ericsson.com

TT1222 MPEG-2 SD 4:2:0 Professional Receiver

Software Version 6.1.1 (and later)

REFERENCE GUIDE

ERICSSON

EN/LZT 790 0002/2 R1A

ENGLISH (UK) - READ THIS FIRST!

If you do not understand the contents of this manual. DO NOT OPERATE THIS EQUIPMENT**.** Also, translation into any EC official language of this manual can be made available, at your cost.

ITALIANO - LEGGERE QUESTO AVVISO PER PRIMO!

Se non si capisce il contenuto del presente manuale. NON UTILIZZARE L'APPARECCHIATURA**.**. È anche disponibile la versione italiana di questo manuale, ma il costo è a carico dell'utente.

SVENSKA - LÄS DETTA FÖRST!

Om Ni inte förstår informationen i denna handbok. ARBETA DÅ INTE MED DENNA UTRUSTNING**.** En översättning till detta språk av denna handbok kan också anskaffas, på Er bekostnad.

NEDERLANDS - LEES DIT EERST!

Als u de inhoud van deze handleiding niet begrijpt. STEL DEZE APPARATUUR DAN NIET IN WERKING. U kunt tevens, op eigen kosten, een vertaling van deze handleiding krijgen.

PORTUGUÊS - LEIA O TEXTO ABAIXO ANTES DE MAIS NADA!

Se não compreende o texto deste manual. NÃO UTILIZE O EQUIPAMENTO. O utilizador poderá também obter uma tradução do manual para o português à própria custa.

SUOMI - LUE ENNEN KÄYTTÖÄ!

Jos et ymmärrä käsikirjan sisältöä. ÄLÄ KÄYTÄ LAITETTA. Käsikirja voidaan myös suomentaa asiakkaan kustannuksella.

FRANÇAIS - AVANT TOUT, LISEZ CE QUI SUIT!

Si vous ne comprenez pas les instructions contenues dans ce manuel. NE FAITES PAS FONCTIONNER CET APPAREIL. En outre, nous pouvons vous proposer, à vos frais, une version française de ce manuel.

DANSK - LÆS DETTE FØRST!

Udstyret må ikke betjenes. MEDMINDRE DE TIL FULDE FORSTÅR INDHOLDET AF DENNE HÅNDBOG. Vi kan også for Deres regning levere en dansk oversættelse af denne håndbog.

DEUTSCH - LESEN SIE ZUERST DIESEN HINWEIS!

Sollte Ihnen der Inhalf dieses Handbuches nicht klar verständlich sein, dann. BEDIENEN SIE DIESE GERÄTE NICHT! Eine Übersetzung des Handbuches in diese Sprache ist gegen Berechnung lieferbar.

ΕΛΛΗΝΙΚΑ - ΔΙΑΒΑΣΤΕ ΠΡΩΤΑ ΑΥΤΟ!

Αν δεν καταλάβετε το περιεχόμενο αυτού του βοηθήματος/εγχειριδίου. ΜΗΝ ΛΕΙΤΟΥΡΓΗΣΕΤΕ ΑΥΤΟΝ ΤΟΝ ΕΞΟΠΛΙΣΜΟ. Επίσης, αυτό το εγχειρίδιο είναι διαθέσιμο σε μετάφραση σε αυτή τη γλώσσα και μπορείτε να το αγοράσετε.

ESPAÑOL - LEA ESTE AVISO PRIMERO!

Si no entiende el contenido de este manual. NO OPERE ESTE EQUIPO. Podemos asimismo suministrarle una traducción de este manual al (idioma) previo pago de una cantidad adicional que deberá abonar usted mismo.

Copyright

Disclaimer

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

Contents

Introduction

This Reference Guide provides instructions and information for the installation, operation of the T1222 MPEG-2 SD 4:2:0 Professional Receiver.

This Reference Guide should be kept in a safe place for reference for the life of the equipment. It is not intended that this Reference Guide will be amended by the issue of individual pages. Any revision will be by a complete reissue. Further copies of this Reference Guide can be ordered from the address listed in *Customer Services*. If passing the equipment to a third party, also pass the relevant documentation.

Revision History

Issues of this Reference Guide are listed below:

Issue	Date	Software Version	Comments
1	Feb 2005	1.0.0	Initial release.
2	Apr 2005	2.0.0	Minor corrections. Changes to Menus. Addition of Russian SECAM Out option module.
3	July 2006	5.1.0	Addition of Dual ASI/SDI option module, nCompass control and TANDBERG DirectorV5.
4	Apr 2007	6.1.1	Addition of TT1221A product, MPE software option and IP OUT option module.
5	Sept 2010	6.1.1	Removal of TT1221A product details and MPE Software option. Conversion to Ericsson document format.
A	Jan 2011	6.1.1	Allocation of Ericsson Number Identity and re-brand completion

Associated Documents

The following manuals/guides are also associated with this equipment:

Ericsson Part Number	Original Part Number	Title
1/1424-EN/LZT 790 0002 Uen A	ST.US.TT1222	TT1222 MPEG-2 SD 4:2:0 Professional Receiver (Sv 6.1.1>) User Guide
1424-EN/LZT 790 0002 Uen A	ST.TS.TT1222	TT1222 MPEG-2 SD 4:2:0 Professional Receiver (Sv 3.0.0>) Remote Control Protocol

Trademarks

All best endeavors have been made to acknowledge registered trademarks and trademarks used throughout this Reference Guide. Any notified omissions will be rectified in the next issue of this Reference Guide. Some trademarks may be registered in some jurisdictions but not in others.

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

Registered Trademarks

Ethernet®	Registered trademark of Xerox Corporation.
Dolby®/AC-3®	Registered trademarks of Dolby Laboratories Licensing Corporation.
Dolby® Digital	Registered trademark of Dolby Laboratories Licensing Corporation.
Musicam®	Registered trademark of Thomson and Télédiffusion de France (TDF), Europe and is a registered trademark of CCS (now Musicam USA Incorporated), USA.

Macrovision

This product incorporates copyright protection technology that is protected by U.S. patents and other intellectual property rights. Use of this copyright protection technology must be authorized by Macrovision Corporation, and is intended for home and other limited viewing uses only unless authorized by Macrovision. Reverse engineering or disassembly is prohibited.

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 property or the environment. They are highlighted 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 highlighted 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.

EMC Compliance

This equipment is certified to the EMC requirements detailed in *Annex B, Technical Specification*. To maintain this certification, only use the leads supplied or if in doubt contact Customer Services.

Contact Information

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 standalone equipment, then Ericsson **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.

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

Ericsson provides a wide range of training courses on the operation and maintenance of our products and on their supporting technologies. Ericsson 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.

International	Tel:	+44 (0) 23 8048 4229
	Fax:	+44 (0) 23 8048 4161
	Email:	tvglobaltraining@ericsson.com

Customer Services and Technical Training Postal Address

Ericsson
Unit 2
Strategic Park
Comines Way
Hedge End
Southampton
Hampshire
SO30 4DA
United Kingdom

Return of Equipment

If you need to return equipment for repair please contact your local Ericsson Customer Services Department.
Please refer to the Customer Services Contact Information on Page vii

You will then be directed to return the faulty equipment to a repair centre with the appropriate facilities for that equipment. A tracking number will be issued that should be used if you need to enquire about the progress of the repair. The equipment should be properly packed and the tracking number should be clearly marked on the outside of the packaging.

Technical Publications

If you need to contact Ericsson Technical Publications regarding this publication, e-mail: tvtechpubs@ericsson.com.

BLANK

Introduction

Chapter 1

Contents

List of Figures

List of Tables

1.1 Scope of This Reference Guide

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 trained and approved service engineers are permitted to service this equipment.

Caution!

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

1.1.1 Who Should Use This Reference Guide

This Reference Guide is written for operators/users of the Ericsson TT1222 MPEG-2 SD 4:2:0 Professional Receiver. It describes the unit's functions and operation. The Reference Guide is written to assist in the installation and day-to-day care and operation of the unit. It does not include any maintenance information or procedures which would require the removal of covers.

1.1.2 What Equipment is Covered by This Reference Guide

The base model of the TT1222 Receiver comprises of an enclosure and Base Board only.

Figure 1.1: TT1222 Front View

There are a number of option modules which can be added to the base unit to provide different inputs and additional outputs. Information regarding the option modules can be found in *Chapter 3, Options*.

Ericsson is introducing an improved ordering system for its television products. New part numbers are being introduced to support this new system.
Table 1.1 shows the new part numbers used for ordering and supply of the product and its options.

Table 1.1: Equipment Model Descriptions

Model Number	TT1222	TT1222 with Russian Secam
Description	1U MPEG-2 SD 4:2:0 Professional Receiver. Common Interface CA unit with: 2 x Composite Video Outputs, 2 x Audio Outputs (D-types), RS-232 Data, RS-232 Remote Control, 5 x General Purpose Outputs (GPO), 1 x Alarm Relay and 1 x Ethernet Port	As described for TT1222 with addition of support for Russian SECAM Video Output.
Marketing Code	TT1222/CIBAS	TT1222/RSBAS
Price Object Number	FAZ 101 0128/1	FAZ 101 0128/2
Supply Object Number	KDU 137 661/1	KDU 137 661/2

1.1.3 Software Version

This Reference Guide has been written to cover the functionality of software version **6.1.1 (and later)**. The current software version can be found in the **Properties Menu**.

1.2 Summary of Features

1.2.1 Main Features

The Receiver is fully compliant with the appropriate sections of the MPEG-2[1] and DVB-S[2] specifications.

The TT1222 offers the following features:

- **Signal Inputs**:
  - QPSK L-Band (Option)[3] - 1 x QPSK via F-connector
  - ASI input (Option)[3] - 1 x ASI via BNC connector
- **Signal Outputs**:
  - Composite Video Outputs - 2 x CVBS via BNC connectors
  - Audio outputs - 2 x Audio via 9-way D-Type connectors (Analogue and Digital)
  - ASI output (Option)[3] - 1 x ASI via BNC connector

[1] Moving Pictures Expert Group: MPEG-2 specification ISO 13818.
[2] European Digital Video Broadcasting (DVB) Project. EN 300 421 Digital broadcasting systems for television, sound and data services: Framing structure, channel coding, and modulation for the 11/12 GHz satellite service.
[3] See *Chapter 3* for details of options.

  - Configurable ASI/SDI outputs (Option)[3] - 2 x ASI/SDI via BNC connectors
  - IP outputs (Option)[3] – 2 x IP OUT via RJ-45 Ethernet connectors

- **Video Decoding**:
  - MP@ML mode support video resolutions up to 720 pixels x 576 active lines (25 frame/s) or 720 pixels x 480 active lines (30 frame/s)
  - Support for PAL- (B, D, G, H, I, M and Combination N)
  - Support for SECAM (B, G, H, K1, L) Line ID
  - Support for SECAM (D, K) Field ID (Option)3
  - Support for NTSC (M)
- **Audio Decoding:**
  - Decoding of two separate audio services. (Audio 1 is dependent on the TV service selection. Audio 2 audio is individually configured).
  - Support of MPEG-1 Layer I and II (Musicam)
  - Support of Dolby Digital AC-3 downmix (Option)
  - Sampling rates 32, 44.1 and 48 kHz
  - All MPEG-1 Layer I and II bit rates
- **Vertical Blanking Interval (VBI) Signalling Support:**
  - In 625 lines: VITS test lines, WSS, WSS-AFD, VPS, Sin(x)/x, WST (EBU) Teletext insertion and Inverted Teletext is supported in both the analogue and digital video outputs.
  - In 525 lines: VITS test lines, Closed Captions, and GCR are supported in both the analogue and digital video outputs.
- **Service Selection:**
  - Chosen from a menu list of available services carried in the currently received transport stream in PSI/SI enabled mode.
- **Conditional Access:**
  - DVB Common Interface
  - BISS Modes 1 and E
  - Director (Option)
- **Front Panel Controls and Indications:**
  - A 2 row by 20 character back lit LCD display provides information and allows operator choice entry
  - Four pushbuttons provide the control interface in conjunction with the LCD display

- Single LED provides status information

- **Data:**
  - Low speed data: RS-232 asynchronous (up to 115.2 kbps)
- **Remote Control:**
  - RS-232, Ericsson proprietary control solution
  - Over-air remote control via Director (Option)
  - Web Browser (or nCompass Control)
- **Control:**
  - 1 Relay available
  - 5 General purpose output (GPO) relay contacts

1.2.2 Inputs

1.2.2.1 ASI Input (Option)

A single BNC connector is present on the rear of the unit if the hardware option TT1222/HWO/ASI/IN is purchased.

1.2.2.2 QPSK L-band Input (Option)

A single F-type connector is available on the rear of the unit if the hardware option TT1222/HWO/QPSK is purchased.

This connects the L-band output of a suitable LNB either directly or via a suitable attenuator giving lightening and surge protection.

1.2.2.3 Ethernet Remote Control

An RJ-45 Ethernet connector connects to a PC or network to provide a network connection for nCompass Control and web browser control.

1.2.2.4 Serial Remote Control

RS232 data via a 9-way D-sub connector for use with RS232 Ericsson proprietary control solution.

1.2.3 Outputs

1.2.3.1 Video Outputs

Two BNC composite video outputs are present on the rear of the unit.

1.2.3.2 Audio Outputs

The TT1222 Receiver has two audio outputs available on 9-way D-sub connectors at the rear panel. Each connector provides one balanced analogue audio pair and one unbalanced digital signal. Dependent on the input, the user can configure the analogue output to present each audio as one stereo, a dual-mono or two independent mono channels.

1.2.3.3 Data Output

RS-232 asynchronous low speed data output carried on a 9-way D-sub connector, available on all models. The data output rate is configurable from 75 bps to 115200 bps.

1.2.3.4 Relay / GPO Output

The unit can be set up to produce warnings and alarms when particular conditions occur.

The relay output can be set up to trigger on one or more ‘error’ states. When the equipment has detected an error, the relay is triggered and the front panel alarm LED is also activated. For instructions on configuring the alarms, see *Chapter 6, Alarms/GPOs.* For a description of the alarm relay, see *Chapter 2, Installing the Equipment*.

The same connector supports five GPOs (General Purpose Outputs). These can be set up to trigger on a single or numerous events. These signals are independent of the relay signal.

1.2.3.5 ASI Output (Option)

A single ASI transport stream output is available on the rear of the unit if the hardware option TT1222/HWO/ASI/OUT is purchased.

1.2.3.6 ASI/SDI Outputs (Option)

Two configurable ASI/SDI outputs are available if the hardware option TT1222/HWO/ASI/SDI is purchased. Each output can be individually configured to be either ASI or SDI.

1.2.3.7 IP Outputs (Option)

Two IP transport stream outputs are available if the hardware option TT1222/HWO/IP/OUT is purchased.

More detail on the option modules can be found in *Chapter 3, Options.*

1.2.4 Conditional Access

The transport stream received by the IRD may be encrypted. The CA system is used to decrypt the required components of the transport stream so that they can be decoded.

The following conditional access systems are available:

- DVB Common Interface
- EBU Basic Interoperable Scrambling System BISS Mode 1 and Mode E (as specified in EBU Tech 3292 May 2002)
- Director (Option). Over-air remote control is available if the TT1222 is used as part of a Director system (over-air software downloading, re-start, tuning and retuning etc.)

The different CA options may be used, for example: Director and BISS, however, streams with mixed CA are not supported.

1.3 TT1222 Control Modes

1.3.1 Introduction

The TT1222 is designed for unattended operation. Once set up, it requires no further attention except to ensure that the fan is working. There are four control methods associated with the Receiver, front panel, remote control (RS-232), nCompass/web browser (Ethernet) and Director.

In Local control mode, the TT1222 may be controlled by the front panel, web browser or nCompass Control.

In Remote control mode, the TT1222 may be controlled by Ericsson RS232 proprietary control solution.

In Director mode, the TT1222 may be controlled by DirectorV5 NCP over-air control commands.

Note: Local Control is the factory default.

1.3.2 Unit Control

1.3.2.1 Front Panel

The receiver is controlled using the front panel menus.

The unit must be set to ‘local’ control to use this mode.

1.3.2.2 nCompass Control / Web Browser (ETHERNET port)

The receiver must have its **IP Address** and **Subnet Mask** (in the **Properties:Network** menu) configured to conform to the controlling network. The receiver can then be controlled using web browser or Ericsson nCompass Control software.

The unit must be set to 'local' control to use either of these modes.

1.3.2.3 Remote (RS-232 REMOTE port)

This state is entered when the **Ctrl Mode** setting (in the **Setup:Control** menu) is set to **remote**. Local mode commands are ignored when the unit is in Remote mode.

1.3.2.4 Director

When Director is enabled (via software license), the TT1222 Receiver can be put into Director OAC control mode. This is done by selecting **Over Air Control** (**OAC)** for the **Ctrl Mode** in the **Setup: Control** menu.

Note: Local mode is the factory default for the Receivers, even when they are used in a Director system. To switch to Director OAC mode, refer to *Chapter 5, Operating the Equipment remotely.*

When in OAC control mode, all Front Panel, Web Browser (and nCompass Control) and Serial Remote commands are ignored except the operating mode. The TT1222 can be put into a local lockout condition to also ignore the operating mode command. When in this condition, there are two ways to recover control:

- Cancelling the local lockout using an over-air command.
- Entering a PIN number via the Conditional Access menu on the Front Panel.

Either of these actions will put the Receiver out of local lockout mode.

1.4 Guided Tour

1.4.1 Construction

The receiver is constructed using a screened fan-ventilated chassis. All operational inputs and outputs are via the rear panel connectors. The unit may be operated freestanding on a horizontal flat surface, or mounted in a 19-inch rack. 1RU rack height is required. It is important that horizontal airflow is not obstructed, to maintain the airflow required to cool the unit.

1.4.2 Front Panel

The front panel is equipped with a Keypad, LCD Display and Status LED.

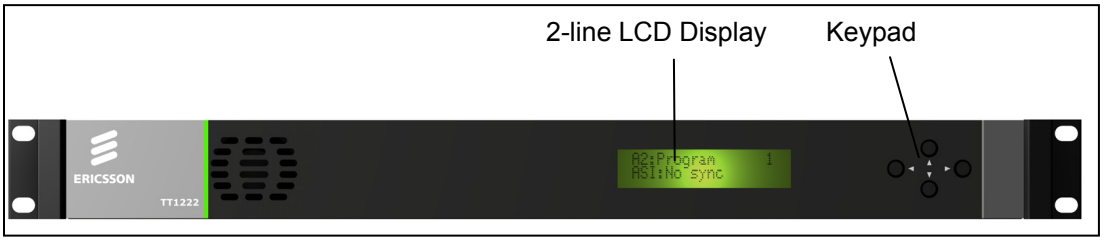


Figure 1.2: TT1222 Receiver Front Panel

1.4.2.1 Keypad

The front panel keypad is used in conjunction with the front panel LCD Display to set up and monitor the unit. The roles and functions of the keys change, depending on what kind of menu or screen is displayed.

Figure 1.3 shows how the arrow keys are used to navigate through the menus.

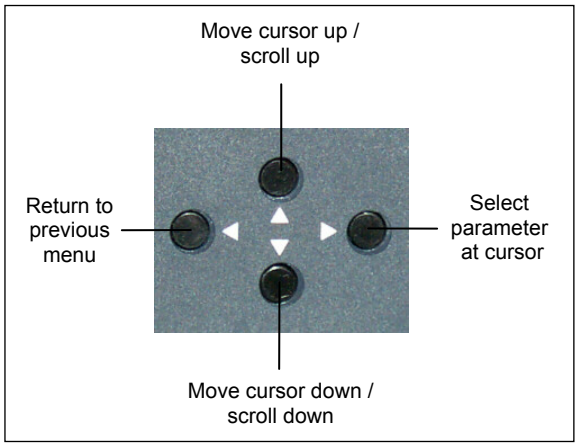


Figure 1.3: Navigating the Menus

Figure 1.4 shows how to edit parameter values once a menu item is selected.

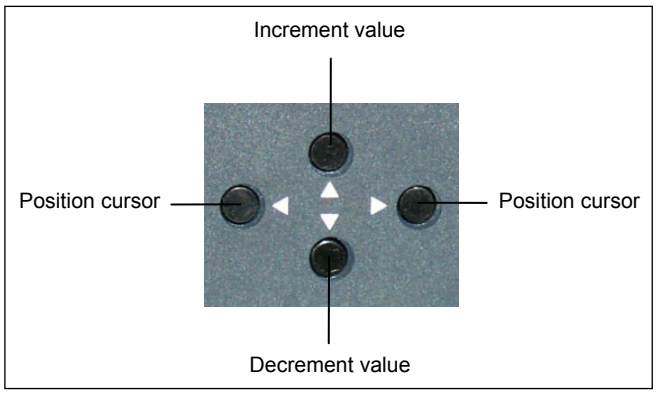


Figure 1.4: Editing Values in a Menu.

1.4.2.2 Edit and Save

In the edit mode, when the correct value is in place, exit and save by pressing multiple times to the right, to move the cursor outside the edit area. When the cursor leaves the edit area, the new setting will be saved, and the keypad will revert to the navigation mode.

1.4.2.3 Cancel and Exit

In the edit mode, if you have incorrectly entered a value, cancel and exit by pressing multiple times to the left, to move the cursor outside the edit area. When the cursor leaves the edit area, the previous setting will reappear, and the keypad will revert to the navigation mode.

Note: Keypad access may be locked, this is easily recognized by the small lock in the top left corner of the display. To navigate the menus, escape the locked mode by pressing left, right, 3 x left and then 3 x right in sequence. This will take you from the default status screen, to the main menu.

1.4.2.4 Status LED

The unit is fitted with one LED, showing the status of the unit. When the LED lights up red, an alarm condition has been met, according to the alarm set up described in *Annex D, Alarm Categories and Conditions*.

1.4.2.5 LCD Display

The 2-line LCD Display menus are detailed in *Annex C, Front Panel LCD Menus*.

1.4.3 Rear Panel

All input, output and control connectors are located on the rear panel. Connector descriptions are given in *Chapter 2, Installing the Equipment*.

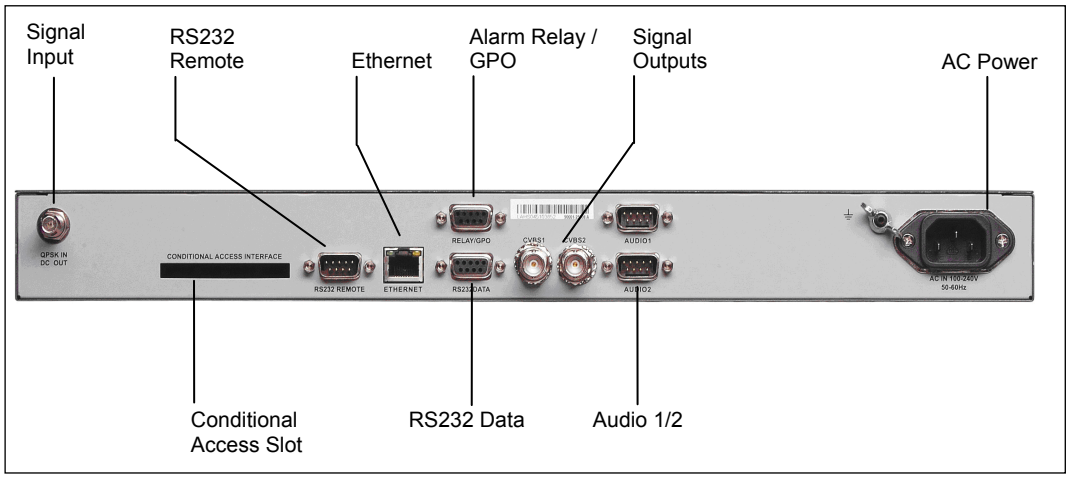


Figure 1.5: TT1222 Receiver Rear Panel

Note: The TT1222 has a common interface (CI) conditional access slot at the rear. The CI module has to be inserted first, before a card can be inserted.

Installing the Equipment

Chapter 2

Contents

List of Figures

List of Tables

2.1 Read this First!

2.1.1 Handling

The TT1222 must be handled and installed carefully and thoughtfully to prevent safety hazards and damage.

2.1.2 Installing the Equipment

Follow the instructions for installation and only use installation accessories recommended by the manufacturers.

Ensure that personnel designated to install the unit have the appropriate skill and knowledge. If in any doubt, please contact Customer Services (see *Preliminary pages* for contact details).

When rack mounted, this unit must have shelf supports as well as being fixed at the front panel. Do not use this product as a support for any other equipment.

2.1.3 Lifting

Although this is a light product, in some circumstances it might be awkward to lift, especially when packed. In which case, do not attempt to lift or move it without proper assistance or equipment. If in doubt, get help.

2.1.4 Site Requirements

2.1.4.1 Power Supplies

See *Annex B, Technical Specification* for a full specification.

2.1.4.2 Environment

See *Annex B, Technical Specification* for a full specification.

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

2.1.4.3 Lightning Protection

Warning!

If the unit has been subject to a lightning strike or power surge which has stopped it working, disconnect the power immediately. Do not reapply power until it has been checked for safety. If in doubt, contact Ericsson 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.

2.2 Preliminary Checks

2.2.1 Mechanical Inspection

Warning!

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

Inspect the equipment for damage-in-transit. If in doubt, please contact Ericsson Customer Services (see *Preliminary pages*).

2.2.2 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.

2.3 Installing the Equipment

2.3.1 Fixing

The TT1222 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 by 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 free-flow of air.
Slide the receiver onto the chassis supports and affix to the rack by means of an M6 x 18mm 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.

2.3.2 Ventilation

2.3.2.1 Openings in the Covers

Openings in the cabinet are provided for ventilation. These ensure reliable operation of the unit and protect it from overheating. These openings must not be blocked or covered.

Figure 2.1: Openings in the Cabinet

2.3.2.2 Care in Positioning

Cautions!

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

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

The TT1222 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. Units in racks can be stacked with no space in between. Racks containing stacked equipment may need to be forced air-cooled to reduce the ambient temperature within the rack.

2.3.2.3 Protection from Moisture

Do not install this unit in areas of high humidity or where there is a danger of water or moisture entering the equipment.

2.3.3 Installing Cables – Safety

Warnings!

When connecting the F-connector cable from the antenna to the QPSK F-connector input, it is important to make sure that:

The unit is properly grounded.

The cable screen is the first point of contact between the F-connector and the cable.

This is to make sure that the cable and unit are at the same electrical potential when the connection is made, and to avoid damage to the equipment.

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 that safety and ESD precautions are observed whilst interconnecting equipment.

2.4 EMC Compliance Statements[1]

2.4.1 EN 55022 and AS/NZS 3548

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.

[1] The EMC information was correct at the time of manufacture. The EMC tests were performed with the technical earth attached.

2.4.2 FCC

This equipment have 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 Reference Guide, 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 his own expense.

2.4.3 Connecting to a Public Telecommunication System

Caution!

TT1222 is not constructed for electrical connection directly to any public telecommunication system. None of the output signals shall be distributed directly from TT1222 to a public telecommunication system leaving the building without using some kind of interface in between such as a telecom terminal, switch or similar unit. Such kind of buffer is required to achieve a protective electrical barrier between the public telecommunication system and TT1222. This electrical barrier is required to achieve protection against lightning or faults in nearby electrical installations.

2.5 AC Supply Voltage and Fusing – Safety Information

2.5.1 AC Power Supply

Warning!

The TT1222 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.

The TT1222 is fitted with a wide ranging power supply. It is suitable for supply voltages of 100 - 240 V AC -10% +6% at 50/60 Hz nominal. It is designed for use in ambient temperature in the range of 0°C to +50°C. The full technical specification is given in *Annex B, Technical Specification*.

Note: There is no user-replaceable fuse in the rear of the unit.

2.5.2 Technical Earth

Caution!

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

The Technical Earth provides a suitable connection between the TT1222 and the installation to give a low impedance path at normal operating frequencies. A terminal at the rear panel (left of the power socket) is provided to:

1. Ensure all equipment chassis fixed within a rack are at the same technical earth potential. To do this, connect a wire between the Technical earth terminal and a suitable point on the rack.
2. Eliminate the migration of stray charges when connecting between equipment.

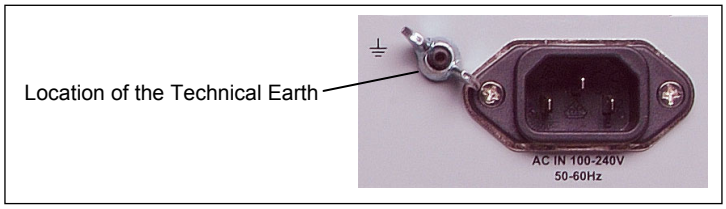


Figure 2.2: Technical Earth Connector

Note: The technical earth shall be fitted with a bolt of M4 x 6 dimensions, 4 millimetres in diameter, and no longer than 6 millimetres.

