



CODICO[®] IRD-2600 / IRD-2800
INTEGRATED RECEIVER DECODERS

User Manual

DVB
Digital Video
Broadcasting

P/N 2349-72784-00

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INTRODUCTION

Scopus Network Technologies Ltd. takes great pride in delivery of its products, and makes every endeavor to ensure its clients full satisfactory.

On behalf of all the Scopus team, we would like to extend our congratulations on your investment in the CODICO® IRD-2600 and IRD-2800 Family of Integrated Receiver Decoders.

IRD-2600 AND IRD-2800 INTEGRATED RECEIVER DECODER



MANUAL SCOPE AND STRUCTURE

The User Manual for the CODICO® IRD-2600 and IRD-2800 Integrated Receiver Decoders is comprised of three main sections:

OVERVIEW:

This section provides introduction and product description, including highlights, benefits and typical applications, gives a functional and physical description of the unit and lists its main capabilities and specifications.

INSTALLATION:

This section provides data and procedures required to install and activate the unit. Procedures include site preparation and requirements, installation in a 19" rack, cable connections, panel options and Pin-out descriptions, initial settings and serviceability check.

OPERATION:

This section provides theoretical background on the operation of the unit, and gives data and instructions on using the unit and operating the control and monitoring functions provided to the user.

MAINTENANCE

The manual includes the following appendices:

- Appendix A Operational Menu Trees.
- Appendix B LNB Theory Of Operation.

It is assumed throughout this document that personnel have a general knowledge about the IRD-2600 and IRD-2800 Integrated Receiver Decoders, application and capabilities.

General knowledge of the CODICO® System and its application is also assumed. For detailed information, refer to the CODICO® MPEG-2 DVB Family Product Description documents.

TECHNICAL SUPPORT

In case of technical problems with the CODICO[®] system or one of its' components please refer to the System Documentation. In most instances, this may save you time in resolving technical difficulties.

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1. Request a RMA (Return Merchandise Authorisation) Tracking Number from your local Distributor.
2. Scopus Network Technologies Support will assign a RMA Tracking Number; this must accompany the item being returned and will be referred to in all correspondence.
3. The item is sent to Scopus Network Technologies with the RMA Number included in the accompanying documentation (shipping and customs forms).

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CE Certification

Both IRD-2600 and IRD-2800 meet all the CE Class B requirements with the exception of Emission Requirements.

In order to meet CE requirements, the following cables must be connected on all ASI outputs (ASI out 1, ASI out 2, ASI out 3). When cables are connected to these outputs then the device is compliant with FAIR-RITE 0443164151.

FCC Compliance Notice

Trade Name	Scopus
Product Name	Integrated Receiver Decoder
Product Model Number	CODICO® IRD-2600
Product Model Number	CODICO® IRD-2800

These devices comply with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Responsible Party:

Responsible Party's Name	Jay Gedanken
Address	16776 Bernardo Ctr. Dr., San Diego, CA 92128
Responsible Party's Telephone	1-619-618-1600

The FCC Wants You to Know

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician.

FCC Warning

Modifications not expressly approved by the manufacturer could void the user authority to operate the equipment under FCC Rules.

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1. OVERVIEW

1.1. General Information

The CODICO® IRD-2600 and IRD-2800 are a new generation of the 4:2:0 / 4:2:2 CODICO® family of Integrated Receiver Decoders. Both IRD-2600 and IRD-2800 are suitable for SCPC and MCPC 4:2:0 applications; IRD-2800 provides support for 4:2:2 applications as well. With DVB-CI (Common Interface) decryption capabilities, the IRD 2600 and IRD-2800 output high quality video, audio and data for satellite, cable and telecom programs distribution. IRD-2600 supports two stereo outputs while IRD-2800 supports up to three stereo outputs.

Both IRD-2600 and IRD-2800 contain a demultiplexer, MPEG-2 video and audio decoders, as well as Data and VBI insertion functions.

Control and management can be obtained via the IRD front control panel, an optional Infrared Remote Control, or an attached PC terminal. The IRD also supports remote management, control and software download, via transport stream link from the CODICO® NMS-4000 Network Management System.

Input and Output sections support variable modules for versatility of the IRD-2600 and IRD-2800. Input of DVB-ASI transport Stream or RS-422 directly to the decoder, as well as ASI output (optionally decrypted) and loopthrough is also supported. ASI TS and RS-422 can be connected at the same time with the various front ends. The desired input is selected by the user.

Figure 1-1: IRD-2600 and IRD-2800 - General View



1.1.1. Highlights and Benefits

The IRD-2600 and IRD-2800 Integrated Receiver Decoders provide the following benefits:

- DVB Common Interface (2 Slots), Supports de-scrambling of all leading CAMs
- On-board DVB descrambling with BISS Mode-1 and BISS-E (DSNG-CA) support.
- Extended Front/End Interface options
- High and Low Speed Data Outputs
- Advanced software control and monitoring of all IRD functions and capabilities.

The following sub-paragraphs detail the features, enhancements and options of the IRD-2600 and IRD-2800.

1.1.1.1. Inputs

Decoder Inputs

RS-422 Clock/Data Input

DVB-ASI with Loop-through (optional)

- Interface: Copper or Optical
- TS bit rate: up to 54 Mbps

Receiver Input Options

DVB Satellite (QPSK) Front End

- Frequency range: 950 -2150 MHz
- Symbol rate range: 1 - 45 M Symbols/s
- L-Band RF input with LNB control and Loop-through output

DVB DSNG (8PSK, 16QAM and QPSK) Front End

- Frequency Range: 950-2150 MHz
- Symbol rate Range: 1 -45 Msym/s
- 2 L-Band inputs with LNB control

DVB Cable (QAM) Front End

- QAM demodulation: 16/32/64/128/256
- VHF//UHF input: 50.5 – 858 MHz
- Symbol Rate Range: 1-7 Msym/s

Telecom G.703 Front End

- Unframed PDH Data rates: E1,E2 or E3
- FEC (optional): DVB-C FEC
- Loop-through output

DVB-PDH Front End

- Interface: ATM AAL-1
- Data rates: DS3 or E3
- Loop-through output

DVB-SDH SONET

- TS bit rate: up to 58 Mbps
- Interface: STM-1/OC-3, ATM AAL-1
- Optical interface types: SM or MM, 1300 nm
- Loop-through output

1.1.1.2. Outputs

Video

- Analog video Interfaces: 2 composite, 1 S-Video
- Digital video Interfaces (optional):
2x SDI, with embedded VBI and up to 2 stereo channels
- Video formats:
PAL-B/G/I/M/N/D, NTSC/SECAM L/B/G/K1
- Russian SECAM D/K (option applicable only in composite video, available only for IRD-2600).
- Decoding:
4:2:0MP@ML (1.5 -15 Mbps)
4:2:2PP@ML (1.5 -50 Mbps) (IRD-2800)
- Video Resolution Interpolation:
Pan-Scan, Letter box or Pass-through
- Aspect ratio:4:3/16:9 and 14:9
- Graphic processing: OSD, DVB Subtitling, EBU (Teletext) Subtitling.
- OSD only on monitoring output (optional)
- Sync Lock Input and Loophrough output (optional)

VBI Re-Insertion

- In Composite video and embedded in SDI
- WST Teletext and inverted Teletext
- WSS, VPS, VITC, SMC, CC, AMOL (optional)
- Enhanced VITS with built-in generator

Audio

- Analog audio: up to 3 stereo pairs (up to 2 stereo pairs in IRD-2600). All inputs balanced or 1st unbalanced (optional)
- Digital audio (optional): up to 3 AES/EBU-SPDIF (up to 2 on IRD-2600)
- Embedded in SDI (optional): up to 2 stereo
- Mode: Stereo, Joint Stereo, Dual Channel, Single Channel
- Max output level: +24 dBu analog, 0 dBFS digital
- Gain Control: -58 to +6 dB /mute
- AC-3 Pass-through (optional)
- Linear PCM audio (IRD-2800)

Data

- Low Speed Data:
- RS-232 up to 115.2 Kbaud, or
- RS-422 (optional) up to 2Mbps
- High Speed Data: RS-422 up to 20 Mbps

Transport Stream Outputs (options)

- 1st and 2nd ASI (optional): Copper, or Input stream with selected program decrypted
- 3rd ASI (optional): Copper or Optical ,Input stream or Loop-through

1.1.1.3. Conditional Access

DVB-Descrambling

- BISS Mode-1
- BISS-E
- CAS-5000

DVB-CI

- Interface: 2 CI slots – EN—50221
- CA Method: Multicrypt, Simulcrypt
- CAS: Irdeto[®], Viaccess[®], Cryptoworks[®], Conax[®], Aston[®], Nagravision[®], On Digital[®], CODICrypt[®], BetaCrypt[®], NDS VideoGuard[®].

1.1.1.4. Control And Monitoring

Local

- Extensive Front Panel Control
- Infrared remote control (optional)
- Up to 140 stored setups (optional for 340)
- Advanced satellite scanning
- Can operate in Service and in PID modes

General Purpose Indicator (GPI)

GPI dry contacts for various alarms and automatic redundancy features. Supports combination of the following alarm modes:

- Activated when hardware failure is identified (default alarm mode).
- Activated when Bit Stream warning is identified (i.e. input signal failure).
- Activated when Service Decoding warning is identified.
- Mode selection is manually activated, using the control protocol.

Over The Air

- Control and Software download

Remote

- PC via RS-232 or RS-485
- Software download
- SNMP proxy PC software (optional)

Enhanced DVB Monitoring

- Front panel display: Signal Quality, Eb/N0, BER, ASI format, Network and Service Information, CA information, CI slots, Video and Audio decoded information
- OSD: PSI tables, Receiver and Decoder status information

1.1.2. Applications

The IRD-2600 and IRD-2800 Integrated Receiver Decoders can be implemented in a wide range of applications. The following is a list of some of the typical uses for the IRD-2600 and IRD-2800:

- Satellite Receiving
- Cable Head-end Receiving
- Digital Satellite News Gathering (DSNG)
- Telecommunication, SDH or microwave
- Network / Professional Video Distribution
- Distance Learning
- Business TV
- Radio Reception
- DVB-CI Decryption for transport stream re-multiplexing
- Bilingual audio transmission

The following sub-paragraphs provides detailed description on various applications.

1.1.2.1. Broadcast Redistribution

The primary application of the IRD-2600 and IRD-2800 is reception and distribution of DVB broadcast signals for cable or local broadcasting.

1.1.2.2. Stand Alone Decoder

The IRD-2600 and IRD-2800 may be utilized without an input receiver as an online decoder for a DVB signal. This may be utilized for monitoring purposes within a broadcast center, for editing components of the DVB bit stream, and for redistribution of local line input such as prerecorded video programs.

1.1.2.3. Internal Corporate Distribution

A growing application for DVB redistribution is internal corporate training and communications. Both training and internal communications can greatly benefit from the decoding and redistribution of DVB signals originating from a central broadcast point within a company.

1.1.2.4. Data Transfer

The IRD-2600 and IRD-2800 can be implemented as a solution for remote locations requiring data links, where no proper line communications exist. In this role, the IRD-2600 and IRD-2800 decodes data from a DVB signal broadcast via satellite or other Telco interfaces.

One of the advanced features of the IRD-2600 and IRD-2800 is simultaneous high-speed and low-speed data transfer. Data transfer from the encoder is one directional. The IRD-2600 and IRD-2800 has no feedback, response, or acknowledgement capabilities.

Low Speed Data

The IRD-2600 and IRD-2800 enable Low Speed Data (LSD) transfer rates up to 115.2 Kbps over a serial RS-232 port. The LSD interface supports filtering of the data encapsulated in PES packets (stream types "0xBD"-private_stream_1 and "0xBF"-private_stream_2). In addition, data filtering level can be according DVB Asynchronous Data streaming (EN 301 192) which includes additional 3 bytes of header information in front of the data information.

The following filtering levels are provided:

- Entire Transport Packet
- Transport Payload (184 bytes if no adaptation field, else adaptation is also stripped).
- PES payload (PES header stripped).
- DVB streaming (PES header and 3 byte pes_data_packet header stripped).

High Speed Data

- a. The IRD-2600 and IRD-2800 enable High Speed Data (HSD) transfer rates up to 20 Mbps over a balanced RS-422 port. The high-speed transfer rates are limited by the maximum rate supported by the RS-422 interface and cable lengths.
- b. IRD HSD rates should be set slightly higher than those on the encoder (5% higher). Optimal rate is best determined by trial and error. Too low a rate yields increased bit errors. Conversely, too high a rate yields a stream that is too bursty. This is not a problem if the target equipment (usually a PC) has a large enough buffer to compensate for incidental burst size. To adapt the IRD-2600 and IRD-2800 to work with a variety of encoders, bit-order can be reversed.
- c. The following packetizing methods of data are provided:
 - Entire Transport Packet
 - Transport Payload (184 bytes if no adaptation field, else adaptation is also stripped).
 - PES payload (PES header stripped).

1.1.2.5. Descrambling

The IRD-2600 and IRD-2800 are equipped with internal DVB descrambler and two independent DVB-CI Common Interface slots.

The internal DVB Descrambler is usable for:

- Scopus CAS-5000 Encryption system (CODICrypt®).
- DSNG-CA (BISS) fixed Key Encryption system and BISS-E.

The DVB-CI decipheres encrypted signals from a DVB signal source, by means of an authorized Smart Card and a CA-specific CAM (Conditional Access Module).

The encryption standards supported by the IRD-2600 and IRD-2800 are:

- CA Method: Multicrypt, Simulcrypt
- CAS: Irdeto®, Viaccess®, Cryptoworks®, Conax®, Aston®, Nagravision®, On Digital®, CODICrypt®, BetaCrypt®, NDS VideoGuard®.

1.1.3. Product Line

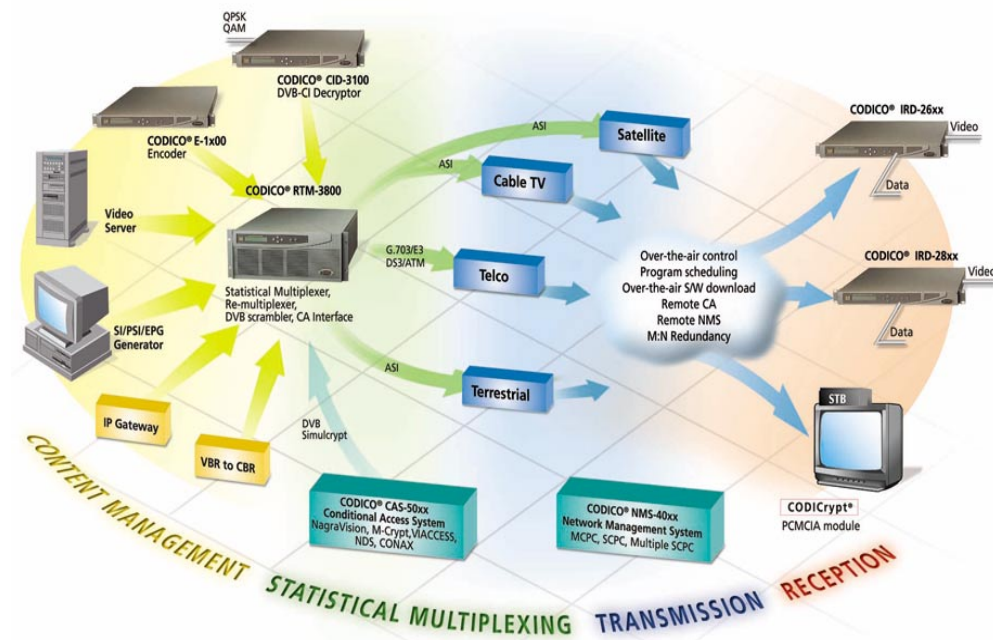
The IRD-2600 / IRD-2800 Integrated Receiver Decoders are an integral member of the advanced CODICO® product line. The CODICO® product family offers comprehensive solutions for both transmission sites and reception stations. In addition, it is the most cost-effective solution for TV broadcasting applications.

Table 1-1 lists the CODICO® product family and Figure 1-2 shows the integration of the product line in a DVB environment.

Table 1-1: CODICO® Product Family

PRODUCT	DESCRIPTION
E-900	Industrial Encoder
E-1000/E-1100	Professional Encoders
E-1500/E-1700	DSNG Encoders
IRD-25x0 Series	Professional Integrated Receiver Decoders
IRD-2600/IRD-2800	Advanced Professional Integrated Receiver Decoders
RTM-3800	DVB Multiplexer
RSW-7x00 Series	Redundancy Switches
MOD-7500	DSNG Modulator
NMS-4000	Complete Network Management System
CAS-5000	Conditional Access System
SM-3000	Statistical Multiplexing System
SI-3050	PSI/SI Generator Application
CID-3100	Common Interface Decryptor

Figure 1-2: CODICO® Integrated Product Line



1.2. Functional Description

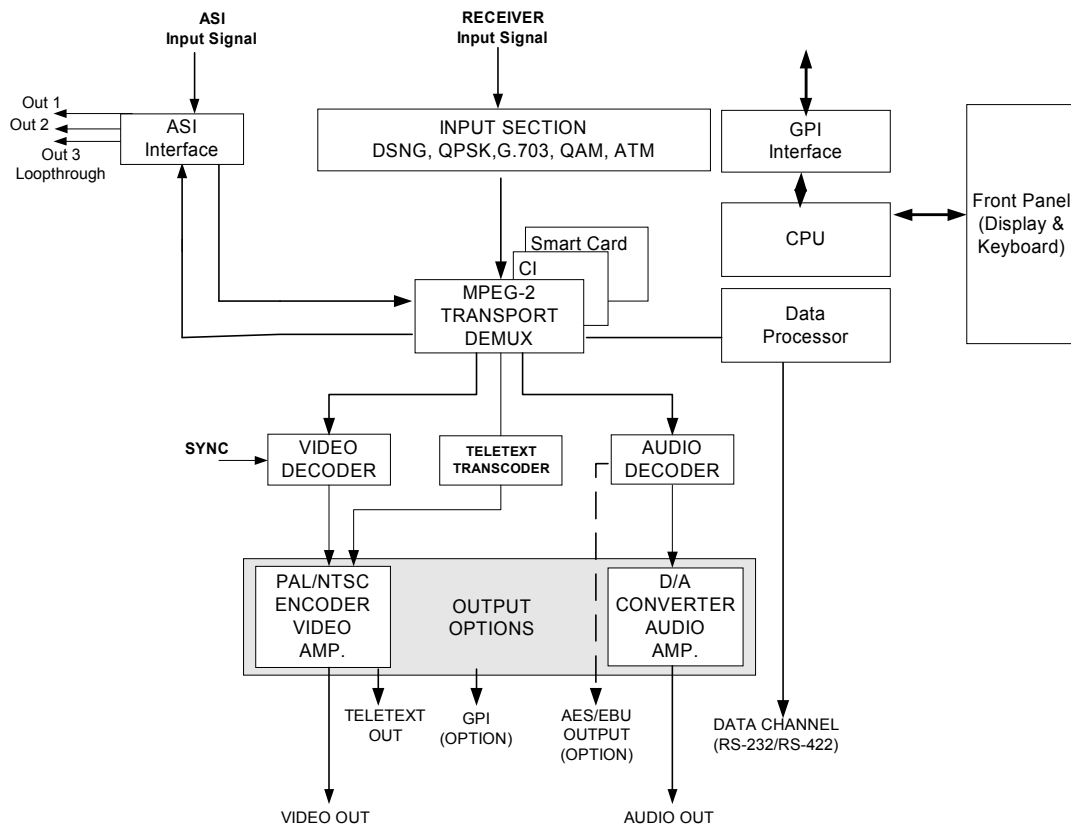
1.2.1. IRD-2600 and IRD-2800 Block Diagram

Input to the Receiver (QDSNG receiver, QPSK, QAM, G.703, DS3/ATM and STM-1/OC-3) is transferred to the de-multiplexer in the MPEG-2 Transport Demux. A video decoder and an audio decoder process the resulting video, audio and data streams.

The end output is modified to suit the required output formats according to the installed output modules.

A dedicated VBI programmable processor is assigned for providing various customers VBI requirements.

Figure 1-3: Signal Path in the IRD-2600 and IRD-2800



1.2.2. Basic Configuration

The IRD-2600 and IRD-2800 are delivered in a wide range of standard configurations, as described in paragraph 1.2.3 ahead. Paragraph 1.2.4 describes the add-on options available for the various configurations.

However, all IRD-2600 / IRD-2800 configurations provide the following basic features:

- Profile: 4:2:0 (4:2:2 for IRD-2800 only)
- 2 slots DVB-CI Common Interface
- Video formats: PAL B/G/M/N/D, NTSC, SECAM L/B/G/K1
- Transcoding of 625/50 video formats (PAL B/G to/from PAL N and SECAM) and of 525/60 video formats (PAL M to/from NTSC)
- Two Composite outputs; One S-VHS output
- Full DVB compliance, as well as special modes for interoperability with certain non-DVB IRDs
- Audio (1st channel): one stereo pair, balanced output via XLR connectors; volume adjustment.
- Data channel: High-Speed Data @ RS-422 and Low-Speed Data @ RS-232
- DVB descrambling, SimulCrypt Support, Scopus CAS-5000 descrambling, BISS DSNG-CA
- Over the air remote control; Over the air software upgrade
- Teletext, VBI (WSS, Close Caption, VPS, VITS, VITC, SMC), analog, over composite
- Selectable Audio/Video/Data combination mode OR Video-only OR Data-only OR Audio-only mode.
- Monitor and Control via RS-232 or RS-485 terminal (factory pre-set).
- Auto-save of last configuration after power off; 140 pre-programmed setups (optional: 340).
- Front panel control; Extensive Status indicators; Signal quality (Eb/N0), Video/Audio rate, CA information.
- RS-422 transport stream input

1.2.3. Receiver Front End Options

The IRD-2600 / IRD-2800 are delivered in various front-end configurations. The following defines the specific features of each configuration, in addition to the basic features described in paragraph 1.2.2 above.

a. DVB-S QPSK Receiver Front-End Option:

- QPSK receiver for full bandwidth (SCPC/MCPC) operation at agile 1-45 MSymbols/sec,
- L-BAND input and RF Loop-through

b. DVB-C QAM Receiver Front-End Option:

- 16/32/64/128/256 QAM receiver for SCPC & MCPC operation at agile 1 - 7 MSymbols/Sec
- VHF/UHF input and Loop-through.

c. Decoder Standard Unit (RS-422 input):

- For ASI Input, refer to options 104 and 105.

d. DVB-C G.703 Receiver Front-End Options:

- G.703 unframed input interface for SCPC & MCPC operation in telecom applications at E1, E2 or E3 rates
- With or without FEC and Loop-through.

e. DVB-PDH Framed DS3 or E3 Receiver Front-End Options:

- DS3 or E3 framed interface and Loop-through, (back to back ATM protocol, AAL1).

f. DVB-SDH STM-1/OC-3 Receiver Front-End Options:

- Optical Multimode or Single mode,
- STM-1/OC-3, SONET 155Mbps input (Max TS bitrate up to 60Mbps) interface, and
- Loop-through, (back to back ATM protocol, AAL1).

g. DVB-DSNG 8PSK, 16QAM and QPSK Receiver Front-End Option:

- 8PSK, 16QAM and QPSK receiver for full bandwidth (SCPC/MCPC) operation at agile 1-45 Msymbols/sec
- 2 x L-Band inputs (950-2150 MHz)

The IRD also supports an option of 2 inputs with loop through of the selected input, with automatic redundancy switching between inputs A & B, for the following input front end options: DVB-S, DVB-C, G.703, DVB-PDH.

Time between switching is controlled.

1.2.4. Configuration Options

Table 1-2 lists the configuration options available for the various IRD-2600/IRD-2800 Standard applications:

Table 1-2: IRD-2600 / IRD-2800 Configuration Options

OPTION	NAME	DESCRIPTION
OPT 002	ASI Out	Two BNC type ASI Output (provides full transport stream, with the selected service decrypted). When used with front-end input: Active Interface Conversion to ASI.
OPT 003	Russian Secam	Russian Secam, on the broadcast output only. (Built-in with OPT 006) Available only for IRD-2600.
OPT 004	Unbalanced 1st Stereo	Unbalanced Audio RCA on First Stereo Channel, instead of the XLR balanced output
OPT 005	AES/EBU, or AC-3 Pass through	OPT 005.1: AES/EBU (SP-DIF) for 1st stereo OPT 005.2: AC-3 Pass-through or AES/EBU, menu selectable NOTE <i>Default connector: Unbalanced BNC.</i> <i>Option connector: Balanced XLR connector.</i>
OPT 006	Monitoring Video Output	One broadcast and one monitoring output (OPT 006) Two identical video outputs (Default Configuration)
OPT 007	IR	Infra-red Remote Control
OPT 008	-48V DC	-48V DC power interface (Replacing the 110-230V AC)
OPT 101	SDI	2 x SDI with embedded audio and VBI (Embedded dual stereo when ordered with option 102)
OPT 102.1	2nd Stereo Analog	2nd Stereo: Analog Balanced over XLR
OPT 102.2	2nd Stereo Digital	2nd Stereo: AES/EBU(SP-DIF) over BNC
OPT 102.3	2nd Stereo Analog & Digital	2nd Stereo: Analog Balanced over XLR and AES/EBU (SP-DIF) over BNC
OPT 103.1	3rd Stereo Analog	3rd Stereo: Analog Balanced over XLR (IRD-2800 ONLY)
OPT 103.2	3rd Stereo Digital	3rd Stereo: AES/EBU(SP-DIF) over BNC (IRD-2800 ONLY)
OPT 103.3	3rd Stereo Analog & Digital	3rd Stereo: Analog Balanced over XLR and AES/EBU (SP-DIF) over BNC (IRD-2800 ONLY)
OPT 104	ASI In + Loop-through, BNC	ASI TS In + out (without decryption), Auto 188/204, BNC. ASI out provides Auto Active/Passive Loop-through. When used with front-end input: Active Interface Conversion to ASI.
OPT 105	ASI In + Loop-through, Optical	ASI TS In + out (without decryption), Auto 188/204, Optical. Active Loop-through. ASI out provides front-end input Conversion to ASI. NOTE Conflicts with Sync Lock
OPT 106	Sync Lock	Sync Lock and Loop-through

1.3. Mechanical Structure

1.3.1. Enclosure

The IRD-2600 and the IRD-2800 are housed in a ruggedized industrial enclosure, 1U by 19" (Rack Mount).

