internal	"Selected Mux SCR Source could not be detected. Check if the Sync Card is plugged in.".

Host Identity Not Programmed	0000044E	1102	internal	"The host identity could not be read correctly.".
Uncontrolled release	0000044F	1103	internal	"This combination of host and option card software is not officially supported. This may lead to unexpected behaviour.".
No identity license	00000450	1104	internal	"This unit has not been licensed with an identity.".
Referenced Output Stream Unavailable from slot	00000461	1121	internal	"An option card is not installed in the specified slot or it cannot provide the requested output stream.".
MGP Collision	00000492	1170	internal	"Potential duplicate transmission detected".
MGP Spurious	00000493	1171	internal	"Spurious MSM packet detected".
No data available for Input Transport Stream	00000501	1281	input	"Both Primary and Backup Input Transport Streams have failed.".
No data available for Input Transport Stream	00000502	1282	input	"Both Primary and Backup Input Transport Streams have failed.".
No data available for Input Transport Stream	00000503	1283	input	"Both Primary and Backup Input Transport Streams have failed.".
No data available for Input Transport Stream	00000504	1284	input	"Both Primary and Backup Input Transport Streams have failed.".
No data available for Input Transport Stream	00000505	1285	input	"Both Primary and Backup Input Transport Streams have failed.".
No data available for Input Transport Stream	00000506	1286	input	"Both Primary and Backup Input Transport Streams have failed.".
No data available for Input Transport Stream	00000507	1287	input	"Both Primary and Backup Input Transport Streams have failed.".
No data available for Input Transport Stream	00000508	1288	input	"Both Primary and Backup Input Transport Streams have failed.".
No data available for Input Transport Stream	00000509	1289	input	"Both Primary and Backup Input Transport Streams have failed.".

No data available for Input Transport Stream	0000050A	1290	input	"Both Primary and Backup Input Transport Streams have failed.".
Input Transport Stream running on Backup	00000511	1297	input	"Primary Input Transport Stream has failed.".
Input Transport Stream running on Backup	00000512	1298	input	"Primary Input Transport Stream has failed.".
Input Transport Stream running on Backup	00000513	1299	input	"Primary Input Transport Stream has failed.".
Input Transport Stream running on Backup	00000514	1300	input	"Primary Input Transport Stream has failed.".
Input Transport Stream running on Backup	00000515	1301	input	"Primary Input Transport Stream has failed.".
Input Transport Stream running on Backup	00000516	1302	input	"Primary Input Transport Stream has failed.".
Input Transport Stream running on Backup	00000517	1303	input	"Primary Input Transport Stream has failed.".
Input Transport Stream running on Backup	00000518	1304	input	"Primary Input Transport Stream has failed.".
Input Transport Stream running on Backup	00000519	1305	input	"Primary Input Transport Stream has failed.".
Input Transport Stream running on Backup	0000051A	1306	input	"Primary Input Transport Stream has failed.".

MPM1 Alarms

The following table lists the alarm and failure identifiers generated within the MPM1 Transcoder Card.

Name	ID (hex)	ID (dec)	Type	Description
Over Temperature	000C0002	786434	internal	"Failure to take action may cause permanent damage to the unit. Please switch off and refer to Customer Support.".
Internal HW Information	000C0007	786439	internal	"HW reported an unexpected status value. This does not effect normal operation of the unit.".
Option Card Build Version Mismatch	000C0008	786440	internal	"The software on this option card is not an officially released version.".
Video Processor Boot Failure	000C0100	786688	internal	"At least one video processor has not booted".
Video Processor Alive Count Failure	000C0101	786689	internal	"At least one video processor has not incremented its alive count".
Video 1 Input Lock	000C0111	786705	input	"No valid video found on video input".
Video 1 Input Mismatch	000C0112	786706	input	"Unexpected video input format detected".
Video 1 Input Quality	000C0113	786707	input	"Too many CC errors or bad packets".
Video 1 Input PCR	000C0114	786708	input	"No or bad PCR detected in input".
Video 1 SCTE35	000C0115	786709	input	"No or bad SCTE35 splice pkt stream".
Video 1 Conversion	000C0116	786710	input	"Requested decode encode combination not supported".
Video 2 Input Lock	000C0121	786721	input	"No valid video found on video input".
Video 2 Input Mismatch	000C0122	786722	input	"Unexpected video input format detected".
Video 2 Input Quality	000C0123	786723	input	"Too many CC errors or bad packets".
Video 2 Input PCR	000C0124	786724	input	"No or bad PCR detected in input".
Video 2 SCTE35	000C0125	786725	input	"No or bad SCTE35 splice pkt stream".
Video 2 Conversion	000C0126	786726	input	"Requested decode encode combination not supported".
Video 3 Input Lock	000C0131	786737	input	"No valid video found on video input".
Video 3 Input Mismatch	000C0132	786738	input	"Unexpected video input format detected".
Video 3 Input Quality	000C0133	786739	input	"Too many CC errors or bad packets".
Video 3 Input PCR	000C0134	786740	input	"No or bad PCR detected in input".
Video 3 SCTE35	000C0135	786741	input	"No or bad SCTE35 splice pkt stream".
Video 3 Conversion	000C0136	786742	input	"Requested decode encode combination not supported".
Video 4 Input Lock	000C0141	786753	input	"No valid video found on video input".
Video 4 Input Mismatch	000C0142	786754	input	"Unexpected video input format detected".