2.5.3 AC Power Supply Cord

2.5.3.1 General

A mains cord is normally supplied with this product. It is fitted with a moulded plug suitable either for mainland Europe, the UK, Australia or USA as advised when ordered.

Note: The TT1222 is not fitted with an AC power supply ON/OFF switch. Ensure the socket-outlet supplying the equipment is installed near the equipment, so that it is easily accessible.

When replacing the power cord in the USA, make sure to always replace it with a cord of the same type. The cord should be of type: Feller type SVT cord rated 3x18 AWG with plug 498 G and appliance coupler C13.

2.5.3.2 Disposal of Moulded Plugs

Warning!

If the moulded plug fitted to the mains cable supplied with this equipment is not required, please cut it off and dispose of it safely. Failure to do this may endanger lives as live ends may be exposed if the removed plug is inserted into a mains outlet.

If the moulded plug fitted to the mains cable supplied with this equipment is not required, use another cable. If the supplied plug is to be changed, cut it off and dispose of it safely.

2.5.3.3 Wire Colours

The wires in the supply cord are coloured as shown in *Table 2.1*.

Table 2.1: Supply Cord Wiring Colours

	UK (BS1363)	**Europe (CEE 7/7)**	**USA (NEMA 5-15P)**
Earth	Green-and-yellow	Green-and-yellow	Green
Neutral	Blue	Blue	White
Live	Brown	Brown	Black

If the colours do not correspond with the coloured markings identifying the terminals in a locally supplied plug, proceed as in *Table 2.2* (included for reference).

Table 2.2: Non Standard Supply Cord Wire Colours

Wire Colour (UK)	**Action**
green-and-yellow	...must be connected to the terminal in the plug which is marked with the letter E or the safety earth symbol ⏚ or coloured green or green-and-yellow.
blue	...must be connected to the terminal in the plug which is marked with the letter N or coloured black.
brown	...must be connected to the terminal in the plug which is marked with the letter L or coloured red.

2.5.4 Connecting the Equipment to the AC Power Supply

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

Connect the mains lead to the TT1222 and then to the local supply.

2.6 Signal Connections

2.6.1 Overview

The block diagram below shows the signal connections for the TT1222 Receiver and its options.

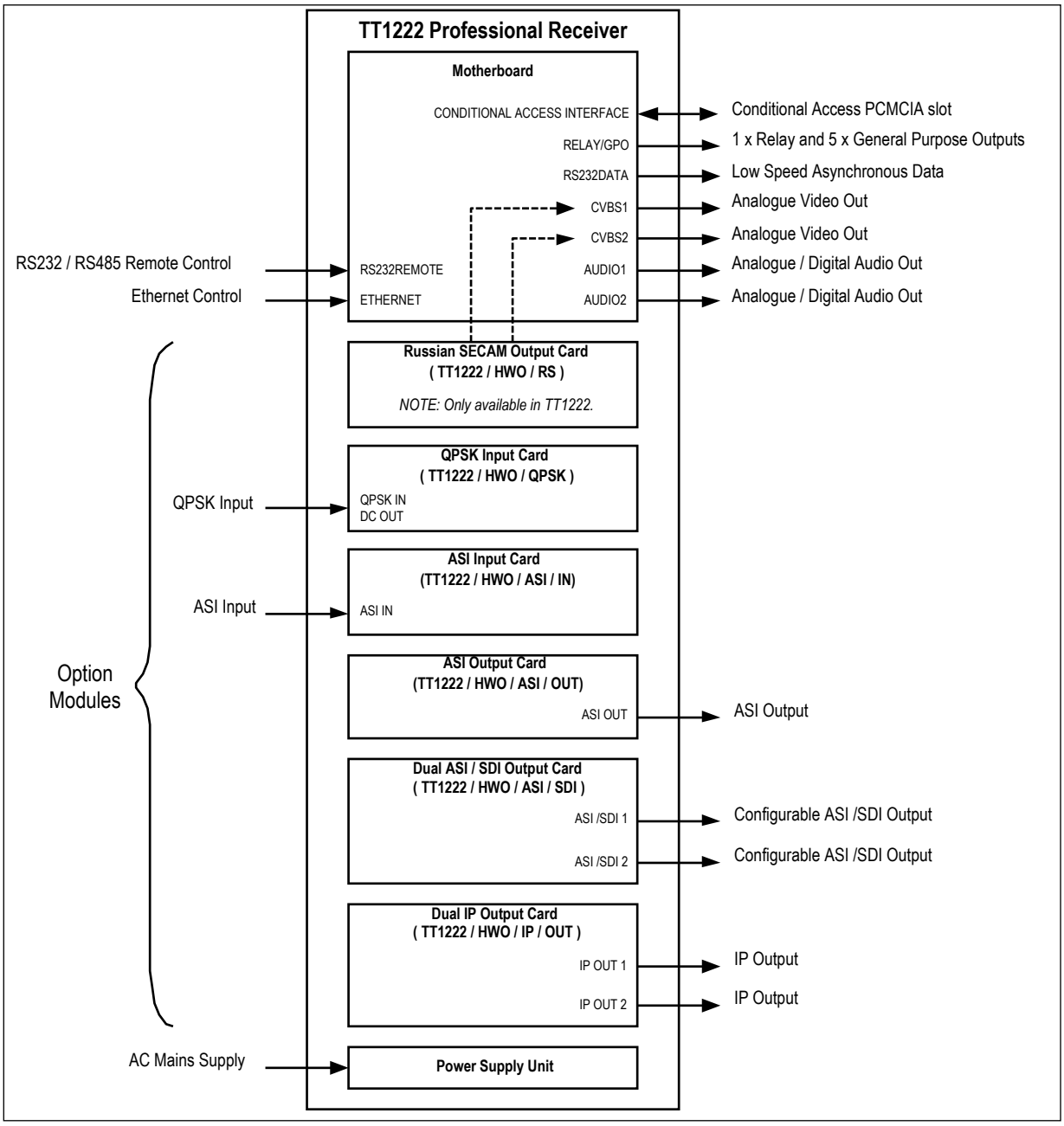
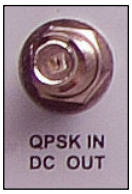


Figure 2.3: Signal Connections

Figure 2.4: TT1222 Example Rear Panel View (Model fitted with QPSK Input Option)

2.6.2 Input Connectors



2.6.2.1 QPSK Input (TT1222/HWO/QPSK)

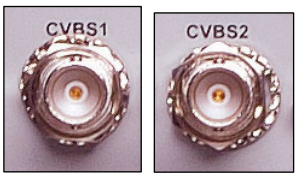
See *Chapter 3, Options* for details.

2.6.2.2 ASI Input (TT1222/HWO/ASI/IN)

See *Chapter 3, Options* for details.

2.6.3 Output Connectors

2.6.3.1 Analogue Video Outputs



This is a pair of BNC sockets, which provide a composite video output. The default output standard is configured using the **Setup** ⇒ **Video Setup** ⇒ **Default o/p** menu.

Table 2.3: Analogue Video Connector

Item	Specification
Connector type	2 x BNC, Female
Output format*	PAL (B, D, G, H, I, Combination N, M) SECAM (B, G, H, K1, L) with Line ID SECAM (D,K) with Field ID setting (if Russian SECAM option module fitted)2 NTSC (M) *Output format varies with menu settings and incoming MPEG data.
Connector designation	CVBS 1, CVBS 2
Pin: Centre Shield	Video output Ground / Chassis
Impedance	75 Ω

[2] See Chapter 3 for details of Options

2.6.3.2 Analogue/Digital Audio Outputs

The TT1222 Receiver is fitted with two 9-pin D-type connectors each carrying one analogue audio pair and one digital audio signal.

Table 2.4: TT1222 Audio Connectors 1 and 2

Item	**Specification**	
Connector type	9-way D-type, Male	
Connector designation	AUDIO 1, AUDIO 2	
Output format	Balanced analogue, Unbalanced digital	
Nominal output level	0 dBm in 600 Ω (0 dBu) adjustable from –9 dB to +3 dB in 0.1 dB steps.	
Output impedance	< 50 Ω	
Idle channel noise	< -74 dB	
Pin-outs:	**Pin**	**Function**
	1	Unbalanced Digital audio
	2	Ground
	3	Left +
	4	Right +
	5	Ground
	6	Reserved
	7	Ground
	8	Left -
	9	Right -

The TT1222 is able to decode and output Dolby AC-3 encoded audio components on both audio outputs if the Dolby AC-3 license is enabled.

Note: Dolby AC-3 decoding shall be enabled and disabled by license key. For more information, please contact Ericsson Customer Services.

2.6.3.3 TT1222 Audio Lead

Two audio cables are supplied with TT1222 units, as shown below. These cables support analogue left and right channels and unbalanced digital audio.

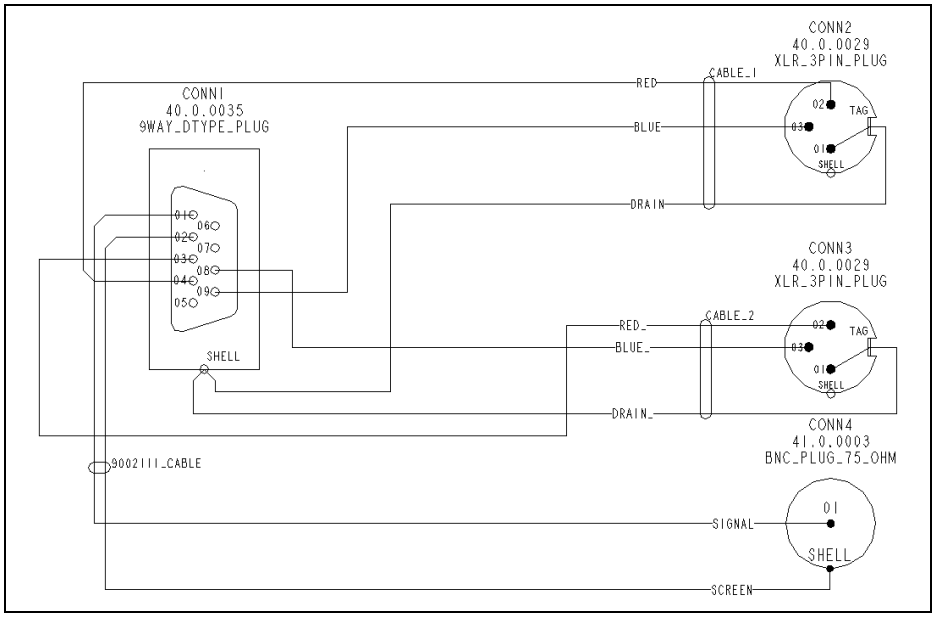
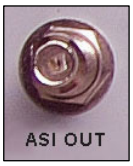


Figure 2.5: Audio Cable

2.6.3.4 ASI Output (TT1222/HWO/ASI/OUT)

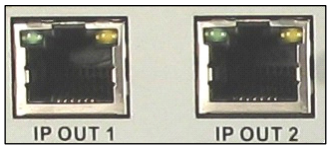


See *Chapter 3, Options* for details.

2.6.3.5 ASI / SDI Outputs (TT1222/HWO/ASI/SDI)

See *Chapter 3, Options* for details.

2.6.3.6 IP Outputs (TT1222/HWO/IP/OUT)



See *Chapter 3, Options* for details.

2.6.3.7 RS-232 Low-speed Asynchronous Data Output

A 9-way D-type female connector is provided as the connection for low-speed data output.

Table 2.5: RS-232 Low-speed Data Connector

Item	**Specification**	
Connector type	9-way D-type, Female	
Connector designation	RS232 DATA	
Output rate	75, 110, 150, 200,300, 600, 1050, 1200, 2400, 4800, 9600, 19200, 38400, 57600 or 115200 baud selectable	
Pin-outs	**Pin**	**Function**
	1	Reserved
	2	Data Transmit (Tx) - data output
	3	Data Receive (Rx) - data input
	4	Reserved
	5	Ground
	6	Reserved
	7	Reserved
	8	Reserved
	9	Reserved

2.6.3.8 Alarm Relay/General Purpose Output

A 9-way D-type female connector is provided as an alarm/ controlled relay mechanism.

The TT1222 has a configurable alarm contact closure. The alarm is activated following the occurrence of an alarm condition. It is possible to control the alarm conditions via a user interface.

In addition, the TT1222 supports five configurable general purpose output pins. These are also controllable via the user interface.

Table 2.6: Relay/GPO Pin Allocation

Parameter	**Specification**
Relay 1, Open on alarm	Pin 9
Relay 1, common	Pin 4
Relay 1, Closed on alarm	Pin 8
GPO 1	Pin 1
GPO 2	Pin 2

Parameter	Specification
GPO 3	Pin 3
GPO 4	Pin 6
GPO 5	Pin 7
GPO ground	Pin 5

2.6.4 RS232 Remote

The RS-232 connector labeled remote on the back of the equipment allows for connection to a PC for remote control, software upload or debug purposes. The **SETUP ⇒ OUTPUTS ⇒ RS232 ⇒ REMOTE_PORT** menu is used to configure the parameters for communicating with the unit. For more information about remote control, see *Chapter 4: Operating the Equipment Remotely*.

Table 2.7: RS-232 Connector

Item	Specification		
Connector type	9-way D-type, Male		
Connector designation	RS232 REMOTE		
Pin-outs	**Pin**	**Function**	**Direction**
	1	Reserved	-
	2	Data receive (Rx)	Input
	3	Data transmit (Tx)	Output
	4	Reserved	-
	5	Ground	-
	6	Reserved	-
	7	Reserved	-
	8	Reserved	-
	9	Reserved	-

2.6.5 Ethernet

An RJ-45 Ethernet connector connects to a PC or network switch to provide a network connection for web browsing or nCompass Control.

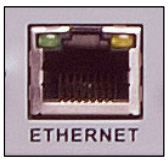


Table 2.8: Ethernet Connector

Item	**Specification**	
Connector type	RJ-45 (100BaseT)	
Connector designation	10/100BaseT	
Pin-outs	**Pin**	**Function**
	1	Tx Out (+)
	2	Tx Out (-)
	3	Rx In (+)
	4	Not connected
	5	Not connected
	6	Rx In (-)
	7	Not connected
	8	Not connected

2.6.6 Conditional Access Interface

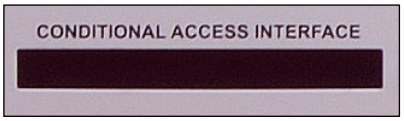


Table 2.9 lists the conditional access schemes supported by the TT1222.

Table 2.9: Conditional Access

Parameter	**Specification**
Common Interface	According to PCMCIA ‘PC Card Standard, release 3’
Fixed key	BISS, BISS-E
Variable key	Director

DVB common interface is provided via a single PCMCIA slot.

Note: DVB Common Interface CA: Specification EN50221 (CENELEC) Common Interface Specification for Conditional Access and other Digital Video Broadcasting Decoder Applications.

Options

Chapter 3

Contents

List of Tables

3.1 Available Options

3.1.1 Hardware Options

These options require extra hardware to be fitted to the unit. Contact the Customer Services Helpdesk for details (see *Preliminary Pages*).

Table 3.1 lists all the different types of option cards that are supported for the TT1222 Receiver.

Table 3.1: Hardware Options

Marketing Code	Price Object Number	Supply Object Number	Description
TT1222/HWO/QPSK	FAZ 101 0128/8	ROA 128 3846	Single QPSK Input Card
TT1222/HWO/ASI/IN	FAZ 101 0128/9	ROA 128 3847	Single ASI Input Card
TT1222/HWO/ASI/OUT	FAZ 101 0128/10	ROA 128 3848	Single ASI Output Card
TT1222/HWO/ASI/SDI	FAZ 101 0128/11	ROA 128 3849	Dual ASI / SDI Output Card
TT1222/HWO/IP/OUT	FAZ 101 0128/12	ROA 128 3850	Dual IP Output Card

3.1.2 Software Options

These options require a license key to be generated and downloaded to the unit. Contact the Customer Services Helpdesk for details (see *Preliminary Pages*).

Table 3.2 lists the different software options available for the TT1222 Receiver.

Table 3.2: Software Options

Marketing Code	Price Object Number	Supply Object Number	Description
TT1222/SWO/AC3	FAZ 101 0128/5	FAT 102 0281	Dolby Digital decoding
TT1222/SWO/DIRV5	FAZ 101 0128/4	FAT 102 0280	Director by Ericsson

3.2 Hardware Enabled Input Options

3.2.1 Limitations

The TT1222 cannot be fitted with the ASI input option and QPSK input option at the same time.

3.2.2 ASI Input (TT1222/HWO/ASI/IN)

3.2.2.1 General

The ASI Input card supports ASI transport stream on a single BNC connector.

3.2.2.2 Connector Details

This is a single 75 Ω BNC connector.

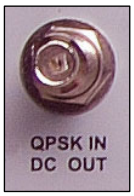
Table 3.3: ASI Input Connector

Input	Specification
Connector Type	BNC 75 Ω socket
Connector designation	ASI IN
Pin: Centre Shield	Analogue Black and Burst Input Ground/Chassis
Impedance	Last unit must be terminated with 75 Ω

3.2.2.3 Setting up the ASI Input

There are no set-up requirements for the ASI Input card.

3.2.3 QPSK Input Card (TT1222/HWO/QPSK)



3.2.3.1 General

The QPSK F-type connector is located on the rear of the unit. This input interfaces directly to Low-Noise Block (LNB) and accepts an intermediate frequency (IF) input in the 950 – 2150 MHz (L-band) range. The unit can provide DC power, that may be used for polarization switching on the LNB, as well as a 22 kHz control signal. The maximum input symbol rate is 44.5 Msym/s.

3.2.3.2 Connector Details - L-Band Input

Cautions!

The Receiver provides DC power via the active L-band input connector to drive an LNB (Low Noise Block Down-Converter). Do not connect equipment other than an LNB to this connector. Failure to do this may result in damage to the external equipment

The F-type connector is not suitable for repeated connection and disconnection. When intended for use in this way, fit a sacrificial connector and connect to it.

Connect the L-band output of a suitable LNB to the F-type connector either directly or via a suitable attenuator giving adequate consideration to lightning and surge protection (see *page 3-5*).

The specification for this connector is given in *Annex B, Technical Specification*.

Table 3.4: QPSK Satellite Receiver (L-band) Connector

Input	**Specification**
Connector Type	F-type, Female
Connector designation	QPSK IN
Pin: Centre Shield	RF Input Ground/Chassis
LNB Supply	Refer to the previous caution box
Impedance	75 Ω

3.2.4 Use of an Attenuator

The L-band input can be connected via a suitable attenuator to give adequate consideration to lightning and surge protection.

In most cases an attenuator will not be required. The following list summarises the circumstances in which one should be used.

1. If the wanted input level is greater than the specified maximum permissible (-25 dBm)
2. If the downlead is a short length of low-loss cable and the LNB in use has a poor return loss (7 dB min)
3. If the receiver is receiving one of many carriers in a multi-carrier FDM system and the level of the wanted signal is close to the specified maximum permissible

3.2.5 Setting Up the QPSK Input

Setting up the QPSK input is done entirely from the **SETUP ⇒ INPUTS** menu.

Table 3.5 steps through all the necessary settings to achieve signal lock.

Table 3.5: Tuning the Satellite Receiver

Step	Action	Result
1.	Go to the **input menu**, located under the **setup** menu.	The display will read “SET: INPUT” on the top line.
2.	Repeat pressing the **up** arrow, until you are on the top line	The display will read “LNB Freq.:” on the bottom line.
3.	Press **right** once, and then by using the arrow keys as explained in *Chapter 4,* enter the desired LNB frequency.	The LNB frequency should be set to match your external LNB.
4.	Go down one line, and edit the satellite channel frequency[1].	This sets up the tuning frequency in the receiver.
5.	Go down to the next line, and enter the Symbol rate.	This sets up the incoming symbol rate of the demodulator.
6.	Continue on-line down to the Inner Code rate, select the correct inner code.	This sets up the Forward error correction (FEC) rate of the demodulator.
7.	For the final three items, select the correct LNB voltage, and turn 22 kHz control signal and spectrum inversion on or off.	This finalises the set-up of the satellite demodulator. Next to the menu name (SET:INPUT), status information about the signal lock is being displayed. (Signal strength.)

3.3 Hardware Enabled Output Options

3.3.1 ASI Output (TT1222/HWO/ASI/OUT)

3.3.1.1 General

The ASI Output option provides a single ASI output on a BNC connector.

3.3.1.2 Connector Details

75 Ω BNC connector.

[1] The satellite frequency should be within the area of the LNB frequency (±950 to 2150 MHz). If your frequency is outside this range, replace your LNB with a higher or lower ranging unit.

3.3.1.3 Setting up the ASI Output

The output can be set to be scrambled or descrambled.

Table 3.6: Setting up the ASI Output

Output	Description
Scramble	If the input is scrambled, the output will also be scrambled.
Descramble	The receiver will output a descrambled service when possible.

Note: When 'descramble' is selected, the receiver can only descramble components from the selected services. i.e. the selected TV Service and Audio 2 Service.

It is possible that not all components within the selected service will be decoded.

3.3.2 Dual ASI/SDI Output (TT1222/HWO/ASI/SDI)

3.3.2.1 General

The Dual ASI/SDI Output option provides two configurable ASI/SDI outputs on BNC connectors.

3.3.2.2 Connector Details

75 Ω BNC connector.

3.3.2.3 Setting up the ASI/SDI Output

Each output can be individually configured to be either ASI or SDI.

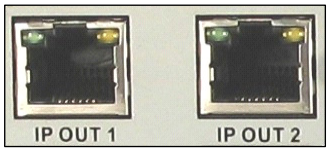
Table 3.7: Setting up the ASI/SDI Outputs

Output	Description
ASI	The output will be set to ASI and will apply the ASI configuration menu settings (ie scramble or descramble, see *Table 3.6* above.)
SDI	The output will be set to SDI and will embed up to two audio pairs in any of the four DID groups as per the setup in the SDI configuration menu.

Table 3.8: Setting up the SDI Output

Menu Item	Description
Select Audio Group 1,2,3,4	There are four audio groups. Each audio group can contain up to two audio pairs.
Embed audios None, 1, 2, 1 and 2	Up to two audio pairs can be embedded in each group. The two audios are the same two audios which are being decoded by the receiver.

3.3.3 Dual IP Output (TT1222/HWO/IP/OUT)



3.3.3.1 General

The Dual IP Output option provides two IP outputs on RJ-45 Ethernet connectors.

3.3.3.2 Connector Details

RJ-45 Connector.

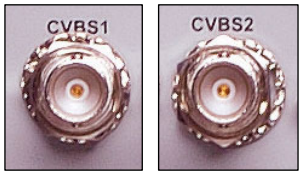
3.3.3.3 Setting up the IP Output

The relevant IP addresses need to be set up for basic operation.

Table 3.9: Setting up the IP Outputs

Output	Description
Src IP Addr	This is the host IP address.
Dest IP Addr	There are 4 possible destination ports which can be set up. The Port 1 destination address must be set up as a minimum for basic operation.

3.3.4 Russian SECAM Output (TT1222/RSBAS)



3.3.4.1 General

The TT1222 can provide a Russian SECAM compliant output. This option module uses the existing CVBS outputs and must be configured using the Video Setup menu.

3.3.4.2 Connector Details

No additional connectors (Uses CVBS 1 and CVBS 2).

3.3.4.3 Setting up the Russian SECAM Output

The output can be set to be LineID, Line+notch, Field+notch or B/W+notch.

Table 3.10: Setting the Russian SECAM Output

Output	Description
Line ID	Chrominance subcarrier reference signals are inserted into the back porch of the line blanking period.
Line+notch	As LineID but also has a luminance trap filter active in the Vertical Blanking Interval (VBI).
Field+notch	Chrominance subcarrier reference signals occupying nine lines of field-blanking period on Lines 7 to 15 in Fields 1 and 3 and Lines 320 to 328 in Fields 2 and 4. Also has a luminance trap filter active in the VBI.
B/W+notch	No chrominance subcarrier is present (monochrome output). Also has a luminance trap filter active in the VBI.

Note: When the Russian SECAM module is fitted, the composite outputs are optimized to meet the Russian standards. The performance of other video standards may be affected if used on this unit.

BLANK

Operating the Equipment Locally

Chapter 4

Contents

List of Figures

List of Tables

BLANK

4.1 Powering the Equipment

4.1.1 Switching On

Connect the TT1222 to the signal inputs and the AC power supply and turn it on. There is a short boot period.

After the boot period, the unit displays the default status view, showing the current condition. It will look similar to *Figure 4.1*.

```
TV: Program 1
QPSK: No lock
```

Figure 4.1: Status Display

This example indicates the name of the selected service, and that no QPSK signal is available.

Note: If the left button on the front panel is pressed at the start of the boot up period, the TT1222 will load an alternative version of code. This should **not** be done for normal boot up.

4.1.2 Front Panel Keypad

The front panel keypad functionally is explained in *Chapter 1, Section 1.4, Guided Tour*.

4.2 Using the Local Controls

4.2.1 Menu Tree

Detailed LCD menu descriptions are given in *Annex C, Front Panel LCD Menus.* This chapter concentrates on describing the use of the menus for local operation.

4.2.2 Selecting a (Sub)Menu Item

4.2.2.1 Selecting the Menu Item

To select a menu item, navigate using the **Up** and **Down** arrow key until the desired menu is displayed in front of the cursor. Press the **Right** arrow to select / enter this menu item.

4.2.2.2 Leaving the Menu Item

To leave the current menu tree, press the **Left** arrow arrow-key.

4.2.3 Editing a Menu Value

4.2.3.1 Accessing the Edit Mode

To edit a menu item, first select the item using the **Right** arrow arrow-key. This will bring you from the select mode to the edit mode.

4.2.3.2 Editing a Selectable Option

Once in edit mode, use the **Up** or **Down** arrow key until the desired value is displayed. Exit and save the selection by pressing the **Right** arrow key.

4.2.3.3 Editing an Alphanumerical Value

When editing an alphanumerical value, the cursor starts flashing underneath the rightmost digit, once entering the edit mode. Use the **Up** and **Down** arrow to increase or decrease the value of this digit. Press the **Left** arrow key to select the next digit. You will see the cursor move to underneath the neighbouring digit. Again, use the **Up** and **Down** arrow to increase or decrease the value of this digit. Once satisfied with the result, move the cursor outside the selectable digits, by using the **Right** arrow key several times. Once the cursor moves outside the selectable area, the arrow keys return to navigation mode, and the new value is saved.

4.3 Customer - Default Parameters

The TT1222 is shipped to the end customer with specific default parameters. These are detailed in *Chapter 7, Preventive Maintenance and Fault-Finding.*

4.4 Powering Up the Equipment/Restarting the Receiver (without having to remove the power cable)

The unit may be restarted/rebooted without having to remove the rear power cable, by use of the **Reset** command in the **System** menu.

Table 4.1: Restarting the Receiver

Step	Action	Result
1.	Go to the **System** menu, located under the **Setup** menu.	The display will read “SET: SYSTEM” on the top line.
2.	Press the **down** arrow key, until the **Reset** option is displayed.	The second line will show “No”.
3.	Press the **right** arrow key to select this option.	
4.	Press the **up** arrow once, to change the parameter.	The second line will show “Yes”.

Step	Action	Result
5.	Press the **right** arrow to action the command and reset the receiver.	Resetting the receiver takes less than a minute to complete. The unit will boot up as normal.

4.5 Service Configuration

4.5.1 Setting Up a Service

Each transport stream may contain a multitude of services and types. The **TV service** and **Audio 2** service menus, located in the **Setup** menu, allow the user to select the services to be decoded.

4.5.2 Setting Up a TV Service

Table 4.2: Selecting a TV Service

Step	Action	Result
1.	Go to the **TV Service** menu, located under the **Setup** menu.	The display will read “SET: TV SERVICE” on the top line.
2.	Select the **Service ID** sub menu (located at the top of the TV Service menu)	The display will read “SET: TV SERVICEID” on the top line.
3.	Repeat pressing the **up** and **down** arrows, until the selected service is displayed. If Service names do not exist for the chosen TS, continue to item 5.	The second line will scroll between all the services available in the transport stream.
4.	Pressing **right** will select the displayed service.	A small check mark is displayed in front of the service, indicating that it is selected.
5.	It is also possible to select service based on service ID. Keep on scrolling up until the display read “**Service ID > xxxx***”*.	This enables you to select services that are not named in the SDT.
6.	By pressing **right** once, the keypad enters edit mode, and keying in the Service ID is now possible.	After entering the Service ID and leaving edit mode, the correct service is chosen and saved.

4.5.3 Setting Up a TV Language

Some services may contain several audio, Teletext and subtitling components, being sent in different languages. To enable the receiver to identify which one of these components to use, it is important to edit the information in the **TV service** menu.