1.3.2. Front Panel

The front panel of the IRD-2600 and IRD-2800 allow control via a four-way touch pad, an Enter key, and an Escape key. Operational commands and parameters are displayed on an Alphanumeric LCD. The four-way touch pad allows scrolling through the menus of the embedded software and parameter modification (see Figure 1-4).

Figure 1-4: Front View of the IRD-2600/IRD-2800



1.3.3. Rear Panel

The rear panel of the IRD 2600 and IRD-2800 are comprised of three sections (see Figure 1-5):

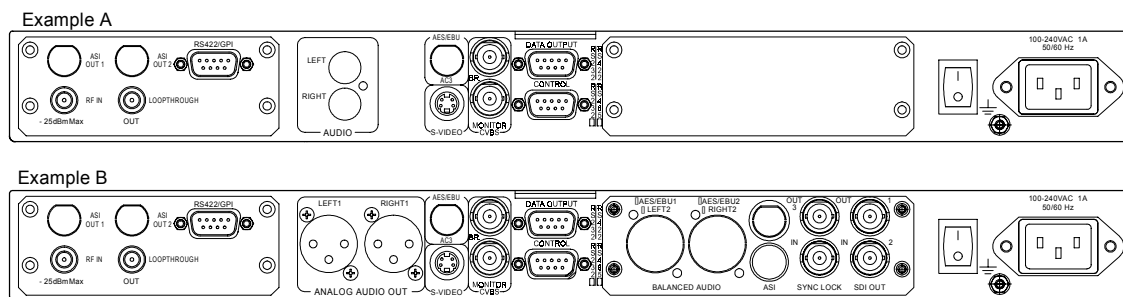
- Front-End Options section (left side of the rear panel)
- Decoder section (center)
- Option section (right side)

Left and right sections support various modules to enhance the versatility of the IRD-2600 and IRD-2800 in varied applications. They support input of Parallel DVB Transport Stream, Parallel TTL, DVB ASI, or RS-422 serial input. This option enables input directly to the Decoder where the signal source is digital or when input via a receiver is not required. Paragraph 1.3.4 shows and describes the various options provided.

The Decoder contains a demultiplexer, MPEG-2 video and audio decoders as well as a Teletext Transcoder module for Teletext output. The Decoder section on the rear panel is standard. However, digital and analog audio options are available.

Figure 1-5 shows two examples of IRD-2600 and IRD-2800 rear panel configurations. Example A shows the Decoder configured for output over RCA connectors. Example B shows the XLR alternative.

Figure 1-5: IRD-2600\IRD-2800 Rear Panel Section



1.3.4. Rear Panel Option Cards

Table 1-3 and Table 1-4 describe the various option cards available for the IRD-3600 and IRD-3800 Integrated Receiver Decoders.

Table 1-3: Rear Panel –Receiver Front End Option Cards

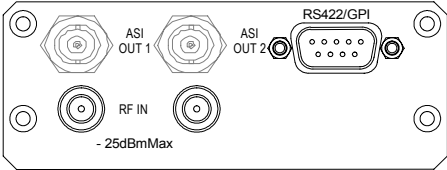
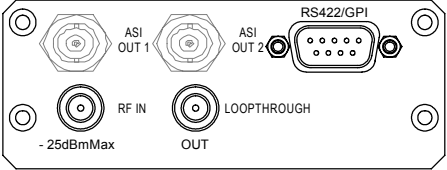
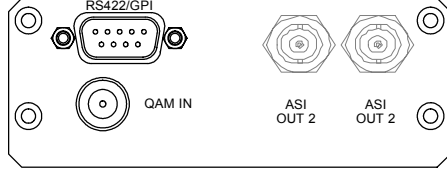
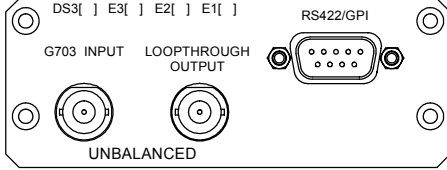
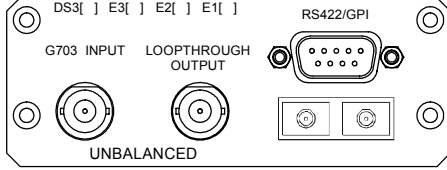
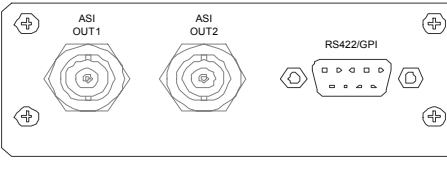

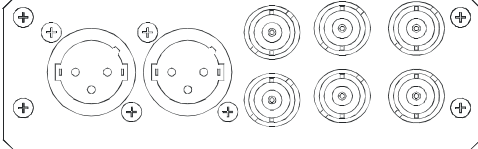
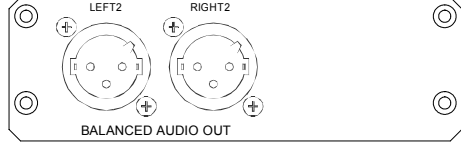
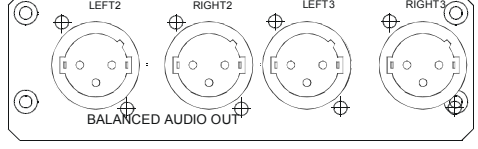
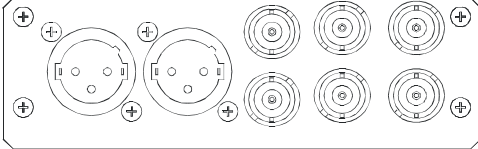
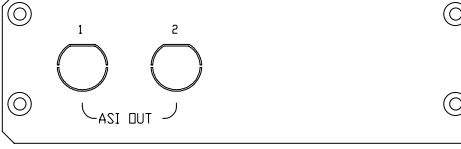
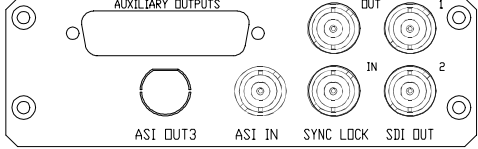
OPTION CARD	DESCRIPTION
	<p>DSNG RECEIVER FRONT-END Two input with two ASI outputs and RS-422/GPI interface connector.</p>
	<p>QPSK RECEIVER FRONT-END QPSK input and loopthrough output with two ASI outputs and RS-422/GPI interface connector.</p>
	<p>QAM RECEIVER FRONT-END QAM input with two ASI out and RS-422/GPI interface connector.</p>
	<p>G.703 RECEIVER FRONT-END G.703 input (BNC unbalanced) with loopthrough output and RS-422/GPI interface connector.</p>
	<p>ATM RECEIVER FRONT-END ATM input with two ASI output and RS-422/GPI interface connector.</p>
	<p>BASIC DECODER FRONT END 2 ASI Output Decrypted selected only when the CI is supplied. When used with front-end input can provide active interface conversion to ASI. In addition, provides RS-422/GPI interface connector.</p>

Table 1-4: IRD-2600/IRD-2800 Output Option

OPTION CARD	DESCRIPTION
	<p>BLANK OUTPUT PANEL This panel is supplied as default when no output option is ordered.</p>
	<p>Full With ASI In and OUT 3 Balanced Analog Audio over XLR or AES/EBU (SP-DIF) over XLR ASI IN + OUT Loopthrough Sync lock IN + OUT SDI OUT 1 + 2</p>
	<p>Balanced Analog Audio 2 Out over XLR</p>
	<p>Balanced Analog Audio 2 and 3 Out over XLR (Applicable Only for IRD-2800)</p>
	<p>Full With ASI OUT 1 + 2</p>
	<p>ASI OUT1 and OUT2 This option is supplied when the receiver option installed is the G.703 interface. The panel provides 2 ASI OUT via BNC connectors</p>
	<p>AUXILIARY</p>

1.4. Management

The IRD-2600 and IRD-2800 Integrated Receiver Decoder contain embedded software for control and configuration. The embedded software is accessible by the following interfaces:

- IRD-2600/IRD-2800 Front Panel
- Infrared Remote Control
- PC terminal
- NMS-4000 broadcast link via an external modem

In addition to the embedded software, prepared program scripts may be applied to the IRD-2600 and IRD-2800 via a PC terminal, or via the NMS-4000.

1.4.1. Front Panel Control

The IRD-2600 and IRD-2800 Front Panel provide a two line LCD display and a control keys. It enables the user to control and monitor the IRD-2600 and IRD-2800.

1.4.2. Infrared Remote Control

The infrared remote control device optionally supplied with the IRD-2600 and IRD-2800 enables arm chair control of the IRD-2600 and IRD-2800. The control keys are similar to those on the IRD-2600 and IRD-2800 Front Panel in order to provide a common interface and control syntax.

1.4.3. PC Terminal Control

The IRD-2600 and IRD-2800 may be controlled and configured from a standard PC terminal attached to the Control (RS-232 or RS-485) connector. The terminal provides access to control and monitor functions not available when using the IRD-2600 and IRD-2800 Front Panel or the infrared remote control.

1.4.4. NMS-4000 Control

The CODICO[®] NMS-4000 Network Management System enables management of the IRD-2600 and IRD-2800 via the Transmission Link.

The NMS-4000 provides a menu and dialog-driven interface from which control, modification, and upgrade operations can be performed on the IRD-2600 and IRD-2800.

1.5. Characteristics and Specifications

1.5.1. Receiver Input Specifications

The following tables summarize the features and specifications of the various receiver input options available for the IRD-2600 and the IRD-2800 Integrated Receiver Decoder:

- QPSK input option, see Table 1-5
- DNSG input option, see Table 1-6
- QAM input option, see Table 1-7
- G.703 input option, see Table 1-8

The decoder is able to receive the following, PDH and SDH, ATM input interfaces as specified in DVB standards; ETS 300813, for PDH and ETS 300814, for SDH.

The IRD also supports an option for 2 PDH Inputs with loop-trough of the selected input, with automatic redundancy switching between inputs A & B. Time between switching is controlled.

The specifications of these ATM protocol supporting front-end interfaces are described in Table 1-9 through Table 1-11.

Table 1-5: QPSK Input Features and Specifications

FEATURE	SPECIFICATION
L-Band input	950-2150 MHz
L-Band Loophrough output	950 – 2150 MHz ± 3dB
Input level	-65 to -25 dBm
Symbol Rate	1 - 45 Msymbols/sec continues
Symbol Rate acquisition range	± 70 ppm
Carrier acquisition range	± 1/4 Symbol Rate
BER (Quasi Error Free after Reed Solomon)	2 x 10 ⁻⁴ for Eb/No = 5.5 dB, after Viterbi 3/4
Viterbi Decoding Rates	1/2, 2/3, 3/4, 4/5, 5/6, 7/8, 8/9
Viterbi Constraint Rate	7
Viterbi Rate Recovery	Automatic
Reed Solomon decoding	204, 188,
De-interleaving	Yes
Digital AGC	Yes
LNB Control Voltage:	Off, 14V, 18V, (350 mA maximum)
Polarization	22 kHz/Off
Spectral Inversion	Automatic

Table 1-6: DSNG Input Features and Specifications

FEATURE	SPECIFICATION
Modulation and coding schemes: QPSK, FEC rate 8PSK, FEC rate 16QAM, FEC rate	1/2, 2/3, 3/4, 5/6, 7/8. 2/3, 5/6, 8/9. 3/4, 7/8.
Automatic modulation scheme recovery	
Symbol Rate	$1 \leq R_s \leq 45$ Mbaud
Half Nyquist filter roll-off	25% and 35%
L-band inputs (950–2150 MHz)	2
Signal level density Co	-130 to -105 dBm/Hz.
Signal level	$C_o + 10\text{Log}(\text{Sat. baud rate})$ (dBm).
Total input power	-25 dBm max
Clock acquisition range	± 200 ppm
carrier acquisition range	± 3 Mhz
Automatic FEC rate recovery	
Spectral inversion ambiguity resolution	Automatic
LNB power generation	Off, 13 or 18 Vdc, 350 mA max, 22Khz, single tone burst and Diseqc 1.0 message, and Diseqc 2.0 compatible

Table 1-7: QAM Input Features and Specifications

FEATURE	SPECIFICATION
QAM constellation	16/32/64/128/256 QAM
Input Level	40 to 85 dB μ V
VHF/UHF input	50.5 to 858 MHz
Noise Figure	8 to 13 dB
Input impedance	75 Ω (BNC)
Symbol Rate	1 to 7 Mbaud
Roll-off	15%
Additional Features	Digital Automatic Gain Control Half Nyquist Filtering Blind equalization Digital carrier recovery

Table 1-8: Telecom (G.703) Input Features and Specifications

FEATURE	SPECIFICATION
Input Impedance	75 Ω
Bit Rate	Unframed E1 (2.048 Mbps), E2 (8.448 Mbps) and E3 (34.368 Mbps)
G.703 Loop Through Output	For cascading multiple IRD units. Loophrough Output Mask according to G.703 recommendation
De-Interleaving	17/12 (*)
Reed-Solomon Decoding	204, 188, 8 (*)
Input/Output Connectors	E1 balanced (male 9 Pin D-Type) E1 unbalanced (female BNC) E2, E3 unbalanced (female BNC)
Additional Features	DVB Descrambler (*) HDB-3 Line code Switchable FEC (Forward Error Correction)

* The FEC includes Interleave, Reed-Solomon Decoder (188, 216) and Descrambler; in accordance with the DVB standard for Cables (ETS 300 429), which can be switched On/Off.

Table 1-9: PDH 34Mbit/s input [E3]

Feature	Specification
E3 Framed	34.368Mbit/s
Frame:	G.832
ATM adaptation layer:	AAL1
Error correction:	RS(124,128) with Interleaving matrix
Connector:	BNC female, 75 Ω
Loop-through output	Available

Table 1-10: PDH 45Mbit/s input [DS3]

Feature	Specification
DS3	44.736Mbit/s
Frame:	ETS 300813
ATM adaptation layer:	AAL1
Error correction:	RS(124,128) with Interleaving matrix
Connector:	BNC female, 75 Ω
Max MPEG TS bit rate:	37.9 Mbit/s
Loop-through output:	Available

**Table 1-11: SONET/SDH 155Mbit/s input
(In accordance with ETS 300 814)**

Feature	Specification
STM-1	155.52Mbit/s (up to 60 Mbps for the selected TS)
Description:	Single-mode/Multi-mode optical interface
Frame:	STM-1/OC-3
Connectors:	Duplex SC fiber optic
Wavelength:	1300 nm
Max selected TS bit rate	Up to 60 Mbps
Loop-through output:	Available

1.5.2. Output Specifications

Table 1-12 and Table 1-13 summarize the features and specifications of the IRD-2600 and the IRD-2800 Video and Audio outputs, respectively.

Table 1-12: Video Decoder Output Features and Specifications

FEATURE	SPECIFICATION																					
MPEG-2 standard	Main Level at Professional Profile, and Main Level at Main Profile																					
Standards decoded	MPEG-1, MPEG-2																					
Decoded Output Resolution	<ul style="list-style-type: none"> • 720 by 480 at 30 Hz (NTSC) • 720 by 576 at 25 Hz (PAL) 																					
Encoded Input Resolution of the IRD-2600	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">[Horizontal]</th> <th style="text-align: center;">by [Vertical]</th> <th style="text-align: right;">at [Frequency]</th> </tr> </thead> <tbody> <tr> <td>720, 704, 640, 544, 528, 480, 352, 320</td> <td style="text-align: center;">480</td> <td style="text-align: right;">30 Hz</td> </tr> <tr> <td>720, 704, 640, 544, 528, 480, 352, 320</td> <td style="text-align: center;">480</td> <td style="text-align: right;">24 Hz</td> </tr> <tr> <td>352</td> <td style="text-align: center;">240</td> <td style="text-align: right;">30 Hz</td> </tr> <tr> <td>384, 352</td> <td style="text-align: center;">240</td> <td style="text-align: right;">24 Hz</td> </tr> <tr> <td>720, 704, 640, 544, 528, 480, 352</td> <td style="text-align: center;">576</td> <td style="text-align: right;">25 Hz</td> </tr> <tr> <td>720, 704, 640, 544, 528, 480, 352</td> <td style="text-align: center;">288</td> <td style="text-align: right;">25 Hz</td> </tr> </tbody> </table>	[Horizontal]	by [Vertical]	at [Frequency]	720, 704, 640, 544, 528, 480, 352, 320	480	30 Hz	720, 704, 640, 544, 528, 480, 352, 320	480	24 Hz	352	240	30 Hz	384, 352	240	24 Hz	720, 704, 640, 544, 528, 480, 352	576	25 Hz	720, 704, 640, 544, 528, 480, 352	288	25 Hz
[Horizontal]	by [Vertical]	at [Frequency]																				
720, 704, 640, 544, 528, 480, 352, 320	480	30 Hz																				
720, 704, 640, 544, 528, 480, 352, 320	480	24 Hz																				
352	240	30 Hz																				
384, 352	240	24 Hz																				
720, 704, 640, 544, 528, 480, 352	576	25 Hz																				
720, 704, 640, 544, 528, 480, 352	288	25 Hz																				

Table 1-12: Video Decoder Output Features and Specifications

FEATURE	SPECIFICATION
Encoded Input Resolution of the IRD-2800	[Horizontal] by [Vertical] at [Frequency] 720, 704, 544, 480, 352 480 30 Hz 352 240 30 Hz 720, 704, 544, 480, 352 576 25 Hz 352 288 25 Hz <u>4:2:2 Mode Only</u> 720 512 30 Hz 720 608 25 Hz
Video Encoder	27 MHz with 10 bits resolution DAC (8 bits input)
Video formats decoded	NTSC / PAL / SECAM standards and sub-standards
Video formats selection	Automatic selection for NTSC / PAL
Standard Outputs	2 Composite Video outputs S-Video (Y/C) output

Table 1-13: Audio Output Features and Specifications

FEATURE	SPECIFICATION
Quality	CD Quality 16 bit delta – sigma DAC
Sample rates	48 KHz, 44.1 KHz, 32 KHz, 24 KHz, 22.05 KHz, 16 KHz
Decoding Levels	<ul style="list-style-type: none"> • MPEG-2 Stereo • MPEG-1 layer I and II • AC-3 Dolby Digital Surround[®] pass-through • Linear Audio on digital output (IRD-2800 Only)
Audio 1 Channel	<ul style="list-style-type: none"> • Balanced Stereo • Unbalanced Mono/Stereo (option) • AES/EBU (SP-DIF, option)
Audio 2 Channel (option)	<ul style="list-style-type: none"> • Balanced Stereo (option) • AES/EBU (SP-DIF, option)
Audio 3 Channel (option) ONLY for IRD-2800	<ul style="list-style-type: none"> • Balanced Stereo (option) • AES/EBU (SP-DIF, option)

1.5.3. Control Ports Specifications

The IRD provides connections for terminal control on the IRD over RS-232 interface or RS-485 Interface. Table 1-14 details the interface specifications.

Table 1-14: RS-232 Interface Specifications

PARAMETER	SETTING
Protocol	XON/XOFF
Baud Rate	9600, 19200, 38400, 57600, 115200
Data Bits	8
Parity	N (None)
Stop Bits	2
Terminal Emulation	ANSI/VT-100

1.5.4. Physical Features and Specifications

Table 1-15 summarizes the physical features and specifications of the IRD-2600 and IRD-2800. Table 1-16 summarizes the electrical supply and consumption specifications of the IRD-2600 and the IRD-2800, in both options, AC and DC supply.

Table 1-15: Physical Specifications

PARAMETER	SPECIFICATION
Dimensions	1U 4.4 x 48.2 x 30.2cm (1.75" x 19" x 11.9")
Weight	2.5 Kg
Operating Temperature	-0°C ÷ +50°C
Operating Humidity	5% ÷ 85% (Non-condensing)
Storage and Transport Temperature	-40° ÷ 70°C NOTE <i>before operation after transportation of the equipment below 00C, wait for 12 Hours at room temperature.</i>
Storage and Transport Humidity	0% ÷ 95% (Non-condensing)

Table 1-16: Electrical Specifications

PARAMETER	SPECIFICATION
AC Mains Supply	
Power Source	100 - 240 V AC, 50/60 Hz
Power Consumption	50 W max. (all options)
-48V DC Supply	
Supply voltage:	36VDC min. - 72VDC max.
Power consumption:	1 Amp. max

2. INSTALLATION

2.1. Introduction

This chapter describes the procedures required for installation of the CODICO® IRD-2600 and IRD-2800 family of Integrated Receiver Decoders.

The scope of the procedures found in this manual include: site preparation and requirements, installation in a 19" rack, cable connections, panel options and pin-out descriptions, initial settings, serviceability check, and multiple unit connections. This manual also describes the inter-connection of multiple IRD devices in order to facilitate system expansion.

2.1.1. Safety Precautions

To avoid injury and prevent equipment damage, observe the following safety precautions:

Do not move or ship equipment unless it is properly packed in its original wrapping and shipping containers.

Equipment service and maintenance should be undertaken only by Scopus trained personnel.

To prevent damage by lightning, ground the unit according to local regulations.

Do not permit unqualified personnel to operate the unit.

2.1.2. Inventory Check

Before installing the unit, ensure that all the equipment has arrived. Check the parts received with the IRD unit for damage according to the following list:

ITEM	QUANTITY
IRD-2600 or IRD-2800 Integrated Receiver Decoder	1
Power Cable	1
IRD-2600 / IRD-2800 Integrated Receiver Decoder User Manual	1

CAUTION

If anything is missing or damaged, do not continue with the installation. Refer to the "TECHNICAL SUPPORT" procedures in the front of this manual for Scopus support.

2.2. Site Preparation

NOTE

If the IRD is to be installed in a standard 19" rack, make sure the rack fully prepared for the installation.

The IRD should be installed within 1.5m (5 feet) from an easily accessible grounded AC outlet, capable of furnishing the required supply voltage as detailed below:

The use of an UPS (Uninterrupted Power Supply) and an AVR (Automated Voltage Regulation) is highly recommended to ensure proper operation of the IRD.

Ensure that a qualified electrician has installed the mains power supply in accordance with power authority regulations

All powering should be wired with an earth leakage in accordance with local regulation. In any rack installation, ensure that the rack has been properly grounded.

2.3. Installation

2.3.1. Installation in 19" Rack

To prepare the IRD for rack installation:

- a. The rack adapter kit includes two mounting brackets. The brackets are fastened with screws to the sides of the IRD housing.
- b. Attach each bracket by inserting two screws, with flat washers, in the two front holes at the sides of the housing. Nuts are already in place on the inner side of the holes.
- c. After attaching the brackets, the unit is ready for installation in the rack.
- d. Fasten the brackets to the side rails of the rack with four screws (not included in the kit), two per side.

Several IRD devices may be installed in a standard 19" rack, one above the other.

Please ensure that proper grounding is provided for the rack assembly to prevent potential electrical problems in the devices mounted on the rack. See paragraph 2.4.5.1 for more details on grounding the IRD to a rack mount.

NOTE

To facilitate easy access during installation and maintenance, leave sufficient space behind the rack.

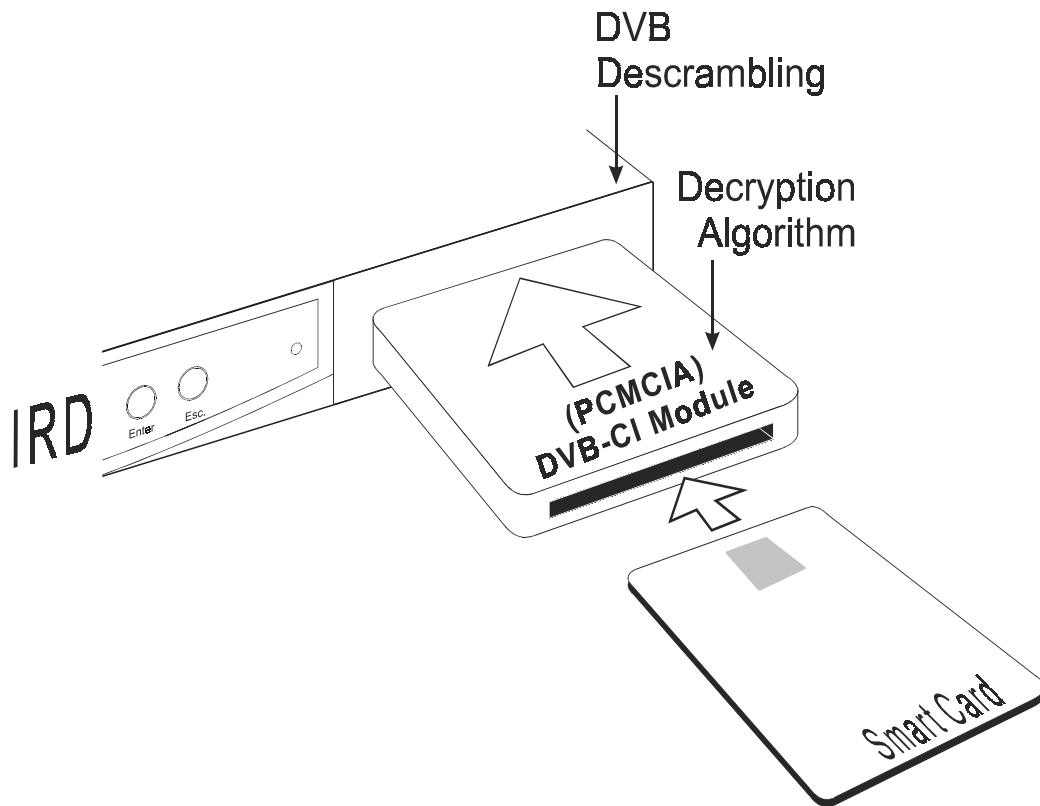
2.3.2. Insertion of the DVB-CI Module (PCMCIA)

Figure 2-1 shows the IRD with DVB-CI Module (PCMCIA card) and the Smart Card used to decrypt the incoming signal. The IRD is provided with two PCMCIA slots for up to two DVB-CI Modules. The PCMCIA should be firmly inserted in to the two slots provided to ensure contact. Each DVB-CI Module accommodates one Smart card, inserted with the UP mark pointing up and forward.