Video 4 Input Quality	000C0143	786755	input	"Too many CC errors or bad packets".
Video 4 Input PCR	000C0144	786756	input	"No or bad PCR detected in input".
Video 4 SCTE35	000C0145	786757	input	"No or bad SCTE35 splice pkt stream".
Video 4 Conversion	000C0146	786758	input	"Requested decode encode combination not supported".
Video 5 Input Lock	000C0151	786769	input	"No valid video found on video input".
Video 5 Input Mismatch	000C0152	786770	input	"Unexpected video input format detected".
Video 5 Input Quality	000C0153	786771	input	"Too many CC errors or bad packets".
Video 5 Input PCR	000C0154	786772	input	"No or bad PCR detected in input".
Video 5 SCTE35	000C0155	786773	input	"No or bad SCTE35 splice pkt stream".
Video 5 Conversion	000C0156	786774	input	"Requested decode encode combination not supported".
Video 6 Input Lock	000C0161	786785	input	"No valid video found on video input".
Video 6 Input Mismatch	000C0162	786786	input	"Unexpected video input format detected".
Video 6 Input Quality	000C0163	786787	input	"Too many CC errors or bad packets".
Video 6 Input PCR	000C0164	786788	input	"No or bad PCR detected in input".
Video 6 SCTE35	000C0165	786789	input	"No or bad SCTE35 splice pkt stream".
Video 6 Conversion	000C0166	786790	input	"Requested decode encode combination not supported".
Video 7 Input Lock	000C0171	786801	input	"No valid video found on video input".
Video 7 Input Mismatch	000C0172	786802	input	"Unexpected video input format detected".
Video 7 Input Quality	000C0173	786803	input	"Too many CC errors or bad packets".
Video 7 Input PCR	000C0174	786804	input	"No or bad PCR detected in input".
Video 7 SCTE35	000C0175	786805	input	"No or bad SCTE35 splice pkt stream".
Video 7 Conversion	000C0176	786806	input	"Requested decode encode combination not supported".
Video 8 Input Lock	000C0181	786817	input	"No valid video found on video input".
Video 8 Input Mismatch	000C0182	786818	input	"Unexpected video input format detected".
Video 8 Input Quality	000C0183	786819	input	"Too many CC errors or bad packets".
Video 8 Input PCR	000C0184	786820	input	"No or bad PCR detected in input".
Video 8 SCTE35	000C0185	786821	input	"No or bad SCTE35 splice pkt stream".
Video 8 Conversion	000C0186	786822	input	"Requested decode encode combination not supported".
Video 9 Input Lock	000C0191	786833	input	"No valid video found on video input".
Video 9 Input Mismatch	000C0192	786834	input	"Unexpected video input format detected".
Video 9 Input Quality	000C0193	786835	input	"Too many CC errors or bad packets".
Video 9 Input PCR	000C0194	786836	input	"No or bad PCR detected in input".
Video 9 SCTE35	000C0195	786837	input	"No or bad SCTE35 splice pkt stream".
Video 9 Conversion	000C0196	786838	input	"Requested decode encode combination not supported".
Video 10 Input Lock	000C01A1	786849	input	"No valid video found on video input".
Video 10 Input Mismatch	000C01A2	786850	input	"Unexpected video input format detected".
Video 10 Input Quality	000C01A3	786851	input	"Too many CC errors or bad packets".
Video 10 Input PCR	000C01A4	786852	input	"No or bad PCR detected in input".