Table 4.3: Selecting a TV Language

Step	Action	Result
1.	Go to the **TV service** menu, located under the **Setup** menu.	The display will read “SET: TV SERVICE” on the top line.
2.	Repeat pressing the up arrow, until you are on the top line	The third line will display “Aud1 Lang.: *xxx*”
3.	Press **right** to enter edit mode, and key in the desired ISO 639 language code.	Upon leaving the menu, the receiver will choose the audio stream in the service with the associated language (if available).
4.	Continue in the same fashion for the Teletext and subtitling components.	Upon leaving the individual menus, the receiver will choose the Teletext and subtitling stream in the service with the associated language (if available).

If the receiver is not able to find the language described in the **TV service** menu, the first component for each type in the PMT is selected for decoding.

4.5.4 Setting Up an Additional Audio (2) Channel

Configuring this output is very similar to configuring the TV output.

Note: Audio 1 is associated with the TV Service. An additional audio is available and referred to as “Audio 2”.

To set up the Audio 2 service, select the service and language according to *Table 4.4*.

Table 4.4: Setting Up Audio2 Services

Step	Action	Result
1.	Go to the **Audio 2 Service** menu, located under the **Setup** menu.	The display will read “**SET: AUD2 SERVICE**” on the top line.
2	Select the **Service ID** sub menu (located at the top of the TV Service menu)	The display will read **“SET: AUD2 SERVICEID”** on the top line.
3.	Repeat pressing the **up** and **down** arrows, until the selected service is displayed. If Service names do not exist for the chosen TS, continue to item 4.	The second line will scroll between all the services available in the transport stream.

Step	Action	Result
4.	Pressing **right** will select the displayed service.	A small check mark is displayed in front of the service, indicating that it is selected. **Note**: If a TV service is selected, only the audio of this service is decoded**.**
5.	It is also possible to select service based on Service ID. Keep on scrolling up until the display read "**Service ID > xxxx**".	This enables you to select services that are not named in the SDT.
6.	By pressing **right** once, the keypad enters edit mode, and keying in the Service ID is now possible.	After entering the Service ID and leaving edit mode, the correct service is chosen and saved.
7.	Return to the **Audio 2 Service** menu.	The display will read "**SET: AUD2 SERVICE**" on the top line. The '**Aud2 Lang**' menu item here will enable you to select the correct audio language component from the service.
8.	Exit the **Audio 2 Service** menu once you have selected the correct service and language.	This will take you back to the **Setup** menu.

4.6 Setting Up Conditional Access

4.6.1 Director

The Director system offers premium functionality including Conditional Access, Over-Air software download and Over-Air Control. Please refer to the Director User Manual for more details.

No specific set-up is required at the receiver for the Conditional Access or software download, other than ensuring the Receiver has the correct software license and setting the Control Mode to OAC.

For over-air control (NCP), see *Chapter 5, Operating the Equipment Remotely*.

4.6.2 Basic Interoperable Scrambling System (BISS)

BISS Mode 1 uses a fixed control word to encrypt the data in the transport stream. The scrambling algorithm is non-proprietary, using the DVB Common Scrambling Algorithm to allow interoperability with other manufacturers' encoding/scrambling equipment.

The **Setup:CA:Biss** menu allows selection of BISS Mode 1 or Mode E operation and allows the fixed key to be entered. Further submenus allow user injected box IDs to be entered.

4.6.3 DVB Common Interface

There is one slot on the rear of the unit, to allow the insertion of a DVB common interface (CI) conditional access module (CAM). This CAM module will host the Conditional Access (CA) card for the CA system. The CAM and the CA card needs to be manufactured to host the same CA system. Please contact Ericsson sales desk for the recommended CAM.

Operating the Equipment Remotely

Chapter 5

Contents

List of Tables

BLANK

5.1 Remote Control

5.1.1 Introduction

The TT1222 can be remotely controlled in a variety of ways. The basic control methods are:

- Third-party application using Ericsson RS-232 control protocol.
- Director (over-air)
- Web Browser using the Ethernet control protocol (nCompass Control also uses this same protocol.)

5.1.2 Remote Protocol Control Documentation

The protocol used for third-party application is the Ericsson RS-232 control. This protocol is not described, or intended to be in the scope of this Reference Guide.

For information about this protocol, refer to the remote control documentation or contact Ericsson to obtain this information.

The TT1222 needs to be set up to accept the remote control handling. Once in remote mode, it cannot be locally controlled unless the mode is deactivated.

Note: The remote control protocols are not contained as a part of the product. An additional license fee, NDA or other agreement with Ericsson may be necessary to obtain the information required to control the product remotely.

5.1.3 Configuring the Unit for Remote Control Via RS-232

For the unit to be controlled via RS-232, the RS-232 port has to be configured to the same settings as the host controller system. The control mode of the TT1222 also needs to be set to remote.

Table 5.1: Configuring the Communication Parameters

Step	Action	Result
1.	Go to the **Remote** menu, located under **Setup** ⇒ **Outputs** ⇒ **RS232** ⇒ **Remote Port** menu.	The display will read “**SET: REMOTE PORT**” on the top line.
2.	Use the up arrow, until you are on the top line.	The second line should read “Baud Rate”.
3.	Press right once, and then by using the up and down arrows, key in the desired baud rate.	The baud rate should be set to the same value as the external control host.

Step	Action	Result
4.	Repeat for data bits, stop bits, parity and flow control.	All settings should be set to match the external control host.
5.	Once completed, the changes take effect immediately.	

When the communication parameters are entered correctly, set the system into remote mode for the external computer to gain control of the unit.

Table 5.2: Activating RS-232 Remote Control

Step	Action	Result
1.	Go to the **Control** menu, located under the **Setup** menu.	The display will read "**SET:CONTROL**" on the top line.
2.	Scroll until the item "**Ctrl. Mode**" is shown.	
3.	Press right once, and then by using the up and down arrows, key in the desired control mode, in this case: "**Remote**".	The unit is now ready to accept remote control via the RS-232 port.

5.1.4 Setting Up Director Over-air Control

5.1.4.1 Overview

For the unit to be controlled via over-air control (OAC), the Director software license must be enabled. The control mode of the unit must also be set to OAC.

Table 5.3: Activating Director Remote Control

Step	Action	Result
1.	Go to the **Control** menu, located under the **Setup** menu.	The display will read "**SET:CONTROL**" on the top line.
2.	Scroll until the item "**Ctrl. Mode**" is shown.	
3.	Press right once, and then by using the up and down arrows, key in the desired control mode, in this case: "**OAC**".	The unit is now ready to accept over-air control.

5.1.4.2 OAC Lockout

Caution!

Ericsson Customer Services Help Desk will not be able to provide you with the Local lockout PIN, as it is uniquely created at the time of the lockout.

Once the unit is in OAC control mode, it is possible for the remote control operator to issue a local lockout command to the receiver. This will effectively deny the local user access to configuring the unit; however, if a situation occurs whereby the local user needs to regain control over the unit, without a local lockout relinquish command being sent from the OAC control PC, a four digit Personal Identification Number (PIN) may be entered using the front panel.

The user creates the PIN at lockout time. To obtain the PIN, please consult the person responsible for the administration of the unit.

5.1.5 Setting up Web Browser Control

The Web Browser provides a web page with a number of sub-pages. Each page maps to a function of the TT1222. These pages contain drop-down menus or editable boxes which can be used to fully control the unit. Details of this control are beyond the scope of this Reference Guide. Contact Ericsson Customer Support for more information.

For the unit to be controlled via Web Browser, the control mode of the unit must be set to Local.

Table 5.4: Activating Web Browser Control

Step	Action	Result
1.	Go to the **Control** menu, located under the **Setup** menu.	The display will read “**SET:CONTROL**” on the top line.
2.	Scroll until the item “**Ctrl. Mode**” is shown.	
3.	Press right once, and then by using the up and down arrows, key in the desired control mode, in this case: “**Local**”.	The unit is now ready to be used with Web Browser.

To access the Web Browser pages a valid IP address must be set on the receiver as shown below.

Table 5.5: Configuring the Unit IP Address for Web Control

Step	Action	Result
1.	Go to the **Network** menu, located under the **Properties** menu.	The display will read "**PROP:NETWORK**" on the top line.
2.	Scroll until the item "**IP Address**:" is shown.	The display will read "**PROP:IP ADDR**" on the top line.
3.	Press right once, and then by using the up and down arrows, key in a valid IP address for your network.	
4.	Repeat for subnet mask.	All settings should be set to valid values for the local Network.

Note: Set up for nCompass Control is not described or intended to be in the scope of this Reference Guide. Contact Ericsson to obtain this information.

Alarms/GPOs

Chapter 6

Contents

List of Figures

List of Tables

BLANK

6.1 Introduction

This chapter describes the four ways in which the TT1222 may locally monitor the operational and alarm status:

- The front panel status LED provides a summary receiver alarm indication.
- The front panel LCD Display provides detailed alarm messages.
- The RELAY/GPO connector on the rear panel provides alarm relay contacts that provide a summary receiver alarm indication, which may be used to trigger an external device.
- The RELAY/GPO connector on the rear panel provides 5 General Purpose Outputs (GPOs) configurable relay contacts, which may be used to trigger external devices.

6.2 Status LED

The front panel status LED, located between the display and the keypad, has two conditions:

- **Red** indicates an **alarm** state.
- **Green** represents **no alarm**.

The summary alarm state is user-configurable so that alarm conditions may be ignored, if required (see *6.4.2 Configuring Alarms*). The conditions for the red LED alarm also corresponds to the summary alarm relay.

6.3 LCD Display Status Messages

The operational status of the unit can be viewed using the front panel LCD Display. This is the default display for the LCD. The current alarm state is shown in the second line of the display.

If no alarms or warnings are active, the status display (if the LCD is in its default mode) will display "**System: OK"**.

If several conditions exist, the most severe (alarm) is displayed, e.g. "**Video: Err in stream**". If no alarms are present in the system, the top most warning will be displayed. When the receiver is in a **WARNING** or **ALARM** state, the easiest way for the user to diagnose the alarm condition is via the **STATUS** menu.

Table 6.1: Navigating the Alarm Status Menus

Step	Action	Result
1.	Go to the **ALARM** menu, located under the **STATUS** ⇒ **ALARM**.	The display will read "**STAT:ALARM**" on the top line.

Step	Action	Result
2.	Scroll up and down through the alarm categories.	Each category will show its status; OK, WARNING or ALARM.
3.	To check the alarm state of an individual alarm, right-click on a category showing a warning or alarm state.	This will show a list of all current alarms generating a warning or alarm message within the currently selected alarm category.

For further explanation of the status menu, refer to *Annex C, Front Panel LCD Menus.*

For description of all the alarm messages, refer to *Annex D, Alarm Categories and Conditions*.

6.4 Alarm Relay

The Relay/GPO connector, located on the rear panel, provides a summary alarm relay contact that may be used to trigger external devices. Details of the connector are provided in *Chapter 2, Installing the Equipment.*

A summary alarm signal generated when one or more of the individual monitored alarm conditions are active. The receiver allows masking of unwanted alarm conditions so that they do not contribute to the summary alarm. The alarm list depends on the unit model, i.e. which input module is fitted (QPSK or ASI), which output module is fitted, etc.

Configuration of the alarms is possible via the Front Panel, Ericsson RS-232 and Web Browser. The state of the summary alarm relay also corresponds to the front panel status LED.

6.4.1 Relay/GPO Connector

The TT1222 rear panel is fitted with 9-way D-type female connector.

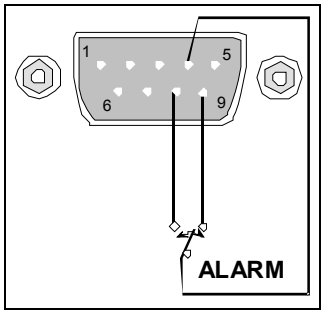


Figure 6.1: Relay/GPO Connector

The relay is a single pole change-over relay with all three contacts available at the output connector. The contacts are fully isolated from each other, and from chassis ground. They are rated at 1 A max at 24 V DC.

The relay is energised in the non-alarm condition, such that an alarm is indicated upon power failure.

In addition, the TT1222 supports five configurable general purpose output pins. The GPO outputs are logic level outputs only and are active high.

Table 6.2: GPO Levels

State	Output
Low	Open drain output (which can sink a maximum of 30mA)
High	5 Volts

The outputs are not suitable for driving general purpose 5 V relays which have a coil resistance of less than 167 Ω.

The GPOs cannot be activated on power failure.

6.4.2 Configuring Alarms

The TT1222 monitors numerous possible error conditions. All of these conditions generate error messages, which are user-configurable. Each message may be given three different states of severity:

- Ignore
- Warning
- Alarm

Note: By sorting these alarm messages into these three different categories, you can avoid unnecessary alarm situations; for example missing Teletext in a service with only video and audio.

The alarms can be configured via Front Panel, Ericsson RS-232 and Web Browser. Below is an example of setting up the alarms using the front panel.

6.4.2.1 Changing the Alarm Configuration via the Front Panel

The alarm messages are sorted into eight different categories, described in *Table 6.3*. The alarm messages associated with each category are described in *Annex D, Alarm Categories and Conditions*.

Table 6.3: Alarm Categories

Category	Description
Input	Alarms relating to the input signal strength, sync etc.
PSI	Alarms relating to errors in the PSI, missing PSI etc.
CA	Alarms relating to the CA system and the descrambling.

Category	Description
Video	Alarms relating to the video PID and the Video Decoding.
VBI	Alarms relating to the VBI PIDs and the display of Teletext, subtitling and testlines.
DVB Subt	Alarms relating to the DVB Subtitles.
Audio	Alarms relating to the audio PIDs and the Audio Decoding.
Data	Alarms relating to the data decoding and output.
Config	Alarms relating to the general hardware and software configuration of the unit.
IPOut *	Alarms relating to the IP outputs. **Note**: This item will only appear if an IP output module is fitted.

The user can define the severity of the alarms. This menu is located under the **Setup ⇒ Outputs ⇒ Alarms** submenu.

Note: The alarm message severity level is indicated by a single character, where **–** is for ignore when the condition is met, **W** is for raising a warning when the condition is met, and **A** is for raising an alarm when the condition is met.

Table 6.4: Navigating the Alarm Configuration Menus

Step	Action	Result
1.	Go to the **Alarm setup** menu, located under **Setup ⇒ Outputs ⇒ Alarms ⇒ Select Alarms**.	The display will read "**SET:SELECT ALARMS**" on the top line.
2.	Using the up and down arrows, select an alarm category for modification, right-click to enter the category.	Scrolling up and down will now reveal all alarm messages associated with this alarm category.
3.	Right-click to select an individual alarm state, and use the up and down arrows to select the severity of the corresponding alarm message.	This will allow you to select between A, W or – for the current alarm situation.
4.	Right-click to save and exit the severity level of the current alarm message.	

6.5 Configuring the GPO (General Purpose Output) Relays

The Relay/GPO connector, located on the rear panel, provides 5 GPOs that can be configured individually to trigger on one or more events. Details of the connector are provided in *Chapter 2, Installing the Equipment.*

There are 5 events which the GPOs can always be set to trigger on. A sixth one is made available when the QPSK input card is fitted. Details of these are provided in *Table 6.5*

Table 6.5: GPO Events/ Conditions

Event / Condition	Description	Section
No Input Lock:	The input is indicated as 'locked' when the receiver is synchronised to the incoming Transport Stream. **On** - This GPO will be triggered if the input is not locked. **Off** – A input lock error will not trigger this GPO.	----
Video Error:	**On** - This GPO will be triggered if any of the Video Alarm conditions detailed in *Annex D, Alarm Categories and Conditions* occur. **Off** – A video error will not trigger this GPO. Default: Off	*Annex D*
Aud 1 Error:	**On** - This GPO will be triggered if any of the Audio Alarm conditions detailed in *Annex D, Alarm Categories and Conditions* occur in Audio 1. **Off** – An error on Audio 1 will not trigger this GPO. Default: Off	*Annex D*
Aud 2 Error:	**On** - This GPO will be triggered if any of the Audio Alarm conditions detailed in *Annex D, Alarm Categories and Conditions* occur in Audio 2. **Off** - An error on Audio 2 will not trigger this GPO. Default: Off	*Annex D*
Data Error:	**On** - This GPO will be triggered if any of the Data Alarm conditions detailed in *Annex D, Alarm Categories and Conditions* occur. **Off** - A data error will not trigger this GPO. Default: Off	*Annex D*
BER Exceeded: *	**On** - This trigger will be activated if the BER exceeds 1 $X10^{-4}$. **Off** – A BER Exceeded error will not trigger this GPO. Default: Off **Note**: This item will only appear if a QPSK input module is fitted in the receiver.	----

The GPOs can be configured via Front Panel, Ericsson RS-232 and Web Browser. Instructions are provided below on how to set up a GPO using the front panel.

Table 6.6: Navigating the GPO Configuration Menus

Step	Action	Result
1.	Go to the **GPO setup** menu, located under **Setup ⇒ Outputs ⇒ GPOs**.	The display will read "**SET:GPOs**" on the top line.
2.	Using the up and down arrows, select a GPO to be set up. Right-click to enter the setup.	Scrolling up and down will now reveal all available events.
3.	Select an event and right-click to enter its setup.	
4.	Select **On** or **Off** for the event.	'**On**' means the GPO will trigger (logic level: high) when the event occurs.
4.	Right-click to save the setup. Then left click to return to the complete event list.	
5.	Continue as above to set up more events for the same GPO or to setup the other GPOs.	

Preventive Maintenance and Fault-finding

Chapter 7

Contents

List of Tables

BLANK

7.1 Routine Checks

7.1.1 Cooling Fan

Caution!

The fan contained within this unit is not fitted with an insect / dust filter. Pay particular attention to the environment in which it is going to be used.

There are no routine checks associated with this equipment other than to ensure that the unit is adequately cooled. This equipment must never be operated unless the cooling fan is working; this should be checked periodically.

7.1.2 Cleaning

Unplug the equipment from the power supply before cleaning. Do not use liquid or aerosol cleaners. Use a damp cloth for cleaning the exterior of the Receiver.

7.2 Servicing

7.2.1 Conditions Requiring Servicing

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 .

The following is a list of conditions which may indicate a need for servicing of the product:

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. Adjust only those controls that are covered by the operating instructions or as told by an Ericsson engineer. Failure to do so may render the product in an unstable state; and may require extensive work by a qualified technician to restore the product to normal operation.
5. If the product has been dropped or the case has been damaged.

6. When the product exhibits a distinct change in performance.
7. If the equipment has been exposed to a lightning strike or power surge.

7.2.2 Replacement Parts

When replacement parts are required, be sure only parts specified by Ericsson (or having the same characteristics as the original part) have been used. Unauthorised substitution may result in fire, electric shock or other hazards.

7.2.3 Check 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.

7.3 Maintenance and Support Services

7.3.1 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 center open round the clock, every day of the year, in your time zone.

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.

7.3.2 Warranty

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

7.3.3 Levels of Continuing Ericsson Service Support

For standalone equipment, then Ericsson **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.

7.3.4 Extended Warranty

Note: The above warranty is the basic warranty on Ericsson Television products. This warranty might be extended through a separate deal or purchase made with Ericsson. Refer to the service contract (if any) that came with your equipment or system for further information.

7.4 Factory Default Settings

The TT1222 is dispatched with the following factory defaults. These can be restored at any time using the **Restore Def:** option found in the **Setup ⇒ System** submenu.

Table 7.1: Factory Defaults

Menu	Item	Default
SET: VIDEO SETUP	Default Line Standard Stop mode	525 (625 if Russian SECAM option module is fitted – See *Chapter 3, Options*) Black
SET: TV SERVICE	Audio 1 Language Teletext Language	eng eng
SET: AUD2 SERVICE	Audio 2 Language	eng
SET: CONTROL	Control Mode Menu lock	Local Off
SET: VIDEO 625	Teletext VPS WSS Testlines Sin (x) / x	On Off MPEG-video 17, 18 Off
SET: VIDEO 525	Testlines Closed Cap	On Off
SET: AUDIO X	Output level (dB) Modulator Digital Audio	0.0 Stereo Linear
SET: REMOTE PORT	Baud rate Data bits Stop bits	115200 8 1.0

Menu	Item	Default
	Parity Flow control	None None
SET: LS DATA	Mode Aux PID	Off 0016
SET: DATA PORT	Baud rate Data bits Stop bits Parity Flow control	115200 8 1.0 None None
SET: LS O/P	O/P Format Buffering	Bin Flow

7.5 Fault-finding

7.5.1 General

The information contained in this chapter is intended to isolate the unit as the faulty equipment if a system failure occurs. If the following information fails to clear the abnormal condition, please contact Customer Services using the information given in the *Preliminary pages* of this Reference Guide.

7.5.2 Preliminary Investigation

1. Ensure that all leads and connectors are in place and serviceable.
2. Ensure the unit is powered.
3. Ensure that the front panel LED is not red. If it is lit, investigate the cause of the alarm in the **alarm status** menu as explained in *Chapter 6, Alarms/GPOs*. If the LED is not red, verify that alarm conditions that could be met have not been masked as explained in *Chapter 6*.
4. Verify signal lock and that the BER is within the acceptable range (QPSK input only).

Glossary

Annex A

The following list covers most of the abbreviations, acronyms and terms as used in Ericsson Manuals, User and Reference Guides. All terms may not be included in this Reference Guide.

µm	Micrometre (former name - micron): a unit of length equal to one millionth (10^{-6}) of a metre.
1000BaseT	The term for the Electrical Gigabit Ethernet interface. This is the most common interface for Gigabit Ethernet. Most Gigabit-enabled PCs and equipment use this interface.
3:2 pull-down	A technique used when converting film material (which operates at 24 pictures per second) to 525-line video (operating at 30 pictures per second).
4:2:0	Digital video coding method in which the colour difference signals are sampled on alternate lines at half the luminance rate.
4:2:2	Digital video coding method in which the colour difference signals are sampled on all lines at half the luminance rate.
422P@ML	422 Profile at Main Level: A subset of the MPEG-2 standard, which supports digital video storage (DVD etc.) and transmissions up to 50 Mbps over various mediums. Used for Contribution and Distribution applications.
5B6B	5 Binary Bits Encoded to 6 Binary Bits: Block code.
ADPCM	Adaptive Differential Pulse Code Modulation: An advanced PCM technique that converts analogue sound into digital data and vice versa. Instead of coding an absolute measurement at each sample point, it codes the difference between samples and can dynamically switch the coding scale to compensate for variations in amplitude and frequency.
ACC	Authorization Control Computer.
ADT	Audio, Data And Teletext.
AFC	Automatic Frequency Control.
AFS	Automation File Server.
AGC	Automatic Gain Control.

AMOL I and II	Automatic Measure of Line-ups I and II: Used by automated equipment to measure programme-viewing ratings.
ARP	Address Resolution Protocol. A protocol used to "resolve" IP addresses into underlying Ethernet MAC addresses.
ASI	Asynchronous Serial Interface.
ASIC	Application-Specific Integrated Circuit: A customized chip designed to perform a specific function.
Async	Asynchronous.
ATM	Asynchronous Transfer Mode: A connection orientated, cell based, data transport technology designed for Broadband ISDN (B-ISDN). It provides a circuit-switched bandwidth-on-demand carrier system, with the flexibility of packet switching. It offers low end-to-end delays and (negotiable on call set up) Quality of Service guarantees. Asynchronous refers to the sporadic nature of the data being transmitted. Cells are transmitted only when data is to be sent, therefore the time interval between cells varies according to the availability of data.
ATSC	Advanced Television Standards Committee: An organization founded in 1983 to research and develop a digital TV standard for the U.S.A. In late 1996, the FCC adopted the ATSC standard, the digital counterpart of the NTSC standard.
B3ZS	Bipolar with Three Zero Substitution: A method of eliminating long zero strings in a transmission. It is used to ensure a sufficient number of transitions to maintain system synchronization when the user data stream contains an insufficient number of 1s to do so. B3ZS is the North American equivalent of the European HDB3.
Backward Compatibility	Refers to hardware or software that is compatible with earlier versions.
BAT	Bouquet Association Table: Part of the service information data. The BAT provides information about bouquets. It gives the name of the bouquet and a list of associated services.
baud rate	The rate of transfer of digital data when the data comprises information symbols that may consist of a number of possible states. Equivalent to bit rate when the symbols only have two states (1 and 0). Measured in Baud.
BER	Bit Error Rate: A measure of transmission quality. The rate at which errors occur in the transmission of data bits over a link. It is generally shown as a negative exponent, (e.g., 10-7 means that 1 in 10,000,000 bits are in error).
BISS	Basic Interoperable Scrambling System: Non-proprietary encryption from EBU (Tech3290).
Bit rate	The rate of transfer of digital data when the data comprises two logic states, 1 and 0. Measured in bit/s.
Block; Pixel Block	An 8-row by 8-column matrix of luminance sample values, or 64 DCT coefficients (source, quantized, or de-quantized).

Bouquet A collection of services (TV, radio, and data, or any combination of the three) grouped and sold together, and identified in the SI as a group. A single service may be in several bouquets.

B-Picture; B-Frame Bi-directionally Predictive Coded Picture/Frame: A picture that is coded using motion-compensated prediction from previous I or P frames (forward prediction) and/or future I or P frames (backward prediction). B frames are not used in any prediction.

BPSK Binary Phase Shift Keying: A data modulation technique.

Buffer A memory store used to provide a consistent rate of data flow.

BW Bandwidth: The transmission capacity of an electronic line such as (among others) a communications network, computer bus, or broadcast link. It is expressed in bits per second, bytes per second or in Hertz (cycles per second). When expressed in Hertz, the frequency may be a greater number than the actual bits per second, because the bandwidth is the difference between the lowest and highest frequencies transmitted. High bandwidth allows fast transmission or high-volume transmission.

Byte-mode Each byte is delivered separately in the ASI transport stream, with stuffing data added between the Bytes to increase the data rate to 270 Mbps. See DVB Document A010 rev. 1, Section B3.3, (ASI) Layer-2 Transport Protocol.

CA Conditional Access: The technology used to control the access to viewing services to authorized subscribers through the transmission of encrypted signals and the programmable regulation of their decryption by a system such as viewing cards.

CAT Conditional Access Table: Part of the MPEG-2 Program Specific Information (PSI) data. Mandatory for MPEG-2 compliance if CA is in use.

C-Band The portion of the electromagnetic spectrum, which spans the frequency range of approximately 4 GHz to 6 GHz. Used by communications satellites. Preferred in tropical climates because it is not susceptible to fading.

CCIR See: ITU-R.

CCITT See: ITU-T.

Channel a narrow range of frequencies, part of a frequency band, for the transmission of radio and television signals without interference from other channels.
In the case of OFDM, a large number of carriers spaced apart at precise frequencies are allocated to a channel.

Channel Coding A way of encoding data in a communications channel that adds patterns of redundancy into the transmission path in order to improve the error rate. Such methods are widely used in wireless communications.

Chrominance The colour part of a TV picture signal, relating to the hue and saturation but not to the luminance (brightness) of the signal. In a composite-coded colour system, the colour information (chrominance, often referred to as chroma) is modulated onto a high frequency carrier and added to the monochrome-format video signal carrying the luminance (Y). In a component-coded colour system, the two colour-difference signals (R-Y)(B-Y) usually referred to as C_RC_B (digital) or P_RP_B (analogue), are used to convey colour information. When C_RC_B (P_RP_B) is added to the luminance (Y), the complete picture information is conveyed as YC_RC_B (YP_RP_B).

Closed Captioning A TV picture subtitling system used with 525-line analogue transmissions.

CODE Create Once Distribute Everywhere.

Codec The combination of an En**co**der and a complementary **Dec**oder located respectively at the input and output of a transmission path.

COFDM Coded OFDM: COFDM adds forward error correction to the OFDM transmission consisting of Reed-Solomon (RS) coding followed by convolutional coding to add extra bits to the transmitted signal. This allows a large number of errors at the receive end to be corrected by convolutional (Viterbi) decoding followed by RS decoding.

Composite CVBS Video Signal, 1 $V_{pk\text{-}pk}$

Compression Reduction in the number of bits used to represent the same information. For the purposes of a broadcast system, it is the process of reducing digital picture information by discarding redundant portions of information that are not required when reconstituting the picture to produce viewing clarity. Compression allows a higher bite-rate to be transmitted through a given bandwidth.

Compression System Responsible for compressing and multiplexing the video / audio / data bitstreams, together with the authorization stream. The multiplexed data stream is then ready for transmission.

C_RC_B Digital Colour difference signals. These signals, in combination with the luminance signal (Y), define the colour and brightness of each picture element (pixel) on a TV line. See: Chrominance

CRC Cyclic Redundancy Check: A mathematical algorithm that computes a numerical value based on the bits in a block of data. This number is transmitted with the data and the receiver uses this information and the same algorithm to ensure the accurate delivery of data by comparing the results of algorithm and the number received. If a mismatch occurs, an error in transmission is presumed.