WARNING

DO NOT ATTEMPT TO REMOVE OR INSERT THE DVB-CI MODULE OR THE SMART CARD WHILE THE IRD IS POWERED ON OR INIALIZING.

Figure 2-1: DVB-CI Module and Smart Card Insertion



2.4. Cable Connections

2.4.1. IRD-2600 and IRD-2800 Connection Setup and Options

This section describes the cable connections for ground, power, and interface cables connected to the rear panel of the IRD-2600 and IRD-2800 Integrated Receiver Decoders.

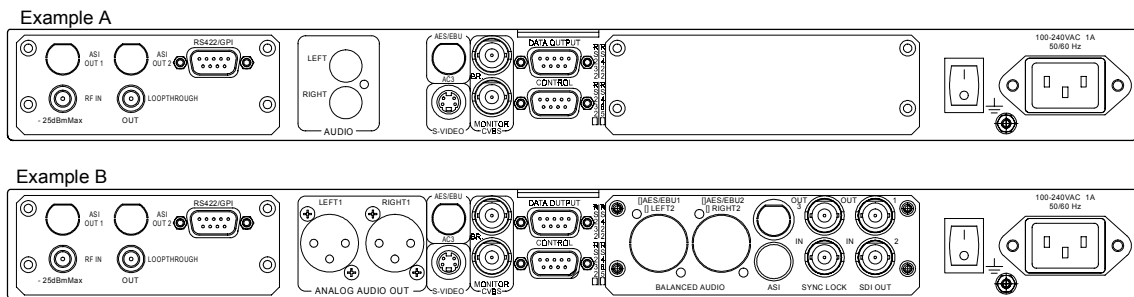
The IRD-2600 or the IRD-2800 are ordered with a specific configuration to suit the requirements of a specific application. It should therefore not be assumed that any two IRDs are identical both on a hardware and software level. To accommodate such flexibility, the IRD is designed with a high degree of modularity and is assembled in the factory with the customer-selected options.

The rear panel can be logically divided into three sections: Left (Receiver), Center (Decoder) and Right (Output). The left and right sections are comprised of option cards. The functionality of the available options is described in paragraph 1.2.4, Configuration Options. The left section provides front-end connectors for the receiver option installed in the IRD. The center (Decoder) section is a standard feature for digital and analog audio options. Right section provides the selected outputs of the IRD.

Figure 2-2 shows two examples of IRD rear panel configurations. Example A shows the Decoder configured for output over RCA connectors. Example B shows the XLR alternative.

The following sub-paragraphs detail the pin-assignment of the connectors on the IRD Rear Panel.

Figure 2-2: IRD-2600 and IRD-2800 Rear Panel Configurations



2.4.2. Front End Panels

All front-end panels provide an RS-422/GPI connector for the input transport stream to the IRD. Table 2-1 describes the functionality of the signals available on the connector.

Table 2-1: RS-422 Serial Input/GPI Pin Out Designations

PIN	DESIGNATION	PIN	DESIGNATION
1	Clock Return (-)	6	GPI 1- NO (option)
2	Clock (+)	7	GPI 1-NC (option)
3	Data Return (-)	8	N/C
4	Data (+)	9	N/C
5	GPI 1-Common (option)		

2.4.3. Decoder Cable Connections

The Decoder section of the IRD is comprised of Audio outputs, Video outputs, Data output, and a Control connection (See Table 2-2 for the Decoder cables).

Table 2-2: Cables and Connectors for Decoder Section

INTERFACE	CONNECTOR TYPE	CABLE TYPE
Analog Audio Out left	RCA (unbalanced) XLR (balanced)	Shielded Audio Cable
Analog Audio Out right/mono	RCA (unbalanced) XLR (balanced)	Shielded Audio Cable
Video Out, S-Video Y/C	75 Ω DIN connector	Super Video Cable
Composite Video Out, CVBS1	BNC	RG-59
Composite Video Out, CVBS2	BNC	RG-59
Data Output (RS-232/RS-422)	9 PIN D-Type	Serial Cable
Control (RS-232/RS-485)	9 PIN D-Type	Serial Cable

2.4.4. Terminal Control and Data Connections

The IRD supports terminal control from a standard PC via a Serial RS-232 or RS-485 cable. Table 2-3 and Table 2-4 detail the pin-to-pin and signal assignment of the RS-232 and RS-485 cables, respectively.

Table 2-5 details the pin designations for Data output (RS-422 and RS-232). These two data flow protocols can be simultaneously enabled over the connector interface.

Table 2-3. RS-232 Control Cable Pin-to-Pin

9 PIN D-TYPE CONNECTOR (PC)	25 PIN D-TYPE CONNECTOR (PC)	9 PIN D-TYPE CONNECTOR (IRD)	SIGNAL DESCRIPTION
2	3	3	PC-RxD
3	2	2	PC-TxD
5	7	5	GND

Table 2-4: RS-485 Control Cable Pin-to-Pin Designations

PC RS-485 9 PIN D-TYPE CONNECTOR		IRD 9 PIN D-TYPE CONNECTOR	
PIN	DESIGNATIONS	PIN	DESIGNATION
1	RB	1	TX +
6	RA	6	TX -
8	TB	8	RX +
9	TA	9	RX -

Table 2-5: RS-422/RS-232 Data Output Pin Out Designations

PIN	DESIGNATION	PIN	DESIGNATION
1	RS-422 Clock Return	6	RS-422 Clock
2	RS-232 RxD	7	RS-422 Data Return
3	RS-232 TxD	8	RS-422 Data
4	Manufacturer Test Point	9	Manufacturer Test Point
5	Ground		

2.4.5. Power Connection

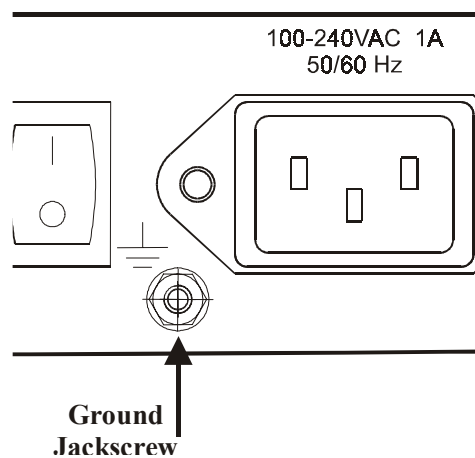
2.4.5.1. Ground Connection

Ground connection to the IRD is made by connecting an AC power cable to the IRD AC connector. If the IRD is fitted with a -48V DC power supply please follow the instruction provided under paragraph 2.4.5.3 below.

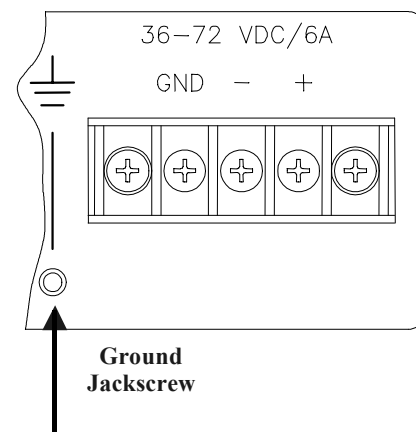
When the IRD is rack mounted, the jackscrew (shown in Figure 2-3) must be connected to the rack housing, which in turn, should be properly grounded.

Figure 2-3: IRD Jack Screw Ground Connection

AC Power Supply Configuration



DC Power Supply Configuration



2.4.5.2. AC Power Connector

Connect the AC power cable to the IRD power connector at the rear of the unit. (see Figure 2-3) Connect the other end to the AC power source.

2.4.5.3. DC Power Connector

In some cases the IRD is fitted with a -48V DC Power Supply as shown Figure 2-3 (DC Power Configuration). When this is the case please connect the power source as described below.

To connect the -48V Power Supply:

- Connect a (+) 48V DC source wire to the (+) contact on the power terminal board.
- Connect a (-) 48V DC source wire to the (-) contact on the power terminal board.
- Connect Grounding point wire to the (GND) contact on the power terminal board.

2.5. System Expansion

This section provides instructions for system expansion through inter-connection of multiple IRD-2600 and IRD-2800 Integrated Receiver Decoder units by daisy chaining the units.. It is assumed that all IRD units are configured and operational.

The IRD supports two Loophrough methods:

- Cascade Loophrough Output from the Receiver Input (see paragraph 2.5.1).
- ASI Interface Loophrough (see paragraph 2.5.2).

2.5.1. Cascade Loophrough Output

Connect the input signal to the first IRD receiver input. Cascade remaining units as shown in Figure 2-4 or for G.703 as shown in Figure 2-5.

Figure 2-4: IRD Cascade with RF Receiver Loophrough

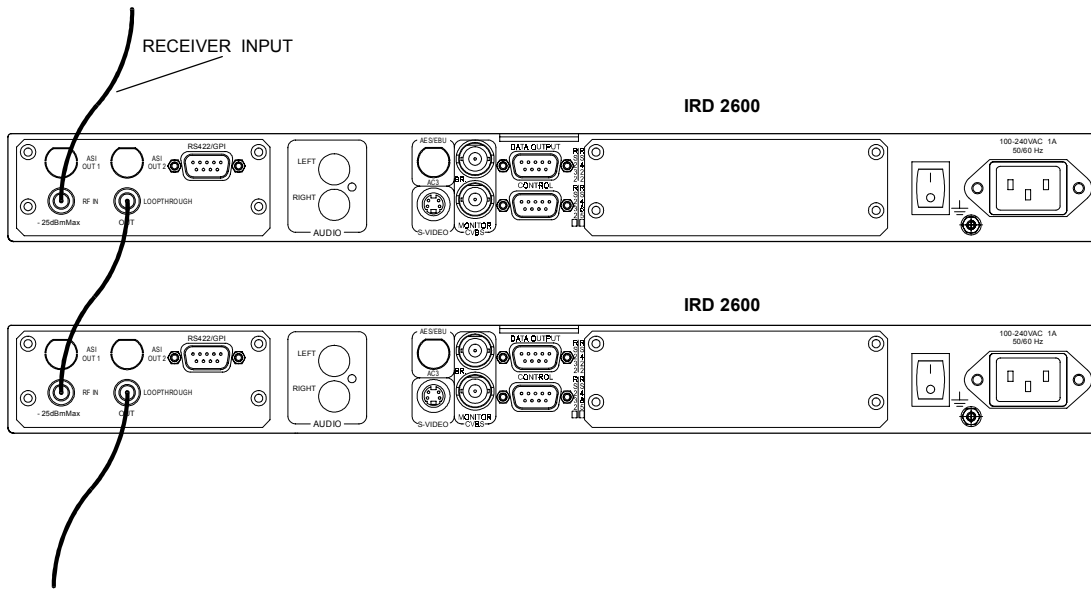
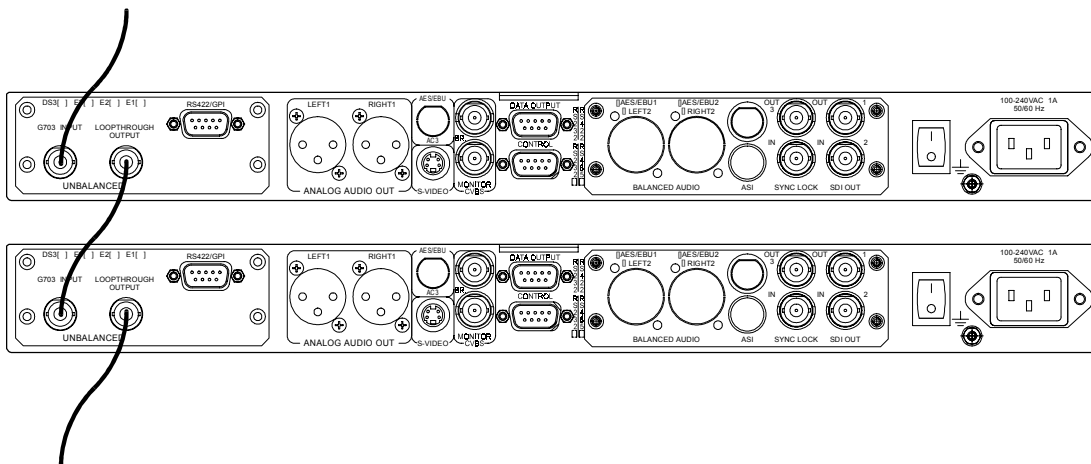


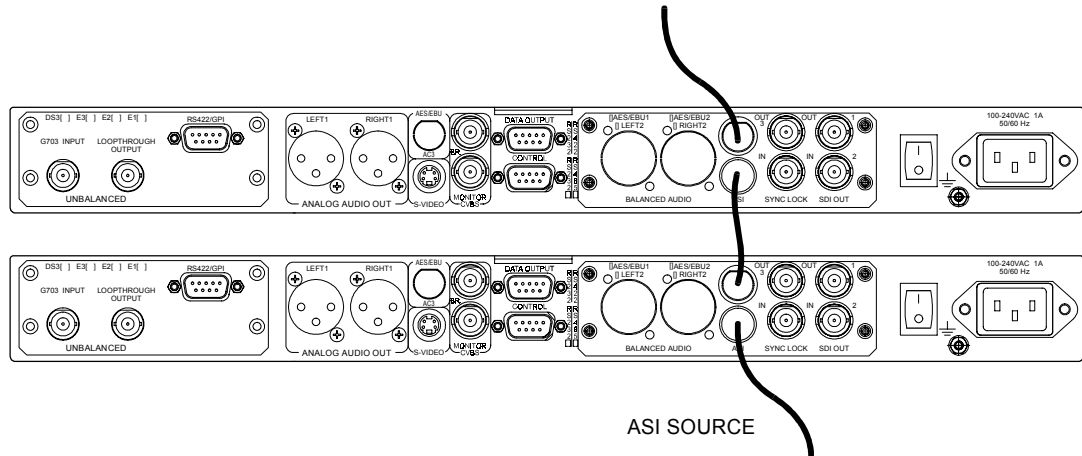
Figure 2-5: IRD Cascade with G.703 Receiver Loophrough



2.5.2. ASI Loophrough Cascade

Connect the input signal to the bottom IRD ASI input (BNC). Cascade the remaining units as shown in Figure 2-6.

Figure 2-6: IRD Cascade with ASI Loophrough

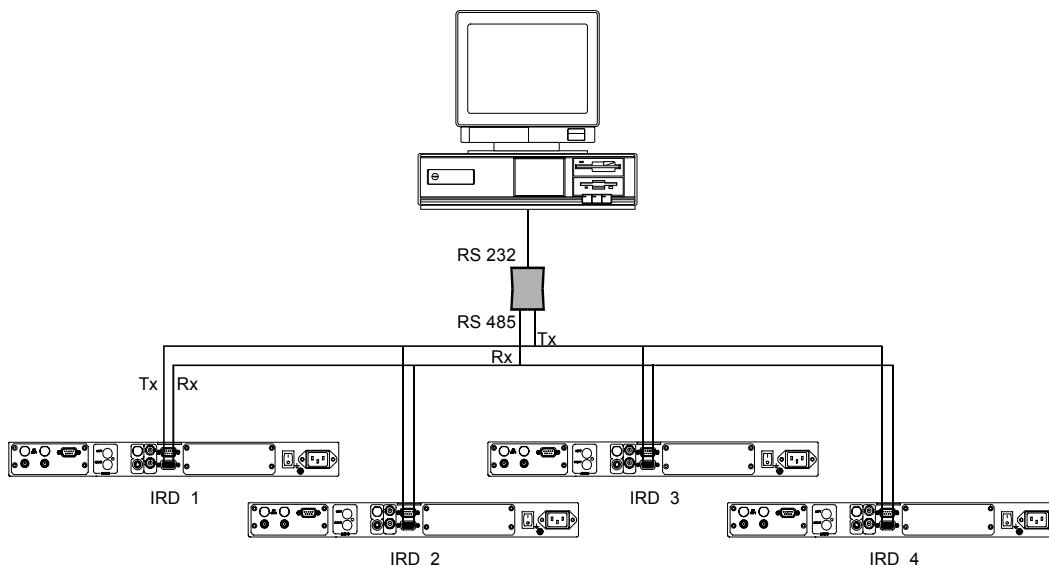


2.5.3. RS-485 Master-Slave Connection

Multiple IRD devices can be managed from a single terminal control station using a Master Slave configuration as shown in Figure 2-7. As shown the Master-Slave configuration uses a RS-232 to RS-485 converter. The converter is connected to a bus, which is in turn connected to the IRD devices. The bus is comprised from transmit (Tx) and receive (Rx) route. Each IRD device is identified on the bus by a unique address. All IRDs on the bus will receive Tx and Rx messages, only the IRD with the matching address will respond to the command of the Terminal.

Operation instructions for the Master-Slave Terminal Control Protocol can be found in the IRD-2600/2800 Master-Slave Operation Guide.

Figure 2-7: Master-Slave RS-485 Control Cable Configuration



2.6. Initialization And Configuration

Prior to powering up the IRD-2600 or IRD-2800 Integrated Receiver Decoder, ensure that all cabling is correctly connected as explained in Section 2.4. Ensure that the unit is connected to the mains power supply and grounded according to instructions.

2.6.1. Powering Up

Upon power up, you will hear the internal fan commence operation and see the front panel LCD display activated.

2.6.2. Initialization Sequence

Once the IRD is powered, the unit commences an initialization phase. IRD Initialization of the IRD includes loading of the embedded system parameters.

The IRD supports QPSK, QAM, G.703, ASI, RS-422, DVB-PDH and DVB-SPI (optional) inputs. Depending on the selected input, initialization sequences will differ. The initialization sequence may be monitored via the Front Panel LCD. Status Messages are detailed in the IRD Operation Guide.

The initialization sequence is detailed in Table 2-6. Prior to initialization, review the IRD Operation Guide for instructions on how to use and navigate the system menus, and for explanation of configuration parameters.

Table 2-6: IRD-2600 / IRD-2800 Initialization Sequence

SEQ. #	OPERATION	DESCRIPTION
a.	MPEG-DVB IRD – Initializing Please Wait	On initialization, the LCD displays the initialization message.
b.	PASSWORD	If a password is defined for system access the enter password prompt is displayed. If a password is not set the system will proceed directly to point three.
c.	WARNING! <Warning or Status Message>	WARNING! is displayed, with a message. This message is normal on first time initialization. See IRD Operation Guide “Status Messages” for list and definition of messages. If the word FAULT! appears, a hardware malfunction is indicated. Contact the manufacturer for further instructions.
d.	CONFIG STATUS TEST RUN	Go to System Menu. Select the TEST option.
e.	TEST ALL O.K.! SERVICE: INTERNAL TEST	For instructions on performing tests, refer to Section 2.6.3 Serviceability. A successful test result is displayed on the LCD as ALL O.K.! Return the Test mode to NONE position to ensure that the IRD returns to normal operation. Return to the root menu.
f.	CONFIG STATUS TEST RUN	Select the CONFIG option. To proceed with configuration as required.

For DSNG Front/End Receiver to the IRD-2600 / IRD-2800, proceed with Table 2-7.

For QPSK Front/End Receiver to the IRD-2600 / IRD-2800, proceed with Table 2-8.

For QAM Front/End Receiver to the IRD-2600 / IRD-2800, proceed with Table 2-9.

Refer to chapter 3: Operation for instructions on all other input types as well as for Decoder Only operation, configuration and/or changing the device Product Type.

Table 2-7: DSNG Receiver Configuration Procedure

SEQ. #	PARAMETER SET	PROCEDURE INSTRUCTIONS
a.	RECEIVER CONFIGURATION Function Start.	The CONFIG sub menu is displayed. Select the RECEIVER option and proceed to configure as described below.
b.	Frequency Range Parameter	1. Select Frequency Range option. 2. Set the frequency according to the BAND input.
c.	LNB Power Supply Parameter	3. Select LNB Power Supply option. 4. Set the LNB Power Supply to: 14, 18 or OFF as required
d.	LNB 22 kHz Parameter	5. Select LNB 22 kHz option. 6. Using the controls, set the option to ON or OFF as required
e.	Input Signal Source Parameter	7. Select Input Signal Source option. 8. Set to A input.
f.	Symbol Rate Parameter	9. Select Symbol Rate option. 10. Set the Symbol Rate as required.
g.	Modulation Mode Parameter	11. Select Modulation Rate option. 12. Set to AUTOMATIC.
h.	Nyquist Filter Roll-Off Parameter	13. Select Nyquist Filter Roll-Off option. 14. Set to AUTOMATIC.
i.	Viterbi Rate Parameter	15. Select Viterbi Rate option. 16. Set to: 1/2, 2/3, 3/4, 4/5, 5/6, 6/7, 7/8, 8/9, or AUTOMATIC as required.
j.	Spectral Inversion Parameter	17. Select Spectral Inversion option. 18. Set the option to AUTOMATIC, NORMAL, or INVERTED as required.

Table 2-8: QPSK Receiver Configuration Procedure

SEQ. #	MENU DISPLAY MESSAGE	PROCEDURE
a.	RECEIVER CONFIGURATION Function Start.	The CONFIG sub menu is displayed. Select the RECEIVER option and proceed to configure as described below.
b.	Frequency Range Parameter	1. Select Frequency Range option. 2. Set the frequency according to the BAND input.
c.	LNB Power Supply Parameter	3. Select LNB Power Supply option. 4. Set the LNB Power Supply to: 14, 18 or OFF as required
d.	LNB 22 kHz Parameter	5. Select LNB 22 kHz option. 6. Using the controls, set the option to ON or OFF as required
e.	Symbol Rate Parameter	7. Select Symbol Rate option. 8. Set the Symbol Rate as required.
f.	Viterbi Rate Parameter	9. Select Viterbi Rate option. 10. Set to: 1/2, 2/3, 3/4, 4/5, 5/6, 6/7, 7/8, 8/9, or AUTOMATIC as required.
g.	Spectral Inversion Parameter	11. Select Spectral Inversion option. 12. Set the option to AUTOMATIC, NORMAL, or INVERTED as required.

Table 2-9: QAM Receiver Configuration Procedure

SEQ. #	MENU DISPLAY MESSAGE	PROCEDURE
a.	RECEIVER CONFIGURATION Function Start.	The CONFIG sub menu is displayed. Select the RECEIVER option and proceed to configure as described below.
b.	VHF/UHF Frequency Configuration Option	1. Select VHF/UHF Frequency option. 2. Set the required input frequency.
c.	Symbol Rate Parameter	3. Select Symbol Rate option. 4. Set the symbol rate as required.
d.	Viterbi Rate Parameter	5. Select Viterbi Rate option.
e.	Modulation Mode Parameter	6. Set the QAM mode to: 16 QAM, 32 QAM, 64 QAM, 128 QAM, or 256 QAM, as required.
f.	Spectral Inversion Parameter	7. Select Spectral Inversion option. 8. Set the option to AUTOMATIC, NORMAL, or INVERTED as required.

2.6.3. Serviceability Check

After performing any installation, initialization, or configuration to the IRD-2600 or IRD-2800 Integrated Receiver Decoder, maintenance checks should be performed to ensure that the unit is serviceable.

A Video Monitor must be connected to the IRD-2600 in order to perform the check.

Table 2-10 provides a systematic instruction for performing a serviceability check.

Table 2-10: Serviceability Check

#	CHECK
1	Verify that the LCD Status Message reads ALL OK
2	Check for Video Picture on monitor
3	Toggle between Composite and S-VIDEO modes
4	Check Audio channels Left and Right

In the event that no video or audio output is received, perform a test on the decoder audio/video stream.

To test the decoder audio/video stream:

From the Status Message, press the down arrow.
The System Menu is displayed.

Select the Test Menu.
The current operation shows NONE.

Select the NTSC Stream.
Press ENTER.

- Listen for the Test Sound (a brief musical sample) from the monitor speakers
- A Standard Test Pattern should be displayed on the TV Monitor.

When both Video and Audio tests are complete, return the TEST mode to the NONE state.

If you received any errors during the test, contact your vendor. If your IRD is not performing as required, refer to the Operation Guide for further instructions.

3. OPERATION

3.1. Introduction

This chapter describes the procedures required for the operation of the IRD-2600 and IRD-2800 Integrated Receiver Decoders.

In addition to the Operation Guide, the following manuals are available for Terminal Control of the IRD:

Basic Terminal Control Protocol (P/N 2349-72175-03.1)

Advanced Terminal Control Protocol (P/N 2349-72175-03.2)

Master-Slave Terminal Control Protocol (P/N 2349-72175-03.3)

3.1.1. IRD Operation and Management

Both IRD-2600 and IRD-2800 Integrated Receiver Decoders can be manually managed from the IRD Front Control Panel, locally by a PC Terminal or remotely, from the Uplink through the incoming Bit Stream.

Manual management of the IRD is provided from the IRD Front Control Panel by the keypad on the panel, or by using an optional Infrared Remote Control. The LCD on the panel displays the menus and options of the IRD embedded software.

The Infrared Remote Control can be ordered through a local SCOPUS Network Technologies Ltd. product supplier.

Management from the Uplink is achieved with the CODICO® NMS-4000 Network Management System. Management from the PC Terminal requires a serial line (RS-232) communication cable to be connected between the IRD and a communication port on the PC. The Terminal Control software is a command line prompt accessible via any PC with Terminal Software installed. For details, refer to Chapter 2 above.