Video 10 SCTE35	000C01A5	786853	input	"No or bad SCTE35 splice pkt stream".
Video 10 Conversion	000C01A6	786854	input	"Requested decode encode combination not supported".
Video 11 Input Lock	000C01B1	786865	input	"No valid video found on video input".
Video 11 Input Mismatch	000C01B2	786866	input	"Unexpected video input format detected".
Video 11 Input Quality	000C01B3	786867	input	"Too many CC errors or bad packets".
Video 11 Input PCR	000C01B4	786868	input	"No or bad PCR detected in input".
Video 11 SCTE35	000C01B5	786869	input	"No or bad SCTE35 splice pkt stream".
Video 11 Conversion	000C01B6	786870	input	"Requested decode encode combination not supported".
Video 12 Input Lock	000C01C1	786881	input	"No valid video found on video input".
Video 12 Input Mismatch	000C01C2	786882	input	"Unexpected video input format detected".
Video 12 Input Quality	000C01C3	786883	input	"Too many CC errors or bad packets".
Video 12 Input PCR	000C01C4	786884	input	"No or bad PCR detected in input".
Video 12 SCTE35	000C01C5	786885	input	"No or bad SCTE35 splice pkt stream".
Video 12 Conversion	000C01C6	786886	input	"Requested decode encode combination not supported".
Audio Module Error	000C0300	787200	input	"The audio module reported an unexpected status value.".
Audio Module CPU loading	000C0301	787201	input	"The audio module CPU load is too high to support the current audio configuration.".
Audio DSP Failed to Boot	000C0302	787202	input	"The audio DSP has failed to boot".
Audio 1 Input lock	000C0311	787217	input	"No valid audio detected on selected input. Please check source connection.".
Audio 1 TS input error	000C0312	787218	input	"Incoming transport stream error. Please check source TS.".
Audio 1 Compressed audio not detected	000C0313	787219	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 1 Input frame CRC failure	000C0314	787220	input	"CRC error in compressed input frame. Output is muted.".
Audio 1 Unsupported sample rate	000C0315	787221	input	"Unsupported sample rate at decoder output.".
Audio 2 Input lock	000C0321	787233	input	"No valid audio detected on selected input. Please check source connection.".
Audio 2 TS input error	000C0322	787234	input	"Incoming transport stream error. Please check source TS.".
Audio 2 Compressed audio not detected	000C0323	787235	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 2 Input frame CRC failure	000C0324	787236	input	"CRC error in compressed input frame. Output is muted.".
Audio 2 Unsupported sample rate	000C0325	787237	input	"Unsupported sample rate at decoder output.".
Audio 3 Input lock	000C0331	787249	input	"No valid audio detected on selected input. Please check source connection.".
Audio 3 TS input error	000C0332	787250	input	"Incoming transport stream error. Please check source TS.".
Audio 3 Compressed audio not detected	000C0333	787251	input	"Compressed audio not detected on input. Please check source connection and source format.".

Audio 3 Input frame CRC failure	000C0334	787252	input	"CRC error in compressed input frame. Output is muted.".
Audio 3 Unsupported sample rate	000C0335	787253	input	"Unsupported sample rate at decoder output.".
Audio 4 Input lock	000C0341	787265	input	"No valid audio detected on selected input. Please check source connection.".
Audio 4 TS input error	000C0342	787266	input	"Incoming transport stream error. Please check source TS.".
Audio 4 Compressed audio not detected	000C0343	787267	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 4 Input frame CRC failure	000C0344	787268	input	"CRC error in compressed input frame. Output is muted.".
Audio 4 Unsupported sample rate	000C0345	787269	input	"Unsupported sample rate at decoder output.".
Audio 5 Input lock	000C0351	787281	input	"No valid audio detected on selected input. Please check source connection.".
Audio 5 TS input error	000C0352	787282	input	"Incoming transport stream error. Please check source TS.".
Audio 5 Compressed audio not detected	000C0353	787283	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 5 Input frame CRC failure	000C0354	787284	input	"CRC error in compressed input frame. Output is muted.".
Audio 5 Unsupported sample rate	000C0355	787285	input	"Unsupported sample rate at decoder output.".
Audio 6 Input lock	000C0361	787297	input	"No valid audio detected on selected input. Please check source connection.".
Audio 6 TS input error	000C0362	787298	input	"Incoming transport stream error. Please check source TS.".
Audio 6 Compressed audio not detected	000C0363	787299	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 6 Input frame CRC failure	000C0364	787300	input	"CRC error in compressed input frame. Output is muted.".
Audio 6 Unsupported sample rate	000C0365	787301	input	"Unsupported sample rate at decoder output.".
Audio 7 Input lock	000C0371	787313	input	"No valid audio detected on selected input. Please check source connection.".
Audio 7 TS input error	000C0372	787314	input	"Incoming transport stream error. Please check source TS.".
Audio 7 Compressed audio not detected	000C0373	787315	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 7 Input frame CRC failure	000C0374	787316	input	"CRC error in compressed input frame. Output is muted.".
Audio 7 Unsupported sample rate	000C0375	787317	input	"Unsupported sample rate at decoder output.".
Audio 8 Input lock	000C0381	787329	input	"No valid audio detected on selected input. Please check source connection.".
Audio 8 TS input error	000C0382	787330	input	"Incoming transport stream error. Please check source TS.".
Audio 8 Compressed audio not detected	000C0383	787331	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 8 Input frame CRC failure	000C0384	787332	input	"CRC error in compressed input frame. Output is muted.".