CVBS Colour Video Black Sync Signal

dB Decibels: A ratio of one quantity to another using logarithmic scales to give results related to human aural or visual perception. dB is a ratio whereas dBm, for example, is an absolute value, quoted as a ratio to a fixed point of 0 dBm. 0 dBm is 1 mW at 1 kHz terminated in 600Ω. 0 dBmV is 1 mV terminated in 75Ω.

DCE	Data Communications Equipment: Typically a modem. It establishes, maintains and terminates a session on a network but in itself is not the source (originator) or destination (end receiving unit) of signals (e.g. a computer, see DTE). A DCE device may also convert signals to comply with the transmission path (network) format.
DCT	Discrete Cosine Transform: A technique for expressing a waveform as a weighted sum of cosines. Raw video data is not readily compressible. DCT is not in itself a compression technique but is used to process the video data so that it is compressible by an encoder. DCT processes the picture on an 8x8-pixel block basis, converting the data from an uncompressible X Y form (as displayed by an oscilloscope) to a compressible frequency domain form (as displayed by a spectrum analyzer). Can be forward DCT or inverse DCT.
DDS	Direct Digital Synthesiser.
Decoder	The unit containing the electronic circuitry necessary to decode encrypted signals. Some Decoders are separate from the receiver but in satellite TV broadcasting, the term is often used interchangeably as a name for an Integrated Receiver Decoder (IRD). The term IRD, or IRD / Decoder, is usually associated with satellite TV broadcasting while Cable systems are based on Converters or on Set-Top Boxes / Converters.
Decoding Time stamp	A field that may be present in a PES packet header that indicates the time that an access unit is to be decoded in the system target Decoder.
DENG	Digital Electronic News Gathering
DID	Data Identifier.
Differential Coding	Method of coding using the difference between the value of a sample and a predicted value.
DiffServ	Differentiated Services. A mechanism used on layer 3 - e.g. the IP layer - to differentiate between traffic of various types. DiffServ is based on the ToS field and provides a mechanism for the network to give e.g. video traffic higher priority than other traffic (for example Internet traffic).
DIL	Dual In Line: The most common type of package for small and medium scale integrated circuits. The pins hang vertically from the two long sides of the rectangular package, spaced at intervals of 0.1 inch.
DIN	Deutsches Institut für Normung: German Standards Institute.
Downlink	The part of the satellite communications circuit that extends from the satellite to an Earth station.
Downconvert	The process by which the frequency of a broadcast transport stream is shifted to a lower frequency range.
DPCM	Differential Pulse Code Modulation: An audio digitization technique that codes the difference between samples rather than coding an absolute measurement at each sample point.

DSNG	Digital Satellite News-Gathering.
DSP	Digital Signal Processor.
DTE	Data circuit Terminating Equipment: A communications device that originates (is the source) or is the end receiving unit (destination) of signals on a network. It is typically a terminal or computer.
DTH	Direct-To-Home. The term used to describe uninterrupted transmission from the satellite directly to the subscriber, that is, no intermediary cable or terrestrial network utilized.
DTMF	Dual-Tone MultiFrequency
DVB	Digital Video Broadcasting: A European project which has defined transmission standards for digital broadcasting systems using satellite (DVB-S), cable (DVB-C) and terrestrial (DVB-T) medium, created by the EP-DVB group and approved by the ITU. Specifies modulation, error correction, etc. (see EN 300 421 for satellite, EN 300 429 for cable and EN 300 744 for terrestrial).
DVB SI	Digital Video Broadcasting Service Information.
DVB-PI	DVB-Professional Interfaces: TTV Lan search shows – DVB Physical Interfaces
DWDM	Dense Wavelength Division Multiplexing. A mechanism to utilize existing fiber with even more bandwidth by adding extra signals using other wavelengths/colors
Earth	Technical Earth: Ensures that all equipment chassis within a rack are at the same potential, usually by connecting a wire between the Technical earth terminal and a suitable point on the rack. This is sometimes known as a Functional earth. Protective Earth: Used for electric shock protection. This is sometimes known as a safety earth.
EBU	European Broadcast Union.
ECM	Entitlement Control Message.
EDI	Ethernet Data Input
EIA	Electronics Industries Association (USA).
EIT	Event Information Table: Equipment: A component of the DVB-Service Information (SI) stream generated within an Encoder, containing information about events or programmes such as event name, start time, duration, etc. System: EIT (Present/Following) contains the name of the current and next event. It may include an optional descriptor (synopsis) giving brief details of content. EIT (Schedule) is used to produce a full EPG. The EIT is the only DVB-SI table, which can be encrypted.
Elementary Stream	A generic term for a coded bitstream, be it video, audio or other.
EMC	Electromagnetic Compatibility.
EMM	Entitlement Management Message.

Encryption	Encoding of a transmission to prevent access without the appropriate decryption equipment and authorization.
EPG	Electronic Programme Guide: On-screen programme listing using thumbnail pictures and/or text.
Ethernet	The most widely used local area network (LAN) defined by the IEEE as the 802.3 standard. Transmission speeds vary according to the configuration. Ethernet uses copper or fibre-optic cables.
ETS	European Telecommunications Standard.
ETSI	European Telecommunications Standards Institute.
FBAS	German for CVBS
FCC	Federal Communications Commission.
FDM	Frequency Division Multiplex: A common communication channel for a number of signals, each with its own allotted frequency.
FEC	Forward Error Correction: A method of catching errors in a transmission. The data is processed through an algorithm that adds extra bits and sends these with the transmitted data. The extra bits are then used at the receiving end to check the accuracy of the transmission and correct any errors.
FFT	Fast Fourier Transformation: A fast algorithm for performing a discrete Fourier transform.
FIFO	First In, First Out: A data structure or hardware buffer from which items are taken out in the same order they were put in. Also known as a shelf from the analogy with pushing items onto one end of a shelf so that they fall off the other. A FIFO is useful for buffering a stream of data between a sender and receiver that are not synchronized - i.e. they not sending and receiving at exactly the same rate.
FM	Frequency Modulation: Analogue modulation procedure
Footprint	The area of the Earth's surface covered by a satellite's downlink transmission. Also (generally) the area from which the satellite can receive uplink transmissions.
FTP	File Transfer Protocol: A protocol used to transfer files over a TCP/IP network (Internet, UNIX, etc.). For example, after developing the HTML pages for a Web site on a local machine, they are typically uploaded to the Web server, using FTP. Unlike e-mail programs in which graphics and program files have to be attached, FTP is designed to handle binary files directly and does not add the overhead of encoding and decoding the data.
G.703	The ITU-T standard which defines the physical and electrical characteristics of hierarchical digital interfaces.
GOP	Group of Pictures: MPEG video compression works more effectively by processing a number of video frames as a block. The Ericsson AB Encoder normally uses a 12 frame GOP; every twelfth frame is an I frame.

GUI	Graphical User Interface: The use of pictures rather than just words to represent the input and output of a program. A program with a GUI runs under a windowing system and has a screen interface capable of displaying graphics in the form of icons, drop-down menus and a movable pointer. The on-screen information is usually controlled / manipulated by a mouse or keyboard.
HDTV	High Definition Television.
HPA	High Power Amplifier: Used in the signal path to amplify the modulated and up-converted broadcast signal for feeding to the uplink antenna.
HSYNC	Horizontal (line) SYNCs.
HTTP	HyperText Transfer Protocol. The fundamental protocol used on the Internet for transmission of WEB pages and other data between servers and PCs
HU	Height Unit
Hub	A device in a multi-point network at which branch nodes interconnect.
ICAM	Integrated Conditional Access Module: Embedded in the IRD and responsible for descrambling, plus packet filtering and reception. It also contains the physical interface to the subscriber's viewing card.
ICMP	Internet Control Message Protocol. ICMP messages, delivered in IP packets, are used for out-of-band messages related to network operation or mis-operation
IGMP	Internet Group Management Protocol. IGMP is a protocol used to manage multicasts on the Internet. For a host (receiver unit) to receive a multicast, it needs to transmit IGMP "join" messages on the right format. Three versions exist. IGMPv2 is common today but IGMPv3 is the next step**.**
IDU	Indoor unit
IEC	International Electrotechnical Committee.
IF	Intermediate Frequency: Usually refers to the 70 MHz or 140 MHz output of the Modulator in cable, satellite and terrestrial transmission applications.
Interframe Coding	Compression coding involving consecutive frames. When consecutive frames are compared, temporal redundancy is used to remove common elements (information) and arrive at difference information. MPEG-2 uses B and P frames, but since they are individually incomplete and relate to other adjacent frames, they cannot be edited independently.
Intraframe Coding	Compression coding involving a single frame. Redundant information is removed on a per frame basis. All other frames are ignored. Coding of a macroblock or picture that uses information only from that macroblock or picture. Exploits spatial redundancy by using DCT to produce I frames; these are independent frames and can be edited.

IP Internet Protocol: The IP part of TCP/IP. IP implements the network layer (layer 3) of the protocol, which contains a network address and is used to route a message to a different network or sub-network. IP accepts packets from the layer 4 transport protocol (TCP or UDP), adds its own header to it and delivers a datagram to the layer 2 data link protocol. It may also break the packet into fragments to support the Maximum Transmission / Transfer Unit (MTU) of the network.

I-picture; I-frame Intracoded Picture/Frame: A picture / frame, which is coded using purely intracoding with reference to no other field or frame information. The I frame is used as a reference for other compression methods.

IPPV Impulse Pay Per View: One-time events, purchased at home (on impulse) using a prearranged SMS credit line.

IRD Integrated Receiver Decoder: The Receiver with an internal MPEG Decoder, which is connected to the subscriber's TV. The IRD is responsible for receiving and de-multiplexing all signals. The unit receives the incoming signal and if CA is active, decodes the signal when provided with a control word by the viewing card. Domestic IRDs are also known as Set-Top Units or Set-Top Boxes.

IRE Institute of Radio Engineers: No longer in existence but the name lives on as a unit of video amplitude measurement. This unit is 1% of the range between blanking a peak white for a standard amplitude signal.

ISDN Integrated Services Digital Network: The basic ISDN service is BRI (Basic Rate Interface), which is made up of two 64 kbps B channels and one 16 kbps D channel (2B+D). If both channels are combined into one, called bonding, the total data rate becomes 128 kbps and is four and a half times the bandwidth of a V.34 modem (28.8 kbps). The ISDN high speed service is PRI (Primary Rate Interface). It provides 23 B channels and one 64 kbps D channel (23B+D), which is equivalent to the 24 channels of a T1 line. When several channels are bonded together, high data rates can be achieved. For example, it is common to bond six channels for quality videoconferencing at 384 kbps. In Europe, PRI includes 30 B channels and one D channel, equivalent to an E1 line.

ISO International Standards Organisation.

ISOG Inter-union Satellite Operations Group.

ITS Insertion Test Signal: A suite of analogue test signals placed on lines in the VBI. Also known as VITS.

ITT Invitation To Tender.

ITU-R International Telecommunications Union - Radiocommunications Study Groups (was CCIR).

ITU-T International Telecommunications Union - Telecommunications Standardization Sector (was CCITT).

JPEG Joint Photographic Experts Group: ISO/ITU standard for compressing still images. It has a high compression capability. Using discrete cosine transform, it provides user specified compression ratios up to around 100:1 (there is a trade-off between image quality and file size).

kbps 1000 bits per second.

Kbit 1024 bits, usually refers to memory capacity or allocation.

Ku-band The portion of the electromagnetic spectrum, which spans the frequency range of approximately 12 GHz to 14 GHz. Used by communications satellites. Preferred for DTH applications because this range of frequency is less susceptible to interference.

LAN Local Area Network: A network, which provides facilities for communications within a defined building or group of buildings in close proximity.

L-band The frequency band from 950 MHz to 2150 MHz, which is the normal input-frequency-range of a domestic IRD. The incoming signal from the satellite is down-converted to L-band by the LNB.

LED Light Emitting Diode.

LNB Low Noise Block Down-Converter: The component of a subscriber satellite transmission receiving dish which amplifies the incoming signal and down-converts it to a suitable frequency to input to the IRD (typically 950 MHz - 1600 MHz).

LO Local Oscillator.

lsb Least significant bit.

Luminance The television signal representing brightness, or the amount of light at any point in a picture. The Y in YC_RC_B.

LVDS Low Voltage Differential Signal: LVDS is a generic multi-purpose Interface standard for high speed / low power data transmission. It was standardized in ANSI/TIA/EIA-644-1995 Standard (aka RS-644).

Macroblock A 16x16-pixel area of the TV picture. Most processing within the MPEG domain takes place with macro blocks. These are converted to four 8x8 blocks using either frame DCT or field DCT. Four 8 x 8 blocks of luminance data and two (4:2:0 chrominance format), four (4:2:2) or eight (4:4:4) corresponding 8 x 8 blocks of chrominance data coming from a 16 x 16 section of the luminance component of the picture. Macroblock can be used to refer to the sample data and to the coded representation of the sample values and other data elements.

Mbps Million bits per second.

MCC Multiplex Control Computer: A component of a System 3000 compression system. The MCC sets up the configuration for the System 3000 Multiplexers under its control. The MCC controls both the main and backup Multiplexer for each transport stream.

MCPC Multiple Channels Per Carrier.

MEM	Multiplex Element Manager: A GUI-based control system, part of the range of Ericsson AB compression system control element products. The evolution *5*000 MEM holds a model of the system hardware. Using this model, it controls the individual system elements to configure the output multiplexes from the incoming elementary streams. The MEM monitors the equipment status and controls any redundancy switching.
Meta-data	Meta-data is descriptive data that is "tagged" to a movie or audio clip. Meta-data is essential for the broadcaster.
MMDS	Multichannel Microwave Distribution System: A terrestrial microwave direct-to-home broadcast transmission system.
Motion Compensation	The use of motion vectors to improve the efficiency of the prediction of sample values. The prediction uses motion vectors to provide offsets into the past and/or future reference frames or fields containing previously decoded sample values that are used to form the prediction error signal.
Motion Estimation	The process of estimating motion vectors in the encoding process.
Motion Vector	A two-dimensional vector used for motion compensation that provides an offset from the coordinate position in the current picture or field to the coordinates in a reference frame or field.
MP@ML	Main Profile at Main Level: A subset of the MPEG-2 standard, which supports digital video storage (DVD etc.) and transmissions up to 15 Mbps over various mediums.
MP@HL	Main Profile at High Level: A subset of the MPEG-2 standard, which supports digital video storage (DVD etc.) and transmissions up to 80 Mbps over various mediums.
MPEG	Moving Pictures Experts Group: The name of the ISO/IEC working group which sets up the international standards for digital television source coding.
MPEG-2	Industry standard for video and audio source coding using compression and multiplexing techniques to minimise video signal bit rate in preparation for broadcasting. Specified in ISO/IEC 13818. The standard is split into layers and profiles defining bit rates and picture resolutions.
MPLS	Multi-protocol Label Switching. A Quality of Service mechanism for IP networks that allow IP packets to flow along a predefined path in a network, improving the reliability and robustness of the transmission.
MPTS	Multi-Program Transport Streams. Transport Streams that carry multiple TV/Radio services.
msb	Most significant bit.
Msymbol/s	(Msym/s) Mega (million) Symbols per second (10^6 Symbols per second).
Multiplex	A number of discrete data streams (typically 8 to 12), from encoders, that are compressed together in a single DVB compliant transport stream for delivery to a Modulator.

Multicast An IP mechanism that allows transmission of data to multiple receivers. A multicast can also have several transmit sources simultaneously. In video applications, multicast is typically used to distribute a video signal from a central source to multiple destinations.

MUSICAM Masking pattern adapted Universal Sub-band Integrated Coding And Multiplexing: An audio bit rate reduction system relying on sub-band coding and psychoacoustic masking.

Mux Multiplexer: Transmission Multiplexer: receives EMMs from the ACC, ECMs from the BCC, video/audio data from the encoders, and the SI stream from the SIC. It then multiplexes them all into a single DVB-compliant transport stream, and delivers the signal to the uplink after modulation.

The Multiplexer also contains the cypher card, which scrambles the services according to the control words supplied by the BCC.

Network In the context of broadcasting: a collection of MPEG-2 transport stream multiplexes transmitted on a single delivery system, for example, all digital channels on a specific cable system.

NICAM Near Instantaneously Companded Audio Multiplex: Official name is NICAM 728. Used for digital stereo sound broadcasting in the UK employing compression techniques to deliver very near CD quality audio. 728 refers to the bit rate in kbps.

NIT Network Information Table: Part of the service information data. The NIT provides information about the physical organization of each transport stream multiplex, and the characteristics of the network itself (such as the actual frequencies and modulation being used).

nm Nanometre: a unit of length equal to one thousand millionth (10^{-9}) of a metre.

NMS Network Management System. A system used to supervise elements in an IP network. When a device reports an alarm, the alarm will be collected by the NMS and reported to the operator. NMS systems typically collect valuable statistics information about the network performance and can warn the operator early.

NTSC National Television Systems Committee: The group, which developed analogue standards used in television broadcast systems in the United States. Also adopted in other countries (e.g. Mexico, Canada, Japan). This system uses 525 picture lines and a 59.97 Hz field frequency.

NVOD Near Video On-Demand: Method of offering multiple showings of movies or events. The showings are timed to start at set intervals, determined by the broadcaster. Each showing of a movie or event can be sold to subscribers separately.

NVRAM Non-volatile Random Access Memory: Memory devices (permitting random read / write access) that do not lose their information when power is removed. Stores the default configuration parameters set by the user.

ODU Outdoor Unit

OFDM Orthogonal Frequency Division Multiplex: A modulation technique used for digital TV transmission in Europe, Japan and Australia; more spectrally efficient than FDM. In OFDM, data is distributed over a large number of carriers spaced apart at precise frequencies. The carriers are arranged with overlapping sidebands in such a way that the signals can be received without adjacent channel interference.

OPPV Order ahead Pay Per View: An advance purchase of encrypted one-time events with an expiry date.

OSD On-screen display: Messages and graphics, typically originating from the SMS, and displayed on the subscriber's TV screen by the IRD, to inform the subscriber of problems or instruct the subscriber to contact the SMS.

Packet A unit of data transmitted over a packet switching network. A packet consists of a header followed by a number of contiguous bytes from an elementary data stream.

PAL Phase Alternating Line: A colour TV broadcasting system where the phase of the R-Y colour-difference signal is inverted on every alternate line to average out errors providing consistent colour reproduction.

PAT Program Association Table: Part of the MPEG-2 Program Specific Information (PSI) data and is mandatory for MPEG-2 compliance. The PAT points (maps) to the PMT.

PCM Pulse Code Modulation: A process in which a signal is sampled, each sample is quantized independently of other samples, and the resulting succession of quantized values is encoded into a digital signal.

PCR Program Clock Reference: A time stamp in the transport stream from which the Decoder timing is derived.

PDC Program Delivery Control: A Teletext service allowing simple programming (i.e. VideoPlus) of VCR recording times. If the desired program is rescheduled, PDC updates the programming information in the VCR.

Pel Picture Element: Also known as a pixel. The smallest resolvable rectangular area of an image either on a screen or stored in memory. On-screen, pixels are made up of one or more dots of colour. Monochrome and grey-scale systems use one dot per pixel. For grey-scale, the pixel is energized with different intensities, creating a range from dark to light (a scale of 0-255 for an eight-bit pixel). Colour systems use a red, green and blue dot per pixel, each of which is energized to different intensities, creating a range of colours perceived as the mixture of these dots. If all three dots are dark, the result is black. If all three dots are bright, the result is white.

PES Packetised Elementary Stream: A sequential stream of data bytes that has been converted from original elementary streams of audio and video access units and transported as packets. Each PES packet consists of a header and a payload of variable length and subject to a maximum of 64 kbytes. A time stamp is provided by the MPEG-2 systems layer to ensure correct synchronization between related elementary streams at the Decoder.

PID Packet Identifier: the header on a packet in an elementary data stream, which identifies that data stream. An MPEG-2 / DVB standard.

PIN Personal Identification Number: A password used to control access to programming and to set purchase limits. Each subscriber household can activate several PINs and may use them to set individual parental rating or spending limits for each family member.

Pixel PIX (picture) Element: The digital representation of the smallest area of a television picture capable of being delineated by the bit-stream. See Pel for more information.

pk-pk peak to peak: Measurement of a signal or waveform from its most negative point to its most positive point.

PLL Phase-Locked Loop. A phase-locked loop is a control system which controls the rotation of an object by comparing its rotational position (phase) with another rotating object as in the case of a sine wave or other repeating signal. This type of control system can synchronize not only the speed, but also the angular position of two waveforms that are not derived from the same source.

PMT Program Map Table: Part of the MPEG-2 Program Specific Information (PSI) data and is mandatory for MPEG-2 compliance. Each service has a PMT, which lists the component parts (elementary streams of video, audio, etc.) for the various services being transmitted.

P-picture/P-frame A picture / frame produced using forward prediction. It contains predictions from either previous I frames or previous P frames. The P frame is used as a reference for future P or B frames.

ppm Parts per million.

PPV Pay Per View: A system of payment for viewing services based on a usage / event basis rather than on on-going subscription. Subscribers must purchase viewing rights for each PPV event that they wish to view. PPV events may be purchased as IPPV or OPPV.

Program PC - A sequence of instructions for a computer.
TV - A concept having a precise definition within ISO 13818-1 (MPEG-2). For a transport stream, the timebase is defined by the PCR. The use of the PCR for timing information creates a virtual channel within the stream.

Programme A linking of one or more events under the control of a broadcaster. For example, football match, news, film show. In the MPEG-2 concept, the collection of elementary streams comprising the programme, have a common start and end time. A series of programmes are referred to as events.

P_RP_B	Analogue Colour difference signals. Refer to C_RC_B for an explanation.
PROM	Programmable Read-Only Memory: A device, which may be written once with data for permanent storage, and then read whenever required. Special types of PROM permit the erasure of all data by Ultraviolet light (EPROM) or by application of an electronic signal (EEPROM).
PS	Program Stream: A combination of one or more PESs with a common timebase.
PSI	Program Specific Information: Consists of normative data, which is necessary for the de-multiplexing of transport streams and the successful regeneration of programs (see also: SI).
PSIP	Program System Information Protocol: The ATSC equivalent of SI for DVB.
PSK	Phase Shift Keying: A method of modulating digital signals particularly suited to satellite transmission.
PSR	Professional Satellite Receiver: See also*:* IRD.
PSU	Power Supply Unit.
QAM	Quadrature Amplitude Modulation: A method of modulating digital signals, which uses combined techniques of phase modulation and amplitude modulation. It is particularly suited to cable networks.
QoS	Quality of Service. A common term for a set of parameters describing the quality you get from an IP network: Throughput, availability, delay, jitter and packet loss.
QPSK	Quadrature Phase Shift Keying: A form of phase shift keying modulation using four states.
QSIF	Quarter Screen Image Format.
Quantise	A process of converting analogue waveforms to digital information. 8-bit quantization as set out in ITU-R Rec. 601. Uses 256 levels in the range 0 – 255 to determine the analogue waveform value at any given point. The value is then converted to a digital number for processing in the digital domain.
RAM	Random Access Memory: A volatile storage device for digital data. Data may be written to, or read from, the device as often as required. When power is removed, the data it contains is lost.
RAS	Remote Authorization System: A Ericsson AB proprietary public-key encryption system used to prevent unauthorized viewing of a TV programme or programmes.
RF	Radio Frequency.
RGB	Red, Green, Blue: The Chroma information in a video signal.
RIP2	Routing Information Protocol v2. A protocol used between network routers to exchange routing tables and information.

ROM	Read Only Memory: A non-volatile storage device for digital data. Data has been stored permanently in this device. No further information may be stored (written) there and the data it holds cannot be erased. Data may be read as often as required.
RS	Reed-Solomon coding: An error detection and correction, coding system. 16 bytes of Reed-Solomon Forward Error Correction code are appended to the packet before transmission bringing the packet length to 204 bytes. The 16 bytes are used at the receiving end to correct any errors. Up to eight corrupted bytes can be corrected.
RSVP	ReSerVation Protocol. A Quality-of-service oriented protocol used by network elements to reserve capacity in an IP network before a transmission takes place.
RTP	Real-time Transfer Protocol. A protocol designed for transmission of real-time data like video and audio over IP networks. RTP is used for most video over IP transmissions.
RLC	Run Length Coding: Minimization of the length of a bit-stream by replacing repeated characters with an instruction of the form ‘repeat character x y times’.
SCPC	Single Channel Per Carrier.
Spectral Scrambling	A process (in digital transmission) used to combine a digital signal with a pseudo-random sequence, producing a randomized digital signal that conveys the original information in a form optimized for a broadcast channel.
Scrambling	Alteration of the characteristics of a television signal in order to prevent unauthorized reception of the information in clear form.
SDI	Serial Digital Interface.
SDT	Service Description Table: Provides information in the SI stream about the services in the system; for example, the name of the service, the service provider, etc.
SDTI	Serial Data Transport Interface. A mechanism that allows transmission of various types of data over an SDI signal. This may be one or more compressed video signals or other proprietary data types. The advantage of SDTI is that existing SDI transmission infrastructure can be used to transport other types of data.
SELV	Safety Extra Low Voltage (EN 60950).
SFP	Small Form-factor Pluggable module. A standardized mechanism to allow usage of various optical interfaces for Gigabit Ethernet. Several types of SFP modules exist: Single-mode fiber modules for long-distance transmission and multi-mode fiber modules for shorter distances. SFP is also known as "mini-GBIC".
SIP	Session Initiation Protocol. A common acronym for the ongoing effort to standardize signaling over IP networks, i.e. connection set-up and tear-down. SIP makes it possible to "dial" a remote receiver of data and set-up the connection in this way.

STB Set-Top Box: A box that sits on top of a television set and is the interface between the home television and the cable TV company. New technologies evolving for set-top boxes are video-on-demand, video games, educational services, database searches, and home shopping. The cable equivalent of the IRD.

SFN Single Frequency Network: The SFN technique allows large geographic areas to be served with a common transmission multiplex. All transmitters in the network are synchronously modulated with the same signal and they all radiate on the same frequency. Due to the multi-path capability of the multi-carrier transmission system (COFDM), signals from several transmitters arriving at a receiving antenna may contribute constructively to the total wanted signal. The SFN technique is not only frequency efficient but also power efficient because fades in the field strength of one transmitter may be filled by another transmitter.

SI Service Information: Digital information describing the delivery system, content and scheduling (timing) of broadcast data streams. DVB-SI data provides information to enable the IRD to automatically demultiplex and decode the various streams of programmes within the multiplex. Specified in ISO/IEC 13818[1]. (DVB)

Single Packet Burst Mode A burst of ASI bytes (either 188 or 204, depending on packet length) is contiguously grouped into an MPEG-2 transport stream packet. Stuffing data is added between the packets to increase the data rate to 270 Mbps. See DVB Document A010 rev. 1, Section B3.3, (ASI) Layer-2 Transport Protocol.

Smart Card A plastic card with a built-in microprocessor and memory used for identification, financial transactions or other authorizing data transfer. When inserted into a reader, data is transferred to and from the host machine or a central computer. It is more secure than a magnetic stripe card and it can be disabled if the wrong password is entered too many times. As a financial transaction card, it can be loaded with digital money and used in the same way as cash until the balance reaches zero. The file protocol is specific to its intended application.

SMATV Satellite Mast Antenna Television: A distribution system, which provides sound and television signals to the households of a building or group of buildings, typically used to refer to an apartment block.

SMPTE Society of Motion Picture and Television Engineers.

SMS Subscriber Management System: A system which handles the maintenance, billing, control and general supervision of subscribers to conditional access technology viewing services provided through cable and satellite broadcasting. An SMS can be an automatic (e.g. Syntellect) system where subscribers order entitlements by entering information via a telephone. Alternatively, an SMS can be a manual system, which requires subscribers to speak with an operator who then manually enters their entitlement requests. Some systems support multiple SMSs.

SNG Satellite News-Gathering.

SNMP Simple Network Management Protocol.

SNTP	Simple Network Time Protocol is an Internet protocol used to synchronize the clocks of computers to some time reference. It is a simplified version of the protocol NTP protocol which is too complicated for many systems.
Spatial Redundancy	Information repetition due to areas of similar luminance and/or chrominance characteristics within a single frame. Removed using DCT and Quantization (Intra-Frame Coding).
SPI	Synchronous Parallel Interface.
Statistical Redundancy	Data tables are used to assign fewer bits to the most commonly occurring events, thereby reducing the overall bit rate. Removed using Run Length Coding and Variable Length Coding.
TAXI	Transparent Asynchronous Tx / Rx Interface: A proprietary high speed data interface.
TCP / IP	Transmission Control Protocol/Internet Protocol: A set of communications protocols that may be used to connect different types of computers over networks.
TDM	Time Division Multiplex: One common, communications channel carrying a number of signals, each with its own allotted time slot.
TDT	Time and Date Table: Part of the DVB Service Information. The TDT gives information relating to the present time and date.
Temporal Redundancy	Information repetition due to areas of little or no movement between successive frames. Removed using motion estimation and compensation (Inter-Frame Coding).
Time stamp	A term that indicates the time of a specific action such as the arrival of a byte or the presentation of a presentation unit.
TOT	Time Offset Table: This optional SI table supports the use of local offsets as well as the UTC time/date combination. The purpose of the table is to list by country the current offset from UTC and the next expected change to that offset (to track when daylight saving occurs). The offset resolution is to within 1 minute over a range of ±12 hours from UTC.
Transport Stream	A set of packetised elementary data streams and SI streams, which may comprise more than one programme, but with common synchronization and error protection. The data structure is defined in ISO/IEC 13818-1 [1] and is the basis of the ETSI Digital Video Broadcasting standards.
Transport Stream Packet Header	A data structure used to convey information about the transport stream payload.
TS	Transport Stream.
TSDT	Transport Stream Descriptor Table: A component of the MPEG-2 PSI data. This table describes which type of Transport stream it is in (i.e. DVB, ATSC etc.). It may also contain other descriptors.
TSP	Transport Stream Processor.
U	44.45 mm (rack height standard).