3.1.1.1. Front Control Panel

Figure 3-1 shows the Front Control Panel of the IRD, its controls and features. Table 3-1 explains the operation of the items found on the Front Control Panel.

NOTE

This panel is identical for the IRD-2600 and for the IRD-2800.

Figure 3-1: IRD-2600 / IRD-2800 Front Control Panel

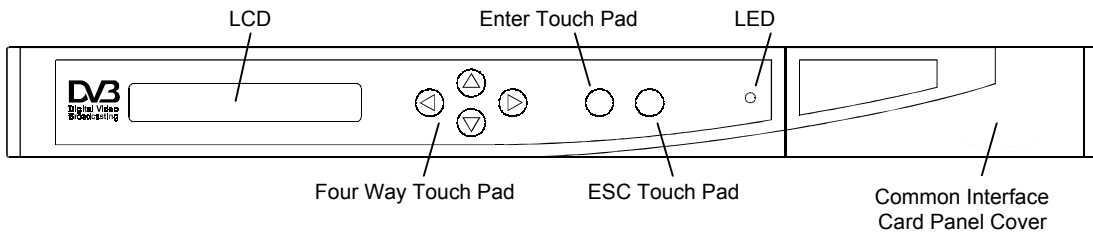


Table 3-1: IRD-2600 / IRD-2800 Front Control Panel

CONTROL ITEM	DESCRIPTION
LCD	The LCD is an alphanumeric display used to view the embedded software, status messages, and parameter settings.
Four Way Touch Pad	The Four Way Touch Pad enables navigation (UP , DOWN , LEFT or RIGHT) in the embedded software menus by moving the cursor position UP, DOWN, LEFT or RIGHT, respectively.
ENTER Touch Pad	Confirms/saves a selection or proceeds to next menu/item.
ESC Touch Pad	Exits from the current position or returns to the Status Message at the top of the menus.
Status Indicator LED	The Status Indicator uses the following legend: <ul style="list-style-type: none"> • Green Light / Constant: System Initializing and Normal Operation. • Green Light / Flashing: Service Warning. • Orange Light / Constant: Bit Stream Warning. • Red Light / Constant: Hardware Fault.

3.1.1.2. Infrared Remote Control (Optional)

Figure 3-2 shows the optional infrared remote control available for the IRTD operation. Table 3-2 explains the control functions on it.

Figure 3-2: IRD Infrared Remote Control

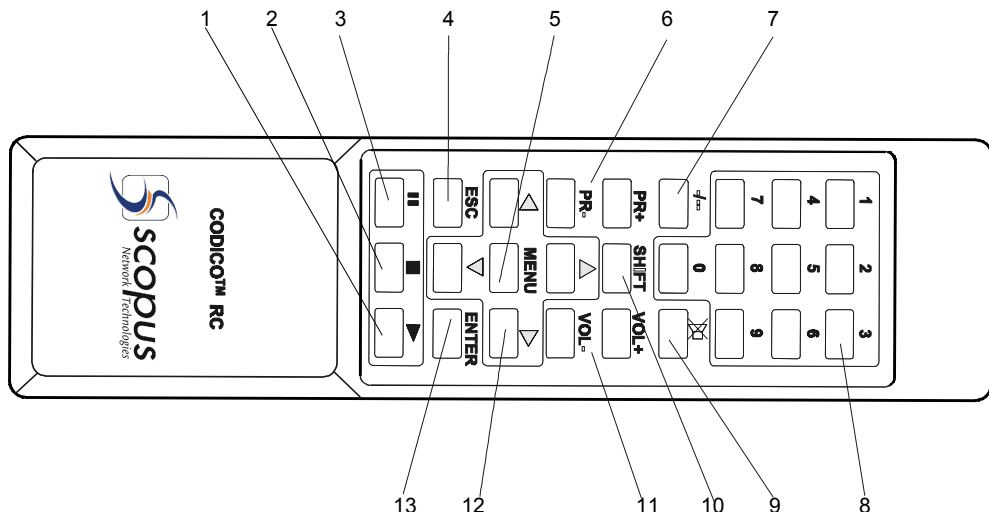


Table 3-2: IRD Infrared Remote Control Items

#	CONTROL	FUNCTION
1	Motion	▷ Play
2		□ Stop
3		⏸ Pause
4	ESC	Exits from the current message or returns to the Status Message when working in the menus.
5	MENU	Calls up Additional Commands.
6	PR+/PR-	Scrolls programs, increasing or decreasing by one.
7	Decimal	Enables the first pressed numerical key to indicate the tens digit of the program to be run.
8	0 to 9	Use to select preset program numbers. In conjunction with the Decimal Key, the first numerical key pressed in a sequence indicates the tens digit and the second numerical pressed key indicates the units digit of the selected program. In conjunction with the right touch pad, each key changes the value of the digit indicated by the cursor.
9	Audio	Toggles audio mode ON/OFF (Mute/UnMute).
10	SHIFT	Not in use.
11	Volume	Increases or decreases program audio level.
12	FOUR WAY	The four way touch buttons enable navigation (UP, DOWN, LEFT or RIGHT) in the embedded software menus.
13	ENTER	Confirms menu selection, saves a new parameter, or proceeds to the next menu.

3.1.1.3. Four Way Touch Pad.

The four way touch pad on the Front Control panel (see Figure 3-1). Four way touch buttons on the optional Infrared Remote Control (see Figure 3-2) are used to navigate in the embedded software menus:

- **UP** Touch Pad: Navigates Up in the menu tree.
- **DOWN** Touch Pad: Navigates Down in the menu tree.
- **LEFT** Touch Pad: Navigates Left in the menu branch.
- **RIGHT** Touch Pad: Navigates Right in the menu branch.

When the LCD displays the Start Up Menu, the pad is used as follows:

- **UP** and **DOWN** Touch Pads: No use.

LEFT Touch Pad: Displays the DVB Service option in the RUN/SERVICE menu (see paragraph 3.5.1 ahead).

RIGHT Touch Pad: Displays the Network Channels option in the CONFIGURATION/RECEIVER Menu (see paragraph 3.5.1 ahead).

NOTE: Option available IRD with DSNG, QPSE or QAM front End interfaces.

3.1.2. Front Panel Common Main Menu Options

The setup, control and monitoring of the IRD operation is locally provided using the extended IRD Front Panel Menu. This menu is displayed on the Front Panel LCD and is operated by the control pad on the IRD Front Panel or by the optional Remote Control (see paragraph 3.1.1 above).

All configurations share a common initialization phase and, when successfully completed, display the IRD Front Panel Main Menu structure, as shown in Figure 3-3 and described in Table 3-3. The following paragraphs provide detailed description of each of the options in the Main Menu. Refer to **Error! Reference source not found.**, **Error! Reference source not found.**, for a full hierarchical structure Main Menu.

A dotted menu selection in the flowing diagrams indicates that the availability of this option is dependent upon the system configuration. For example, Password control is available as an option for the IRD. Once a session has been initiated via the Password, the password is bypassed on repeated entry to the MAIN MENU.

Unless specifically marked, all functions are applicable for both the IRD-2600 and the IRD-2800.

Figure 3-3: IRD Front Panel Main Menu Structure.

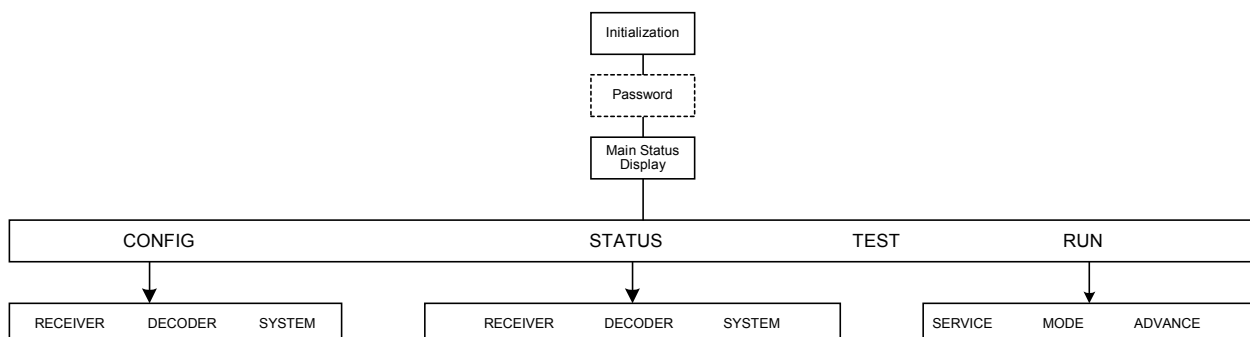


Table 3-3: IRD Front Panel Main Menu Options.

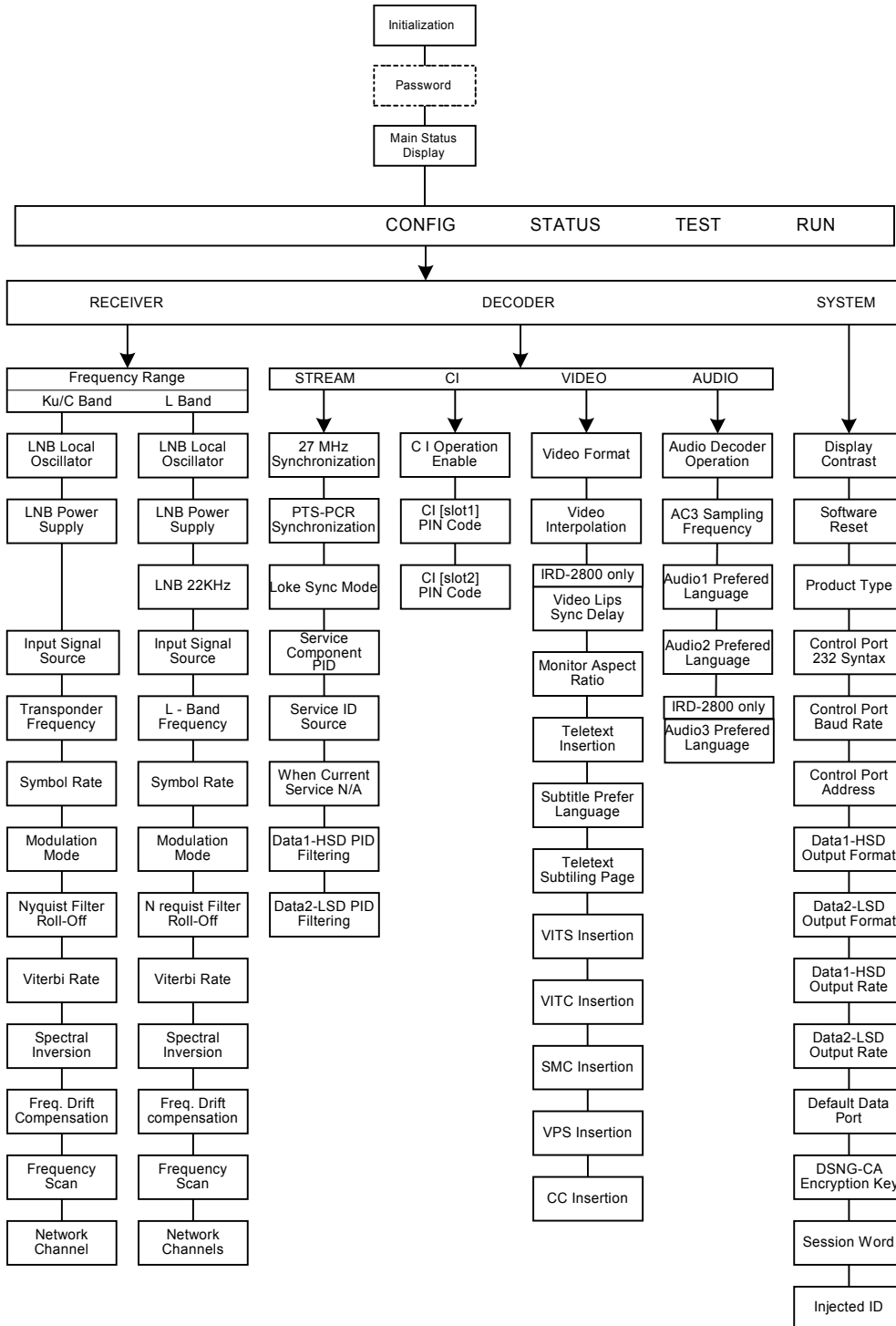
MENU	DESCRIPTION
<p>Configuration Menu</p>	<p>The Configuration Menu option enables access to the Receiver, Decoder and System configuration parameters. These options are used to define or modify the IRD configuration:</p> <ul style="list-style-type: none"> • The Receiver Configuration Menu provides functions to configure the operation of the receiver, depending on the type of receiver installed in the IRD; QPSK (DVB-S), DSNG (DVB-DSNG), ATM (DVB-PDH), QAM (DVB-C) or G.703 (E1, E2, E3) • The Decoder Configuration Menu provides access to a further sub-menu for Stream, CI, Video and Audio settings. • The System Configuration Menu enables setup and control on the IRD operation. <p>Refer to paragraph 3.2 for a detailed description of the IRD-2600/2800 Configuration Menu.</p>
<p>Status Menu</p>	<p>The Status Menu option enables access to the Receiver, Decoder and System status parameters. These options are used to view the IRDs current configuration and status:</p> <ul style="list-style-type: none"> • Depending on the type of Receiver installed in the IRD, the Receiver Status Menu provides functions to monitor the operation of the receiver. • The Decoder Status Menu provides access to a further sub-menu for monitoring Stream, CI, Video and Audio operation. • The System Status Menu enables viewing the IRD information. <p>Refer to paragraph 3.3 for a detailed description of the IRD-2600/2800 Status Menu.</p>
<p>Test Menu</p>	<p>The Test Menu option enables access to special internal test procedures on the Decoder section of the IRD.</p> <p>Refer to paragraph 3.4 for a detailed description of the IRD-2600/2800 Test Menu.</p>
<p>Run Menu</p>	<p>The Run Menu option enables access to high-level operation menus, depending on the operation mode of the IRD – PID or Service Mode:</p> <ul style="list-style-type: none"> • When in Service Mode, the Run Menu provides sub-menus for advanced control and operation functions, divided into Service, Mode and Advance Sub-Menus. • When in PID Mode, the Run Menu provides sub-menus for advanced control and operation functions, divided into PID, Mode and Advance Sub-Menus. <p>Refer to paragraph 3.5 for a detailed description of the IRD-2600/2800 Run Menu.</p>

3.2. Configuration Menu

The Configuration Menu enables the IRD operator to set-up the specific configuration required of the IRD. Figure 4-1 shows the IRD Configuration Menu tree and the options available to the user.

The IRD Front Panel display, controls and keypad are used to scroll through the menu, view the options available and set the parameters of the configuration functions provided.

Figure 3-4: IRD Configuration Menu Tree Structure (DSNG IRD Configuration)



3.2.1. Configuration / Receiver Menu

The IRD is provided in a wide range of input receivers: QPSK (DVB-S), DSNG (DVB-DSNG), QAM (DVB-C), G.703 (E1, E2, E3) and ATM (DVB-PDH, SDH) receiver options. The Configuration / Receiver Menu is input sensitive (i.e., varies automatically according to the IRD Input option installed), and provides a group of functions to configure the receiver section of the IRD.

Figure 3-5 shows the various menu options provided for the different front-end interfaces.

NOTE

IRD with a G.703 Input type receiver is automatically configured, thus no configuration functions under the Configuration/Receiver Menu are applicable for this option.

The IRD Front Panel display, controls and keypad are used to scroll through the menu, view the options available and set the parameters of the configuration functions provided.

Table 3-4 describes the configuration functions available for the receiver option installed in the IRD-2600 / IRD-2800 (DSNG, QPSK, QAM, ATM and G.703 input options).

The icon legend is used to show menu option availability for the different input receiver:

Figure 3-5: DSNG Receiver Configuration Menu Tree Structure

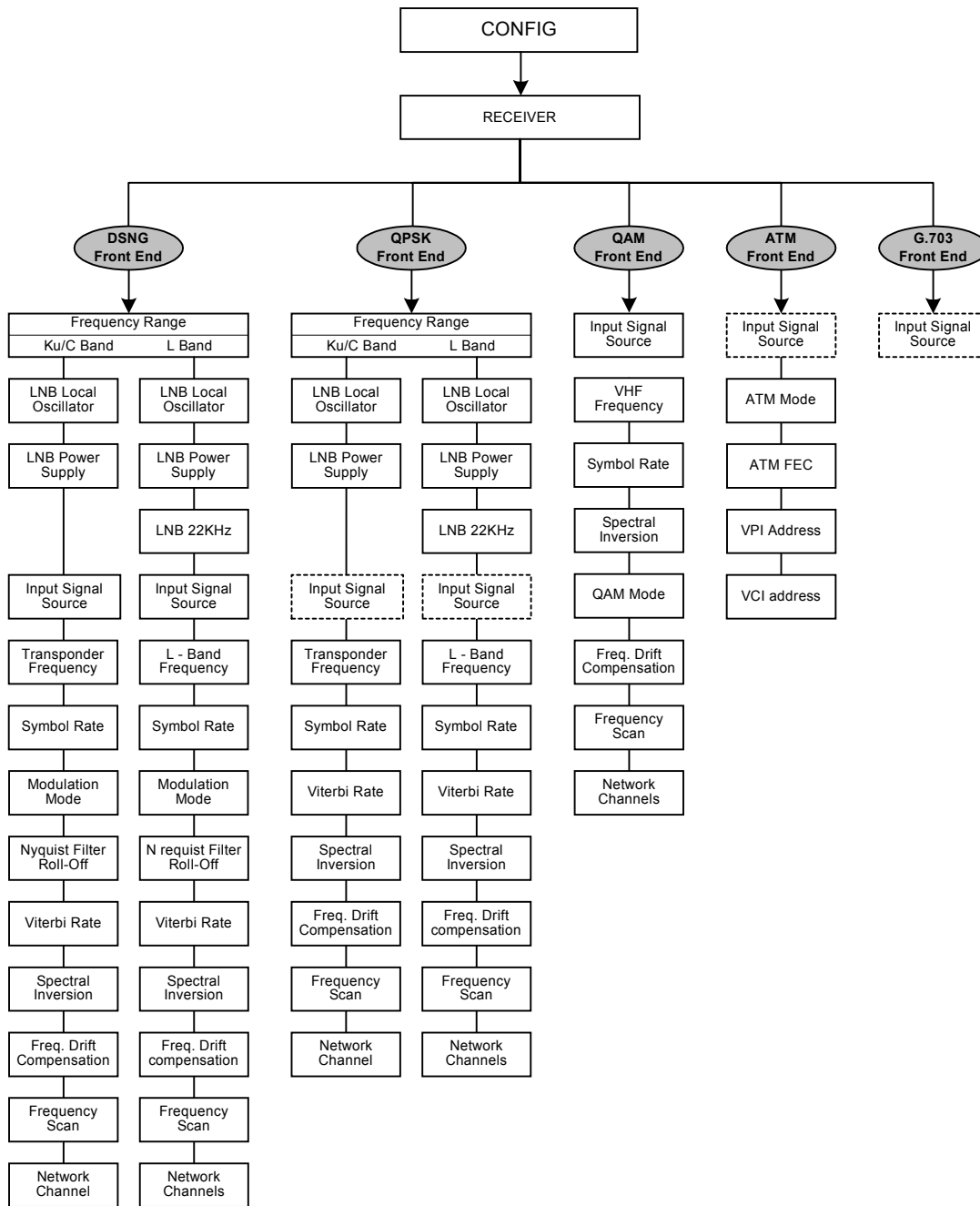


Table 3-4 Configuration/Receiver Menu Options

DSNG	QPSK	QAM	ATM	G.703	OPTION	DESCRIPTION																																				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				Frequency Range	<p><u>Frequency Range Selector</u></p> <p>This parameter supports various frequency ranges for a satellite band range receiver. Two options are provided:</p> <p>L-Band: Receiving in the L-Band frequency range.</p> <p>Satellite (Ku/C) Band: Receiving in the Ku/C-Band frequency range.</p>																																				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				LNB Local Oscillator	<p><u>LNB Oscillator Setup</u></p> <p>The LNB Local Oscillator (LO) provided with the receiving antenna unit, down converts the carrier frequency of the incoming signal to a range acceptable to the receiver. This is achieved by down converting the frequency of the incoming signal.</p> <p>However, for display accuracy, the selected LNB Local Oscillator frequency must be in accordance with the frequency of the receiving antenna installed in the system (disregarding the frequency provided at the IRD input).</p> <p>The LNB Local Oscillator parameter has following select options:</p> <table border="1"> <thead> <tr> <th>PARAMETER</th> <th>BAND</th> <th>PARAMETER</th> <th>BAND</th> </tr> </thead> <tbody> <tr> <td>DiSeQC *</td> <td>(9750-10600)</td> <td>10600</td> <td>(Ku Band)</td> </tr> <tr> <td>Wide Band</td> <td>(9750-10750)</td> <td>10700</td> <td>(Ku Band)</td> </tr> <tr> <td>Universal</td> <td>(9750-10600)</td> <td>10750</td> <td>(Ku Band)</td> </tr> <tr> <td>05150</td> <td>(C Band)</td> <td>10950</td> <td>(Ku Band)</td> </tr> <tr> <td>05950</td> <td>(C Band)</td> <td>11250</td> <td>(Ku Band)</td> </tr> <tr> <td>09750</td> <td>(Ku Band)</td> <td>11300</td> <td>(Ku Band)</td> </tr> <tr> <td>10000</td> <td>(Ku Band)</td> <td>11700</td> <td>(Ku Band)</td> </tr> <tr> <td>10250</td> <td>(Ku Band)</td> <td>12500</td> <td>(Ku Band)</td> </tr> </tbody> </table> <p>* DiSeQC band (9750-10600) is available only for the DSNG Receiver option.</p>	PARAMETER	BAND	PARAMETER	BAND	DiSeQC *	(9750-10600)	10600	(Ku Band)	Wide Band	(9750-10750)	10700	(Ku Band)	Universal	(9750-10600)	10750	(Ku Band)	05150	(C Band)	10950	(Ku Band)	05950	(C Band)	11250	(Ku Band)	09750	(Ku Band)	11300	(Ku Band)	10000	(Ku Band)	11700	(Ku Band)	10250	(Ku Band)	12500	(Ku Band)
PARAMETER	BAND	PARAMETER	BAND																																							
DiSeQC *	(9750-10600)	10600	(Ku Band)																																							
Wide Band	(9750-10750)	10700	(Ku Band)																																							
Universal	(9750-10600)	10750	(Ku Band)																																							
05150	(C Band)	10950	(Ku Band)																																							
05950	(C Band)	11250	(Ku Band)																																							
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10000	(Ku Band)	11700	(Ku Band)																																							
10250	(Ku Band)	12500	(Ku Band)																																							
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				LNB Power Supply	<p><u>LNB Power Supply Setup</u></p> <p>The polarization of the receiving antenna is determined according to the requirements in the broadcast program parameters. The IRD controls the polarization of the receiving antenna by means of the voltage provided to the LNB Power Supply.</p> <p>Available options:</p> <p>OFF: Power Supply off.</p> <p>14 (Vertical): 14 V Power Supply / Vertical Polarization.</p> <p>18 (Horizontal): 18 V Power Supply / Horizontal Polarization.</p>																																				

Table 3-4 Configuration/Receiver Menu Options

DSNG	QPSK	QAM	ATM	G.703	OPTION	DESCRIPTION													
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				LNB 22KHz	<p><u>LNB 22 KHz Selector</u> Turns ON and OFF the 22 KHz LNB. This action determines the band selected (ON = High Band, OFF = Low Band). In addition, the selection of the LNB Power Supply determines the polarization of the antenna. The following table shows the correlation between the LNB parameters:</p> <table border="1"> <thead> <tr> <th>LNB POWER SUPPLY LNB POLARIZATION</th> <th>LNB 22 KHZ</th> <th>LNB BAND</th> </tr> </thead> <tbody> <tr> <td rowspan="2">14V / Vertical Polarization</td> <td>OFF</td> <td>Low Band</td> </tr> <tr> <td>ON</td> <td>High Band</td> </tr> <tr> <td rowspan="2">18V / Horizontal Polarization</td> <td>OFF</td> <td>Low Band</td> </tr> <tr> <td>ON</td> <td>High Band</td> </tr> </tbody> </table> <p>NOTE <i>In the Ku/C band mode, the LNB 22KHz converter setting is performed automatically and the LNB 22 KHz Receiver Configuration function is not displayed in the Receiver Configuration Menu.</i></p>	LNB POWER SUPPLY LNB POLARIZATION	LNB 22 KHZ	LNB BAND	14V / Vertical Polarization	OFF	Low Band	ON	High Band	18V / Horizontal Polarization	OFF	Low Band	ON	High Band
LNB POWER SUPPLY LNB POLARIZATION	LNB 22 KHZ	LNB BAND																	
14V / Vertical Polarization	OFF	Low Band																	
	ON	High Band																	
18V / Horizontal Polarization	OFF	Low Band																	
	ON	High Band																	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Input Signal Source	<p><u>Input Select</u> Selects the input source for the IRD Receiver input. Available options: In-A: Selects Input A In-B: Selects Input B</p> <p>NOTE (☑*) <i>The In-B connector is standard in the DSNG application. For all other receivers (QPSK, QAM, ATM and G.703) the IN-B connector is connected as loop-through of In-A input. As an option, an additional, independent In-B input can be added to these receivers. When this option is implemented for any one of the receivers, the Input Select function is available in the Receiver Configuration Menu to select between In-A and In-B.</i></p>													
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				L-Band Frequency	<p><u>L-Band Receiver Frequency Selection</u> Input of the calculated L-Band Frequency for the DSNG IRD and QPSK IRD Receivers in the L-Band, as described in Appendix B.</p>													
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				Transponder Frequency	<p><u>Ku/C-Band Frequency Selection</u> Input of the Satellite Transponder (Ku or C Band) frequency for the DSNG IRD and QPSK IRD Receivers in the Ku/C Band. See Appendix B for an example on calculating the input frequency.</p>													

Table 3-4 Configuration/Receiver Menu Options

DSNG	QPSK	QAM	ATM	G.703	OPTION	DESCRIPTION
		<input checked="" type="checkbox"/>			VHF/UHF Frequency	<u>VHF/UHF-Band Frequency Selection</u> Displays the expected carrier frequency of the received input signal at the QAM (DVB-C) application.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			Symbol Rate	<u>Symbol Rate Setup</u> The Symbol Rate for a group of station programs is configured according to the broadcast program parameters and the specific ranges available in your IRD. The available Symbol Rate range is: QPSK and DSNG 1-45 configuration: 1 to 45 Mbaud/sec. QAM configuration: 1 to 7.2 Mbaud/sec. If the Bit rate information is provided but no Symbol Rate information is given, the Symbol Rate may be calculated by the equations provided in Appendix B. NOTE <i>It is important to input the Symbol Rate accurately, including all the decimal places that are given.</i>
		<input checked="" type="checkbox"/>			QAM Mode	<u>QAM Mode Select</u> Selects the QAM Mode of operation for the QAM IRD. Available options: 16_QAM, 32_QAM, 64_QAM, 128_QAM, 256_QAM.
<input checked="" type="checkbox"/>					Modulation Mode	<u>Modulation Mode Select</u> Selects the modulation mode for the DSNG IRD. Available options: MOD – QPSK: Quadrature Shift Keying Modulation. MOD – 8PSK: Eight Phase Shift Keying Modulation. MOD – 16 QAM: 16 Quadrature Amplitude Modulation. Automatic: Automatic Selection of modulation.
<input checked="" type="checkbox"/>					Nyquist Filter Roll-Off	<u>Nyquist Filter Type Selection</u> Selects the roll-off parameter for the Nyquist filter. Available options: 35%: 35% roll-off parameter. 25%: 25% roll-off parameter. Automatic: Automatic selection of the roll-off parameter (25% or 35%).