Audio 8 Unsupported sample rate	000C0385	787333	input	"Unsupported sample rate at decoder output.".
Audio 9 Input lock	000C0391	787345	input	"No valid audio detected on selected input. Please check source connection.".
Audio 9 TS input error	000C0392	787346	input	"Incoming transport stream error. Please check source TS.".
Audio 9 Compressed audio not detected	000C0393	787347	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 9 Input frame CRC failure	000C0394	787348	input	"CRC error in compressed input frame. Output is muted.".
Audio 9 Unsupported sample rate	000C0395	787349	input	"Unsupported sample rate at decoder output.".
Audio 10 Input lock	000C03A1	787361	input	"No valid audio detected on selected input. Please check source connection.".
Audio 10 TS input error	000C03A2	787362	input	"Incoming transport stream error. Please check source TS.".
Audio 10 Compressed audio not detected	000C03A3	787363	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 10 Input frame CRC failure	000C03A4	787364	input	"CRC error in compressed input frame. Output is muted.".
Audio 10 Unsupported sample rate	000C03A5	787365	input	"Unsupported sample rate at decoder output.".
Audio 11 Input lock	000C03B1	787377	input	"No valid audio detected on selected input. Please check source connection.".
Audio 11 TS input error	000C03B2	787378	input	"Incoming transport stream error. Please check source TS.".
Audio 11 Compressed audio not detected	000C03B3	787379	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 11 Input frame CRC failure	000C03B4	787380	input	"CRC error in compressed input frame. Output is muted.".
Audio 11 Unsupported sample rate	000C03B5	787381	input	"Unsupported sample rate at decoder output.".
Audio 12 Input lock	000C03C1	787393	input	"No valid audio detected on selected input. Please check source connection.".
Audio 12 TS input error	000C03C2	787394	input	"Incoming transport stream error. Please check source TS.".
Audio 12 Compressed audio not detected	000C03C3	787395	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 12 Input frame CRC failure	000C03C4	787396	input	"CRC error in compressed input frame. Output is muted.".
Audio 12 Unsupported sample rate	000C03C5	787397	input	"Unsupported sample rate at decoder output.".
Audio 13 Input lock	000C03D1	787409	input	"No valid audio detected on selected input. Please check source connection.".
Audio 13 TS input error	000C03D2	787410	input	"Incoming transport stream error. Please check source TS.".
Audio 13 Compressed audio not detected	000C03D3	787411	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 13 Input frame CRC failure	000C03D4	787412	input	"CRC error in compressed input frame. Output is muted.".
Audio 13 Unsupported sample rate	000C03D5	787413	input	"Unsupported sample rate at decoder output.".