UART Universal Asynchronous Receiver Transmitter: A device providing a serial interface for transmitting and receiving data.

UDP User Datagram Protocol. A protocol above the IP layer that provides port multiplexing in addition. In essence, you can transmit IP data packets to several receiving processes in the same unit/device.

Unicast Point-to-point connection, i.e. the "opposite" of multicast which is one to many (or many to many). In this mode, a transmit unit sends video data direct to a unique destination address.

Upconvert The process by which the frequency of a broadcast transport stream is shifted to a higher frequency range.

Uplink The part of the communications satellite circuit that extends from the Earth to the satellite.

UPS Uninterruptable Power Supply: A method of supplying backup power when the electrical power fails or drops to an unacceptable voltage level. Small UPS systems provide battery power for a few minutes; enough to power down the computer in an orderly manner. This is particularly important where write back cache is used. Write back cache is where modified data intended for the disk is temporarily stored in RAM and can be lost in the event of a power failure. Sophisticated systems are tied to electrical generators that can provide power for days. UPS systems typically provide surge suppression and may provide voltage regulation.

UTC Universal Time Coordinate: An internationally agreed basis for timekeeping introduced in 1972 and based on international atomic time (corresponds to Greenwich Mean Time or GMT).

VITC Vertical Interval Time Code.

VITS Vertical Interval Test Signal: See: ITS.

VLAN Virtual LAN, a network of units that behave as if they are connected to the same wire even though they may actually be physically located on different segments of a LAN.

VPS Video Programming System: A German precursor to PDC

WSS Wide Screen Switching: Data used in wide-screen analogue services, which enables a receiver to select the appropriate picture display mode.

WST World System Teletext: System B Teletext. Used in 625 line / 50 Hz television systems
(ITU-R 653).

XILINX A type of programmable Integrated Circuit.

XLR Audio connector featuring three leads, two for signal and one for GND.

XML eXtensible Markup Language. A very common self-describing text-based data format. Used for many purposes: Meta-data, configuration files, documents, etc. The readability of the format has made it very popular and is now the fundament for many types of WEB services.

Y (Luminance)	Defines the brightness of a particular point on a TV line. The only signal required for black and white pictures.
Y/C	Broadcast video with separate colour, Y (luminance) and C (Chroma) (sometimes called S-Video).
YUV	Y: Luminance component (Brightness), U and V: Chrominance (Colour difference)

Technical Specification

Annex B

Contents

List of Tables

B.1 General

The TT1222 is a 1RU single channel MPEG-2 receiver, designed to decode MP@ML MPEG-2 compliant transport streams.

B.2 Key Features

- Optional inputs: QPSK, ASI (refer to *Chapter 3* for details)
- Optional outputs: Single ASI, Dual ASI/SDI, Russian SECAM, Dual IP (refer to *Chapter 3* for details)
- MP@ML decoding up to 15 Mbps
- Remote controllable via Web Browser/nCompass Control (Ethernet), Director or RS-232

B.3 Video Decoder

Table B.1: Video Decoder

Parameter	**Performance**	
Profile:	MP@ML	
Max bit rate:	15 Mbps	
Resolutions supported:	**625 lines**	**525 lines**
	720 x 576	720 x 480
	704 x 576	704 x 480
	544 x 576	544 x 480
	480 x 576	480 x 480
	352 x 576	352 x 480
	352 x 288	352 x 240

B.4 Outputs

B.4.1 Analogue Video Output

Two BNC composite analogue video outputs are provided on the rear panel of the unit.

Table B.2: Analogue Video Output

Parameter	Performance
Safety status:	SELV
Connector type:	2 x BNC (female)
Impedance:	75 Ω
Chroma / Luminance gain error (measured on 20T modulated pulse):	100 +/- 3%
Chroma / Luminance delay error (measured on 20T modulated pulse):	< 37.5 ns
Differential gain:	< 2%
Differential phase:	< 1 deg

B.4.2 Composite 625 Lines Output

Table B.3: 625 Line Analogue Video Parameters

Parameter	Performance
Frequency response:	0.0 – 5.0 MHz:±0.5 dB 5.0 – 5.5 MHz:+0.5 dB / –1.5 dB 5.5 – 5.8 MHz:+0.5 dB / -3 dB
Video output level:	±3% (700 mV)
Synch level:	±3% (300 mV)
Luminance non-linearity (measured on ramp):	< 4 %
2T K factor:	< 1%
PAL Parameters	
Output encoding PAL:	B, D, G, H, I, Combination N, M

Parameter	Performance
SECAM (Line ID) Parameters	
Output encoding SECAM (Line ID):	B, G, H, K1, L
Chroma subcarrier frequency:	±2 kHz
SECAM (Field ID) Parameters[1]	
Output encoding SECAM (Field ID):	D, K
Attenuation of color difference signals:	≤ 3dB @ 1.3 MHz ≥ 30 dB @ 3.5 MHz
Chroma subcarrier frequency:	±2 kHz
Chroma subcarrier blanking:	a. From leading edge of line-blanking signal up to: $i = 5.6 \pm 0.2$ (μs) after epoch O_H, b. During field-blanking interval, excluding frame identification signals, or, in countries where this is possible, during the whole of the field-blanking interval. *Refer to ITU-R BT.470-6 for details*
Field identification lines:	Lines 7 to 15 and lines 320 to 328 inclusive.
Identification line amplitude:	500mV ± 40mV *Refer to ITU-R BT.470-6 for details of the trapezoidal shaping for the first 15 μs ± 5 μs*
Video bandwidth:	6 MHz nominal
Peak level including chroma:	1.15 x 700 mV

B.4.3 Composite 525 Lines Output

Table B.4: 525 Line Analogue Video Parameters

Parameter	Performance
Frequency response:	0.0 – 4.2 MHz:± 0.5 dB 4.2 – 4.5 MHz:+0.5 dB / –1.5 dB
Video output level:	±3 IRE
Synch level:	±1.5 IRE
Output encoding NTSC:	M
Output encoding PAL:	M

[1] Available if Russian SECAM hardware option fitted.

B.4.4 PAN/SCAN

The IRD can perform the following horizontal Pan vector handling.

Table B.5: Pan/Scan

Parameter	Specification
16:9 -> 4:3 Horizontal	Mandatory TR 101 154
16:9 -> 4:3 Horizontal centre (no Pan/Scan information in signal)	Mandatory TR 101 154

Note: No support is required for vertical ("scan") vectors.

B.4.5 VBI 625 Lines Output

Table B.6: 625 Line VBI Output

Parameter	Line/Field	Performance
VITS lines specification		ITU-R J.63
VITS PAL (lines)	17, 18, 330, 331	
VITS SECAM (lines)	17, 18	
VITC	lines 16 or 22 (fields 1 and 2)	SMPTE RP164, ISO 13818-2 GOP header
Other testlines PAL / SECAM		Sin(x)/x
WST (EBU) Teletext Source system	7 to 23, 319 to 335 mandatory 6 to 23, 318 to 335 (inclusive) if possible.	EN 300 472 (DVB), SI-DAT 477 rev. 2
WST (EBU) Teletext Output system	7 to 23, 319 to 335 mandatory 6 to 23, 318 to 335 (inclusive) if possible.	ITU-R BT.653-3, system B
WST (EBU) Teletext Level		462 mV ± 6%
WST (EBU) Teletext Eye height		> 90%
WST (EBU) Teletext Delay rel. to video	±1 frame	
VPS Source system[2]	16	EN301 775

[2] VPS data are encoded on line 16, comprising a total of 13 bytes per frame. The data is used for a number of different purposes. Only bytes 5, 11, 12, 13 and 14 are supported.

Parameter	Line/Field	Performance
VPS Output system		ETS 300 231, ARD/ZDF Nr. 8R2
WSS Source system		EN301 775
WSS Output system[3]	23	ETS 300 294, ITU-R BT.1119

B.4.6 VBI 525 Lines Output

Table B.7: 525 Line VBI Analogue Output

Parameter	Lines/Fields	Performance
VITS lines Output system		ITU-R J.63
VITS (lines)	Line 17, field 1 and 2	
VITC	Line 14 (fields 1 and 2)	SMPTE RP164, ISO 13818-2 GOP header
GCR		ref. ATSC Doc A/49
Closed Captions	21 and 284 (Line 21 of fields 1 and 2)	ATSC A/53B ANSI/SCTE 20 (formerly DVS157)

B.4.7 Audio Decoder

Table B.8: Audio Decoder

Parameter	Performance
Supported formats:	MPEG-1 layer 1, MPEG-1 layer 2 (MUSICAM) Dolby AC-3 Downmix
Output format option:	Audio 1 and Audio 2:Balanced analogue and S/PDIF

B.4.8 Analogue Audio Output

Table B.9: Analogue Audio Output Specification

Parameter	Performance
Safety status:	SELV
Output connector:	9 pin D-sub (male)
Output format:	Balanced

[3] WSS is either (by user selection): a) Reproduced on line 23 of the output, or b) Used to control the aspect ratio of the output. If present, AFD takes precedence over WSS. If present, WSS takes precedence over the MPEG Sequence Header data.

Parameter	Performance
Minimum bitrate:	32 kbps
Maximum bitrate:	384 kbps
Sampling rates:	32, 44.1, 48 kHz
Nominal output level	
18 dB below clipping:	0 dBm in 600 Ω
Adjustable:	-9 to +3 dB
Step size:	0.1 dB
Output impedance:	< 20 Ω
Freq response	
Fs 44.1 / Fs 48 kHz:	±0.5 dB (20 Hz – 20 kHz)
Fs 32 kHz:	±0.5 dB (20 Hz – 14.5 kHz), +0.5 dB / -1.5 dB (14.5 – 20 kHz)
THD+N @ +9 dB:	< 63 dB (20 Hz – 20 kHz)
IMD @ 9.95-10.05 kHz, 0 dB:	< -50 dB
Inter channel phase:	< 3°
Idle channel noise:	< -74 dB

For detail of connector pin-out, refer to *Chapter 2, Installing the Equipment.*

B.4.9 S/PDIF Audio Output

Table B.10: S/PDIF Audio Output Specification

Parameter	Performance
Safety status:	SELV
Output connector:	9 pin D-sub (male)
Sampling rates:	44.1, 48 kHz
Output format:	IEC 60958
Levels:	ANSI/SMPTE 276M-1995

For detail of connector pin-out, refer to *Chapter 2, Installing the Equipment.*

B.5 Data Communication

B.5.1 Low Speed Data

Table B.11: LS Data Configuration

Parameter	**Performance**		
Safety status:	SELV		
Output connector:	9 pin D-sub (female)		
Electrical format:	RS-232		
Data rates:	75, 110, 150, 200, 300, 600, 1050, 1200, 2400, 4800, 9600, 19200, 38400, 57600 or 115200 baud selectable		
Tolerance:	2.5 %		
Pin-outs:	**Pin**	**Function**	**Direction**
	1	Reserved	-
	2	Data Transmit (Tx)	Output
	3	Data Receive (Rx)	Input
	4	Reserved	-
	5	Ground	-
	6	Reserved	-
	7	Reserved	-
	8	Reserved	-
	9	Reserved	-

B.5.2 Remote Control Port

Table B.12: Remote Control Port Configuration

Parameter	**Performance**
Safety status:	SELV
Output connector:	9 pin D-sub (male)
Electrical format:	RS-232
Data rates:	75, 110, 150, 200, 300, 600, 1050, 1200, 2400, 4800, 9600, 19200, 38400, 57600 or 115200 baud selectable
Baud rate tolerance:	±2.5%
Protocol:	Proprietary Ericsson remote control protocol

Parameter	Performance		
Pin-outs:	**Pin**	**Function**	**Direction**
	1	Reserved	-
	2	Data receive (Rx)	Input
	3	Data transmit (Tx)	Output
	4	Reserved	-
	5	Ground	-
	6	Reserved	-
	7	Reserved	-
	8	Reserved	-
	9	Reserved	-

B.5.3 Ethernet Port

The Ethernet port is used for Web Browser control nCompass Control. In order to use this port, a valid IP address and subnet mask must be set.

Table B.13: Ethernet Port Configuration

Parameter	Specification
Safety status:	SELV
Output connector:	Female 8 way R-J45
Connector designation:	10/100BT
Signal type:	10/100BaseT Ethernet (IEEE 802.3/IEEE 802.3u)

B.6 Alarm Relay/General Purpose Output

Table B.14: Alarm Relay

Parameter	Specification
Safety status	SELV
Output connector	Female 9 pin D-sub
Electrical format	Mechanical relay, contact closure
Number of signals	1
Contact resistance	50 mΩ

Parameter	Specification
Max switching voltage (AC/D.C.)	30 V / Not to exceed SELV limit of 60 V DC
Max switching power (AC/D.C.)	120 VA / 24 W
Surge voltage - contact coil	1.5 kV

Table B.15: General Purpose Output Pins

Parameter	Specification
Output connector	Female 9 pin D-sub
Electrical format	0 V, 5 V
Number of signals	5
Protection	Open collector buffers and diode clamps.

B.7 Options

B.7.1 QPSK Input Option (TT1222/HWO/QPSK)

The satellite input interface shall be compliant with the DVB specification. The LNB supply shall meet the requirements of IEC1319-1 (IEC61319-1) for European satellite receiver interfaces. Any requirements specific to Japan and USA are not included. Relevant requirements are summarized in *Table B.16*.

Table B.16: QPSK Demodulator

Parameter	Specification
Safety status	TNV-1
Input connector	F-type (Female), 75 Ω
Symbol Rate	DVB compliant 4 – 30 Msym/s and DVB capable 1 – 45 Msym/s.
Return Loss at i/p	>9.5 dB (VSWR < 2.0) for each input even if not selected.
Modulation	QPSK
Symbol rate set up	Manual
Frequency range	950 to 2150 MHz
Input level	-65 dBm to –25 dBm [40 dB dynamic range]
Frequency selection	Digital PLL

Parameter	Specification
Tuning Step size	125 kHz
Second order Intercept Point	+15 dBm minimum (referenced to the input)
Third order Intercept Point	+10 dBm minimum (referenced to the input) for an input signal level of –25 dBm
FEC	RS (188,204), Viterbi – Rates: 1/2, 2/3, 3/4, 5/6, 7/8
LNB power feed	Off, 13.5 V DC, 18 V DC output through the RF input connector
LNB power feed current supply	max 350 mA
LNB power supply tolerance	±5%
LNB power feed short prot	Automatic recovery when fault is removed.
LNB 22 kHz	ON / OFF
LNB 22 kHz freq. tolerance	±2 kHz
LNB 22 kHz duty cycle	50 ±10%
LNB 22 kHz amplitude @0-350 mA load	650 mV ±250 mV
LNB 22 kHz rise/fall time 10/90%	10 ±5μs
Spectral inversion	Normal / Inverted

B.7.2 ASI Input Option (TT1222/HWO/ASI/IN)

The ASI interface is implemented in accordance with CENELEC EN 50083-9: ref [15], in particular Annex B and E.

Table B.17: ASI Input

Parameter	Specification
Safety status	SELV
Input connector	1 x BNC, female 75 Ω
Sustained transport stream data rate	50 Mbps
Cable length	Better than 100m Belden 8281
Byte mode	Supported
Single packet burst mode	Supported
Return loss (5 MHz to 270 MHz)	Better than 15 dB

B.7.3 ASI Output Option (TT1222/HWO/ASI/OUT)

The ASI interface is implemented in accordance with CENELEC EN50083-9: ref[15], in particular Annex B and E.

Table B.18: ASI Output

<table>
<tr><th>Parameter</th><th colspan="2">Specification</th></tr>
<tr><td>Safety status</td><td colspan="2">SELV</td></tr>
<tr><td>Output connector</td><td colspan="2">BNC, female 75 Ω</td></tr>
<tr><td>Sustained transport stream data rate</td><td colspan="2">50 Mbps</td></tr>
<tr><td rowspan="4">Characteristics</td><td colspan="2">Non-bursting (spread byte mode).
Size of packet (188 or 204) is not user selectable. It is dependent on the TS input and whether the output is scrambled or descrambled.</td></tr>
<tr><td>Type of ASI Output selected</td><td>Output Packet Size</td></tr>
<tr><td>Descrambled output.</td><td>Output is always 188 byte packets</td></tr>
<tr><td>Scrambled output</td><td>Output will be the same packet size as the TS input.
(ASI input can be 188 bytes or 204 byte packets and QPSK is always 204 byte packets.)</td></tr>
<tr><td>No of Descrambled Services</td><td colspan="2">2 (1 TV Service and one additional audio service)</td></tr>
<tr><td>Output levels</td><td colspan="2">800 mV p-p ±10%</td></tr>
<tr><td>Deterministic jitter</td><td colspan="2">< 10% p-p</td></tr>
<tr><td>Random jitter</td><td colspan="2">< 8% UI p-p</td></tr>
</table>

When a service is being descrambled for monitoring, the descrambled output can also be made available on the ASI output. Alternatively the unit can be configured to output the scrambled TS.

B.7.4 ASI/SDI Output Option (TT1222/HWO/ASI/SDI)

The ASI/SDI option module provides 2 outputs which can be configured to be either ASI or SDI.

The ASI interface is implemented in accordance with CENELEC EN50083-9: ref[15], in particular Annex B and E.

Table B.19: ASI Output

Parameter	Specification
Safety status	SELV
Output connector	BNC, female 75 Ω
Sustained transport stream data rate	50 Mbps
No of Descrambled Services	2 (1 TV Service and one additional audio service)
Output levels	800 mV p-p ±10%
Deterministic jitter	< 10% p-p
Random jitter	< 8% UI p-p

B.7.5 Russian SECAM Output Version (TT1222/RSBAS)

The Russian SECAM output is only available on the TT1222 product. It offers ITU-R BT470-6/GOST 7845-92 compliant Russian SECAM for systems D and K.

When the module is fitted both CVBS outputs of the receiver can be configured to have field identification lines (also known as “bottles”).

B.7.6 Dual IP Output Option (TT1222/HWO/IP/OUT)

The Dual IP option module provides 2 RJ-45 outputs.

Table B.20: IP Out Port Configuration

Parameter	Specification
Safety status:	SELV
Output connector:	Female 8 way R-J45
Connector designation:	10/100BT
Signal type:	10/100BaseT Ethernet (IEEE 802.3/IEEE 802.3u)
Maximum Data Rate	50 Mbps

Parameter	Specification
Pro-MPEG FEC	In accordance with Pro-MPEG Code of Practice #3, release 2 July 2004
IP Traffic Modes	Unicast, Smallcast, Multicast and Broadcast
Characteristics	Multi-Program Transport Stream with 1 service decrypted – CBR and VBR available. Single – Program Transport Stream (Service Filter Mode) - CBR only - PAT, SDT regeneration

B.8 Power Supply

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

Table B.21: AC Power Supply 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 earth being connected 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	100-240 V AC (single phase)
Rated frequency	50/60 Hz
Voltage selection	Wide-ranging
Rated current	0.7A Max (100 - 240 V AC range)
Input connector	CEE 22/IEC 3-pin male receptacle
Fuse	Internal fuse is not user-replaceable
Power consumption	20 W maximum (no options fitted)

B.9 Physical Details[4]

Table B.22: Physical Details

Item	Specification
Height	44.5 mm chassis (1RU)
Width	442.5 mm excluding fixing brackets (19-inch rack size)
Overall width	482.6 mm including fixing brackets
Depth	320 mm chassis 20 mm plugs 10 mm clearing
Approximate weight	3.5 kg (7.7 lbs)

B.10 Environmental Conditions

Table B.23: Environmental Specification

Item	Specification
Operational	
Temperature	0°C to +50°C (14°F to 122°F) ambient with free air-flow
Relative humidity	0% to 95% (non-condensing)
Cooling requirements	Cool air input from front panel, exhaust from right and left side of unit
Handling/movement	Designed for stationary or fixed use when in operation
Storage/ Transportation	
Temperature	-20°C to +70°C (-4°F to 158°F)
Relative humidity	0% to 95% (non-condensing)

[4] The physical environment specification of the unit may be limited to the specifications of the DVB-CIF CAM module in use.

B.11 Compliance[5]

B.11.1 Safety

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.

B.11.2 EMC[6]

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[7]	European	Electromagnetic Compatibility (EMC), Part 3 Limits; Section 2. Limits for harmonic current emissions (equipment input current ≤ 16 A per phase).
EN 61000-3-3[7]	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 ≤ 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.

[5] The version of the standards shown is that applicable at the time of manufacture.
[6] The EMC tests were performed with the Technical Earth attached, and configured using recommended cables.
[7] Applies only to models of the Product using a.c. power sources.

B.11.3 CE Marking

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

89/336/EEC of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility.

73/23/EEC of 19 February 1973 on the harmonisation of the laws of the Member States relating to electrical equipment designed for use within certain voltage limits.

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).

Note: The CE mark was first affixed to this product in 2005.

B.11.4 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 the Radiocommunications Act 1992.

Note: The C-Tick mark was first affixed to this product in 2005.

B.11.5 Packaging Statement

The outer carton and any cardboard inserts are made from 82% recycled material and are fully recyclable.

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

B.11.6 Packaging Markings

The symbols printed on the outer carton are described below:

Handle with care.

This way up.

Fragile.

Protect from moisture.

See *Section B.11.3.*

See *Section B.11.4.*

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.

B.11.7 Materials Declarations

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

B.11.7.1 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.

B.11.7.2 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.

B.11.8 Equipment Disposal

B.11.8.1 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.

B.11.8.2 For the European Union

"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."

B.11.9 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/.

Click on the Login Page then enter:

```
User id:  ETelevision
Password: Television
```

B.12 Recommended Cable Types

Table B.24: Recommended Cable Types

Signal Type	Connector	Recommended Cable
CVBS 1 / CVBS 2	BNC	Canford 1/3 PSF (type 2 video cable)
Audio 1 / Audio 2	9-Way D-Type	Please contact Ericsson Customer Services (see *Preliminary pages*).
Relay/GPO	9-Way D-Type	Belden 8162 CM2PR24
RS232 Data	9-Way D-Type	Belden 8162 CM2PR24
RS232 Remote	9-Way D-Type	Belden 8162 CM2PR24
Ethernet	RJ-45	CAT 5E Data Cable FTP or STP
IP Output (Hardware Option)	RJ-45	CAT 5E Data Cable FTP or STP
QPSK In (Hardware Option)	F-Type	CT100 – Belden 1694A 3 GHz video cable
ASI In (Hardware Option)	BNC	Canford 1/3 PSF (type 2 video cable)
ASI Out, SDI Out (Hardware Options)	BNC	Canford 1/3 PSF (type 2 video cable)

BLANK

Front Panel LCD Menus

Annex C

Contents

List of Figures

List of Tables

BLANK

C.1 LCD Menus

C.1.1 Using the Menus

Detailed description of the use of menus is given in *Chapter 4, Operating the Equipment Locally*.

C.1.2 Menu Descriptions

This annex describes the front panel LCD menus.

The menu is created in a tree structure, where each branch may contain items, new branches, or both.

An item is viewed as an information string on the left side of the LCD, with an editable or selectable item on the right side, or an information string.

A path to a new sub branch is viewed as an information string on the left side of the LCD, where the string ends with a “>” character. The “>” symbolises the arrow key you have to press, to enter the submenu.

C.1.3 Menu Controls

C.1.3.1 Enter Operation

Type or select required information by exiting the editing menu with the **Right** arrow key.

C.1.3.2 Cancel Operation

If the selection is not required, and you want to exit without doing anything, exit the menu with the **Left** arrow key.

C.1.3.3 Menu Modes

Some menus are editable and some menus are information only.

C.1.3.4 Persistent Display Information

Some information will appear in the top right corner of the menu window depending on where you are in the menu tree. This information is related to the input signal.

C.1.3.5 Locking the Front Panel

If you want to lock the display for unwanted access, select the MENU LOCK menu item located under Setup>Control>Menu Lock.

You will need to unlock the menu again to be able to use the keys.

C.1.3.6 Unlocking the Front Panel

The unlocking sequence is required if the locked indicator is present on the top left line. The sequence is **Left**, **Right**, **Left**, **Left**, **Left**, **Right**, **Right**, **Right**.