Table 3-4 Configuration/Receiver Menu Options

DSNG	QPSK	QAM	ATM	G.703	OPTION	DESCRIPTION
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				Viterbi Rate	<p><u>Viterbi Rate Select</u> This parameter is configured according to the information provided from the broadcast head end. The available values are: Auto, 1/2, 2/3, 3/4, 4/5, 5/6, 6/7, 7/8, 8/9.</p> <p>NOTE <i>If the specific Viterbi rate is not provided, selecting the AUTO option enables the IRD to automatically detect the Viterbi rate.</i></p>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			Spectral Inversion	<p><u>Spectral Inversion Select</u> Selects the operation mode of the spectral inversion options. Available options: Automatic: IRD automatic selection between Normal and Inverted spectral inversion. Normal: Normal spectral inversion. Inverted: Inverted spectral inversion.</p>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			Freq Drift Compensation	<p><u>Frequency Drift Compensation Activation</u> ENABLE/DISABLE the frequency drift compensation function (caused by LNB drift and enviromental changes).</p>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			Frequency Scan	<p><u>Frequency Scan Select</u> This utility provides two frequency scan options, used to find DVB transmission signals: Scan Frequency between +/- 6 MHz: Allows scanning a frequency range of ± 6 MHz from the current tuning frequency. Entire Current Band: Scan the entire band to find the DVB Network frequencies. The detected frequency (and it's parameters) are stored in volatile memory. Powering down the IRD will erase them.</p> <p>NOTE <i>The user must save them manually in the non-volatile memory.</i></p>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			Network Channels	<p><u>Network Channels Select</u> In systems where several network channels has been detected, this option allows the user to select one network channel from an incoming satellite signal.</p> <p>NOTE <i>This option can be accessed directly from the Start Up Menu by pressing the RIGHT Touch Pad on the on the Front Panel.</i></p>

Table 3-4 Configuration/Receiver Menu Options

DSNG	QPSK	QAM	ATM	G.703	OPTION	DESCRIPTION
			<input checked="" type="checkbox"/>		ATM Mode	<u>ATM Receiver Mode Selection</u> Selects the operational mode of the ATM receiver (According to the hardware installed). Options available: E3, Mode: Ds3 Mode, STM1 Multi-Mode, STM1 Single-Mode, Oc3 Multi/Single-Mode.
			<input checked="" type="checkbox"/>		ATM FEC	<u>Select the ATM FEC Mode:</u> Option available: Enable – enable FEC / Packet size: 204 Disable – disable FEC / Packet size: 188
			<input checked="" type="checkbox"/>		VPI Address	<u>Path Address</u> Virtual Path Indication Address Acceptable range: 0-FF (8bit)
			<input checked="" type="checkbox"/>		VCI Address	<u>Channel Address</u> Virtual Channel Indication Address. Acceptable range: 0-FFFF (16 bit)

3.2.2. Configuration / Decoder Menu

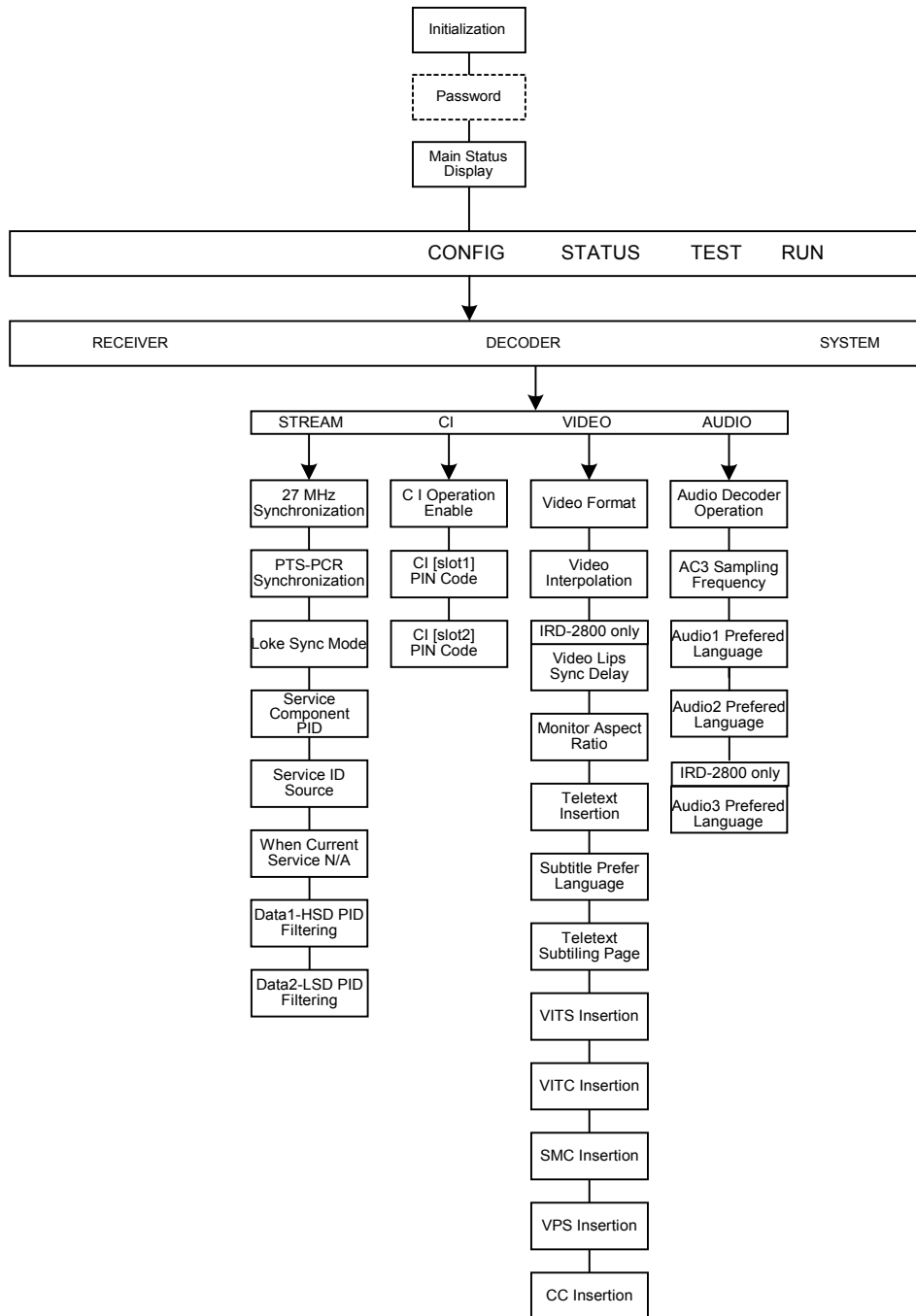
The Decoder Configuration menu provides the IRD user the capability to setup and configure the decoder in the IRD. Figure 3-6 shows the menu tree of configuration functions available in the Decoder Configuration Menu (password is required only if it was enabled previously).

The IRD Front Panel display, controls and keypad are used to scroll through the menu, view the options available and set the parameters of the configuration functions provided.

The Decoder Configuration functions are grouped into four groups and are described in the following sub-paragraphs:

- Decoder/Stream functions configuration sub-menu, refer to paragraph 3.2.2.1.
- Decoder/Common Interface (CI) functions configuration sub-menu, refer to paragraph 3.2.2.2.
- Decoder/Video functions configuration sub-menu, refer to paragraph 3.2.2.3.
- Decoder/Audio functions configuration sub-menu, refer to paragraph 3.2.2.4.

Figure 3-6: Decoder Configuration Menu Tree Structure



3.2.2.1. Decoder / Stream Configuration Sub-Menu

The Decoder / Stream Configuration Sub-Menu provides an extended menu of setup and selection options to configure the decoder's streams.

Figure 3-7 shows the menu tree of configuration functions available in the Decoder / Stream Configuration Sub-Menu. Table 3-5 describes the configuration functions provided to the IRD operator in the sub-menu.

Figure 3-7: Decoder / Stream Configuration Sub-Menu Tree Structure

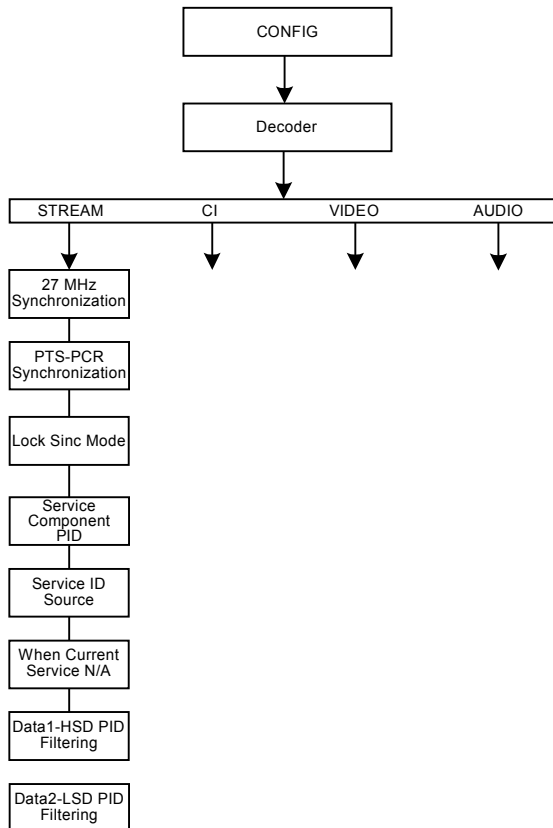


Table 3-5: Decoder / Stream Configuration Menu Options

OPTION	DESCRIPTION
27 MHz Synchronization	<u>Decoder Synchronization Source</u> The IRD is synchronized by a 27MHz clock, generated by a Voltage Controlled Oscillator (VCXO). This function enables the user to select a synchronization source for the VCXO. Options available: Internal: The VCXO is factory calibrated to a fixed 27 MHz clock. External Video Sync: The VCXO is synchronized to an external video signal. External Stream PCR: The VCXO is synchronized by the stream Program Clock Recovery (PCR) signal, received with the stream data.
PTS-PCR Synchronization	<u>Lips Synchronization.</u> ENABLE/DISABLE the PTS – PCR (picture/video and sound/audio), “lips” synchronization, using the Presentation Time Stamp (PTS) and PCR signals from the stream data.
Lips Sync Mode	<u>Lips Synchronization Mode.</u> Selects the operating mode for the “Lips” PTS-PCR Synchronization function. (Active when PIS-PCR synchronization is ENABLED). Options available: Locked: Picture/video and sound/audio are locked ($\pm 2\text{mSec}$). Standard: (Standard Synch of video and audio data ($\pm 40\text{mSec}$). Option available for IRD –2800 only.
Service Component PID	<u>Service Information Set-Up Mode</u> Selects the set-up mode for the service components information: Manually by User: Switches the IRD to PID mode. Service Information must be manually provided when in PID Mode. DVB Service Content: Switches the IRD to Service Mode. When in Service Mode, the IRD extracts service information from the PSI-SI tables contained in the stream.
Service ID Source	<u>Service ID Source Selection</u> Selects the source for the identification data on the services received. Options available: Stream PSI-SI Tables: External information provided by the stream PSI/SI tables. Pre-programmed Memory: Pre-saved information in the IRD programmed non-volatile memory.
When Current Service Not Available	<u>Current Service Not Available Response</u> Defines the reaction of the IRD when the current service is not available: Automatic call 1st Active The IRD will auto select the first active service. Wait for User command The IRD will wait in the current service until the user will change his request.

Table 3-5: Decoder / Stream Configuration Menu Options

OPTION	DESCRIPTION
Data1-HSD PID Filtering	<u>Data1 High Speed Data Filtering Options</u> Selects the filtering applied to the Data1 (HSD PID) information: P.E.S Payload: Strips the header of the Packetised Elementary Stream (PES). Entire Transport Packet: Enables the entire transport stream packet (188 bytes). Transport Payload: Strips the transport stream header (first 4 bytes on of the 188 bytes).
Data2-LSD PID Filtering	<u>Data2 Low Speed Data Filtering Options</u> Selects the filtering applied to the Data1 (LSH PID) information: P.E.S Payload: Strips the header of the Packetised Elementary Stream (PES). Entire Transport Packet: Enables the entire transport stream packet (188 bytes). Transport Payload: Strips the transport stream header (first 4 bytes on of the 188 bytes). DVB streaming: Streams the Data2/LSD stream according to the DVB specifications (EN 301 192, paragraph 5 and 6).

3.2.2.2. Decoder/CI Configuration Sub-Menu

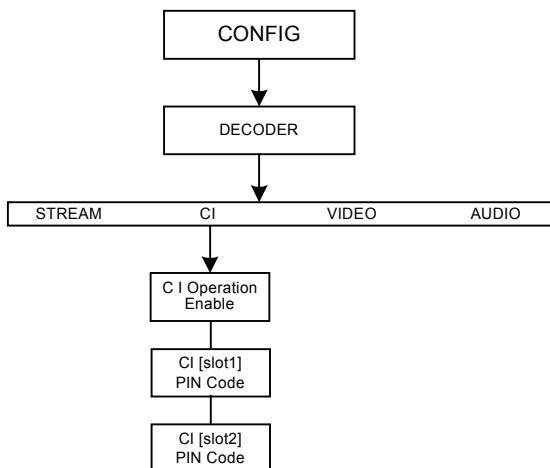
The Decoder / Common Interface (CI) Configuration Sub-Menu provides setup and configuration options for the CI function.

Figure 3-8 shows the menu tree for the Decoder / CI Configuration Sub-Menu.

Table 3-6: Describes the Options in the Sub Menu.

OPTION	DESCRIPTION
CI Operation Enable	<u>CI Operation Control.</u> ENABLE / DISABLE the common Interface Function.
CI [slot 1] PIN Code	<u>PIN Code for CI / Slot 1</u> Enables the user to enter the password (PID /Code) for the smart card installed in CI / slot 1.
CI [slot 2] PIN Code	<u>PIN Code for CI / Slot 2</u> Enables the user to enter the password (PID /Code) for the smart card installed in CI / slot 2.

Figure 3-8: Decoder / CI Configuration Sub-Menu Tree Structure



3.2.2.3. Decoder / Video Configuration Sub-Menu

The Decoder / Video Configuration Sub-Menu provides an extended menu of setup and selection options to configure the decoder's video signal generated from the input data.

Figure 3-9 shows the menu tree of configuration functions available in the Decoder / Video Configuration Sub-Menu. Table 3-7 describes the configuration functions provided to the IRD operator in the sub-menu.

Figure 3-9: Decoder / Video Configuration Sub-Menu Tree Structure

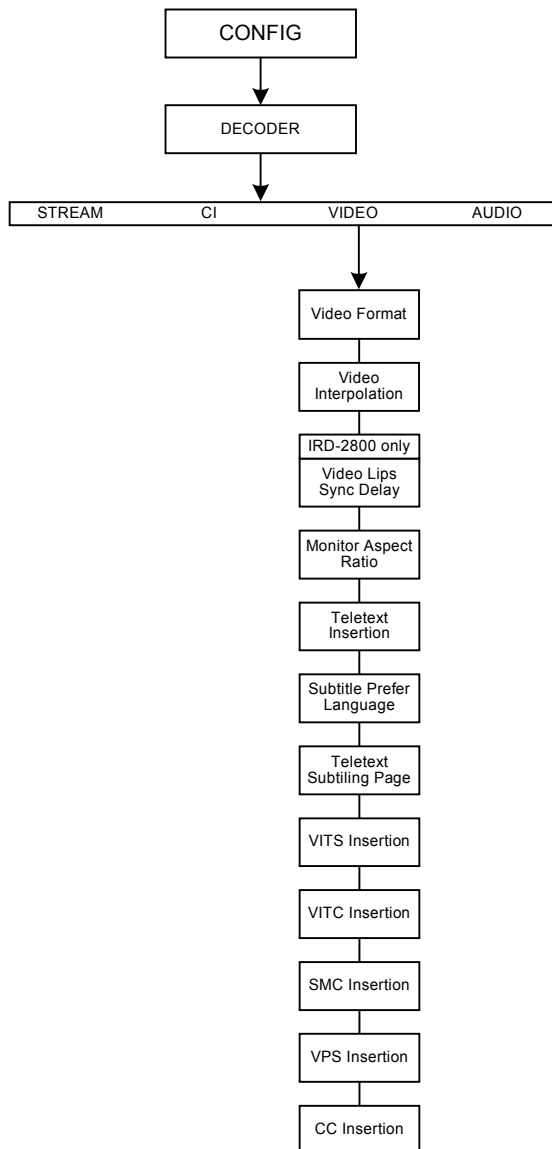


Table 3-7: Decoder / Video Configuration Sub-Menu Options

OPTION	DESCRIPTION	
Video Format	<u>Video Format Selection</u> Selects the output format of the video signal. Options available are: PAL N, PAL B/G, PAL M, NTSC, PAL D/I, SECAM	
Video Interpolation	<u>Video Interpolation Selection</u> Selects the interpolation format of the output video signal. Options available are: Pan Scan: Activates the expand resolution function for the received picture (full resolution out of half or quarter) Pass Through: No expansion, picture resolution is provided as received. Letter Box: Picture is in "letter box" format.	
Video Lips Sync Delay	<u>Lips Synchronization Delay Setup</u> Sets the delay between video and audio data when the "lips" PTS-PCR Synchronization function is "locked" (see paragraph 3.4.2.1). Delay range available: from -20 to +20 mSec (negative for delay of audio). Option available for IRD-2800 ONLY.	
Monitor Aspect Ratio	<u>Aspect Ratio Select</u> Selects the aspect ration for the displayed picture: 16:9, or 4:3, or 14:9: Selects the monitor type connected to the IRD. The IRD will insert the Wide Screen Signaling (WSS, line 23) signal, accordingly. W.S.S Disabled: The IRD will not insert (disable) the WSS signal. Transparent to Encoder: The IRD will set the WSS in accordance with the video stream ratio detected.	
Teletext Insertion	<u>Teletext Insertion Control</u> Enable/Disable the insertion of Teletext information in the VBI.	
Subtitle Prefer Language	<u>Preferred Language for Subtitles.</u> Selects the preferred language for the displayed sub-titles. Option available: ALL (default): No preferred language is selected. The subtitle language is set according to the Service PID.	
1. English. 2. Arabic. 3. Bulgarian. 4. Chinese. 5. Dutch. 6. Danish. 7. German. 8. Greek Modern.	9. Finnish. 10. French. 11. Hebrew. 12. Hungarian. 13. Irish. 14. Italian. 15. Japanese. 16. Norwegian..	17. Turkish 18. Persian. 19. Polish. 20. Portuguese. 21. Romanian. 22. Russian. 23. Spanish. 24. Swedish.

Table 3-7: Decoder / Video Configuration Sub-Menu Options

OPTION	DESCRIPTION
Teletext Subtitling Page	<u>Teletext Subtitling Select</u> Selects a page number for the EBU Teletext Subtitling. Options available are: 100 , through 899 . NOTES: <i>The Teletext Subtitling function is available ONLY when the PID mode is activated.</i> Selection of the EBU Teletext Subtitling page from the PSI/SI tables can also be done using the RUN/SERVICE Sub-Menu (see paragraph 3.5.1, "TSubtitle SubService" option).
VITS Insertion	<u>VITS Insertion Selection</u> Selects the Video Internal Test Signals (VITS) Insertion type: Disable VBI Lines 19,20 VBI Lines 17,18 VBI Line 17 (NTSC)
VITC Insertion	<u>VITC Insertion Selection</u> Selects the Video Internal Time Code (VITC) Insertion type: Disable VBI Lines 12,14 (Extrn) VBI Lines 14,16 (Extrn) VBI Lines 16,18 (Extrn) VBI Line 14 (Extrn) VBI Line 19 (Extrn) VBI Lines 12, 14 (Intrn) VBI Lines 14 (Intrn) NOTE Extrn: The time code is taken from the stream GOP Header. Intrn: The time code is locked to the internal IRD clock.
SMC Insertion	<u>SMC Insertion Control</u> Enable/Disable the Sound Mode Control (SMC) insertion.
VPS Insertion	<u>VPS Insertion Control</u> Enable/Disable the Video Programming Signal (VPS) insertion.
CC Insertion	<u>CC Insertion Control</u> Controls the Closed Caption (CC) insertion. Option available: Disable: Disables CC insertion. Enable (Decode LSB => MSB): Enables CC insertion LSB first. Enable (Decode MSB => LSB): Enables CC insertion MSB first.

3.2.2.4. Decoder / Audio Configuration Sub-Menu

The Decoder / Audio Configuration Sub-Menu provides an extended menu of setup and selection options to configure the decoder's audio signals generated from the input data.

Figure 3-10 shows the menu tree of configuration functions available in the Decoder / Audio Configuration Sub-Menu. Table 3-8 describes the configuration functions provided to the IRD operator in the sub-menu.

Figure 3-10: Decoder / Audio Configuration Sub-Menu Tree Structure

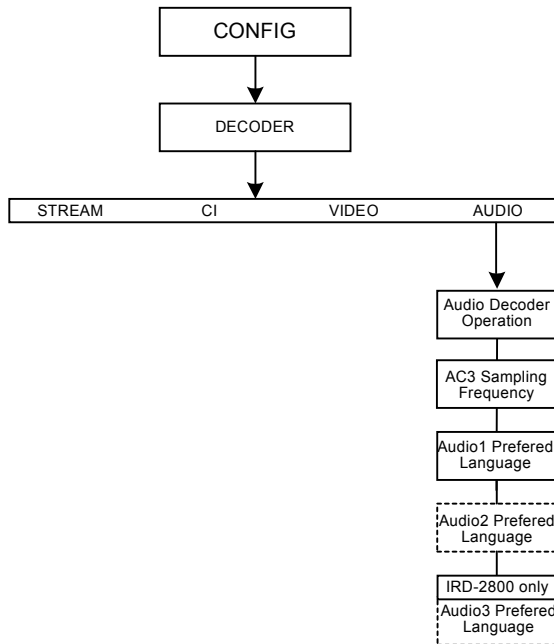


Table 3-8: Decoder / Video Configuration Sub-Menu Options

OPTION	DESCRIPTION																								
Audio Decoder Operation	<u>Audio Decoder Operation</u> Selects the digital audio operation mode. Available options: MPEG: Musicam Decoding AC3 Passthru (IEC 1937): Digital output only. Linear PCM Audio: Available only in the IRD-2800.																								
AC3 Sampling Frequency	<u>AC3 Sampling Frequency Select</u> Selects the sampling frequency for the AC3 pass through function in the digital audio function provided by the IRD. Available options are: 48 KHz, 44.1 KHz, 32 KHz																								
Audio1 Preferred Language Audio2 Preferred Language Audio3 Preferred Language	<u>Preferred Language for Subtitles.</u> Selects the preferred language for the audio1 (or audio2, audio3 respectively). Option available: ALL (default): No preferred language is selected. The audio language is set according to the Service PID. <table border="1"> <tbody> <tr> <td>1. English.</td> <td>9. Finnish.</td> <td>17. Turkish</td> </tr> <tr> <td>2. Arabic.</td> <td>10. French.</td> <td>18. Persian.</td> </tr> <tr> <td>3. Bulgarian.</td> <td>11. Hebrew.</td> <td>19. Polish.</td> </tr> <tr> <td>4. Chinese.</td> <td>12. Hungarian.</td> <td>20. Portuguese.</td> </tr> <tr> <td>5. Dutch.</td> <td>13. Irish.</td> <td>21. Romanian.</td> </tr> <tr> <td>6. Danish.</td> <td>14. Italian.</td> <td>22. Russian.</td> </tr> <tr> <td>7. German.</td> <td>15. Japanese.</td> <td>23. Spanish.</td> </tr> <tr> <td>8. Greek Modern.</td> <td>16. Norwegian..</td> <td>24. Swedish.</td> </tr> </tbody> </table>	1. English.	9. Finnish.	17. Turkish	2. Arabic.	10. French.	18. Persian.	3. Bulgarian.	11. Hebrew.	19. Polish.	4. Chinese.	12. Hungarian.	20. Portuguese.	5. Dutch.	13. Irish.	21. Romanian.	6. Danish.	14. Italian.	22. Russian.	7. German.	15. Japanese.	23. Spanish.	8. Greek Modern.	16. Norwegian..	24. Swedish.
1. English.	9. Finnish.	17. Turkish																							
2. Arabic.	10. French.	18. Persian.																							
3. Bulgarian.	11. Hebrew.	19. Polish.																							
4. Chinese.	12. Hungarian.	20. Portuguese.																							
5. Dutch.	13. Irish.	21. Romanian.																							
6. Danish.	14. Italian.	22. Russian.																							
7. German.	15. Japanese.	23. Spanish.																							
8. Greek Modern.	16. Norwegian..	24. Swedish.																							