Audio 14 Input lock	000C03E1	787425	input	"No valid audio detected on selected input. Please check source connection.".
Audio 14 TS input error	000C03E2	787426	input	"Incoming transport stream error. Please check source TS.".
Audio 14 Compressed audio not detected	000C03E3	787427	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 14 Input frame CRC failure	000C03E4	787428	input	"CRC error in compressed input frame. Output is muted.".
Audio 14 Unsupported sample rate	000C03E5	787429	input	"Unsupported sample rate at decoder output.".
Audio 15 Input lock	000C03F1	787441	input	"No valid audio detected on selected input. Please check source connection.".
Audio 15 TS input error	000C03F2	787442	input	"Incoming transport stream error. Please check source TS.".
Audio 15 Compressed audio not detected	000C03F3	787443	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 15 Input frame CRC failure	000C03F4	787444	input	"CRC error in compressed input frame. Output is muted.".
Audio 15 Unsupported sample rate	000C03F5	787445	input	"Unsupported sample rate at decoder output.".
Audio 16 Input lock	000C0401	787457	input	"No valid audio detected on selected input. Please check source connection.".
Audio 16 TS input error	000C0402	787458	input	"Incoming transport stream error. Please check source TS.".
Audio 16 Compressed audio not detected	000C0403	787459	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 16 Input frame CRC failure	000C0404	787460	input	"CRC error in compressed input frame. Output is muted.".
Audio 16 Unsupported sample rate	000C0405	787461	input	"Unsupported sample rate at decoder output.".
Audio 17 Input lock	000C0411	787473	input	"No valid audio detected on selected input. Please check source connection.".
Audio 17 TS input error	000C0412	787474	input	"Incoming transport stream error. Please check source TS.".
Audio 17 Compressed audio not detected	000C0413	787475	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 17 Input frame CRC failure	000C0414	787476	input	"CRC error in compressed input frame. Output is muted.".
Audio 17 Unsupported sample rate	000C0415	787477	input	"Unsupported sample rate at decoder output.".
Audio 18 Input lock	000C0421	787489	input	"No valid audio detected on selected input. Please check source connection.".
Audio 18 TS input error	000C0422	787490	input	"Incoming transport stream error. Please check source TS.".
Audio 18 Compressed audio not detected	000C0423	787491	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 18 Input frame CRC failure	000C0424	787492	input	"CRC error in compressed input frame. Output is muted.".
Audio 18 Unsupported sample rate	000C0425	787493	input	"Unsupported sample rate at decoder output.".
Audio 19 Input lock	000C0431	787505	input	"No valid audio detected on selected input. Please check source connection.".

Audio 19 TS input error	000C0432	787506	input	"Incoming transport stream error. Please check source TS.".
Audio 19 Compressed audio not detected	000C0433	787507	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 19 Input frame CRC failure	000C0434	787508	input	"CRC error in compressed input frame. Output is muted.".
Audio 19 Unsupported sample rate	000C0435	787509	input	"Unsupported sample rate at decoder output.".
Audio 20 Input lock	000C0441	787521	input	"No valid audio detected on selected input. Please check source connection.".
Audio 20 TS input error	000C0442	787522	input	"Incoming transport stream error. Please check source TS.".
Audio 20 Compressed audio not detected	000C0443	787523	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 20 Input frame CRC failure	000C0444	787524	input	"CRC error in compressed input frame. Output is muted.".
Audio 20 Unsupported sample rate	000C0445	787525	input	"Unsupported sample rate at decoder output.".
Audio 21 Input lock	000C0451	787537	input	"No valid audio detected on selected input. Please check source connection.".
Audio 21 TS input error	000C0452	787538	input	"Incoming transport stream error. Please check source TS.".
Audio 21 Compressed audio not detected	000C0453	787539	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 21 Input frame CRC failure	000C0454	787540	input	"CRC error in compressed input frame. Output is muted.".
Audio 21 Unsupported sample rate	000C0455	787541	input	"Unsupported sample rate at decoder output.".
Audio 22 Input lock	000C0461	787553	input	"No valid audio detected on selected input. Please check source connection.".
Audio 22 TS input error	000C0462	787554	input	"Incoming transport stream error. Please check source TS.".
Audio 22 Compressed audio not detected	000C0463	787555	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 22 Input frame CRC failure	000C0464	787556	input	"CRC error in compressed input frame. Output is muted.".
Audio 22 Unsupported sample rate	000C0465	787557	input	"Unsupported sample rate at decoder output.".
Audio 23 Input lock	000C0471	787569	input	"No valid audio detected on selected input. Please check source connection.".
Audio 23 TS input error	000C0472	787570	input	"Incoming transport stream error. Please check source TS.".
Audio 23 Compressed audio not detected	000C0473	787571	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 23 Input frame CRC failure	000C0474	787572	input	"CRC error in compressed input frame. Output is muted.".
Audio 23 Unsupported sample rate	000C0475	787573	input	"Unsupported sample rate at decoder output.".
Audio 24 Input lock	000C0481	787585	input	"No valid audio detected on selected input. Please check source connection.".
Audio 24 TS input error	000C0482	787586	input	"Incoming transport stream error. Please check source TS.".

Audio 24 Compressed audio not detected	000C0483	787587	input	"Compressed audio not detected on input. Please check source connection and source format.".
Audio 24 Input frame CRC failure	000C0484	787588	input	"CRC error in compressed input frame. Output is muted.".
Audio 24 Unsupported sample rate	000C0485	787589	input	"Unsupported sample rate at decoder output.".