C.2 Menu Tree

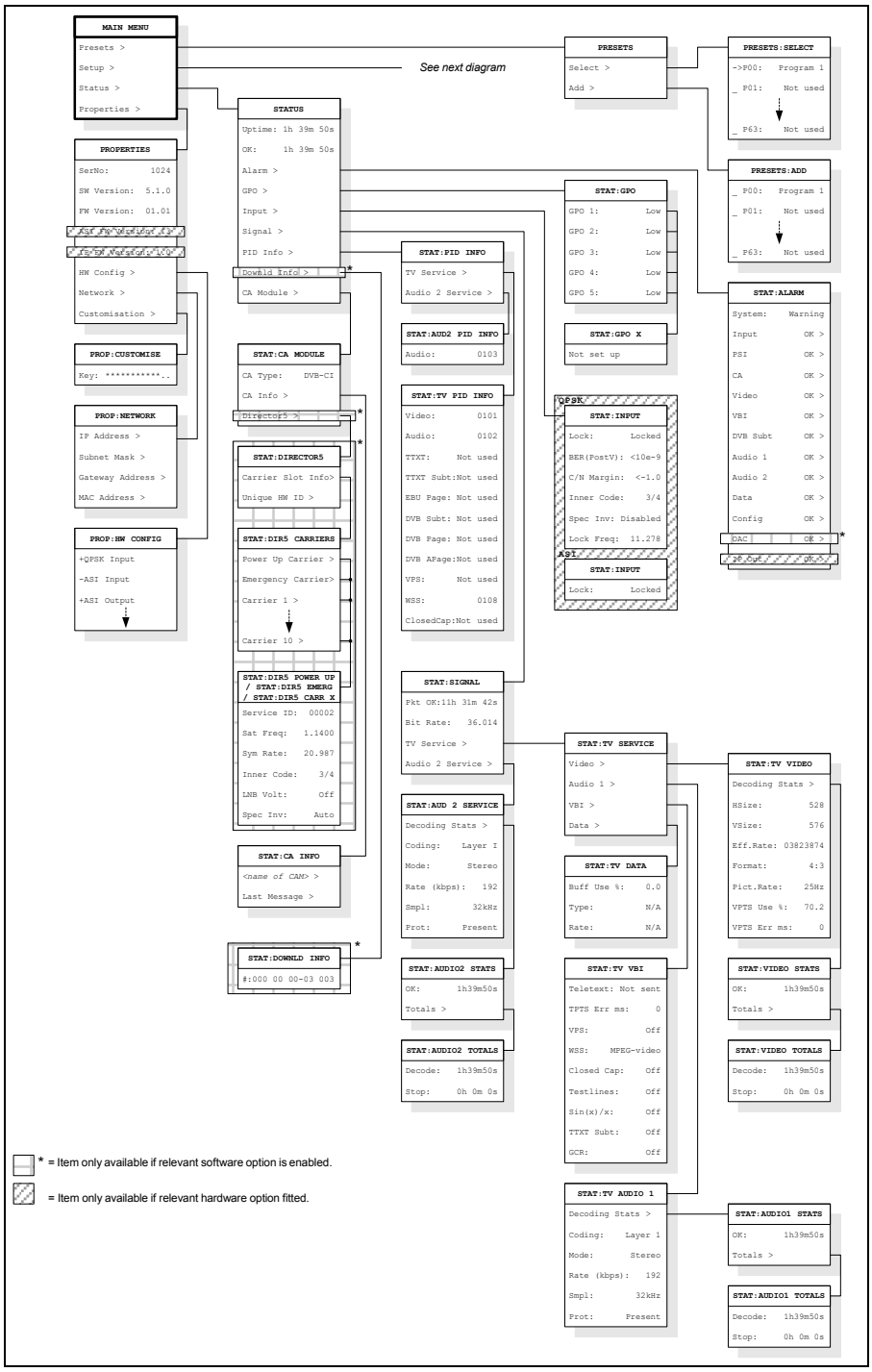


Figure C.1: Menu Tree: Presets, Status and Properties Menus

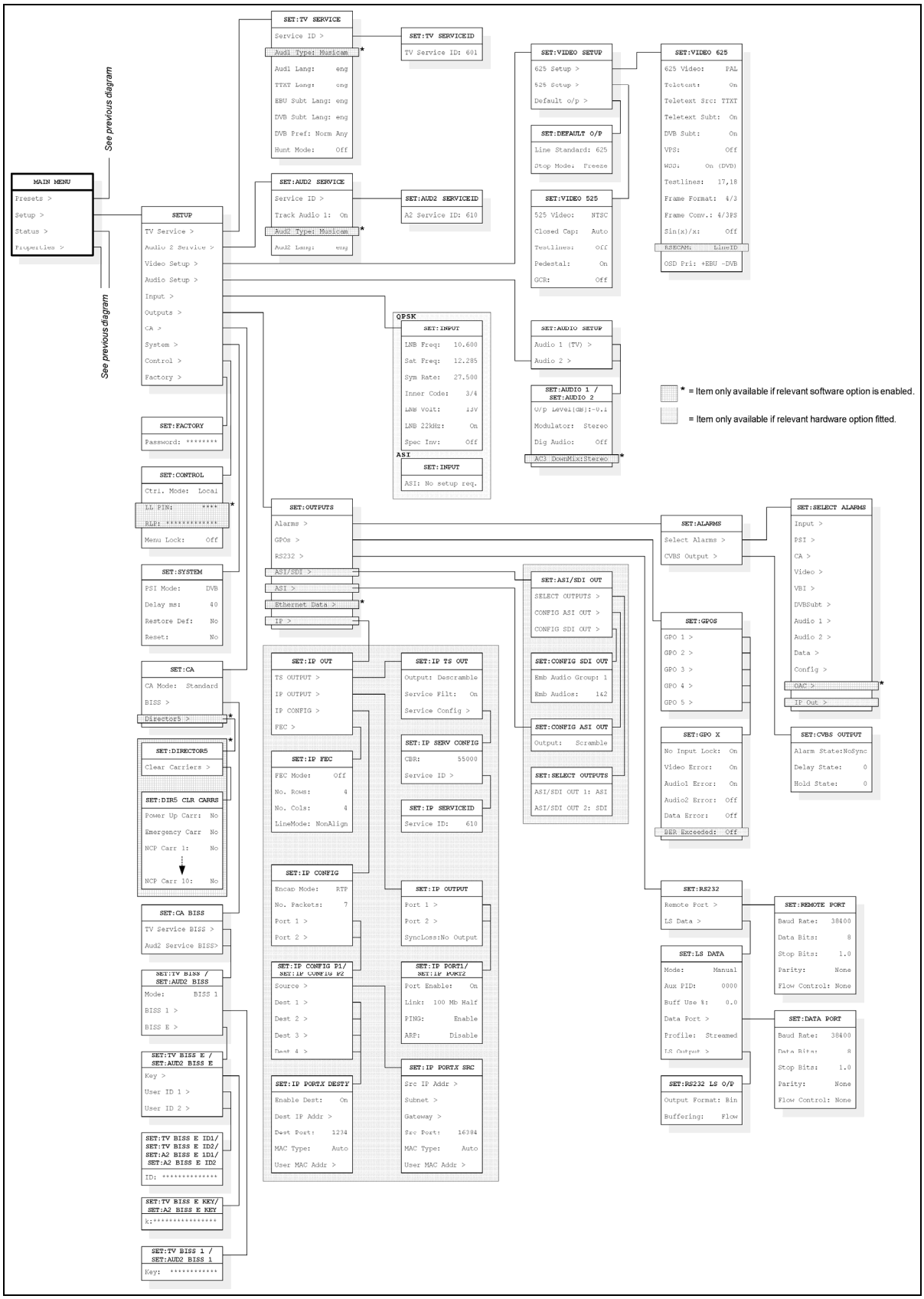


Figure C.2: Menu Tree: Setup Menus

C.3 Menu Pages - Main Menu

The main menu is a branching menu which allows access to other, lower level menus described in later sections.

Table C.1: Main Menu Items

Menu title: Main Menu	Description	Section
Presets>	Enters the Presets submenu.	C.4
Setup>	Enters the Setup submenu.	C.5
Status>	Enters the Status submenu.	C.6
Properties>	Enters the Properties submenu.	C.7

All submenus under these items have a menu title. The upper part of the menu display (the menu title) indicates which branch the submenu is under.

```
      PRESETS
Select >
```

Presets menus will be preceded by **PRESETS**.

Setup menus will be preceded by **SET**.

Status menus will be preceded by **STAT**.

Properties menus will be preceded by **PROP**.

C.4 Presets Menu

C.4.1 Presets Menu Items

Provides access to menus that allow the user to store and retrieve service selections.

Table C.2: Presets Menu

Menu title: PRESETS	Description	Section
Select >	Enters the service selection sub menu.	C.4.2
Add >	Enters the service selection storage sub menu.	C.4.3

C.4.2 Presets Select Menu

This menu allows the user to re-select a previously stored service.

Table C.3: Presets Select Menu

Menu title: PRESETS:SELECT	Description	Section
P00 to P63	Allows the user to select between 64 stored channels.	----

C.4.3 Presets Add Menu

This menu allows the user to store a current service.

Table C.4: Presets Add Menu

Menu title: PRESETS:ADD	Description	Section
P00 to P63	Allows the user to select which slot to store the current service reference (00 to 63). '**Not used**' will be shown if the unit is not decoding a service. Default for every preset is '**Not used**'.	----

C.5 Setup Menu

C.5.1 Setup Menu Items

The **Setup** menu contains all the submenus and items, required to set the configuration and control the daily use of the unit.

Table C.5: Setup Menu Items

Menu title: SETUP	Description	Section
TV Service >	Enters the TV Service submenu.	C.5.2
Audio 2 Service >	Enters the Audio 2 Service submenu.	C.5.4
Video Setup >	Enters the Video Setup submenu.	C.5.6
Audio Setup >	Enters the Audio Setup submenu.	C.5.10
Input >	Enters the Input setup submenu.	C.5.12
Outputs >	Enters the Outputs setup submenu.	C.5.13
CA >	Enters the CA (Conditional Access) setup submenu	C.5.38

Menu title: SETUP	Description	Section
System >	Enters the System submenu	C.5.47
Control >	Enters the Control submenu	C.5.48
Factory >	Enters the Factory submenu	C.5.49

C.5.2 TV Service Menu

The TV Service menu contains the service list for the currently tuned transport stream.

The menu allows the user to select which of the currently selected service components are to be decoded. This is relevant for services with multiple components associated with the video.

Table C.6: TV Service Menu

Menu title: SET:TV SERVICE	Description	Section
Service ID >	Allows the user to select a service to decode.	C.5.3
Aud1 Type *:	Defines the preferred audio format. **Musicam** – The receiver will decode the Musicam packets **AC-3** - The receiver will decode the AC-3 packets (if this software option is enabled on the receiver). Default = Musicam. **Note:** * This option is only available if the AC-3 software option has been enabled on the receiver.	----
Aud1 Lang:	Allows the entry of the three character ISO language code (e.g. **eng** or **nor**). This code selects the correct audio PID for the video service. If the selected code is not present in the audio stream, the first audio stream in the PMT table will be used. Default = eng.	----

Menu title: SET:TV SERVICE	Description	Section
TTXT Lang:	Allows the entry of the three character ISO language code (e.g. **eng** or **nor**). This code selects the correct Teletext PID for the video service. If the selected code is not present in the Teletext streams, the first Teletext stream in the PMT table will be used. Default = eng.	----
EBU Subt Lang:	Allows the entry of the three character ISO language code (e.g. **eng** or **nor**). This code selects the correct EBU subtitle language for the video service. If the selected code is not present in the subtitle stream, the first EBU subtitle stream in the PMT table will be used. Default = eng.	----
DVB Subt Lang:	Allows the entry of the three character ISO language code (e.g. **eng** or **nor**). This code selects the correct DVB subtitle language for the video service. If the selected code is not present in the subtitle stream, the first DVB subtitle stream in the PMT table will be used. Default = eng.	----
DVB Pref:	Allows the selection of formatting the DVB subtitles in conjunction with format conversion and wide screen signalling. A preferred format can be specified. If the preferred format is present in the stream in the chosen language (DVB Sub Lang), the subtitles will be displayed in the chosen format. If the preferred format is not available, the next available format in the chosen language (DVB Sub Lang) will be used. **Norm Any** - Standard subtitles, any aspect ratio. **Norm 4:3** - Standard subtitles, 4:3 aspect ratio **Norm 16:9** - Standard subtitles, 16:9 aspect ratio **Norm 2.12:1** - Standard subtitles, 2.12:1 aspect ratio **HoH Any** – Subtitles for viewers with impaired hearing, any aspect ratio. **HoH 4:3** – Subtitles for viewers with impaired hearing, 4:3 aspect ratio.	----

Menu title: SET:TV SERVICE	Description	Section
	HoH 16:9 – Subtitles for viewers with impaired hearing, 16:9 aspect **ratio.** **HoH 2.12:1** - Subtitles for viewers with impaired hearing, 2.12:1 aspect ratio Default = Norm Any	
Hunt Mode:	Allows the user to control how the unit reacts if service reference for the currently selected service no longer appears in the service list. **On** - Unit will automatically select the first service in the service list. **Off** - Unit will indicate that the currently selected service has been lost. Default = Off.	----

C.5.3 TV Service ID

Table C.7: TV Service ID Menu

Menu title: SET: TV SERVICEID	Description	Section
TV Service ID:	The Service ID of the required service can be entered directly. Alternatively, the user can scroll down and select from a list of recognised services.	----

C.5.4 Audio 2 Service Menu

The Audio2 Service menu contains the service list for the currently tuned transport stream. The list also provides a link to a **ServiceID** item, which allows the user to select the service by typing in the correct PID. When a service is selected, the receiver will decode the selected service on the corresponding audio output.

The menu allows the user to select which of the available audio components are to be decoded. This is relevant for services with multiple audio streams associated with the video.

Table C.8: Audio2 Service Menu

Menu title: SET:AUD2 SERVICE	Description	Section
Service ID >	Display or change the service ID for the decoded service.	C.5.5
Track Audio 1:	Audio 2 can be set to track Audio 1. **Off**: Audio 2 can be set to decode a different audio service. **On**: Audio 2 will be the same audio service as Audio 1. **Note:** When this is selected, the Audio 2 service ID menu is frozen and can not be used. It will show the Audio 1 service ID. Default = Off.	----
Aud2 Type *:	Defines the preferred audio format. **Musicam** – The receiver will decode the Musicam packets **AC-3** - The receiver will decode the AC-3 packets (if this software option is enabled on the receiver) Default = Musicam. **Note:** * This option is only available if the AC-3 software option has been enabled on the receiver.	----
Aud2 Lang:	Allows the entry of the three character ISO language code (e.g. **eng** or **nor**). This code selects the correct audio PID for the selected audio service. If the selected code is not present in the audio stream, the first audio stream in the PMT table will be used. Default = eng.	----

C.5.5 Audio 2 Service ID

Table C.9: Audio 2 Service ID Menu

Menu title: SET:AUD2 SERVICEID	Description	Section
A2 Service ID:	The Service ID of the required audio service can be entered directly. Alternatively, the user can scroll down and select from a list of recognised services.	----

C.5.6 Video Setup

Table C.10: Video Setup Menu

Menu title: SET:VIDEO SETUP	Description	Section
625 Setup >	Enters the 625 Video Setup submenu.	C.5.7
525 Setup >	Enters the 525 Video Setup submenu.	C.5.8
Default o/p >	Enters the Default Output submenu.	C.5.9

C.5.7 Video 625 Setup Menu

The Video setup 625 menu contains all the parameters that affect the 625 line Video, other than the basic selection of Video service and language.

Table C.11: Video 625 Setup Menu

Menu title: SET:VIDEO 625	Description	Section
625 Video:	Selects the format of the video output if the incoming MPEG video component has a horizontal resolution of 625 lines. **PAL** - Video output conforms to PAL standards. **PALCN** - Video output conforms to combinational PALN standard. **SECAM** - Video output conforms to SECAM standards. Default = PAL. **Note:** Default will be SECAM if Russian SECAM option module is fitted.	----
Teletext*:	Activates Teletext processing. **On** - Teletext PID is processed **Off** - Teletext PID is **not** processed Default = On. **Note:** * This option is not available if the Russian SECAM hardware option has been fitted in the receiver and SECAM output mode has been selected.	----
Teletext Src*:	Teletext source. Informs the system whether the Teletext PID is used for Teletext (optionally including EBU subtitles) or EBU subtitling. **TTXT** - Teletext PID contents inserted into VBI **Subt** - Teletext PID's subtitles imprinted on video Default = TTXT.	----

Menu title: SET:VIDEO 625	Description	Section
	Note: * This option is not available if the Russian SECAM hardware option has been fitted in the receiver and SECAM output mode has been selected.	
Teletext Subt:	**On** - Activates EBU Teletext Subtitling, if available. **Off** - Deactivates EBU Teletext Subtitling. Default = On.	----
DVB Subt:	**On** - Enables DVB Subtitling if present in service **Off** - Disables DVB subtitling Default = Off.	----
VPS:	Video programme system. **On** - Enables decoding of the VPS information into the VBI area. **Off** - Disables decoding of the VPS information into the VBI area. Default = Off.	----
WSS:	Wide screen signalling. Selects decoding of the WSS information into the VBI area. **On (DVB)** - WSS will be regenerated as sent in the WSS PID. **MPEG-video** - WSS will be regenerated as sent in the Video Packet header of the video stream. **On (no VBI)** - WSS is extracted and used for format conversion, but the unit does not regenerate a WSS signal in the video. Default = MPEG-video.	----
Testlines:	Enables testlines. The line numbers here indicate on which VBI lines the testlines are displayed. **Off** - Disables testlines. **17** - Enables testlines on video line 17. **17,18** - Enables testlines on video lines 17 and 18. **19,20** - Enables testlines on video lines 19 and 20. Default = 17,18.	----
Frame Format:	Allows the user to enable format conversion on the decoded picture. **Off** - No format conversion is done on the video output.	----

Menu title: SET:VIDEO 625	Description	Section
	4/3 - Generates a 4/3 picture in the method described in the Frame conv. menu item below. Default = Off.	
Frame Conv:	Allows the user to control the type of format conversion carried out on the decoded picture. **14/9** - Generates a 4/3 image using the 14/9 combination method. (Cutoff + Letterbox) **16/9LB** - Generates a 4/3 image using the 16:9 letterbox method. **4/3PS** - Generates a 4/3 image using the 4:3 Pan and Scan method. (DVB specified). **AFD** - Generates a 4/3 image as defined in the AFD found in the Video Index **AFDWSS** - Generates a 4/3 image as defined in the WSSAFD data found in the WSSAFD VBI PES. Default = 4/3PS.	----
Sin(x)/x*:	Enables Sin(x)/x testline. **Off** - Disables the testline. **319** - Enables the testline on line 319. **335** - Enables the testline on line 335. Default = Off. **Note:** * This option is not available if the Russian SECAM hardware option has been fitted in the receiver and SECAM output mode has been selected.	----
RSECAM *:	Enables the Russian SECAM subcarrier reference signal to be configured. **LineID** - Chrominance subcarrier reference signals are inserted into the back porch of the line blanking period. **Line+notch** - As LineID but also has a luminance trap filter active in the Vertical Blanking Interval (VBI). **Field+notch** - Chrominance subcarrier reference signals occupying nine lines of field-blanking period on Lines 7 to 15 in Fields 1 & 3 and Lines 320 to 328 in Fields 2 & 4. Also has a luminance trap filter active in the VBI. **B/W+notch** – No chrominance subcarrier is present (monochrome output). Also has a luminance trap filter active in the VBI. Default = LineID.	----

Menu title: SET:VIDEO 625	Description	Section
	Note: * This option is only available if the Russian SECAM hardware option has been fitted in the receiver.	
OSD Pri:	The unit supports simultaneous superimposing of DVB and EBU subtitles but not at the same time. This menu option selects the relative priority of the two methods of subtitling. **+EBU –DVB** - EBU subtitles take precedence. **-EBU +DVB** - DVB subtitles take precedence. Default = +EBU –DVB.	----

C.5.8 Video 525 Setup Menu

The Video setup 525 menu contains all the parameters that affect 525 line Video, other than the basic selection of Video service and language.

Table C.12: Video 525 Setup Menu

Menu title: SET:VIDEO 525	Description	Section
525 Video:	Selects the format of the video output if the incoming MPEG video component has a horizontal resolution of 525 lines. **NTSC** - Video output conforms to NTSC standards. **PALM** - Video output conforms to PALM standards. Default = NTSC.	----
Closed Cap:	Activates closed caption reinsertion onto line 21. **Auto** - Detects and decodes, if present, ATSC or Ericsson Proprietary formatted closed captioning. **Off** - Closed caption VBI insertion is turned off. **C-Cube** - Decoding of C-Cube formatted closed captioning is turned on. **Divicom** - Decoding of Divicom formatted closed captioning is turned on. Default = Off. **Note:** ATSC closed captions can be extracted from a VBI PES stream or from the MPEG video PES stream. Ericsson proprietary, Divicom and C-Cube closed captions can only be extracted form the MPEG video PES stream.	----

Menu title: SET:VIDEO 525	Description	Section
Testlines:	**On** - Activates testlines (VITS) on line 17. **Off** - Deactivates testlines (VITS) on line 17. Default = On.	----
Pedestal	**On –** Sets pedestal on. **Off –** Sets pedestal off. Default = On.	----
GCR:	**On** - Activates Ghost Cancelling Reference. **Off** - Deactivates Ghost Cancelling Reference. Default = Off.	----

C.5.9 Default Output Menu

If the receiver losses its input signal, input lock or has decoding errors, the video output will default to a legal output.

Table C.13: Default Output Setup Menu

Menu title: SET:DEFAULT O/P	Description	Section
Line Standard:	**625** - The default output line standard is 625. **525** - The default output line standard is 525. Default = 525. **Note:** Default will be 625 if Russian SECAM option module is fitted.	----
Stop Mode:	**Freeze** - The last complete frame, before the picture was lost, will be displayed. **Black** - The output will be a black pattern in the default line standard. Default = Black.	----

C.5.10 Audio Setup Menu

The audio setup menu directs the user to further menus to configure and control the audio output of the TV and second audio channel.

Table C.14: Audio Setup Menu

Menu title: SET:AUDIO SETUP	Description	Section
Audio 1 (TV) >	Enters the Audio 1 setup submenu.	C.5.11
Audio 2 >	Enters the Audio 2 setup submenu.	C.5.11

C.5.11 Audio 1 (TV) and Audio 2 Setup Menus

The audio setup menus allows the user to configure and control each audio output.

Table C.15: Audio 1 and 2 Setup Menu

Menu title: SET:AUDIO 1, SET:AUDIO 2	**Description**	**Section**
O/p Level [dB]:	9dBu to +3dBu selectable, in 0.1 dBu steps. Default = 0.0.	----
Modulator:	Stereo – Stereo mode. Stereo audio will be provided where possible. More detail provided in table C.16. **ProLogic** * – Enables the Dolby ProLogic decoder which performs AC-3 Downmix mode. When this is set, the 'AC-3 DownMix' menu (see below) is used to determine the audio decoding method. **Transp** – Transparent mode. More detail provided in table C.16. **Mono** – Monomode. Left and Right channels will be the same. More detail provided in table C.16. Default = Stereo. **Note:** * This option is only available if the AC-3 software option has been enabled on the receiver. If Prologic was set but the stream is musicam, the Modulator can not be Prologic but will default back to Stereo.	----
Dig Audio:	Configures the digital output. **Off** – No digital audio output is produced. **AC-3** * - Produces AC-3 digital output. **Linear** – If the input is Musicam audio, both audio outputs will be linear PCM Left Only Right Only (LO-RO). If the input is AC-3, Audio 1 will be linear PCM LO-RO or LT-RT and Audio 2 will always be LT-RT. Audio 1 is dependent on the setting of the DownMix menu as shown below. Default = Off. **Note:** * This option is only available if the AC-3 software option has been enabled on the receiver.	----

Menu title: SET:AUDIO 1, SET:AUDIO 2	Description	Section
AC-3 DownMix *:	This item is only used if the Modulator setting is set to ProLogic. **Stereo** – If more than 2 audio channels are present within the service, only the front right and front left channels will be decoded. **LT-RT** - If more than 2 audio channels are present within the service, all channels are decoded and downmixed to produce a stereo compatible output. Default = Stereo. **Note:** * This option is only available if the AC-3 software option has been enabled on the receiver.	----

The modulation of the audio depends both on the modulation used on the encoder side, and on the decoder side. *Table C.16* below lists what is output on the decoder, in correlation to the modulator setting, and what is sent from the encoder.

Table C.16: Audio Modulation Results

	Modulator					
	Stereo		Mono		Transparent	
Audio source	Left output	Right output	Left output	Right output	Left output	Right output
Stereo (or joint stereo)	L	R	L+R	L+R	L	R
Dual Channel No.1 (L)	1	1	1	1	1	2
No. 2 (R)	2	2	2	2	2	1
Single Channel (mono)	1	1	1	1	1	1

The Left output and Right output columns refer to the output at the left and right audio connector, respectively. **L** and **R** refer to the content of the left and right audio signal present in a stereo transport stream. **1** and **2** refers to the audio signals in channel 1 and 2 respectively (the two mono signals present in the Dual Channel audio PID), or 1 for a mono PID.

As seen from the table, Dual Channel PIDs will only provide both channels to the user if modulation is set to **transparent**. This could for instance be very useful for a two language service, where each language is sent as a mono component in a dual channel PID. In both the stereo and mono configurations, a dual channel PID will only provide one of the audio channels to the users.

This channel is selected to match the **Aud Lang** setting set up in the TV Service Menu (see *Table C.6*). If the language setting does not match any of the two audio components in the dual channel stream, the first one will be selected and decoded.

Table C.17: Linear Digital Audio

Input Audio Format	Audio 1	Audio 2
Musicam	Linear PCM LO-RO	Linear PCM LO-RO
AC-3	Linear PCM LO-RO (If Downmix=Stereo) or Linear PCM LT-RT (DownMix=LT-RT)	Linear PCM LT-RT

C.5.12 Input Menu

This menu is dependant on the input module fitted inside the receiver.

The input menu will be one of the types below:

C.5.12.1 ASI Input

If an ASI input card is fitted there are no setup options available.

Table C.18: ASI Input Setup Menu

Menu title: SET:INPUT	Description	Section
ASI: No setup req.	No set-up is available when the ASI input card is fitted.	----

C.5.12.2 QPSK Input

The QPSK menu contains all the items that need to be set, to achieve a signal lock on an incoming QPSK transport stream.

In addition to the set-up parameters, the menu title line shows the current input status. This is useful when the QPSK module is being set-up. It can indicate three states as shown in *Table C.19*:

Table C.19: Input Status

Input Status	Description
No Sig	No signal is detected on the input.
No Sync	The input module is not able to lock to the input signal.
Sync	The input module is locked to the incoming signal.

Table C.20: QPSK Input Setup Menu

Menu title: SET:INPUT	Description	Section
LNB Freq:	Changes the LNB frequency in Gigahertz.	----
Sat Freq:	Changes the satellite frequency in Gigahertz. For a frequency to be valid, the (Sat. Freq. – LNB Freq) must be a number between 950 MHz and 2150 MHz.	----
Sym Rate:	Changes the Symbol Rate in Msym/s. Valid range is 1.000 to 45.000 Msym/s.	----
Inner Code:	Changes the FEC rate. Options available are: **Auto** / **1/2** / **2/3** / **3/4** / **5/6** / **7/8**	----
LNB Volt:	Defines the voltage output of the F-connector located on the rear of the unit. **Off** / **13V** / **18V**	----
LNB 22 kHz:	**On** - Activates the LNB 22 kHz control signal to the LNB. **Off** - Deactivates the LNB 22 kHz control signal to the LNB.	----
Spec Inv:	Enables or disables spectrum inversion on the incoming signal. **On** / **Off** / **Auto**	----

C.5.13 Outputs Setup Menu

The number of items available in this menu is dependent on the output cards fitted inside the receiver. The items that are not standard are indicated with *.

Table C.21: Output Select Setup Menu

Menu title: SET:OUTPUTS	Description	Section
Alarms >	Enters the alarm setup submenu.	C.5.14
GPOs >	Enters the GPO setup submenu.	C.5.17
RS232 >	Enters the RS232 setup submenu.	C.5.19
ASI > *	Enters the ASI output setup submenu. **Note:** : * This item will only appear if the Single ASI output module is fitted.	C.5.24
ASI/SDI > *	Enters the ASI/SDI output setup submenu. **Note:** * This item will only appear if a Dual ASI/SDI output module is fitted.	C.5.25

Menu title: SET:OUTPUTS	Description	Section
IP > *	Enters the IP output setup submenu. **Note:** * This item will only appear if a Dual IP output module is fitted.	C.5.28

C.5.14 Alarms Menu

This menu links to submenus that allow alarm types and conditions to be set.

Table C.22: Alarms Menu

Menu title: SET:ALARMS	Description	Section
Select Alarms >	Enters the Select Alarm submenu.	C.5.15
CVBS Output >	Enters the CVBS Output submenu.	C.5.16

C.5.15 Select Alarms Menu

This menu links to several submenus. The submenus contain all the configurable alarm parameters. The alarm parameters may be configured into three levels of severity; alarm (A), warning (W), or ignore (-).

Table C.23: Select Alarms Menu

Menu title: SET:SELECT ALARMS	Description	Section
Input >	Enters the Input alarms submenu.	*Annex D*
PSI >	Enters the PSI alarms submenu.	*Annex D*
CA >	Enters the CA alarms submenu.	*Annex D*
Video >	Enters the Video alarms submenu.	*Annex D*
VBI >	Enters the VBI alarms submenu.	*Annex D*
DVBSubt >	Enters the DVB subtitle alarms submenu.	*Annex D*
Audio1 >	Enters the Audio 1 alarms submenu.	*Annex D*
Audio2 >	Enters the Audio 2 alarms submenu.	*Annex D*
Data >	Enters the Data alarms submenu.	*Annex D*
Config >	Enters Config alarms submenu.	*Annex D*
OAC > *	Enters the OAC alarms submenu. **Note:** * This option is only available if the Director software option has been enabled on the receiver.	*Annex D*

Menu title: SET:SELECT ALARMS	Description	Section
IP OUT > *	Enters the IP OUT alarms submenu. **Note:** * This item will only appear if a Dual IP output module is fitted.	*Annex D*

For further information on what the different alarms mean, refer to *Annex D, Alarm Categories and Conditions*.

C.5.16 CVBS Output Menu

This menu allows the Colour Video Black Sync output alarm conditions to be set.

Table C.24: CVBS Output Menu

Menu title: SET:CVBS OUTPUT	Description	Section
Alarm State:	Selects the format of the CVBS output if an alarm is raised. **Sync** - The CVBS output will **not** be affected by an alarm condition and will continue to output a valid video signal (with sync pulse). **NoSync** - The CVBS output will have no sync pulses. Default = Sync.	----
Delay State:	Selects the number of seconds an alarm should be present, before the CVBS output goes to NoSync. **Note:** This item only applies if the Alarm state is set to NoSync. Range = 0-999.	----
Hold State:	Selects the number of seconds an alarm should be absent, before the CVBS output alarm is cleared. **Note:** This item only applies if the Alarm state is set to NoSync. Range = 0-99.	----

C.5.17 GPOs Menu

There are five GPOs available on the receiver. Each one of these can be configured to activate on one or more particular events or conditions.

Table C.25: GPO Setup Menu

Menu title: SET:GPOs	Description	Section
GPO 1 >	Enters the GPO 1 setup menu.	C.5.18
GPO 2 >	Enters the GPO 2 setup menu.	C.5.18
GPO 3 >	Enters the GPO 3 setup menu.	C.5.18
GPO 4 >	Enters the GPO 4 Setup menu.	C.5.18
GPO 5 >	Enters the GPO 5 setup menu.	C.5.18

C.5.18 GPO X Menu

One or more of these can be set to trigger a single General Purpose Output (GPO). The list of available triggers are the same for the each GPO.