3.2.3. Configuration/System Menu

The System Configuration Menu provides the IRD user the capability to set-up and configure the IRD operation. Figure 3-11 shows the menu tree of system level configuration functions available in the System Configuration Menu (password is required only if it was enabled previously). Table 3-9 describes each configuration function and the options available to the IRD user.

The IRD Front Panel display, controls and keypad are used to scroll through the menu, view the options available and set the parameters of the configuration functions provided.

Figure 3-11: System Configuration Menu Tree Structure

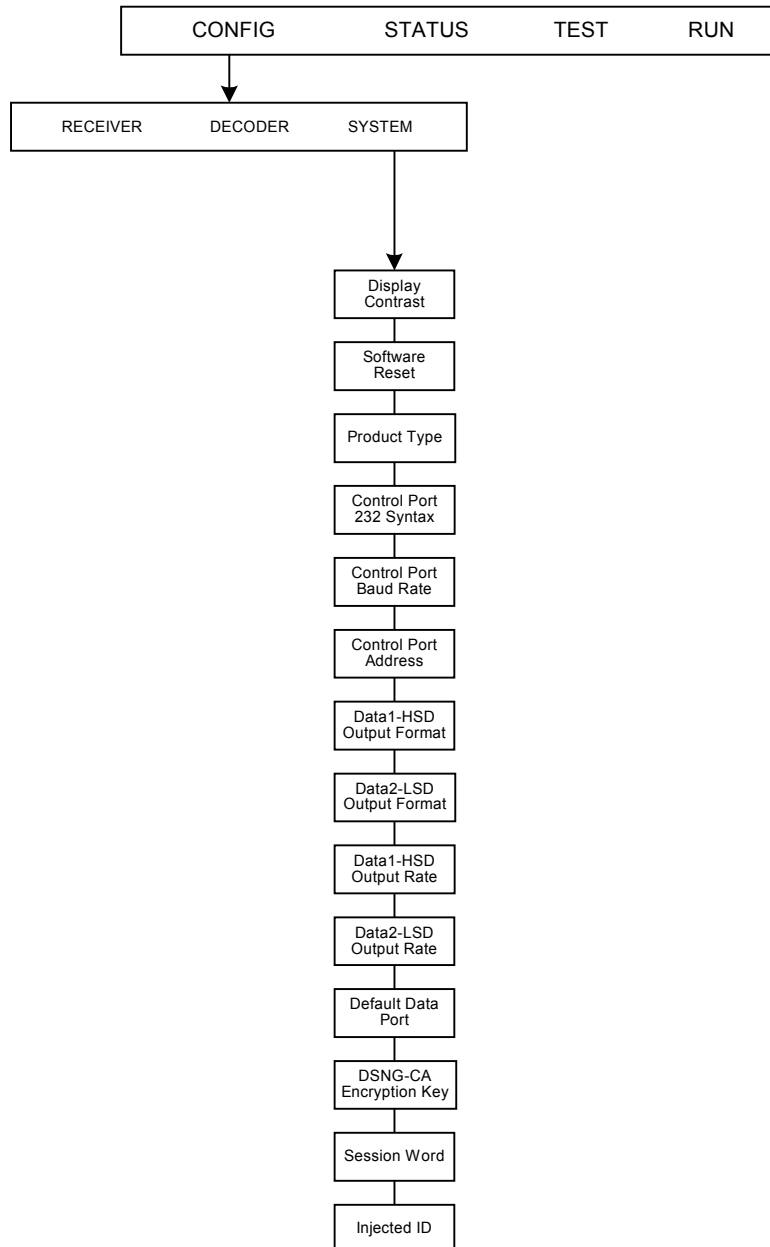


Table 3-9: System Configuration Menu Options

OPTION	DESCRIPTION
<p>Display Contrast</p>	<p><u>Display Contrast Level Set-Up</u> Controls the display contrast of the LCD display on the front panel of the IRD. Contrast level is set as follows: The [up] touch-pad increases the contrast level, and The [down] touch-pad to decreases the contrast.</p>
<p>Software Reset</p>	<p><u>IRD Reset</u> This function resets the IRD. The following choices are available: Warm Boot (Reset): for a minimum reset.. Cold Boot (Power-Up): for a complete power up of the IRD device.</p>
<p>Product Type</p>	<p><u>Product Type Configuration</u> This function defines the basic product configuration' IRD or Decoder. NOTE <i>The IRD input module is factory installed and cannot be changed by hardware replacement.</i> <i>The Decoder software can be updated when required.</i> The available options are: IRD (DSNG): Displays the factory predefined IRD receiver type. Options: IRD (DSNG), IRD (QPSK), IRD (QAM), IRD (G.703), IRD (ATM) Decoder (Serial RS-422): Selects serial RS-422 output configuration for the Decoder. Decoder (Parallel DVB): Selects Parallel DVB output configuration for the Decoder (requires optional hardware installation). Decoder ASI: Selects Analog (ASI) output configuration for the Decoder (requires optional hardware installation). RCV DSNG to ASI-OUT: The received signal is outputed directly from the front-end to the ASI output, without decoding. Options: RCV DSNG to ASI -OUT, RCV QPSK to ASI -OUT, RCV QAM to ASI -OUT, RCV G.703 to ASI -OUT, RCV ATM to ASI -OUT .</p>
<p>Control Port-232 Syntax</p>	<p><u>Control Port Protocol Select</u> Selects the RS-232 Control Port protocol for communication with an external RS-232/RS-485 host controller. Options are selected according to the way the IRD is configured: Terminal Protocol: The IRD Terminal protocol is used to control (status monitoring) a single IRD, connected to any RS2323/RS485 host controller. Master-Slave Protocol: The IRD Master-Slave protocol is used to control (status monitoring) multi IRD connection (RS-485) or single IRD connection (RS-232) to any host controller.</p>

Table 3-9: System Configuration Menu Options

OPTION	DESCRIPTION
Control Port Baud Rate	<u>Control Port Rate Select</u> Selects the Baud rate of the RS-232/RS-488 Control Port. Available options: 9600 Baud, 19200 Baud, 38400 Baud, 57600 Baud, 115200 Baud
Control Port Address	<u>Control Port Address Set-Up</u> Sets the address of the RS-232/RS-488 Control Port. Address is given in two digits decimal number. Range: 128-255(Dec).
Data1 HSD Output Format	<u>Data1 Output Format Select</u> This parameter sets the Data1 / HSD output format. Available on the DATA Output connector. Available options: RS-422 (MSB to LSB): Transmits bytes from MSB to LSB. RS-422 (LSB to MSB): Transmits bytes from LSB to MSB.
Data2-LSD Output Format	<u>Data2 Output Format Select</u> This parameter sets the Data2 / LSD output format. Available options: RS-232: Transmits on PS-232 port, on the DATA Output Connector. RS-422 (MSB to LSB): Transmits bytes from MSB to LSB on RS-422 port. RS-422 (LSB to MSB): Transmits bytes from LSB to MSB on RS-422 port. NOTE (*): <i>The RS-422 level output is available on an extended DATA Output Connector (Optional).</i>
Data1-HSD Output Rate	<u>Data1 Output Rate Set-Up</u> This parameter sets the Data1 / HSD output rate. Available rates: 10 K b/s through 20 M b/s .
Data2-LSD Output Rate	<u>Data2 Output Rate Set-Up</u> This parameter sets the Data2 / LSD output rate. Available rates: 1200 Baud through 115200 Baud .
Default Data Port	<u>Default Data Port Definition</u> Determines the default data port when the data PID does not provide HSD/LSD descriptor. Options are: Data1, Data2 / LSD .
DSNG-CA Encryption Mode	<u>DSNG Encryption Mode Selection</u> Selects the DSNG-Conditional Access (CA) encryption mode. Options available: BISS-Mode 1 BISS-E – Clear SW: BISS-E – Injected ID BISS-E – Buried ID EVEN-ODD

Table 3-9: System Configuration Menu Options

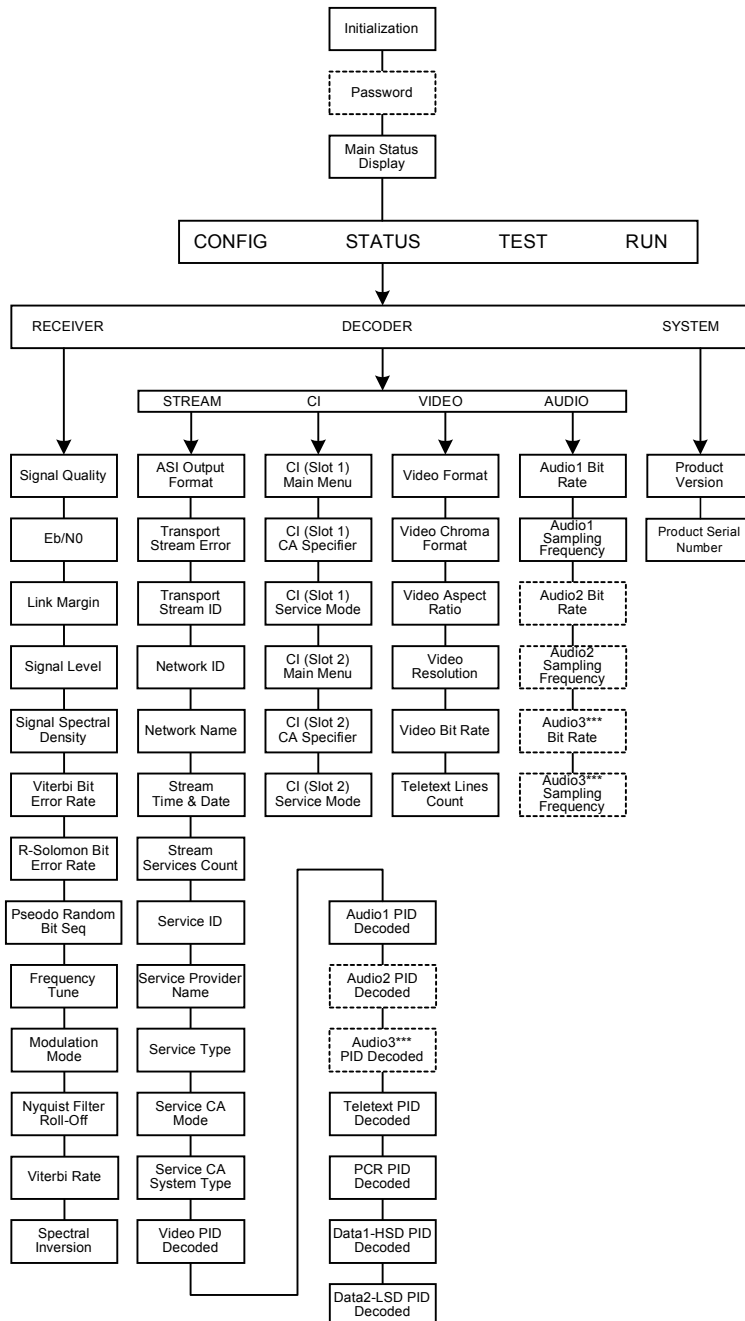
OPTION	DESCRIPTION
Session Word	<u>Session Word Setup</u> Sets the session word for BISS encryption word value (8 digits Hex word), for all BISS CA encryption modes NOTE This option is NOT available when the EVEN-ODD DSNG-CA Encryption mode is selected.
ODD/EVEN Key	<u>Odd / Even Key Setup.</u> Sets the key value (64 bit word), for the ODD/EVEN CA Encryption mode. NOTE This option is available ONLY when the EVEN-ODD DSNG-CA Encryption mode is selected. It is NOT available when any of the BISS CA Encryption modes are activated.
Injected ID	<u>BISS-E – Injected ID Word Setup.</u> Sets the word value (56 bit word), for the BISS-E / Injected ID mode. NOTE T this option is available ONLY when the BISS-E / Injected ID DSNG-CA Encryption mode is selected. It is NOT available when any of the other DSNG-CA Encryption modes are activated.

3.3. Status Menu

The Status Menu enables the IRD operator to monitor specific functions and activities in the IRD. Figure 3-12 shows the IRD Status Menu tree and the options available to the user (password is required only if it was enabled previously).

The IRD Front Panel display, controls and keypad are used to scroll through the menu, view the options available and set the parameters of the configuration functions provided.

Figure 3-12: IRD Status Menu Tree Structure (DSNG IRD Configuration)



3.3.1. Status / Receiver Menu

The IRD is provided in a wide range of input receivers; QPSK (DVB-S), DSNG (DVB-DSNG), QAM (DVB-C), G.703 (E1, E2, E3) and ATM (DVB-PDH) input options. The Status / Receiver Menu is input sensitive (i.e., varies automatically according to the IRD Input option installed), and provides a group of functions to monitor the input section of the IRD.

Figure 3-13 shows the menu options provided for the different front end interface. IRDs with a G.703 Input option do not have a Status/Receiver Menu.

The IRD Front Panel display, controls and keypad are used to scroll through the menu, view the options available and set the parameters of the configuration functions provided. Table 3-10 describes the configuration functions available for the receiver option installed in the IRD-2600 / IRD-2800 (DSNG, QPSK, QAM, ATM and G.703 input options).

The icon legend is used to show option availability for the specific receiver.

Figure 3-13: DSNG Receiver Status Menu Tree Structure

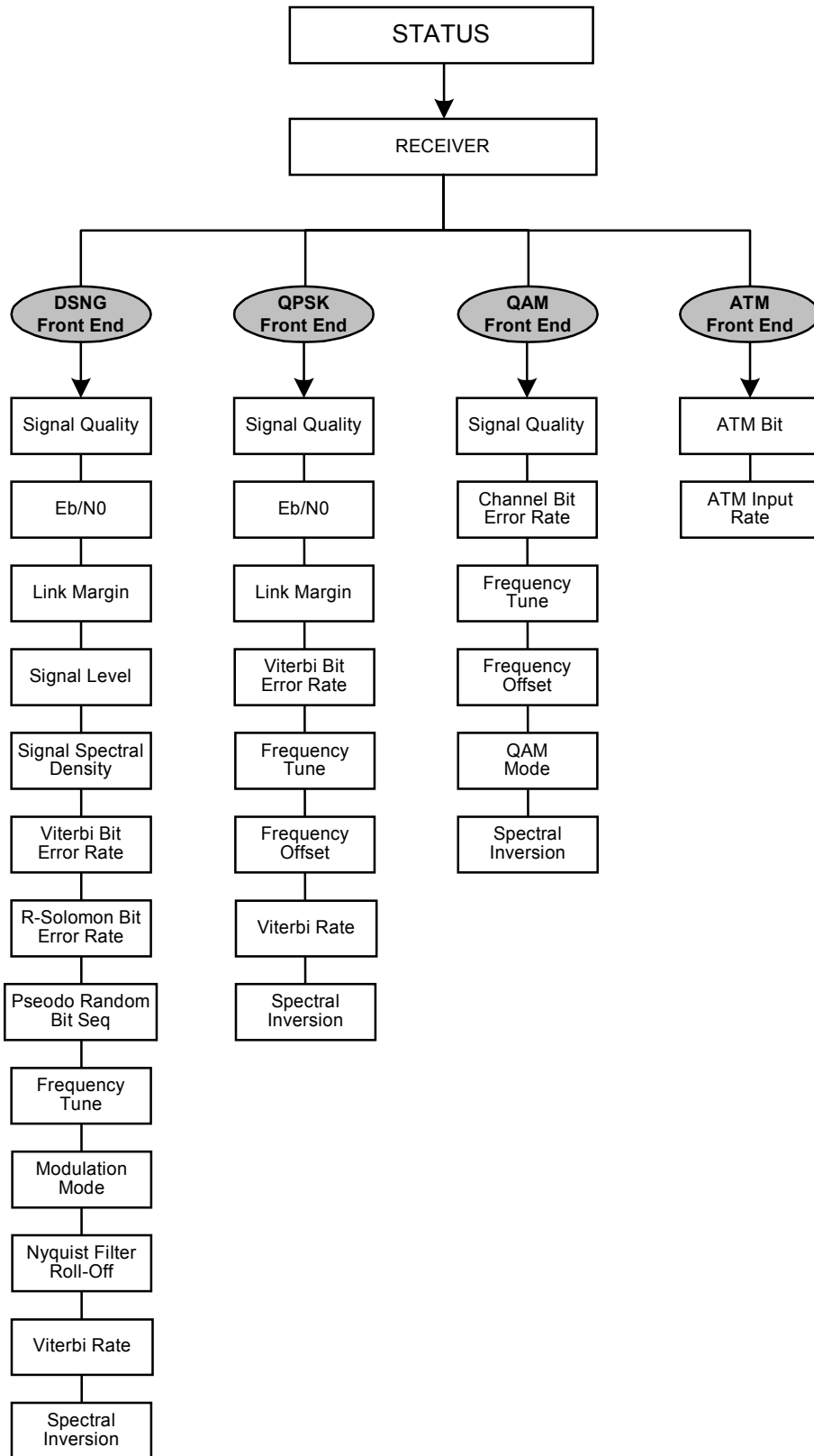


Table 3-10: Receiver Status Menu Parameters

DSNG	QPSK	QAM	ATM	G.703	OPTION	DESCRIPTION
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			Signal Quality	<p><u>Signal Quality Indicator</u> Displays the quality of the input signal as a bar. The longer the bar, the stronger the signal. The indicator may be used to position the antenna to obtain optimal signal quality.</p>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				Eb/N0	<p><u>Bit Energy Level</u> Provides an estimation of the input signal strength (bit energy) relative to the noise level (spectral density). Number is given in dB.</p> <p>NOTE <i>For a proper reading, wait one minute for value stabilization.</i></p>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				Link Margin	<p><u>Link Signal Margin Display</u> Displays the margin between the input signal strength and the link margin standard (as per Error Performance Requirements; EN300.421 for QPSK input link, and EN301.210 for DSNG input link). Number is given in dB above (+dB) or below (-dB) the link margin standard.</p>
<input checked="" type="checkbox"/>					Signal Level	<p><u>Input Signal Level</u> Displays the signal level at the RF input to the receiver. Number is given in dBm.</p>
<input checked="" type="checkbox"/>					Signal Spectral Density	<p><u>Input Signal Spectral Density Level</u> Displays the signal spectral density at the RF input to the receiver. Number is given in dBm /Hz.</p>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				Viterbi Bit Error Rate	<p><u>Viterby Bit Error Rate (BER) Indication</u> Indicates BER level measured after Viterbi correction.</p>
<input checked="" type="checkbox"/>					R-Solomon Bit Error Rate	<p><u>Reed-Solomon Bit Error Rate (BER) Indication</u> Indicates BER level measured after Reed-Solomon correction.</p>
<input checked="" type="checkbox"/>					Pseodo Random Bin Seq	<p><u>Pseodo Random Binary Sequence Detection</u> Checks and displays detection of the Pseodo Random Binary Sequence data in the DSNG packet and the test results. Displays one of the following messages: Not Available: Test data not detected. RCV: [# error bits detected] [test time (sec)] AIS: [# error bits detected] [test time (sec)]</p>

Table 3-10: Receiver Status Menu Parameters

DSNG	QPSK	QAM	ATM	G.703	OPTION	DESCRIPTION
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			Frequency Tune	<p><u>Tune Frequency Received</u> Displays the tuner programmed frequency of the signal received at the IRD (as set in the Receiver Configuration Menu, see paragraph 3.2.1). Number given in KHz.</p> <p>NOTE <i>When the Frequency Drift Compensation function is activated, the displayed frequency is adjusted by the frequency offset during receiver operation.</i></p>
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			Frequency Offset	<p><u>Frequency Offset Value</u> Indicates the frequency offset between the expected carrier frequency (as set in the Receiver Configuration Menu, see paragraph 3.2.1) and the carrier frequency of the recovered signal at the antenna. Number is given in KHz.</p>
		<input checked="" type="checkbox"/>			QAM Mode	<p><u>QAM IRD Operational Mode</u> Displays the QAM mode active in the QAM IRD receiver (as set in the Receiver Configuration Menu, see paragraph 3.2.1). Options available: 16 QAM, 32 QAM, 64 QAM, 128 QAM, 256 QAM.</p>
<input checked="" type="checkbox"/>					Modulation Mode	<p><u>DSNG IRD Modulation</u> Displays the modulation detected at the DSNG IRD receiver (as set in the Receiver Configuration Menu, see paragraph 3.2.1). Options available: QPSK, 8PSK, 16QAM.</p>
<input checked="" type="checkbox"/>					Nyquist Filter Roll-Off	<p><u>Nyquist Filter Roll-Off</u> Displays the current roll-off value of the Nyquist filter in the DSNG IRD (as set in the Configuration/Receiver Menu, see paragraph 3.2.1). Options available: 25%, 35%.</p>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			Viterbi Rate	<p><u>Viterbi Rate</u> Displays the current rate for the Viterbi correction (as set in the Configuration/Receiver menu, see paragraph 3.2.1). Options available: 1/2, 2/3, 3/4, 4/5, 5/6, 6/7, 7/8, 8/9.</p>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				Spectral Inversion	<p><u>Spectral Inversion State</u> Displays the current state of the spectral inversion function in the receiver (as set in the Configuration/Receiver menu, see paragraph 3.2.1). Options available: NORMAL, INVERTED.</p>

Table 3-10: Receiver Status Menu Parameters

DSNG	QPSK	QAM	ATM	G.703	OPTION	DESCRIPTION
			<input checked="" type="checkbox"/>		ATM Bit	CAUTION <i>Advanced status functions to be operated ONLY by the authorized Scopus personnel. Unauthorized operation may create in unpredicted results.</i>
			<input checked="" type="checkbox"/>		ATM Input Rate	<u>ATM IRD Input Modulation</u> Displays the input rate active at the ATM IRD receiver (as set in the Receiver Configuration Menu, see paragraph 3.2.1). Options available: 14 Kbit/sec.

3.3.2. Status / Decoder Menu

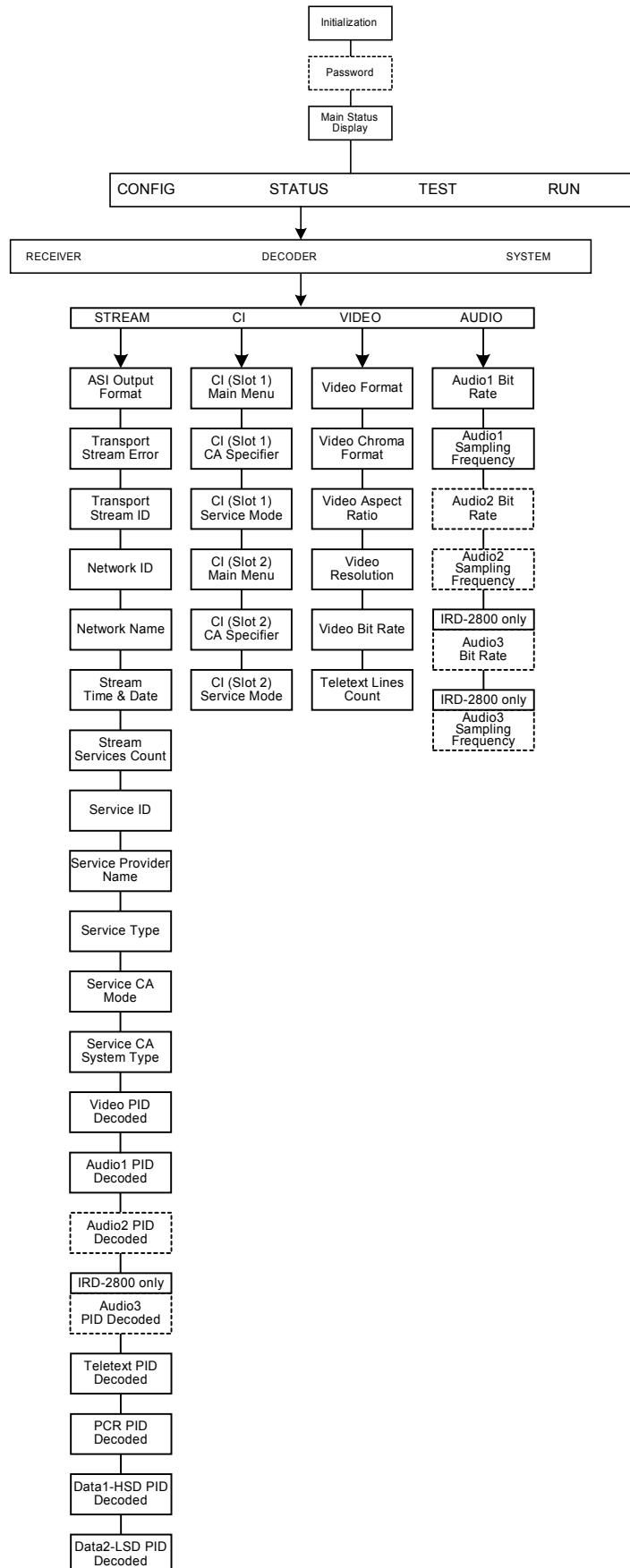
The Decoder Status Menu enables the IRD user to monitor the status of the decoder in the IRD. Figure 3-14 shows the menu tree of status parameters available in the Decoder Status Menu (password is required only if it was enabled previously).

The IRD Front Panel display, controls and keypad are used to scroll through the menu, view the options available and set the parameters of the configuration functions provided.