Table C.26: GPO Trigger Setup Menu

Menu title: SET:GPO *X*	Description	Section
No Input Lock:	The input is indicated as 'locked' when the receiver is synchronized to the incoming Transport Stream. **On** - This GPO will be triggered if the input is not locked. **Off** – A input lock error will not trigger this GPO.	----
Video Error:	**On** - This GPO will be triggered if any of the Video Alarm conditions detailed in *Annex D, Alarm Categories and Conditions* occur. **Off** – A video error will not trigger this GPO. Default = Off.	*Annex D*
Audio 1 Error:	**On** - This GPO will be triggered if any of the Audio Alarm conditions detailed in *Annex D, Alarm Categories and Conditions* occur in Audio 1. **Off** – An error on Audio 1 will not trigger this GPO. Default = Off.	*Annex D*
Audio 2 Error:	**On** - This GPO will be triggered if any of the Audio Alarm conditions detailed in *Annex D, Alarm Categories and Conditions* occur in Audio 2.	*Annex D*

Menu title: SET:GPO *X*	Description	Section
	Off - An error on Audio 2 will not trigger this GPO. Default = Off.	
Data Error:	**On** - This GPO will be triggered if any of the Data Alarm conditions detailed in *Annex D, Alarm Categories and Conditions* occur. **Off** - A data error will not trigger this GPO. Default = Off.	*Annex D*
BER Exceeded: *	**On** - This trigger will be activated if the BER exceeds 1 $X10^{-4}$. **Off** – A BER Exceeded error will not trigger this GPO. Default = Off. **Note:** * This item will only appear if a QPSK input module is fitted in the receiver.	----

C.5.19 RS232 Menu

The RS232 setup menu allows the user to enter the configuration of the two RS-232 ports on the unit, the remote port and the LS data port.

Table C.27: RS232 Setup Menu

Menu title: SET:RS232	Description	Section
Remote Port >	Enters the Remote Port setup submenu.	C.5.20
LS Data >	Enters the LS Data setup submenu.	C.5.21

C.5.20 Remote Port Menu

Caution!

When software upgrading the unit via RS-232 and the Ericsson software upgrade application (UPGRADE.EXE), it is important that the baud rate is set to 38400, the data bits to 8, the stop bits to 1, the parity to none, and the flow control to none. If this is not the case, the UPGRADE software may fail to work.

The remote port menu contains the parameters that have to be configured for a remote control computer / device to work correctly.

Note: Ericsson remote control or software upgrade software requires the use of a null-modem (crossed) RS-232 cable.

Table C.28: Remote Port Setup Menu

Menu title: SET:REMOTE PORT	**Description**	**Section**
Baud Rate:	Sets the baud-rate for the communication with the external device. **75, 110, 110, 150, 200, 300, 600, 1050, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200** Default = 115200.	----
Data Bits:	Sets the number of data bits used for each character. **7** - The number of data bits is set to 7 **8** - The number of data bits is set to 8 Default = 8.	----
Stop Bits:	This setting determines the time between each character being transmitted (bits per second). **0.5** - 0.5 bps **1.0** - 1 bps **1.5** - 1.5 bps **2.0** - 2.0 bps Default = 1.0.	----
Parity:	The parity bit setting defines the type of error checking used. **None** – No parity **Odd** – Odd parity **Even** – Even parity Default = None.	----
Flow Control:	Sets the flow control. **None** – No flow control. **Note:** Only one option is available	----

C.5.21 LS Data Menu

The LS data menu configures the parameters for the output of RS-232 data, extracted from the transport stream.

Table C.29: LS Data Setup Menu

Menu title: SET:LS DATA	Description	Section
Mode:	Sets the operation mode of the Asynchronous data output. **Off** - No data is output on the port. **Manual** - The data from the PID selected in the AUX PID menu is output on the port. **Diagnostic** - The diagnostic information from the unit is output on the port. Default = Off.	----
Aux PID:	Selects the PID that is output on the port if "Mode" is set to manual. Default = 0016.	----
Buff Use %:	Shows the fill level of the RS-232 buffer. If this buffer cycles up to 100% constantly, it is likely that data is being lost due to buffer overruns. **Note:** This is a status item and cannot be set by the user.	----
Data Port >	Enters the Data Port submenu	C.5.22
Profile:	Selects the encoding format used by encoder/transmitter. **Streamed** - DVB format. **Piped** – Ericsson Proprietary format **Format #2** - Ericsson Proprietary format **TS-Packets** - The whole Transport packet payload **PES Payld** - The whole PES packet payload Default = Streamed.	----
LS Output >	Enters the LS Data Output submenu	C.5.23

The RS-232 data output cannot exceed the data rate configured in the communication menu. If the outgoing data rate is higher, information will be dropped in an unpredictable fashion.

The transmitted PID's contents should have a lower rate than 115200 bps, since this is the maximum output rate. If the rate is higher, burst mode can be used, as explained in *Section C.5.23.*

C.5.22 Data Port Menu

The data port menu contains the controls for the physical output of the LS data.

The settings configured here, need to match the settings on the device set up to receive the LS data.

Table C.30: The Data Port Setup Menu

Menu title: SET:DATA PORT	**Description**	**Section**
Baud Rate:	Sets the baud-rate for the communication with the external device. **75, 110, 150, 200, 300, 600, 1050, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200** Default = 115200.	----
Data Bits:	Sets the number of data bits used for each character. **7** - The number of data bits is set to 7 **8** - The number of data bits is set to 8 Default = 8.	----
Stop Bits:	This setting determines the time between each character being transmitted (bits per second). **0.5** - 0.5 bps **1.0** - 1 bps **1.5** - 1.5 bps **2.0** - 2.0 bps Default = 1.0.	----
Parity:	The parity bit setting defines the type of error checking used. **None** – No parity **Odd** – Odd parity **Even** – Even parity Default = None.	----
Flow Control:	Sets the flow control. **None** – No flow control. **Note**: Only one option is available	----

C.5.23 LS Output Menu

The LS data output menu controls the output format and buffering of the low speed data.

Table C.31: LS Data Output Setup Menu

Menu title: SET:RS232 LS O/P	Description	Section
O/P Format:	Sets the output format of the low speed data port. **Bin** - Provides a binary output. **Hex** - Provides a hexadecimal output with the most significant nibble first Default = Bin.	----
Buffering:	Set the buffering mechanism used for the low speed data port. **Flow** - Transmits the selected PID directly without buffering. **Burst** - This mode can be used for analysing the input sequence of a PID that has higher transfer rate than the UART can handle (max 115.2k). The buffer will fill up and dump the contents out on the serial line. The buffer size is in both cases 16 kbps. Default = Flow.	----

C.5.24 ASI Output Menu

Table C.32: ASI Output Setup Menu

Menu title: SET:CONFIG ASI OUT	Description	Section
Output:	This item selects the preferred ASI output. **Scramble** – If the input is scrambled, the output will also be scrambled. **Descramble** –The receiver will output a descrambled service when possible. Default = Scrambled. **Note:** The receiver must be set up to descramble a scrambled service. The output will always be 188 packet size.	----

C.5.25 ASI/SDI Outputs Menu

Table C.33: ASI/SDI Output Setup Menu

Menu title: SET:ASI/SDI OUT	Description	Section
Select Outputs >	Enters the Select Outputs submenu.	C.5.26
Config ASI Out >	Enter the Config ASI Out submenu.	C.5.24
Config SDI Out >	Enters the Config SDI Out submenu.	C.5.27

C.5.26 Select ASI/SDI Outputs Menu

This menu provides the ASI/SDI output setup parameters.

Table C.34: ASI/SDI Outputs Setup Menu

Menu title: SET:SELECT OUTPUTS	Description	Section
ASI/SDI OUT 1:	**ASI** – Output is set to be ASI. **SDI** – Output is set to be SDI. **Off** – Output is set to be off.	----
ASI/SDI OUT 2:	**ASI** – Output is set to be ASI. **SDI** – Output is set to be SDI. **Off** – Output is set to be off.	----

C.5.27 Config SDI Output Menu

This menu provides the SDI output setup parameters.

Table C.35: Configure SDI Output Setup Menu

Menu title: SET:CONFIG SDI OUT	Description	Section
Emb Audio Group:	Inserts the embedded audio into a group**:** **1** - Group 1. **2** - Group 2. **3** - Group 3. **4** - Group 4.	----
Emb Audios:	**1** - Audio 1 is embedded in SDI output. **2** - Audio 2 is embedded in SDI output. **1 and 2** - Both Audio 1 and 2 are embedded in SDI output.	----

C.5.28 IP Output Menu

This menu provides the IP output setup parameters.

Table C.36: IP OUT Setup Menu

Menu title: SET:IP OUT	Description	Section
TS Output >	Enters the configuration submenus for the IP Out Transport Stream.	C.5.29
IP Output >	Enters the setup submenus for the two IP Outputs.	C.5.31
IP Config >	Enters the configuration submenus for the IP Outputs.	C.5.33
FEC >	Enters the setup submenus for the IP FEC.	C.5.37

C.5.29 IP Transport Stream Output Menu

This menu provides the IP Transport Stream output setup parameters.

Table C.37: IP TS OUT Setup Menu

Menu title: SET:IP TS OUT	Description	Section
Output:	This item selects the preferred IP output. **Scramble** – If the input is scrambled, the output will also be scrambled. **Descramble** –The receiver will output a descrambled service when possible. Default = Scramble. **Note:** The receiver must be set up to descramble a scrambled service. The output will always be 188 packet size.	----
Service Filt:	This item enables Service Filtering. **On –** Service Filtering will be enabled. When this enabled, only the chosen service will be present in the IP Output Transport Stream. All other services will be removed from the stream. **Off -** No service filtering will be done. The full transport stream will be present in the IP Output Transport Stream. Default = Off.	----
Service Config >	Enters the Service Config setup submenu.	C.5.30

C.5.30 IP Out Service Config Menu

This menu provides the IP output setup parameters for when Service Filtering is enabled.

Table C.38: IP SERV CONFIG Setup Menu

Menu title: SET:IP SERV CONFIG	Description	Section
CBR:	Defines the output bit rate when 'Service Filtering' is enabled and CBR mode has been selected. Range = 1000-55000 (Units kbps) Default = 10000 (corresponding to 10 Mbps). **Note:** If the incoming service rate exceeds the CBR rate setting, transport packets may be dropped.	----
Service ID >	Enters the Service ID submenu. This menu allows the user to select the service to be filtered.	----

C.5.31 IP Output Menu

This menu provides the setup parameters for the two IP outputs.

Table C.39: IP OUTPUT Setup Menu

Menu title: SET:IP OUTPUT	Description	Section
Port 1 >	Enters the setup submenu for IP Out Port 1.	C.5.32
Port 2 >	Enters the setup submenu for IP Out Port 2.	C.5.32
SyncLoss:No Output	Controls the IP output produced when MPEG II transport stream synchronization is lost. **No Output –** If no valid transport stream is available, the IP ports will output nothing (i.e. no packets). **Null Pkts -** If no valid transport stream is available, the IP outputs will output null packets at a rate of 1 Mbps. Default = No Output.	----

C.5.32 IP Port Setup Menus

This menu provides the setup parameters for the each IP output port.

Table C.40: IP PORT 1 and 2 Setup Menus

Menu title: SET:IP PORT 1, SET:IP PORT 2	**Description**	**Section**
Port Enable:	This item enables the relevant IP port. **On –** Switches the port on. **Off -** Switches the port off. No packets will be output regardless of other IP output settings. Default = On.	----
Link:	**Auto –** Auto negotiates the link it is connected to. **10 MB Full -** Force 10 Mbps full duplex operation **100 MB Full –** Force 100 Mbps full duplex operation Default = Auto. **Note:** In Auto mode, only 10 Mbps and 100 Mbps are supported.	----
PING:	This item is used to configure how the unit will respond to PINGs. **Enable –** The IP port will respond to any PINGs received. **Disable -** The IP port will not respond to any PINGs received. Default = Enable.	----
ARP:	This item is used to configure how the unit will respond to ARPs. **Enable –** The IP port will respond to any ARPs received. **Disable –** The IP port will not respond to any ARPs received. Default = Enable.	----

C.5.33 IP Config Menu

This menu provides the configuration parameters for the IP outputs.

Table C.41: IP CONFIG Setup Menu

Menu title: SET:IP CONFIG	Description	Section
Encap Mode:	Controls the IP encapsulator mode. **RTP –** When selected, the MPEG II transport packets are encapsulated in RTP packets which are then encapsulated in the UDP payload. **UDP –** When selected, the FEC functionality will be disabled and MPEG II transport packets are directly encapsulated in the UDP payload. Default = RTP.	----
No. Packets:	Controls the number of MPEG II transport packets encapsulated in the UDP payload Range = 1-7 Default = 7 **Note:** Reducing this number will increase the bandwidth required for a given data rate. 7 packets is the maximum amount that will fit into a Ethernet frame.	----
Port 1 >	Enters the IP configuration submenu for Port 1.	C.5.34
Port 2 >	Enters the IP configuration submenu for Port 2.	C.5.34

C.5.34 IP Port Configuration Menus

This menu provides the configuration parameters for the two IP outputs. Up to four destination ports can be configured for each output port.

Table C.42: IP PORT CONFIG Setup Menu

Menu title: SET:IP CONFIG P1, SET:IP CONFIG P2	Description	Section
Source >	Enters the Source configuration submenu for the port.	C.5.35
Dest 1 >	Enters the Destination 1 configuration submenu for the port.	C.5.36
Dest 2 >	Enters the Destination 2 configuration submenu for the port.	C.5.36

Menu title: SET:IP CONFIG P1, SET:IP CONFIG P2	Description	Section
Dest 3 >	Enters the Destination 3 configuration submenu for the port.	C.5.36
Dest 4 >	Enters the Destination 4 configuration submenu for the port.	C.5.36

C.5.35 IP Port Source Menu

This menu provides the configuration parameters for the IP source.

Table C.43: IP PORT SOURCE Setup Menu

Menu title: SET:IP PORT1 SRC, SET:IP PORT2 SRC	Description	Section
Src IP Addr >	Enters the submenu to set the Source IP Address. IP address must be expressed in dotted decimal format. Default = 192.168.2.100 **Note:** This address must be unicast.	----
Subnet >	Enters the submenu to set the Subnet Mask. Subnet mask must be expressed in dotted decimal format. Default = 255.255.255.0 **Note:** The subnet mask is checked for consistency with the source IP address.	----
Gateway >	Enters the submenu to set the Gateway Address. The gateway address must be expressed in dotted decimal format. Default = 0.0.0.0 **Note:** The gateway is checked for consistency with the source IP address and subnet mask. A gateway setting of 0.0.0.0 means no gateway is defined.	----
Src Port:	Source port number for UDP frames encapsulating the MPEG transport stream Range = 0-65535. Default = 5500.	----

Menu title: SET:IP PORT1 SRC, SET:IP PORT2 SRC	Description	Section
MAC Type:	**Auto –** The source MAC address will be set automatically using the unit serial number. **User –**The source MAC address used is the user specified MAC address source. This allows the user complete control over source MAC address. Default = Auto	----
User MAC Addr >	Enters the submenu to set the MAC address. The MAC address specified is used as the source MAC address when the MAC Type setting is “User” MAC address is expressed as a string of 6 hexadecimal bytes separated by colons. Default = 00:00:00:00:00:00	----

C.5.36 IP Port Destination Menus

This menu provides the configuration parameters for each IP destination.

Table C.44: IP PORT DEST Setup Menu

Menu title: SET:IP PORT1 DEST1, SET:IP PORT1 DEST2, SET:IP PORT1 DEST3, SET:IP PORT1 DEST4, SET:IP PORT2 DEST1, SET:IP PORT2 DEST2, SET:IP PORT2 DEST3, SET:IP PORT2 DEST4	Description	Section
Enabled Dest:	Controls if destination is enabled. **On –** This destination IP address is active, all IP datagrams will be sent to this address. **Off –** Destination is disabled Default = Destination 1 On, Destinations 2,3 and 4 Off.	----
Dest IP Addr >	Enters the submenu to set the Destination IP address. Destination IP address in dotted decimal format. Default = 192.168.2.101 **Note:** This address may be unicast, broadcast or multicast.	----

Menu title: SET:IP PORT1 DEST1, SET:IP PORT1 DEST2, SET:IP PORT1 DEST3, SET:IP PORT1 DEST4, SET:IP PORT2 DEST1, SET:IP PORT2 DEST2, SET:IP PORT2 DEST3, SET:IP PORT2 DEST4	Description	Section
Dest Port:	Destination UDP port number. Range = 0-65535. Default = 5510.	----
MAC Type:	**Auto** – The destination MAC address is derived either from ARP protocol or multicast/broadcast IP address. **User** –The destination MAC address is specified by the parameter User MAC address. This allows the user complete control over destination MAC address. Default = Auto.	----
User MAC Address >	Enters the submenu to set the MAC address. The MAC address specified is used as the destination MAC address. This is only used when MAC type is set to 'User'. MAC address is expressed as a string of 6 hexadecimal bytes separated by colons. Default = 00:00:00:00:00:00	----

C.5.37 IP FEC Menu

This menu provides the setup parameters for the FEC on the IP outputs.

Table C.45: IP FEC Setup Menu

Menu title: SET:IP FEC	Description	Section
FEC Mode:	Controls what kind of FEC packets are produced. **Off –** No FEC packets are produced. **Col –** Produces Column only FEC packets. **Row and Col –** Produces Column and Row FEC packets Default = Off **Note:** FEC packets are only produced when the encapsulator mode is RTP.	----

Menu title: SET:IP FEC	Description	Section
No. Rows:	This sets the number of rows in the FEC matrix. Range = 4 - 20 Default = 4 **Note:** The product of No. Rows x No. Cols must not exceed 100.	----
No. Cols:	This sets the number of columns in the FEC matrix. Range = 1 - 20 Default = 4 **Note:** The product of No. Rows x No. Cols must not exceed 100.	----
LineMode:	Sets the FEC alignment mode for the FEC information packets. ie. sets it to meet the mode defined in Annex A or Annex B of the Pro-MPEG Code of Practice #3 release 2 July 2004. **NonAlign -** Non Block Aligned mode, as described in Annex A in the forementioned standard. **BlkAlign** - Block Aligned mode, as described in Annex B in the forementioned standard. Default = NonAlign	----

C.5.38 CA Menu

This menu provides all CA setup parameters.

Table C.46: CA Setup Menu

Menu title: SET:CA	Description	Section
CA Mode:	Sets the CA mode to be used on the receiver. **Standard** – Uses Common Interface and Director CA. **BISS** – Uses BISS CA. Default = Standard.	----
BISS >	Enters the BISS setup submenu.	C.5.39
Director 5 > *	Enters the Director setup submenu. **Note:** * This option is only available if the Director software option has been enabled on the receiver.	C.5.45

C.5.39 BISS Menu

This menu contains links to TV and audio submenus for BISS setup parameters.

Table C.47: BISS Setup Menu

Menu title: SET:CA BISS	Description	Section
TV Service BISS >	Enters the TV Service BISS setup submenu.	C.5.40
Aud 2 Service BISS >	Enters the Audio 2 Service BISS setup submenu.	C.5.40

C.5.40 TV / AUD2 BISS Menus

Table C.48: TV and Audio 2 BISS Setup Menus

Menu title: SET:TV BISS, SET:AUD2 BISS	Description	Section
Mode:	This sets the mode of the BISS CA as per EBU Standard Tech 2392, the modes currently available are 1 and E. **BISS 1** - BISS scrambling with an unencrypted key. **BISS E User 1** - Biss scrambling with an encrypted key (key encryption word is user id1). **BISS E User 2** - Biss scrambling with an encrypted key (key encryption word is user id1). **BISS E Fixed** - Biss scrambling with an encrypted key (key encryption word is a fixed unique unit number 6 bytes long). **BISS E TTV** - Biss scrambling with an encrypted key (key encryption word is a fixed unique unit number 7 bytes long).	----
BISS 1 >	Enters the BISS 1 submenu.	C.5.41
BISS E >	Enters the BISS E submenu.	C.5.42

C.5.41 BISS 1 Menu

This menu is the key entry menu for BISS 1 set-up.

Table C.49: BISS 1 Setup Menu

Menu title: **SET:TV BISS 1,** **SET:AUD2 BISS 1**	**Description**	**Section**
Key:	The 12-digit BISS key can be entered here.	----

C.5.42 BISS E Menu

Table C.50: BISS E Setup Menu

Menu title: **SET:TV BISS E,** **SET:AUD2 BISS E**	**Description**	**Section**
Key >	Enters the BISS E key submenu.	C.5.43
User ID 1 >	Enters the BISS E key submenu.	C.5.44
User ID 2 >	Enters the BISS E key submenu.	C.5.44

C.5.43 BISS E Key Menu

Table C.51: BISS E Key Setup Menu

Menu title: **SET:TV BISS E KEY,** **SET:A2 BISS E KEY**	**Description**	**Section**
k:	The 16-digit BISS E key can be entered here.	----

C.5.44 BISS E User ID Menus

Table C.52: BISS E User ID Setup Menus

Menu title: **SET:TV BISS E ID1,** **SET:TV BISS E ID2,** **SET:A2 BISS E ID1,** **SET:A2 BISS E ID2**	**Description**	**Section**
ID:	The 14 Digit BISS user IDs can be entered here.	----

C.5.45 Director 5 Setup Menu

This menu contains the setup parameters for Director CA.

Table C.53: DirectorV5 Setup Menu

Menu title: SET:DIRECTOR5	Description	Section
Clear Carriers >	Enters the Clear Carriers submenu.	C.5.46

C.5.46 Clear Carriers Menu

Table C.54: Clear Carriers Menu

Menu title: SET:DIR5 CLR CARRS	Description	Section
Power Up Carr:	Clears the power up carrier.	----
Emergency Carr:	Clears the emergency carrier.	----
NCP Carr 1 to 10:	Clears the user defined carriers.	----

C.5.47 System Menu

The system options menu contains the parameters necessary to configure detailed operational aspects of the unit.

Table C.55: System Setup Menu

Menu title: SET:SYSTEM	Description	Section
PSI Mode:	Allows the user to control the method used for component/service selection. **DVB** - PSI/SI is used for service selection. **ATSC** - PSI/PSIP is used for service selection. **Off** - Component selection is done using manual PID entry: This is not suitable for scrambled services. **Note:** When the PSI Mode is turned off, the 'Service ID' menu (under SETUP:SERVICE menus) will be replaced by a 'TV PIDs' showing PID values instead of the service names. Default = DVB.	----

Menu title: SET:SYSTEM	Description	Section
Delay ms:	Delays the presentation of video/audio/data information relative to the Presentation Time Stamps (PTS). This feature directly affects the buffer management within the receiver. The user can increase the delay for low bit rate inputs to prevent the buffer's under-flowing. Range = 0 - 240 ms. Default = 40 ms.	----
Restore Def.:	**No** – The current parameter settings in the unit will be used. **Yes** – All parameters settings will return to the factory defaults. **Note**: The unit will reset when this is selected. Default = No.	----
Reset:	**No** / **Yes**. Default = No.	----

C.5.48 Control Menu

Table C.56: Control Setup Menu

Menu title: SET:CONTROL	Description	Section
Ctrl. Mode:	Allows the selection of the control mode of the unit. **Local** - Control via the front panel or Web Browser. **Remote** - Remote control via a none-addressable remote control protocol. **OAC*** – Control via Director. Default = Local. **Note:** In Remote mode, no other parameters on the unit can be changed locally, until the control mode is set back to local. **Note:** * This item will only appear if the Director software option is enabled.	----
LL PIN: *	The 4-digit local lockout key can be entered here. **Note:** * This item will only appear if the Director software option is enabled.	----
RLP: *	The 13-digit reset lockout pin can be entered here. **Note:** * This item will only appear if the Director software option is enabled.	----

Menu title: SET:CONTROL	Description	Section
Menu lock:	Activates or disables the menu lock. **On** - Menu lock activated. Once activated, an 8 key combination has to be entered to allow access to the menus. (Refer to *Section C.1.3* for combination.) **Off** - Menu lock disabled. Default = Off.	----

C.5.49 Factory Menu

This menu is not for customer use.

C.6 Status Menu

C.6.1 Status Menu Items

The status menu contains all the submenus and items, required to check the condition of the unit, and the currently decoded service.

Table C.57: Status Menu Items

Menu title: STATUS	Description	Section
Uptime:	Number of days (d), hours (h) and minutes (m) since last reset or power cycle.	----
OK: ERR:	If there are no errors, the menu displays “OK”. Number of days (d), hours (h) and minutes (m) in an error state for the indicated services displayed (VA1A2) – Video, Audio 1 and/or Audio 2. Service error details are displayed at the relevant **Decoding Stats** menus.	----
Alarm >	Enters the Alarm Status submenu.	C.6.2
GPO >	Enters the GPO Status submenu.	C.6.3
Input >	Enters the Input Status submenu.	C.6.4
Signal >	Enters the Signal Status submenu.	C.6.5
PID info >	Enters the currently decoded service’s PID Status submenu.	C.6.15

Menu title: STATUS	Description	Section
Download info >*	Enters the download information submenu, which provides a number in the format: #000 00 00-03 003. **Note:** * This option is only available if the Director software option has been enabled on the receiver.	C.6.18
CA module >	Enters the CA Module Status submenu.	C.6.19

C.6.2 Alarm Status Menu

The alarm status menu contains a list of all the alarm groups, and the associated status of that group. If the group status is in an alarm or warning state, the user can enter the group to see the individual alarms or warnings for that group.

Table C.58: Alarm Status Menu

Menu title: STAT:ALARM	Description	Section
System: OK	The first line of the alarm status menu is reserved to show the most urgent alarm which is present at the time. If there are no alarms present, it will read 'System: OK' as shown.	----
Input	Enters the Input alarm status submenu.	Annex D
PSI	Enters the PSI alarm status submenu.	Annex D
CA	Enters the CA alarm status submenu.	Annex D
Video	Enters the Video alarm status submenu.	Annex D
VBI	Enters the VBI alarm status submenu.	Annex D
DVB Subt	Enters the DVB Subtitle alarm status submenu.	Annex D
Audio1	Enters the Audio 1 alarm status submenu.	Annex D
Audio2	Enters the Audio 2 alarm status submenu.	Annex D
Data	Enters the Data alarm status submenu.	Annex D
Config	Enters the Config alarm status submenu.	Annex D
OAC *	Enters the OAC alarm status submenu. **Note:** * This option is only available if the Director software option has been enabled on the receiver.	Annex D
IP Out *	Enters the IP output setup submenu **Note:** * This item will only appear if the Dual IP output module is fitted.	Annex D

For information regarding the alarms and their individual interpretations, refer to *Annex D, Alarm Categories and Conditions*.

C.6.3 GPO Status Menu

This menu shows the current state of all the General Purpose Output (GPO) relay contacts.

Table C.59: GPO Status Menus

Menu title: STAT:GPO	Description	Section
GPO 1:	**High** – One or more events are triggering the GPO. **Low** – No events are triggering the GPO.	----
GPO 2:	**High** – One or more events are triggering the GPO. **Low** – No events are triggering the GPO.	----
GPO 3:	**High** – One or more events are triggering the GPO. **Low** – No events are triggering the GPO.	----
GPO 4:	**High** – One or more events are triggering the GPO. **Low** – No events are triggering the GPO.	----
GPO 5:	**High** – One or more events are triggering the GPO. **Low** – No events are triggering the GPO.	----

Further menus indicate which events are triggering the GPOs. It will show one of the following:

- **No Setup** – the GPO is not set to trigger on any events.
- **No Trigger** – the GPO is set up trigger on one or more events but the events are not occurring.
- **<a list of one or more triggers>** – the list of events which are currently triggering the GPO.

C.6.4 Input Status Menu

The input status menu provides information regarding the quality of the input signal. The information provided will depend on what input module is fitted inside the receiver.

C.6.4.1 ASI Input

Table C.60: Input Status Menu, ASI Input

Menu title: STAT:INPUT	Description	Section
Lock:	Indicate whether the input is locked. Options are: **Locked** and **Not locked.**	----

C.6.4.2 QPSK Input

Table C.61: Input Status Menu, QPSK Input

Menu title: STATUS: INPUT	Description	Section
Lock:	Indicates whether the demodulator is locked. Options are: **Locked** and **Not locked.**	----
BER(PostV):	Provides the post Viterbi BER measurement, in logarithmic annotation.	----
C/N Margin:	Displays the carrier-to-noise margin in dB.	----
Inner Code:	Displays the modulation forward-error-correction code.	----
Spec Inv:	Indicates whether the spectrum is inverted.	----
Lock freq:	Provides the frequency at which the demodulator has locked in Gigahertz (GHz).	----

C.6.5 Signal Status Menu

The signal status menu provides information on the incoming transport stream.

Table C.62: Signal Status Menu

Menu title: STAT:SIGNAL	Description	Section
Pkt OK:	Counts the number of seconds since the last sync break.	----
Bit rate:	Reports the current total bit rate of the incoming transport stream in Mbps.	----
TV Service >	Enters the TV Service status submenu.	C.6.6
Audio 2 Service >	Enters the Audio 2 Service status submenu.	C.6.10

C.6.6 TV Service

Table C.63: TV Service Status Menu

Menu title: STAT:TV SERVICE	Description	Section
Video >	Enters the Video status submenu.	C.6.7
Audio 1 >	Enters the Audio1 status submenu.	C.6.10
VBI >	Enters the VBI status submenu.	C.6.13
Data >	Enters the Data status submenu.	C.6.14

C.6.7 Video Status Menu

The video signal status submenu contains information about the currently decoded MPEG-2 video.

Table C.64: Video Status Menu

Menu title: STAT: VIDEO	Description	Section
Decoding Stats >	Enters the Video Decoding Statistics submenu.	C.6.8
Hsize:	Display the horizontal resolution of the video.	----
Vsize:	Display the Vertical resolution of the video.	----
Eff. Rate:	Shows the effective bit rate of the video component in 188 byte packet size.	----
Format:	Shows the aspect ratio (4:3 or 16:9) of the video.	----
Pict. Rate:	Displays the number of pictures per second being displayed.	----
VPTS Use %:	Shows the usage, in percent, of the video decoding buffer.	----
VPTS Err ms:	Shows the difference (in ms) between the actual decoding of the component, and the ideal decoding time according to PTS.	----

C.6.8 Video Decoding Statistics Status Menu

Table C.65: Video Decoding Statistics Status Menus

Menu title: STAT:VIDEO STATS	Description	Section
OK:	If there have been no failures, this menu will display 'OK'. FAIL: If failures have occurred, the display will show the number of days (d), hours (h), minutes (m) or seconds (s) since last video decoding failure.	----
Totals >	Enters the Total Video Decoding Statistics Status submenu.	C.6.9

C.6.9 Total Video Decoding Statistics Status Menu

Table C.66: Total Video Decoding Statistics Status Menus

Menu title: STAT:VID TOTALS	Description	Section
Decode:	Cumulative time that the unit has been decoding video in days (d), hours (h), minutes (m) or seconds (s).	----
Stop:	Cumulative time that the unit has stopped decoding video in days (d), hours (h), minutes (m) or seconds (s).	----

C.6.10 Audio Status Menu

These status submenus contain information about the audio format and quality of the currently decoded audio stream for the corresponding audio channel.

Table C.67: Audio 1 and 2 Status Menus

Menu title: STAT:TV AUDIO 1, STAT:AUD 2 SERVICE	Description	Section
Decoding Stats >	Enters the Audio Decoding Statistics submenu.	C.6.11
Coding:	Display the audio coding model, as layer I, layer II.	----

Menu title: STAT:TV AUDIO 1, STAT:AUD 2 SERVICE	Description	Section
Mode:	Shows the modulation mode reported used in the encoder. **Mono**, **Dual mono**, **Stereo**, **Joint Stereo** is displayed depending on the input.	----
Rate (kbps):	Shows the bitrate, in kilobits per second, that the audio was coded.	----
Smpl:	Shows the sampling rate, usually 32, 44.1 or 48 kHz.	----
Prot:	Informs if protection bits are present for the currently decoded audio stream.	----

C.6.11 Audio Decoding Statistics Status Menu

Table C.68: Audio 1 and 2 Decoding Statistics Status Menus

Menu title: STAT:AUDIO1 STATS, STAT:AUDIO2 STATS	Description	Section
OK: FAIL:	If there have been no failures, this menu will display 'OK'. If failures have occurred, the display will show the number of days (d), hours (h), minutes (m) or seconds (s) since last audio decoding failure.	----
Totals >	Enters the Total Audio Decoding Statistics Status submenu.	C.6.12

C.6.12 Total Audio Decoding Statistics Status Menu

Table C.69: Audio 1 and 2 Total Audio Statistics Status Menus

Menu title: STAT:AUDIO1 TOTALS, STAT:AUDIO2 TOTALS	Description	Section
Decode:	Cumulative time that the unit has been decoding audio in days (d), hours (h), minutes (m) or seconds (s).	----
Stop:	Cumulative time that the unit has stopped decoding audio in days (d), hours (h), minutes (m) or seconds (s).	----

C.6.13 VBI Status Menu

The VBI status menu displays the current status of the VBI components.

Table C.70: VBI Status Menu

Menu title: STAT:TV VBI	**Description**	**525**	**625**
Teletext:	Show the current status of the Teletext. **Off**: Teletext is switched off in the Video set-up menu. **Not sent**: Teletext transmission is turned on, but there is no Teletext for the service in the transport stream. **Active**: Teletext is being transmitted. **Overflow**: Teletext is switched on, but some lines are being suppressed by higher priority VBI data.		x
TPTS Err ms:	Shows the difference (in ms) between the actual decoding of the Teletext component, and the ideal decoding time according to PTS.		x
VPS:	**Off**: VPS is switched off in the Video set-up menu. **Not sent**: VPS is switched on, but there is no VPS information for the selected service in the transport stream. **Active**: VPS is switched on, and is present in the transport stream.		x
WSS:	**Off**: WSS is switched off in the Video set-up menu. **Active**: WSS is present in the transport stream, and is transcoded into the PAL signal. **MPEG video**: WSS is included in the video stream and transcoded transparently as video in line 23.		x
Closed Cap:	Show the current status of the Closed Caption. **Off**: Closed Caption is switched off in the VBI set-up menu. **Not sent**: Closed Caption transmission is turned on, but there is no Closed Caption for the selected service in the transport stream. **Active**: Closed Caption is being transmitted.	x	
Testlines:	Shows the currently displayed testlines.	x	x
Sin(x)/x:	**Off**: Sin(x)/x is switched off in the Video set-up menu. **On**: Sin(x)/x is switched on in the Video set-up menu, and transmitted in the video signal.		x
TTXT Subt:	Show the current status of the EBU Teletext Subtitling. **Off**: EBU Teletext Subtitling is switched off in the Video set-up menu. **Not sent**: EBU Teletext Subtitling transmission is turned on, but there is no EBU Teletext Subtitling for the service in the transport stream. **Active**: EBU Teletext Subtitling is being transmitted.		x

Menu title: STAT:TV VBI	Description	525	625
GCR:	Shows the currently displayed GCR line, if 525 line video is being decoded	x	

C.6.14 TV Data Status Menu

The TV Data menu shows the current status of the data component. The data service is normally referred to as low speed data and is an RS-232 data protocol i.e. a data service from the transport stream is extracted and sent out through the RS-232 ports. The buffer use item defines the level of occupancy of the low speed data buffer.

Table C.71: TV Data Status Menu

Menu title: STAT:TV DATA	Description	Section
Buff Use %:	Shows the usage, in percent, of the data decoding buffer.	----
Type:	**Piped** - Supports data broadcast services that require a simple, asynchronous, end-to-end delivery of data through DVB compliant networks. Data broadcast according to the data pipe specification is carried directly in the payloads of MPEG-2 TS packets. **Asynchronous -** Supports data broadcast as PES data where no data rate is specified (the entire payload is data) **Synchronous -** Supports data broadcast as PES data which has a data id of 0x21 **Synchronised -** Supports data broadcast as PES data which has a data id of 0x22 **Format #1 -** Supports data broadcast as PES private data **Format #2 -** This is the proprietary Ericsson way of encapsulating data.	----
Rate:	Defines the baud rate of the data (in bit/s), this can be: **1200**, **2400**, **4800**, **9600**, **19200** or **8400**.	----

C.6.15 PID Info Menu

This menu provides access to the submenus that display the packet identifiers (PIDs) for the components of the received stream.

Table C.72: PID Info Menu

Menu title: STATUS:PID INFO	Description	Section
TV Service >	Enters the TV Service PID Info submenu.	C.6.16
Audio 2 Service >	Enters the Audio 2 Service PID Info submenu.	C.6.17

C.6.16 TV Service PID Info Menu

The TV Service submenu lists the PIDs associated with the individual components belonging to a service.

Table C.73: TV Service PID Info Menu

Menu title: STAT:TV PID INFO	Description	Section
Video:	Shows the video PID, if present.	----
Audio:	Shows the audio PID, if present.	----
TTXT:	Shows the Teletext PID, if present.	----
TTXT Subt:	Shows the subtitling PID, if present.	----
EBU Page:	Shows the EBU subtitling Page, if present.	----
DVB Subt:	Shows the DVB subtitling PID, if present.	----
DVB Page:	Shows the DVB subtitling Page, if present.	----
DVB Apage:	Shows the DVB subtitling Page A, if present.	----
VPS:	Shows the VPS PID, if present.	----
WSS:	Shows the WSS PID, if present.	----
ClosedCap:	Shows the Closed caption PID, if present.	----

C.6.17 Audio 2 Service PID Info Menu

Shows the Audio PID associated with the currently selected Audio2 service, if present.

Table C.74: Audio2 Service PID Info Menu

Menu title: STAT:AUD2 PID INFO	**Description**	**Section**
Audio:	Shows the audio PID, if present.	----

C.6.18 Downld Info Menu

This menu shows the status of the last over-air download.

Table C.75: Downld Info Menu

Menu title: STAT:DOWNLD INFO	**Description**	**Section**
RRRSSTT-XXYY	**R –** Percentage Complete 0 to 100 **S –** Status • 0 = Download Idle • 1 = Download Running • 2 = Download Aborted • 3 = Download Wait User • 4 = Download Wait Service • 5 = Download Wait Selection • 6 = Download Finished	----
	T – Error Type • 0 = Download General Error • 1 = Download Section Error • 2 = Download PMT Error • 3 = Download CDS Error • 4 = Download no error type	

Menu title: STAT:DOWNLD INFO	Description	Section
	X – Error Number • 0 = Download no error • 1 = Code Verification • 2 = Program Flash Failure • 3 = Unexpected OS Message • 4 = Unexpected Return • 5 = Unexpected Event • 6 = Download Timer Not Available • 7 = Download Timed Out • 8 = Download Switch No Version • 9 = Download Already in Flash • 10 = No Inactive Code • 11 = Cannot Lock Section • 12 = Descriptor Not Found • 13 = Invalid Header • 14 = Section Unavailable • 15 = Code Stream Not Found • 16 = Download Not In Service • 17 = Invalid Code Download Section • 18 = Incorrect Download Received • 19 = Download Software Size Invalid • 20 = Software Descriptor Inconsistent • 21 = CDB Section Not Found • 22 = Invalid Signature **Y –** Count of errors in download	

C.6.19 CA Module Menu

The CA module menu shows the currently active conditional access (CA) system, and allows access to the lower level CA menus.

Table C.76: CA Module Menu

Menu title: STAT:CA MODULE	Description	Section
CA Type:	Shows the active CA module. **DVB-CI** – The unit has common interface CA. **BISS** – The unit has BISS CA. **Director** – The unit has Director CA.	----
CA Info >	Enters the CA info submenu.	C.6.20
Director5 > *	Enters the DirectorV5 status menu. **Note:** * This option is only available if the Director software option has been enabled on the receiver.	C.6.20.1

C.6.20 CA Info Menu

This menu is dependant on the CA module fitted inside the receiver.

Table C.77: CA Info Menu

Menu title: STAT:CA INFO	**Description**	**Section**
< *name of CA module* >	If a CA module is present and recognized, the name of it will be displayed here. Further menus may be accessible. The structure of the menus from this point are dependent on the CAM inserted. If no CA module is present, it will show '**No CI Module**'.	----
Last Message >	This item leads to a further menu which displays messages from the CAM to the user. If no messages are present, the next menu will show '**(none)**'.	----
Video:	**Searching** – Information not yet received. Displays Video information, if present.	----
Audio 1:	**Searching** – Information not yet received. Displays Audio 1 information, if present.	----
Audio 2:	**Searching** – Information not yet received. Displays Audio 2 information, if present.	----
Ttx:	**Searching** – Information not yet received. Displays Teletext information, if present.	----
TTXT Subt:	**Searching** – Information not yet received. Displays Teletext Subtitling information, if present.	----
DVB Subt:	**Searching** – Information not yet received. Displays DVB subtitling information, if present.	----
VPS:	**Searching** – Information not yet received. Displays VPS information, if present.	----
WSS:	**Searching** – Information not yet received. Displays WSS information, if present.	----
Closed Cap	**Searching** – Information not yet received. Displays Closed caption information, if present.	----

C.6.20.1 Director 5 Status Menu

Table C.78: Director 5 Status Menu

Menu title: STAT:DIRECTOR5	Description	Section
Carrier Slot Info >	Enters the carrier slot submenu.	C.6.21
Unique HW ID >	Displays the unique hardware identifier of the unit, part of this is the unit serial number.	----

C.6.21 Director 5 Carrier Slot Menu

Table C.79: Director 5 Carrier Slot Menu

Menu title: STAT:DIR5 CARRIERS	Description	Section
Power Up Carrier >	Enters the power up carrier details submenu.	C.6.22
Emergency Carrier >	Enters the emergency carrier details submenu.	C.6.22
Carrier 1 to 10 >	Enters the user defined carriers details submenu.	C.6.22

C.6.22 Director 5 Carrier Detail Menu

Table C.80: Director 5 Carrier Detail Menu

Menu title: STAT:DIR5 POWER UP, STAT:DIR5 EMERG, STAT:DIR5 CARR X	Description	Section
Service ID:	Displays the Service ID.	----
Sat Freq:	Displays the satellite frequency (in MHz).	----
Sym Rate:	Displays the symbol rate (in Msym/s).	----
Inner Code:	Displays the modulation forward-error-correction code.	----
LNB Volt:	Displays the voltage output of the F-connector located on the rear of the unit.	----
Spec Inv:	Indicates whether the spectrum is inverted.	----

C.7 Properties Menu

C.7.1 Properties Menu Items

Shows the hardware and software properties of the unit.

Table C.81: Properties Menu

Menu title: PROPERTIES	Description	Section
SerNo:	Shows the receiver serial number.	----
SW Version:	Shows the receiver software version.	----
FW Version:	Shows the receiver firmware version.	----
ASI FW Version: *	Shows the receiver ASI firmware version. Note: * This item will only appear if the ASI OUT or ASI/SDI OUT option modules are fitted.	----
IP FW Version: *	Shows the receiver IP firmware version. Note: * This item will only appear if the Dual IP OUT option module is fitted.	----
HW Config >	Enters the HW config submenu.	C.7.2
Network >	Enters the Network submenu.	C.7.3
Customization >	Enters the Customization submenu.	C.7.8

C.7.2 HW Config Menu

This lists the available features and hardware of the Unit. A “+” in front of the component, signifies that the component is present. A “-“in front of the component, signifies that the component is not available.

Example text is provided in *Table C.82.* All possible options are not listed below.

Table C.82: HW Config Menu

Menu title: PROP: HW CONFIG	Description	Section
- QPSK.Input	QPSK input is not available.	----
+ QPSK.Input	QPSK input is available.	----
- ASI.Input	ASI input is not available (option not fitted).	----
- ASI.Output	ASI output is not available (option not fitted).	----

C.7.3 Network Menu

The Ethernet network properties for operating the receiver using nCompass (web browser) control are listed under this menu item.

Table C.83: Network Menu

Menu title: PROP: NETWORK	Description	Section
IP Address >	Set and read the receiver IP address.	C.7.4
Subnet Mask >	Set and read the receiver SubNet Mask.	C.7.5
Gateway Address >	Set and read the receiver Gateway address.	C.7.6
MAC Address >	View the receiver MAC address.	C.7.7

C.7.4 IP Address

The IP address of the unit can be set/changed by the user at any time. The unit must be reset for the new address to be used.

C.7.5 SubNet Mask

The SubNet Mask of the unit can be set/changed by the user at any time.

C.7.6 Gateway Address

The Gateway address of the unit can be set/changed by the user at any time.

C.7.7 MAC Address

This address is information only and cannot be changed.

C.7.8 Customisation Menu

The unit can be customized with license keys using this menu. Customization keys are only available direct from Ericsson.

Contact Ericsson if further information is required.

Table C.84: Network Menu

Menu title: PROP: NETWORK	**Description**	**Section**
Key:	The customization key supplied by Ericsson can be entered here.	----

Alarm Categories and Conditions

Annex D

Contents

List of Tables

BLANK

D.1 Alarm Conditions

This chapter lists the alarm conditions detected by the unit. It also lists a description for the alarm, a possible remedy, and the default state of the alarm in the alarm configuration menu.

D.2 Input Stage Alarms

D.2.1 QPSK Input Alarms

The QPSK input alarms relate to alarms received from the DVB-S QPSK demodulator, or the lack of communication with this component.

Table D.1: QPSK Alarm Categories and Conditions

Alarm Category	**Contents**			
QPSK Input:	**Alarm**	**Description**	**Remedy**	**Default**
	Tuner fail	This alarm is set if the communication with the tuner is lost.		A
	No signal	Alarm only if the RF level has been zero for more than 2 consecutive times	Check signal source	A
	No lock	Demod will not be deemed to be locked until full lock status has occurred for 3 consecutive polls	Check input settings (frequency, FEC, symbol rate etc.)	A
	BER exceeded	BER TOO HIGH is declared when BER estimate exceeds # defined value for FEC rate.	The input signal strength or quality is not adequate.	W

Note: These alarms are only available when the QPSK input module is fitted in the receiver.

D.2.2 ASI Input Alarms

The ASI input alarms relate to errors seen at the ASI input.

Table D.2: ASI Alarm Categories and Conditions

Alarm Category	**Contents**			
ASI Input:	**Alarm**	**Description**	**Remedy**	**Default**
	No sync	Will alarm if the receiver can **not** lock to the incoming transport stream.	Check signal source	A

Note: These alarms are only available when the ASI input module is fitted in the receiver.

D.3 Output Stage Alarms

D.3.1 Video Output Alarms

The video output alarms relate to errors occurring in the video stream decoder.

Table D.3: Video Alarm Categories and Conditions

Alarm Category	**Contents**			
Video output:	**Alarm**	**Description**	**Remedy**	**Default**
	No stream input	No stream is detected in the current TS.	Check input source.	A
	Error in stream	There is an error in the video stream.	Verify correct CA system and smart card.	A
	Video resync	There has been a transition from “no frame sync” to “frame sync OK”.		A
	Video not used	No video component exists for the currently selected service.		W

D.3.2 Audio Output Alarms

The audio output alarms relate to errors occurring in the audio decoders.

The same alarm categories/conditions are available for Audio 1 and Audio 2.

Table D.4: Audio Alarm Categories and Conditions

Alarm Category	**Contents**			
Audio output:	**Alarm**	**Description**	**Remedy**	**Default**
	No stream input	No stream is detected in the current TS.	Check input source.	A
	Unknown format	The incoming stream is impossible to decode.		A
	PES resync	There has been a transition from “no PES Sync” to “PES Sync OK”.		W
	Frame resync	There has been a transition from “no frame sync” to “frame sync OK”.		W
	Same PID	Attempt to set the same PID in one of the additional channels as in the main channel OR attempt to set the same PID in the main channel as in one of the additional channels.	Same PID in both additional channels is allowed. Same PID cannot be selected for the base and extended audio at the same time.	A
	FW restart	Audio artefacts due to hardware re-initialisation.		A
	PTS starvation	Cannot obtain LipSync according to PCR/PTS due to compressed bit buffer underflow.		A
	PTS overflow	Cannot obtain LipSync according to PCR/PTS due to compressed bit buffer overflow.		A
	PTS resync	Audio artefacts due to presentation adjustments.		W

Alarm Category	Contents			
Audio output:	**Alarm**	**Description**	**Remedy**	**Default**
	Audio not used	Audio component not signalled in service		W

D.3.3 VBI Output Alarms

The VBI output alarms relate to errors occurring in the decoding and embedding of VBI information into the outgoing video.

Table D.5: VBI Alarm Categories and Conditions

Alarm Category	Contents			
VBI output:	**Alarm**	**Description**	**Remedy**	**Default**
	TTX data Err	Error in Teletext data.	Improve signal quality.	W
	TTX overflw.	Teletext buffer overflow.	The Decoder cannot handle the rate of incoming Teletext data.	A
	TTX no data	No Teletext data available	Make sure Teletext subtitling is sent, or ignore.	A
	EBU Subt no data	No EBU subtitling data available	Make sure EBU subtitling is sent, or ignore.	W
	WSS no data	No WSS data available.	Make sure WSS is sent, or ignore.	A
	VPS data err	Error in VPS data	Improve signal quality.	W
	VPS no data	No VPS data available	Make sure VPS is sent, or ignore.	A
	CC no data	No CC data available	Make sure CC is sent, or ignore.	W
	CC data err	Error in CC data	Improve signal quality, verify CC format setting.	W

Alarm Category	Contents			
VBI output:	**Alarm**	**Description**	**Remedy**	**Default**
	Userdata err	Error in user data	Improve signal quality, verify user data format	W

D.3.4 Data Output Alarms

The data output alarms reflect the status of the LS data (RS-232) output port and its associated functions.

Table D.6: Data Output Alarm Categories and Conditions

Alarm Category	Contents			
Data output:	**Alarm**	**Description**	**Remedy**	**Default**
	Error in stream	Cannot decode the component stream.	Make sure the correct component is selected	A
	CC failure	TS has missing packets on the incoming transport stream.	Improve input signals, or check source	W
	Buffer overflow	Output port rate is lower than incoming data rate.	Increase output rate or select new component	A
	Not used	No PID selected to decode.	Select PID or turn off data output	A
	Same PID	The selected PID is in use by another part of the Decoder.	Choose a different PID.	W

D.4 CA and PSI/SI Related Errors

D.4.1 CA Related Alarms

The CA status alarms indicate the current condition of the CA system

Table D.7: CA Related Alarm Categories and Conditions

Alarm Category	**Contents**			
CA system:	**Alarm**	**Description**	**Remedy**	**Default**
	No access	The DVB common interface module has no access to the currently selected component.	Check conditional access entitlements with service provider.	W

D.4.2 PSI/SI Related Alarms

Contains information about the currently processed PSI/SI arriving at the Decoder.

Table D.8: PSI/SI Related Alarm Categories and Conditions

Alarm Category	**Contents**			
PSI/SI:	**Alarm**	**Description**	**Remedy**	**Default**
	No stream input	No stream is detected.	Check input signal and verify source.	A
	PAT not present	No data is received on the PAT PID.	Check input signal and verify source.	A
	CAT not present	No data is received on the CAT PID.	Check input signal and verify source.	A
	PMT not present	No data is received on the PMT PID.	Check input signal and verify source.	A
	NIT not present	No data is received on the NIT PID.	Check input signal and verify source.	A
	SDT/BAT not present	No data is received on the SDT or BAT PID.	Check input signal and verify source.	A

Alarm Category	Contents			
	TDT not present	No data is received on the TDT PID.	Check input signal and verify source.	A
	VCT not present	No data is received on the VCT PID.	Check input signal and verify source.	A
	STT not present	No data is received on the STT PID.	Check input signal and verify source.	A

D.5 Config Alarms

The config alarms contain alarms regarding the mismatches between present hardware, software and license keys, and the overall health of the hardware.

Table D.9: Hardware Configuration Related Alarm Categories and Conditions

Alarm Category	Contents			
Config alarms:	**Alarm**	**Description**	**Remedy**	**Default**
	Init fail	General initialization failure.	Contact Ericsson Customer Help Desk	A
	Cfg. Not supp	The configuration defined by the configuration word could not be supported.		A
	HW err.	The hardware check during initialization failed.		A

D.6 OAC Alarms

The OAC out alarm provides a controllable relay via an over-air (NCP) command. This menu is only available if the Director V5 software option is enabled.

Table D.10: OAC Alarm Categories and Conditions

Alarm Category	**Contents**			
OAC alarms:	**Alarm**	**Description**	**Remedy**	**Default**
	Relay Alarm	The OAC alarm relay has been set using the NCP command DIR5_NCP2_SET_RELAYS	This alarm is set from the 'headend' via an NCP command. Any remedial action should be performed at the headend.	A

D.7 IP Out Alarms

The IP out alarms provide alarm status for the IP outputs.

Note: These menus are only available when the Dual IP Output module is fitted in the receiver.

The IP output card has two output Ethernet ports each supporting up to 4 independently configurable destination addresses. *Table D.11* describes the alarms and indicates if they are per port or per port and destination.

Table D.11: Output Alarm Categories and Conditions

Alarm Category	**Contents**			
IP Out alarms:	**Alarm**	**Description**	**Remedy**	**Default**
	Relay Alarm	The Ethernet link is down. **Note**: This is a per port alarm.	Check Ethernet cable is plugged in. Check far end equipment (hub or switch) is powered. Check cable is not faulty e.g. swap with known good cable. **Note**: The TT1222 will auto detect crossover cabling and switch TX/RX lines accordingly.	A
	10 Mbps Link	The link rate is 10 Mbps. **Note**: This is a per port alarm.	This is simply a warning that the Ethernet line rate is 10 Mbps rather than the more common 100 Mbps.	A
	H/D Not Supported	The link is half duplex but the unit cannot support this link setting. **Note**: This is a per port alarm.	Connect the unit to a switch or hub that is full duplex capable or configure the existing connection to be full duplex capable.	A
	Bad IP	Unicast host IP address configuration required. **Note**: This is a per port alarm.	Assign a valid unicast host IP address to the port.	A
	Bad Subnet	Subnet mask is invalid for host IP address. **Note**: This is a per port alarm.	Assign a valid subnet mask.	A

Alarm Category	Contents			
IP Out alarms:	**Alarm**	**Description**	**Remedy**	**Default**
	Bad Gateway	Gateway address is either not unicast IP or not local to host subnet. **Note**: This is a per port alarm.	Assign a valid gateway address.	A
	Need Subnet	A unicast destination address is configured but the port has no valid subnet mask configured. **Note**: This is a per port alarm.	Assign a valid subnet mask.	A
	ARP Timeout	No ARP reply from destination (if on local subnet) or gateway (if destination not on local subnet). **Note**: This is a per port and per destination alarm.	Check destination IP address is a valid destination.	A

Using the TT1222 with the Director System

Annex E

Contents

BLANK

E.1 Configuring the TT1222 for Use With Director

E.1.1 Getting Started

Set the Receiver to **DIRECTOR 5 OAC** mode (Over-air Control mode).

Notes: The CA system is unrecognised if the service is shown as CLEAR (that is, unscrambled).

In OVER-AIR mode, menu items can not be edited. The Receiver should be moved to LOCAL control for editing.

E.1.2 Using the TT1222 in the Over-air Mode

This section describes the behaviour of the TT1222 when it is controlled over-air using the Receiver Control part of the Director PC GUI.

It is assumed that the Receiver is entitled to receive Director commands. Consult the Director Control PC GUI manual for more information.

The following commands are supported:

- Force Channel Selection
- Force Carrier Retune
- Store Carrier Data
- Reset Carrier Data
- Set Relays
- Set Message
- Set Receiver State
- Set Default Audio Language
- Set License
- Set Audio Mute

E.2 Response to Over-air Commands

E.2.1 Scope of This Section

This section describes the receiver's response to a selection of over-air commands.

E.2.2 Display On-screen Display (OSD) Messages

Displays a text string on the LCD front panel. The display will show the NCP MESSAGE. The message is displayed for a set time or until cleared from the head-end.

Note: The viewing Monitor does NOT display messages. All user interaction is via the front panel.

E.2.3 Store Carrier Data

Stores a particular service as a preset. Subsequently, the head-end can force a service selection from this preset. Director presets are different to those set up in LOCAL ONLY mode. They are not visible to the user on the front panel LCD.

E.2.4 Set Power up Carrier

Set's the receiver Power up service. If the Power Up Carrier has been defined and the receiver is in OAC control mode, these will be the service parameters used after power up. If this is not defined or the control mode is not OAC, then the current service parameters used when the receiver was last powered on will be used.

If the service fails to decode, the receiver will tune to the **Emergency Home Carrier** if valid.

E.2.5 Force Carrier Retune

Force's the receiver to tune to a different frequency and service. The command requires the service selection, frequency, LNB, symbol rate and other tuning parameters, or this could be a service previously stored by the **Store Carrier Data** command.

The timeouts allow the receiver to revert back to the previous service after the timeout has expired. Use a timeout of at least 15 seconds to allow the receiver to successfully tune and decode the new service. Where the timeout is 0 seconds, the receiver will permanently tune to the new service and not revert back to the previous service.

If the service fails to decode, the receiver will tune to the **Emergency Home Carrier** if valid.

E.2.6 Force Service Selection

Force's the receiver to select a different service on the same frequency and LNB input. Only the service selection is required for this command.

If the service fails to decode, the receiver will tune to the **Emergency Home Carrier** if valid.

E.2.7 Set Emergency Home Carrier

Set the service parameters to use in the event of decode failure. Where the current service selection fails to decode and the receiver is in OAC control mode then if the Emergency Home Carrier has been defined, the receiver will tune to this service after a specified timeout. The timeout for Emergency Home Carrier is defined when sending this command.

Setting the Emergency Home Carrier allows a failure situation to be recovered, particularly since the receiver can only accept Director commands from a carrier that contains them.

E.2.8 Set Relays

Switches the general-purpose alarms. This command does not affect the summary alarm relay.

E.2.9 Local Lockout

Locks out the LOCAL CONTROL mode but status information can still be viewed. All Director commands are functional. The Receiver can be unlocked locally using a PIN number or over-air using Allow Local Access.

E.2.10 Abort NCP Command

Aborts commands that have been sent but not executed. When a command is received which has an expired execute time, it is acted on immediately.

BLANK