The Decoder Status monitoring options are grouped into four groups and are described in the following sub-paragraphs:

- Decoder/Stream Status monitoring sub-menu, refer to paragraph 3.3.2.1.
- Decoder/Common Interface (CI) Status monitoring sub-menu, refer to paragraph 3.3.2.2.
- Decoder/Video Status monitoring sub-menu, refer to paragraph 3.3.2.3.
- Decoder/Audio Status monitoring sub-menu, refer to paragraph 3.3.2.4.

Figure 3-14: Decoder Status Menu Tree Structure



3.3.2.1. Decoder / Stream Status Sub-Menu

The Decoder / Stream Status Sub-Menu provides an extended menu of status monitoring options on the input stream data.

Figure 3-15 shows the menu tree of status monitoring options available in the Decoder / Stream Status Sub-Menu. Table 3-11 describes the status parameters provided by the sub-menu to the IRD operator.

Figure 3-15: Decoder / Stream Status Sub-Menu Tree Structure

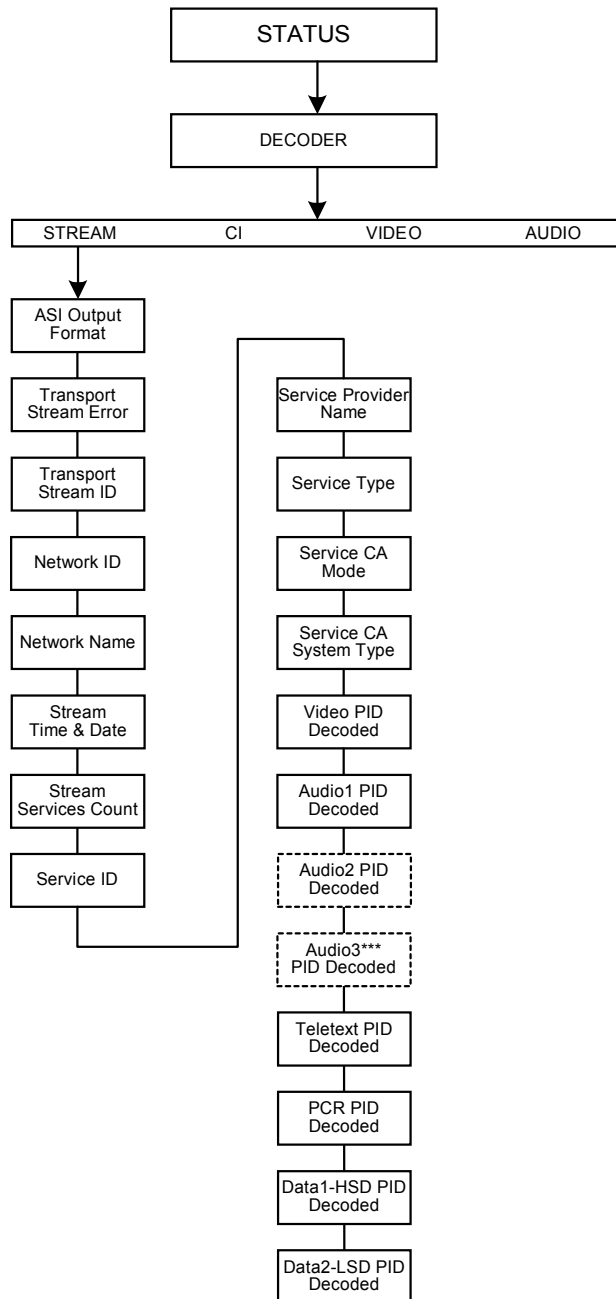


Table 3-11: Decoder / Stream Status Sub-Menu Parameters

OPTIONS	DESCRIPTION
ASI Output Format	<u>Current ASI Output Format</u> Displays the current format of the ASI output; 188 or 204 bytes packets.
Transport Stream ID	<u>Current Transport Stream ID</u> Displays the identification code of the current transport stream in decimal (Dec) and hexadecimal (Hex) values.
Network ID	<u>Current Network ID</u> Displays the identification code of the current network in decimal (Dec) and hexadecimal (Hex) values.
Network Name	<u>Current Network Name</u> Displays the provider name of the current network in decimal (Dec) and hexadecimal (Hex) values.
Stream Time-Date	<u>Current Stream Time-Date</u> Displays the time (HH:MM:SS) and date (DD-MMMM-YYYY) of the current incoming stream.
Stream Service Count	<u>Current Service Count</u> Displays the service count of the current stream in decimal (Dec) values.
Service ID	<u>Current Service ID</u> Displays the identification code of the current service in decimal (Dec) and hexadecimal (Hex) values.
Service Provider Name	<u>Current Service Provider Name</u> Displays the service provider name of the current DVB input stream.
Service Type	<u>Current Service Type</u> Displays the service type of the current DVB input stream (TV, Radio, Data, etc...).
Service CA Mode	<u>Current Conditional Access (CA) Mode</u> Displays the CA mode currently applied to the service. Service may be Clear, or Encrypted.
Service CA System Types	<u>Current CA System Type</u> Displays the types of CA Systems included in the current service. Second line displays the name of the system type.
Video PID Decoded	<u>Current Video PID</u> Displays the PID currently decoded for the video signal received.

Table 3-11: Decoder / Stream Status Sub-Menu Parameters

OPTIONS	DESCRIPTION
Audio1 PID Decoded	<u>Current Audio1 PID</u> Displays the PID currently decoded for the audio_1 signal received.
Audio2 PID Decoded	<u>Current Audio2 PID</u> Displays the PID currently decoded for the audio_2 signal received.
Audio3 PID Decoded	<u>Current Audio3 PID</u> Displays the PID currently decoded for the audio_3 signal received. (Available ONLY in the IRD-2800).
Teletext PID Decoded	<u>Current Teletext PID</u> Displays the PID currently decoded for the Teletext signal received.
PCR PID Decoded	<u>Current PCR-PID</u> Displays the PID currently decoded for the PCR information received.
Data1- HSD PID Decoded	<u>Current Data1-HSD PID</u> Displays the PID currently decoded for the Data1-HSD data received.
Data2- LSD PID Decoded	<u>Current Data2-HSD PID</u> Displays the PID currently decoded for the Data2-LSD data received.

3.3.2.2. Decoder / CI Status Sub-Menu

The Decoder / CI Status Sub-Menu provides an extended menu of status monitoring options on the Common Interface (CI) data.

Figure 3-16 shows the menu tree of status monitoring options available in the Decoder / CI Status Sub-Menu. Table 3-12 describes the status parameters provided by the sub-menu to the IRD operator.

Figure 3-16: Decoder / CI Status Sub-Menu Tree Structure

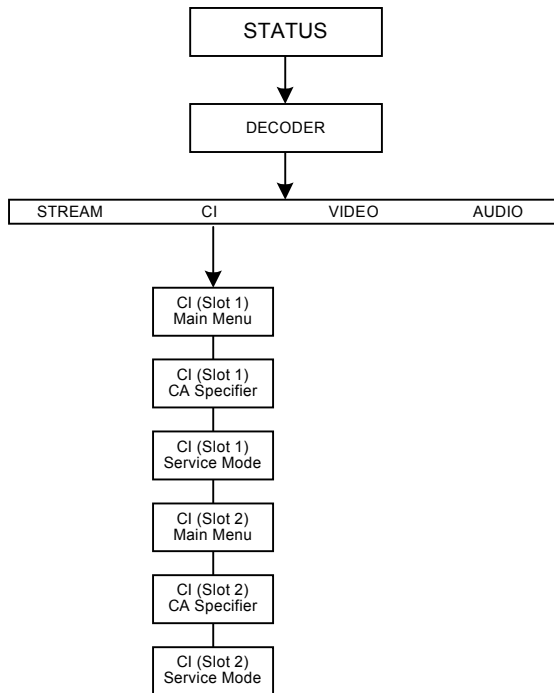


Table 3-12: Decoder / CI Status Sub-Menu Parameters

OPTIONS	DESCRIPTION
CI (SLOT 1) Main Menu	<u>Slot 1 CI Module Name</u> Provides the name of the module installed in SLOT 1, in accordance with EN 50221 requirements (refer to paragraph 8.4.2.2, table 21). The name is filtered from the CIS Table in the module.
CI (SLOT 1) CA Specifier	<u>Slot 1 CI Module Specifier</u> Provides the system ID of the module currently installed in SLOT 1, in accordance with ETR-162 requirements (refer to paragraph 4.3, table 5).
CI (SLOT 1) Service Mode	<u>Slot 1 CI Current Service</u> Displays the response of the module currently installed in SLOT 1 to the service currently received. Options available: NO CA DESCRIPTORS: Service not encrypted. NOT ENTITLED: Service encrypted but module in SLOT 1 not entitled to it (i.e. service not enabled). ENTITLED: Service encrypted and module in SLOT 1 entitled to it (i.e. service enabled).
CI (SLOT 2) Main Menu	<u>Slot 2 CI Module Name</u> Provides the name of the module installed in SLOT 2, in accordance with EN 50221 requirements (refer to paragraph 8.4.2.2, table 21). The name is filtered from the CIS Table in the module.
CI (SLOT 2) CA Specifier	<u>Slot 2 CI Module Specifier</u> Provides the system ID of the module currently installed in SLOT 2, in accordance with ETR-162 requirements (refer to paragraph 4.3, table 5).
CI (SLOT 2) Service Mode	<u>Slot 2 CI Current Service</u> Displays the response of the module currently installed in SLOT 2 to the service currently received: Options available: NO CA DESCRIPTORS: Service not encrypted. NOT ENTITLED: Service encrypted but module in SLOT 2 not entitled to it (i.e. service not enabled). ENTITLED: Service encrypted and module in SLOT 2 entitled to it (i.e. service enabled).

3.3.2.3. Decoder / Video Status Sub-Menu

The Decoder / Video Status Sub-Menu provides an extended menu of status monitoring options on the video data.

Figure 3-16 shows the menu tree of status monitoring options available in the Decoder / Video Status Sub-Menu. Table 3-12 describes the status parameters provided by the sub-menu to the IRD operator.

Figure 3-17: Decoder / Video Status Sub-Menu Tree Structure

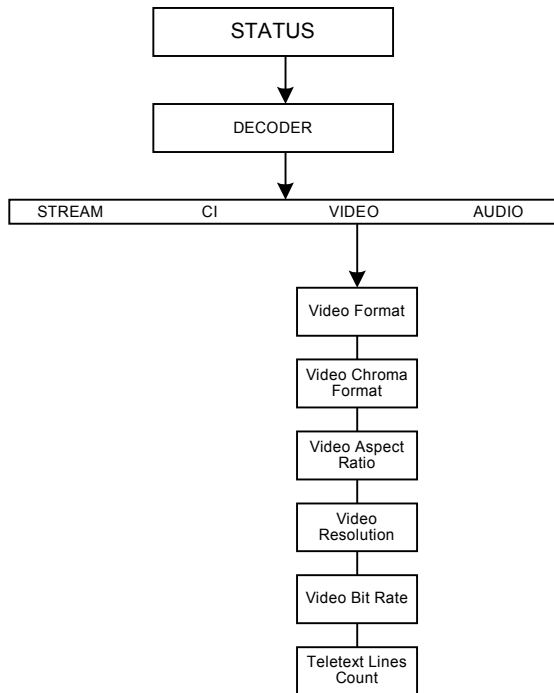


Table 3-13: Decoder / Video Status Sub-Menu Parameters

OPTIONS	DESCRIPTION
Video Format	<u>Current Video Format</u> Displays the video format currently used (as configured in the Decoder/ Video Configuration Sub-Menu, refer to paragraph 3.2.2.3). Options available: PAL B/G, PAL M, NTSC, PAL D, SECAM, PAL N.
Video Chroma	<u>Current Video Chroma Format</u> Displays the Chroma format currently used for the incoming video stream: Options available: 4:2:0 (4:2:0 and 4:2:2 are available only in IRD-2800)
Video Aspect Ratio	<u>Current Video Aspect Ratio</u> Displays the aspect ratio for the incoming video stream. Options available: 4:3, 16:9
Video Resolution	<u>Current Video Resolution</u> Displays the horizontal and vertical video resolutions for the incoming video stream (i.e., the number of pixels per horizontal and vertical screen lines).
Video Bit Rate	<u>Current Video Bit Rate</u> Displays the bit rate, in bits/sec, for the incoming video stream.
Teletext Line Count	<u>Current Teletext Line Count</u> Shows the number of Teletext lines detected on each video field.

3.3.2.4. Decoder / Audio Status Sub-Menu

The Decoder / Audio Status Sub-Menu provides an extended menu of status monitoring options on the audio data.

Figure 3-18 shows the menu tree of status monitoring options available in the Decoder / Audio Status Sub-Menu. Table 3-14 describes the status parameters provided by the sub-menu to the IRD operator.

Figure 3-18: Decoder / Audio Status Sub-Menu Tree Structure

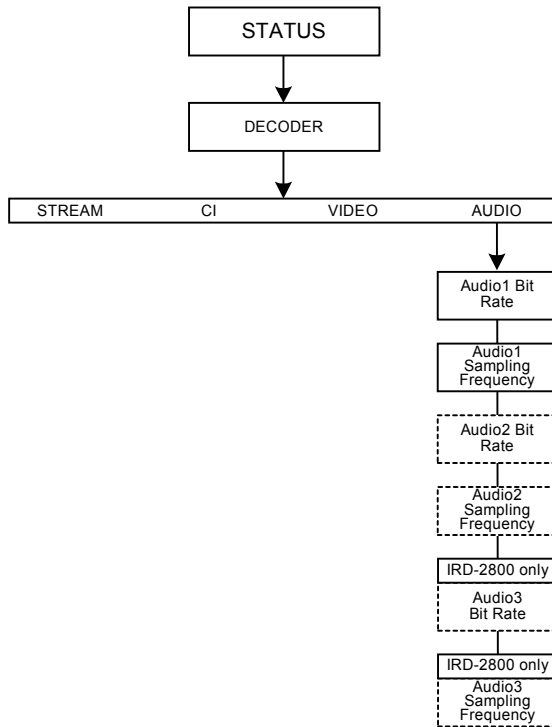


Table 3-14: Decoder / Video Status Sub-Menu Parameters

OPTION	DESCRIPTION
Audio1 Bit Rate	<u>Current Audio1 Bit-Rate</u> Displays the current Audio1 rate, in bits/sec.
Audio1 Sampling Frequency	<u>Current Audio1 Sampling Frequency</u> Displays the current Audio1 sampling frequency, in KHz.
Audio2 Bit rate	<u>Current Audio2 Bit-Rate</u> Displays the current Audio2 rate, in bits/sec.
Audio2 Sampling Frequency	<u>Current Audio2 Sampling Frequency</u> Displays the current Audio2 sampling frequency, in KHz.
Audio3 Bit Rate	<u>Current Audio3 Bit-Rate</u> Displays the current Audio3 rate, in bits/sec (Available ONLY in the IRD-2800).
Audio3 Sampling Frequency	<u>Current Audio3 Sampling Frequency</u> Displays the current Audio3 sampling frequency, in KHz (Available ONLY in the IRD-2800).

3.3.3. Status / System Menu

The System Status Menu enables the IRD user review the current version of the IRD. Figure 3-14 shows the menu tree flowchart to the Status/System Menu with an example of message displayed on the LCD display. Table 3-15 describes the System Status Menu options.

Figure 3-19: System Status Menu Tree

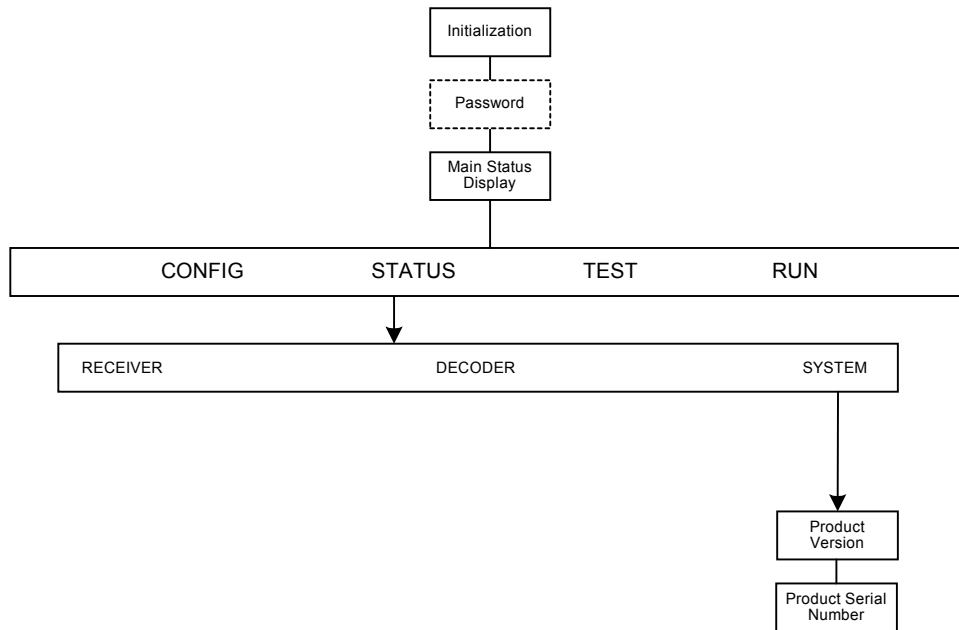


Table 3-15: System Status Menu Parameters

OPTION	DESCRIPTION
Product Version	<u>Product Version Information</u> Provides the current Version Code, Date, and Time. Example format: H/W BOOTMAINDATE 420 02:00 014 22 NOV 2000
Product Serial Number	<u>Product Serial Number</u> Provides the product serial number in hex and decimal. Example: 0003E8 hex 00001000 Dec

3.4. Test Menu

The IRD enables the user to perform a group of tests to check the correct operation of the unit. Figure 3-20 shows the Test Menu Tree structure (password is required only if it was enabled previously). Table 3-16 describes the test options provided by the menu.

The IRD Front Panel display, controls and keypad are used to scroll through the menu, view the options available and set the parameters of the configuration functions provided.

Figure 3-20: Test Menu Tree Structure

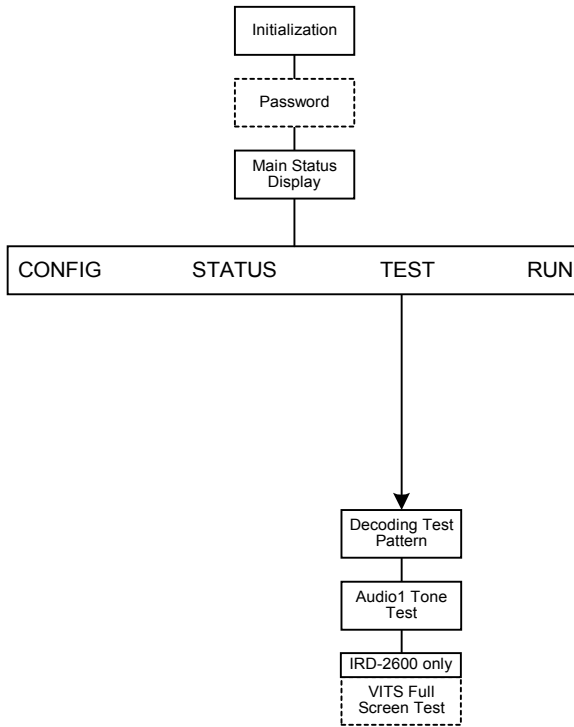


Table 3-16: Test Menu Functions

OPTION	DESCRIPTION
<p>Decoding Test Pattern</p>	<p><u>Test Pattern Decoding Test</u> This test option checks the response of the decoding function in the IRD to various internally injected test patterns. Available test options: None PAL B/G, PAL D, SECAM, PAL N (these tests include display of Teletext information) PAL M, NTSC (these tests include display of Audio1 and Audio2 information)</p>
<p>Audio1 Tone Test</p>	<p><u>Audio 1 Tone Test</u> This test option establishes the tone test for Audio 1. Test tone is between 1 KHz to 10 KHz.</p>
<p>VITS Full Screen Test (IRD-2600 Only)</p>	<p><u>VITS Test</u> NOTE <i>This test is available ONLY in the IRD-2600</i> Insertion of full screen test pattern only if the Video Internal Time Code (VITS) is enabled (refer to the Decoder / Video Configuration Sub-Menu, see paragraph 3.2.2.3). Available test options: NONE SIGNAL TO NOISE (S/N) SIN (x)/x BAR 75% CCIR473 LINE 17 CCIR473 LINE 18 CCIR473 LINE 330 CCIR473 LINE 331 CCIR473 ADDITIONAL</p>

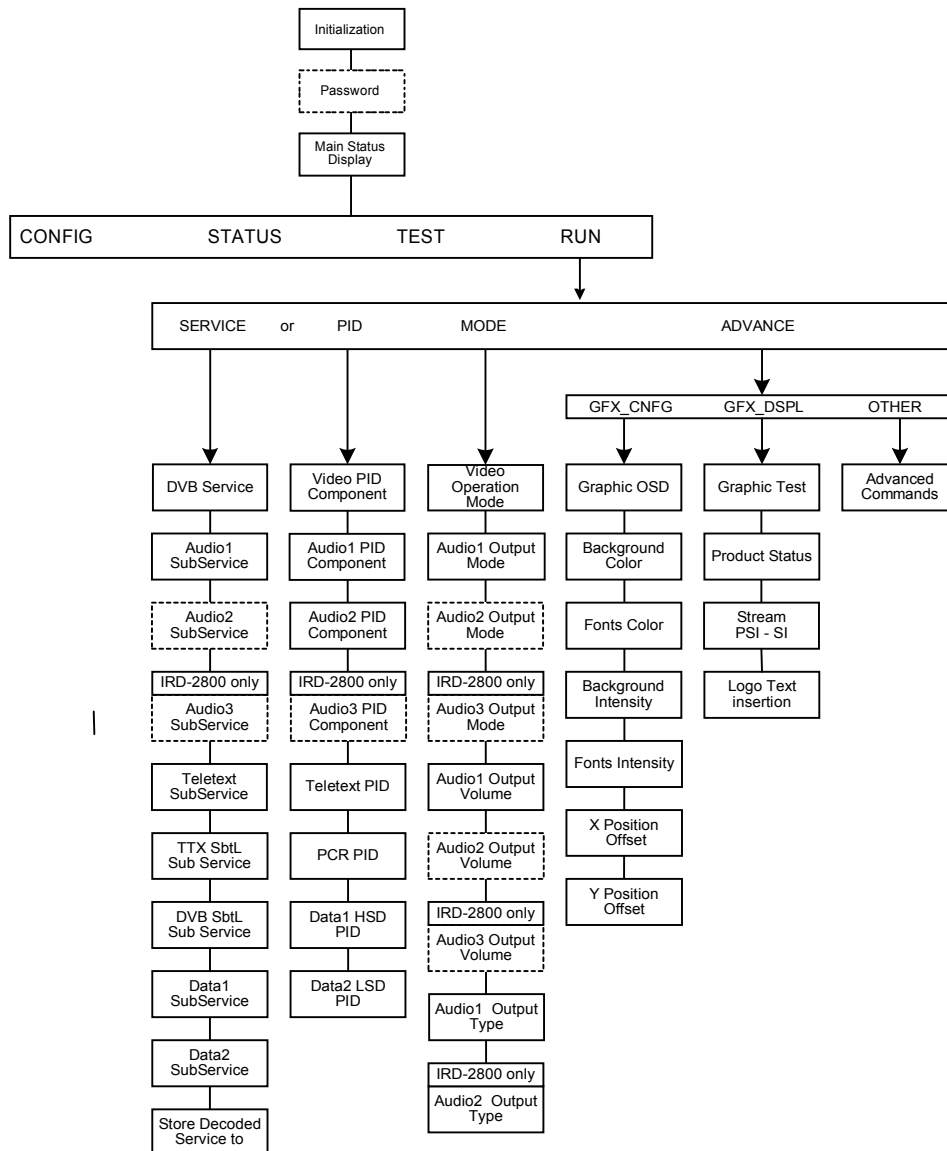
3.5. Run Menu

The IRD Run Menu provides the IRD user access to high-level operation functions. The IRD operation is basically effected when operated by information received from the stream (Service parameters) or from the users (PID parameters), as set by the Decoder / Stream Configuration Sub-menu, see paragraph 3.2.2.1.

Figure 3-21 shows the IRD Run Menu tree and the options available to the user (password is required only if it was enabled previously).

The IRD Front Panel display, controls and keypad are used to scroll through the menu, view the options available and set the parameters of the configuration functions provided.

Figure 3-21: IRD Run Menu Tree Structure



NOTE

Either the Run Service Menu or the Run PID Menu can be displayed under the IRD Run Menu.

Selection is provided either by choosing the “DVB Service Content” (Service) parameter, or the “Manually By User” (PID) parameter, in the Decoder / Stream Configuration Sub-Menu (see paragraph 3.2.2.1).

3.5.1. Run / Service Menu

The Service Run Menu enables the IRD user to control the operation of the IRD using the Service parameters (available in the PSI/SI tables from the broadcaster). When the IRD receives data from the service, it is provided on the relevant menu screen on the IRD Front Panel LCD.

Figure 3-22 shows the menu tree flowchart for the Service Run Menu (password is required only if it was enabled previously). In addition, Figure 3-22 displays a typical LCD screen. The top line of the LCD displays the function and ID data. The bottom line displays the options available under the function. Table 3-17 describes the System Status Menu options.

Figure 3-22: Service Run Menu Tree Structure

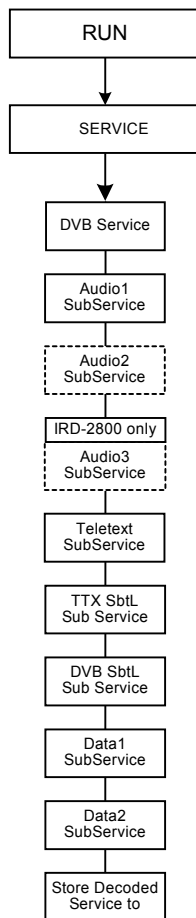


Table 3-17: Service Run Menu Parameters

OPTION	DESCRIPTION
<p>DVB Service</p>	<p><u>DVB Service Selection</u> Enables selection of a DVB Service from within the PSI-SI tables contained within the stream e.g. CNN, FOX, MSNBC ... The top line on the LCD displays the Service Type and Service ID Example: TV 001. The bottom line displays a list of all available services for selection. The information is provided as index number and the Service Name. Example: 001 FOX CH1</p> <p>NOTE <i>This option can be accessed directly from the Start-Up Menu by pressing the LEFT Touch Pad on the Front Panel.</i></p>
<p>Audio1 Sub Service</p>	<p><u>Audio1 Sub Service Selection</u> Enables selection of Audio1 Sub-service, contained within the main DVB Service. The top line on the LCD displays the Audio 1 PID number. The bottom line displays a list of all available services for selection. The information is provided as index number, the language format and the audio type: Musicam (default, no marking), Dolby digital (AC3), uncompressed (LINEAR) or Dual mono (2 MONO). Example: 001 French-AC-3</p>
<p>Audio2 Sub Service</p>	<p><u>Audio2 Sub Service Selection</u> Enables selection of Audio2 Sub-service, contained within the main DVB Service. The top line on the LCD displays the Audio 2 PID number. The bottom line displays a list of all available services for selection. The information is provided as index number the language format and the audio type: Musicam (default, no marking), Dolby digital (AC3), uncompressed (LINEAR) or Dual mono (2 MONO). Example: 003 German – 2 MONO.</p>
<p>Audio3 Sub Service</p>	<p><u>Audio3 Sub Service Selection</u> (Available ONLY in the IRD-2800) Enables selection of Audio3 Sub-service, contained within the main DVB Service. The top line on the LCD displays the Audio 3 PID number. The bottom line displays a list of all available services for selection. The information is provided as index number the language format and the audio type: Musicam (default, no marking), Dolby digital (AC3), uncompressed (LINEAR) or Dual mono (2 MONO). Example: 005 Japanese</p>
<p>Teletext Sub Service</p>	<p><u>Teletext Sub Service Selection</u> Enables selection of Teletext Sub-service, contained within the main DVB Service. The top line on the LCD displays the Teletext PID number. The bottom line displays a list of all available services for selection. The information is provided as index number and the language format. Example: 007 Russian</p>

Table 3-17: Service Run Menu Parameters

OPTION	DESCRIPTION
TTX SbtL Sub Service	<u>EBU Teletext Subtitle Page Sub Service Selection</u> Enables selection of the Teletext Subtitle Page Sub-service, contained within the main DVB Service. (in accordance to ETS 300 743). The top line on the LCD displays the Teletext Subtitle Page number. The bottom line displays a list of all available services for selection. The information is provided as index number and the language format. Example: 005 Japanese
DVB SbtL Sub Service	<u>DVB SbtL Sub Service Selection</u> Enables selection of DVB SbtL Sub-service, contained within the main DVB Service. The top line on the LCD displays the DVB SbtL PID number. The bottom line displays a list of all available services for selection. The information is provided as index number and the language format. Example: 007 Russian
Data1 Sub Service	<u>Data1 Sub Service Selection</u> Enables selection of the 1'st Data Channel (HS, high speed data) Sub-service, contained within the main DVB Service. The top line on the LCD displays the HS Data (Channel 1) PID number. The bottom line displays a list of all available services for selection. The information is provided as index number. Example: 005 H.S Data
Data2 Sub Service	<u>Data2 Sub Service Selection</u> Enables selection of the 2'nd Data Channel (LS, low speed data) Sub-service, contained within the main DVB Service. The top line on the LCD displays the LS Data (Channel 2) PID number. The bottom line displays a list of all available services for selection. The information is provided as index number. Example: 005 L.S Data
Store Decoded Service to	<u>Current Service Store</u> Stores the current IRD Service Parameters to one of the non-volatile memory Setups. A maximum of 140 setups may be stored (1-140).

3.5.2. Run / PID Menu

The PID Run Menu enables the IRD user to control the operation of the IRD by setting the Packet Identifier (PID) parameters

Figure 3-23 shows the menu tree flowchart for the PID Run Menu (password is required only if it was enabled previously). Table 3-18 describes the System Status Menu options.

Figure 3-23: PID Run Menu Tree Structure

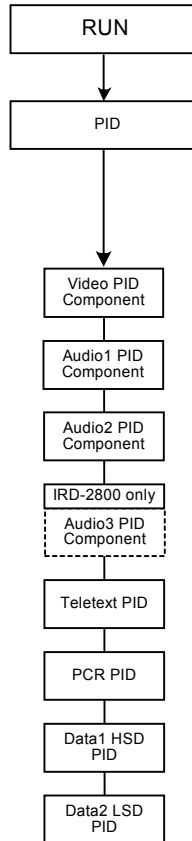


Table 3-18: PID Run Tree Parameters

OPTION	DESCRIPTION
Video PID Component	Sets values for Video PID (in Hexadecimal). Accepted values: 0020-1FFF(Hex).
Audio1 PID Component	Sets values for Audio1 PID (in Hexadecimal). Accepted values: 0020-1FFF(Hex).
Audio2 PID Component	Sets values for Audio2 PID (in Hexadecimal). Accepted values: 0020-1FFF(Hex).
Audio3 PID Component	Sets values for Audio3 PID (in Hexadecimal). (Available ONLY in the IRD-2800) Accepted values: 0020-1FFF(Hex).
Teletext PID	Sets values for Teletext PID (in Hexadecimal). Accepted values: 0020-1FFF(Hex).
PCR PID	Sets values for PCR PID (in Hexadecimal). Accepted values: 0020-1FFF(Hex).
Data1-HSD PID	Sets values for Data1-HSD PID (in Hexadecimal). Accepted values: 0020-1FFF(Hex).
Data2-LSD PID	Sets values for Data2-LSD PID (in Hexadecimal). Accepted values: 0020-1FFF(Hex).

3.5.3. Mode Run Menu

The Mode Run Menu enables the IRD user to control the operation of the IRD using the Packet Identifier (PID) parameters (available from the IRD).

Figure 3-24 shows the menu tree flowchart for the PID Run Menu (password is required only if it was enabled previously). Table 3-19 describes the System Status Menu options.

Figure 3-24: Mode Run Menu Tree

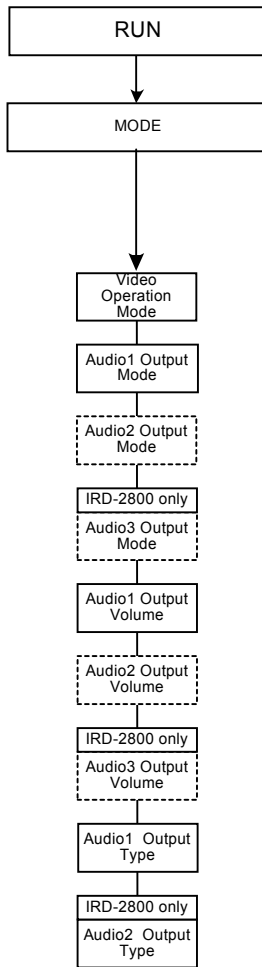


Table 3-19: Mode Run Menu Parameters

OPTION	DESCRIPTION
Video Operation Mode	<p><u>Video Decoding Control</u> This sub-menu is used to select the program operation mode. The available options are: Blank Output: video is not displayed either when no decoding or when selected. When activated, one of the following options are provided: Blank Video or 75% Wide Bar. NOTE: Last Frame is also available for IRD-2800 ONLY. Freeze Decoder: pauses current displayed picture. Play Decoder: releases a paused or stopped program.</p>
Audio1 Output Mode	<p><u>Audio1 Output Control</u> This sub-menu is used to select the Audio1 mode of a current program. The available options are: Unmute: the current analog audio is heard on Audio1 channel. Mute: Silences the analog audio signal in the Audio1 channel. To restore the audio, select the Unmute option.</p>
Audio2 Output Mode	<p><u>Audio2 Output Control</u> This sub-menu is used to select the Audio2 mode of a current program. The available options are: Unmute: the current analog audio is heard on Audio2 channel. Mute: Silences the analog audio signal in the Audio2 channel. To restore the audio, select the Unmute option.</p>
Audio3 Output Mode	<p><u>Audio3 Output Control</u> (Available ONLY for the IRD-2800). This sub-menu is used to select the Audio2 mode of a current program. The available options are: Unmute: the current analog audio is heard on Audio3 channel. Mute: Silences the analog audio signal in the Audio3 channel. To restore the audio, select the Unmute option.</p>
Audio1 Output Volume	<p><u>Audio1 Volume Control</u> Selects the volume level (gain/attenuation) for Audio1 Output digital and analog signals. Available options: from -58 dB (min) to +06 db (max) in 2 dB steps – analog values. Digital values are shifted down by -06 dB (i.e., from -64 dB to 00 dB).</p>
Audio2 Output Volume	<p><u>Audio2 Volume Control</u> Selects the volume level (gain/attenuation) for Audio2 Output analog and digital signals. Available options: from -58 dB (min) to +06 db (max) in 2 dB steps – analog values. Digital values are shifted down by -06 dB (i.e., from -64 dB to 00 dB).</p>

Table 3-19: Mode Run Menu Parameters

OPTION	DESCRIPTION
Audio3 Output Volume	<p><u>Audio3 Volume Control</u> (Available ONLY for the IRD-2800). Selects the volume level (gain/attenuation) for Audio3 Output analog and digital signals.</p> <p>Available options: from -58 dB (min) to +06 db (max) in 2 dB steps – analog values. Digital values are shifted down by -06 dB (i.e., from -64 dB to 00 dB).</p>
Audio1 (DAC) Output Type	<p><u>Audio1 DACOutput Type</u> Selects the modulation type for the Audio 1 Digital to Analog Converter (DAC).</p> <p>Options available:</p> <p>MONO MIXING: Mixes left and right stereo channels signals for mono output on both LEFT and RIGHT connectors.</p> <p>STEREO (LEFT & RIGHT): Standard stereo output on the respective LEFT&RIGHT connectors.</p> <p>BOTH RIGHT: Outputs right channels on both LEFT and RIGHT connectors.</p> <p>BOUT LEFT: Outputs left channels on both LEFT and RIGHT connectors.</p> <p>SWAP (L→, R→L): Swaps outputs; -Left channels on RIGHT connectors. -Right channels on LEFT connectors.</p>
Audio2 (DAC) Output Type	<p><u>Audio2 DAC Output Type</u> (Available ONLY for the IRD-2800). Selects the modulation type for the Audio 2 Digital to Analog Converter (DAC).</p> <p>Options available:</p> <p>MONO MIXING: Mixes left and right stereo channels signals for mono output on both LEFT and RIGHT Audio connectors.</p> <p>STEREO (LEFT & RIGHT): Standard stereo output on the respective LEFT&RIGHT connectors.</p> <p>BOTH RIGHT: Outputs right stereo on both LEFT and RIGHT connectors.</p> <p>BOUT LEFT: Outputs left stereo on both LEFT and RIGHT connectors.</p> <p>SWAP (L→, R→L): Swaps outputs; -Left channels on RIGHT connectors. -Right channels on LEFT connectors.</p>

3.5.4. Advance Run Menu

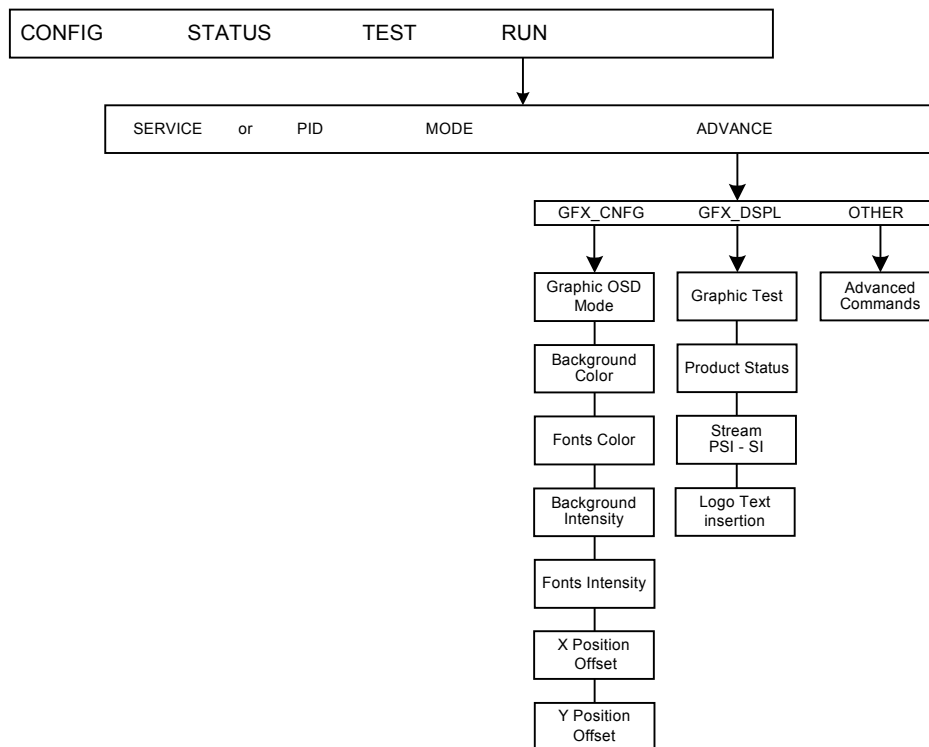
The Advance Run Menu provides the IRD user a group of advanced configuration and set-up functions for the IRD. Figure 3-24 shows the menu tree of functions available in the Advance Run Menu (password is required only if it was enabled previously).

The IRD Front Panel display, controls and keypad are used to scroll through the menu, view the options available and set the parameters of the configuration functions provided.

The Advance Run functions are grouped into three groups and are described in the following sub-paragraphs:

- Graphic Configuration (GFX-CNFG) Sub-Menu, refer to paragraph 3.5.4.1.
- Graphic Display (GFX-DSPL) Sub-Menu, refer to paragraph 3.5.4.2.
- Other Advanced Run Sub-Menu, refer to paragraph 3.5.4.3.

Figure 3-25: Advance Run Menu Tree



3.5.4.1. Graphics Configuration (GFX-CNFG) Sub-Menu

The Graphics Configuration Sub-Menu enables the IRD user to configure the graphics function provided by the IRD. This function generates graphic overlays to be displayed over the video picture.

Figure 3-26 shows the menu tree flowchart for the Graphics Configuration (GFX-CNFG) Sub-Menu Tree (password is required only if it was enabled previously). Table 3-20 describes the Sub-Menu functions.

Figure 3-26: Graphics Configuration (GFX-CNFG) Sub-Menu Tree

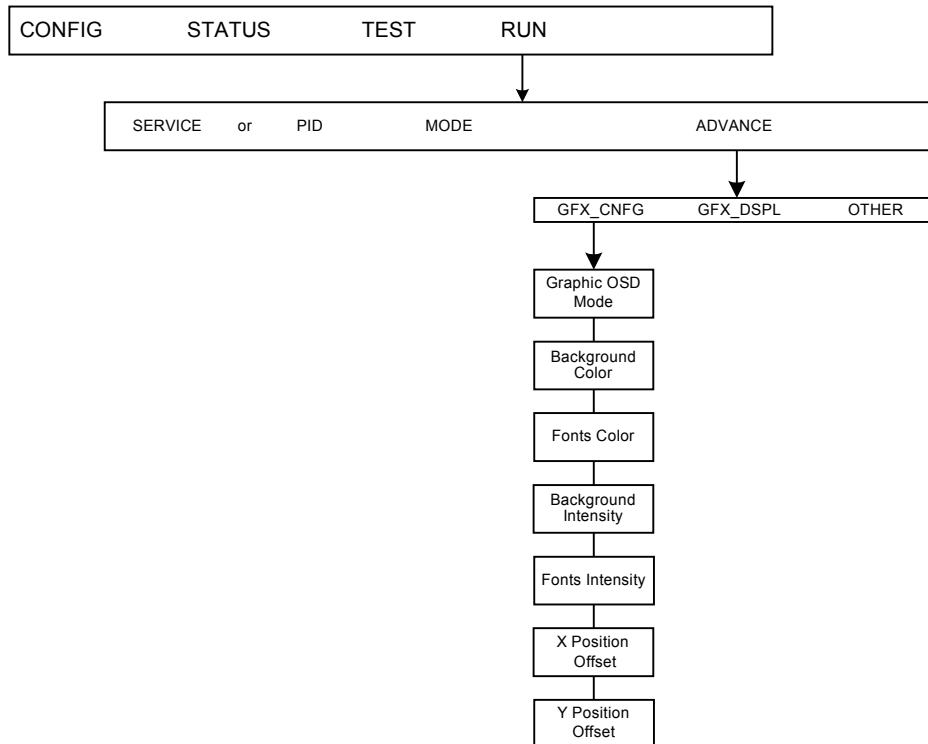


Table 3-20: Graphics Configuration (GFX-CNFG) Sub-Menu Functions

OPTION	DESCRIPTION
<p>Graphics OSD</p>	<p><u>Graphics Display Control</u> This function ENABLE/DISABLE the On Screen Display (OSD) of the IRD generated graphics overlay (as selected by the Graphics Display Sub-Menu, see paragraph 3.5.4.2). Options available: Disable: Disables on-screen display of graphic overlay. EBU-TTX Subtitle: Enables display of EBU Teletext subtitles. DVB Subtitle No Page: Enables display of DVB Subtitles. One Language is selected for the provided service. DVB Subtitle PAGE mode: Enables display of DVB Subtitles the subtitles Language is selected in the subtitle page. NOTE <i>Select DUB Subtitle Page Mode only when required. Working from DVB Subtitle No Page is more effective</i></p>
<p>Background Color</p>	<p><u>Background Color Select</u> Selects the background color (16 options) for the graphics overlay. Available options: Turquoise, White, Black, Cyan, Blue, Grey, Olive, Green, Magenta, Purple, Violet, Brown, Orange, Pink, Yellow, Red.</p>
<p>Fonts Color</p>	<p><u>Fonts Color Select</u> Selects the color (16 options) of the fonts displayed on the graphics overlay. Available options: Turquoise, White, Black, Cyan, Blue, Grey, Olive, Green, Magenta, Purple, Violet, Brown, Orange, Pink, Yellow, Red.</p>
<p>Background Intensity</p>	<p><u>Background Intensity Select</u> Selects the level of transparency (9 levels) for the graphics overlay background (i.e., how much of the video picture can be viewed through the overlay). Available options: From Level 0 (Opaque) to Level 8 (Transparent).</p>
<p>Fonts Intensity</p>	<p><u>Fonts Intensity Select</u> Selects the level of transparency (9 levels) of the fonts displayed on the graphics overlay (i.e., how much of the video picture can be viewed through the graphics). Available options: From Level 0 (Opaque) to Level 8 (Transparent).</p>
<p>X Position Offset</p>	<p><u>Subtitle Offset / X Position.</u> Sets the Lateral position (x) offset of the subtitle graphic overlay (Teletext or DVB). Range: from -120 to +120 pixels/x-position offset.</p>
<p>Y Position Offset</p>	<p><u>Subtitle Offset / Y Position.</u> Sets the vertical position (y) offset of the subtitle graphic overlay (Teletext or DVB). Range: from -120 to +120 pixels/y-position offset.</p>

3.5.4.2. Graphics Display (GFX-DSPL) Sub-Menu

The Graphics Display Sub-Menu enables the IRD user to select the graphic overlays to be displayed over the video picture.

Figure 3-27 shows the menu tree flowchart for the Graphics Display (GFX-DSPL) Sub-Menu Tree (password is required only if it was enabled previously). Table 3-21 describes the Sub-Menu functions.

Figure 3-27: Graphics Display (GFX-DSPL) Sub-Menu Tree

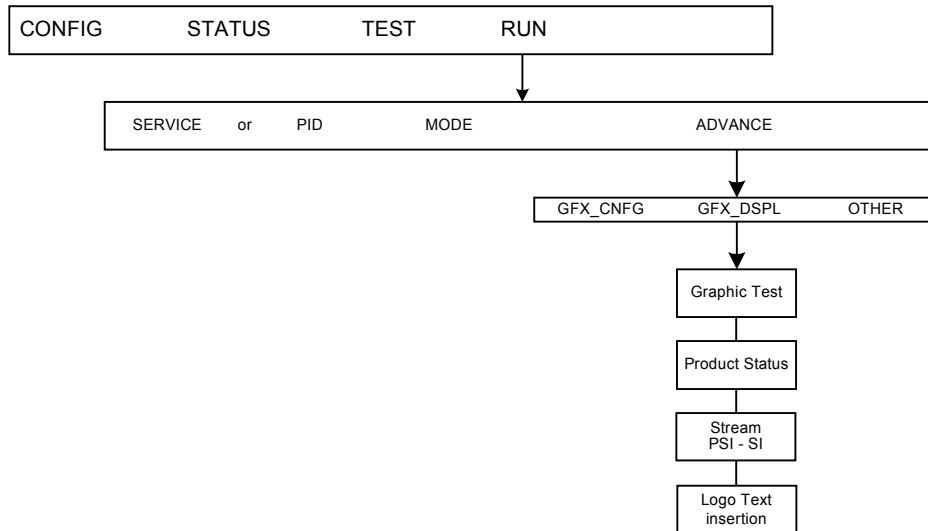


Table 3-21: Graphics Display (GFX-DSPL) Sub Menu Commands

OPTION	DESCRIPTION
<p>Graphic Test</p>	<p><u>Graphics Overlay Testing</u> Enables the user to test the capabilities of the graphics function. Available options: NONE: Test disabled COLOR LOOK-UP TABLE: 16 squares color test pattern displayed on the screen, to test the 16-color look-up table.</p>
<p>Product Status</p>	<p><u>Product Status Overlays</u> Selects for display graphic overlays with various Product Status reports. Options available: MAIN OPERATION: see example in Figure 3-28. FRONT END OPERATION: see example in Figure 3-29. PRODUCT CONFIGURATION: see example in Figure 3-30. PRODUCT REVISION: see example in Figure 3-31. PRODUCT SETUPS: see example in Figure 3-32. NONE: No Product Status overlay. NOTE: (*) <i>Same pages (marked by *above) require more than one page to display all information. Pressing the ENTER Touch Pad on the Front Panel displays the next page.</i></p>
<p>Stream PSI-SI</p>	<p><u>Stream PSI-SI Overlays</u> Selects for display graphic overlays with data from the received stream PSI/SI tables. Options available: PROGRAM ASSOCIATION TABLE (PAT): see example in Figure 3-33. PROGRAM MAP TABLE (PMT): see example in Figure 3-34. SERVICE DESCRIPTION TABLE (SDT): see example in Figure 3-35. NETWORK INFORMATION TABLE (NIT): see example in Figure 3-36. NONE: No PSI/SI based overlay.</p>
<p>Logo Text Insertion</p>	<p><u>Logo Text Overlay.</u> Inserts the Logo text graphic overlay. Options available: DISABALE (Default): Disables display of logo. LEFT BOTTOM: displays the logo on the bottoms - Left corner of the screen. LEFT TOP: Displays the logo on the top – left corner of the screen. RIGHT BOTTOM: Displays the logo on the bottom – right corner of the screen. RIGHT TOP: Displays the logo on the top – right corner of the screen.</p>

Figure 3-28: Product Status / Main Operation Overlay - Example

```

HARDWARE status : ALL OK.
OPERATION status : DECODING.
BIT STREAM status : ALL OK.
PROGRAM PIDs (hex) : Video =00A5, Audio1=0064, Audio2=001F, Pcr=00A5
: Teletext=002F, Data1 =0021, Data2 =0021.
SERVICE status : Active in PSI (0006-MTV 1-EN1- TV).
GPI status : CLOSE.
VIDEO operation mode : PLAY.
VIDEO format : PAL BG.
VIDEO chroma format : 4:2:0
VIDEO bit rate (dec): 06960000 Bit/Sec.
VIDEO resolution (dec): 480 * 576.
VIDEO aspect ratio : SOURCE= 4:3
: DISPLAY= TRANSPARENT - PAN SCAN ON.
VIDEO teletext info : EVEN= 05, ODD= 05. EBU Subtitling page= 541.
AUDIO digital output : MPEG DECODED (IEC958).
AUDIO1 analog output : PLAY - STEREO.
AUDIO1 bit rate (dec) : 192000 Bit/Sec.
AUDIO1 sampling (dec) : 48.0 kHz.
AUDIO2 analog output : PLAY.
AUDIO2 bit rate (dec) : 000000 Bit/Sec.
AUDIO2 sampling (dec) : 00.0 kHz.

```

Figure 3-29: Product Status / Front End Operation Overlay - Example

```

LNB local oscillator (dec) : UNIVERSAL (Ku).
LNB power (polarization) : 14 Volts (Vertical).
LNB 22 Khz : OFF.
FREQUENCY (dec) : 11238000 Khz.
SYMBOL rate (dec) : 27500.00 KBaud.
VITERBI rate - FEC (dec) : 3/4.
SPECTRAL inversion : NORMAL.
Eb/N0 (dec) : 10.09 dB.
Link Margin (dec) : +05.0 dB.
SIGNAL quality (dec) : 057 %.
TUNER AGC (dec) : 042 %.
VITERBI BER (dec) : 0.0e-7
FREQUENCY offset (dec) : +00000 Khz.

```

Figure 3-30: Product Status / Product Configuration Overlay - Example

```
PRODUCT Configuration :
PRODUCT TYPE (num. group) : IRD (0003E881 - 00000000).
INPUT TYPE                : PARALLEL TTL.
DECODER CLOCK (27 Mhz)   : LOCKED TO PCR.
SERVICE INFORMATION      : SERVICE MODE (PSI-SI SOURCE).
SOFTWARE UPGRADE         : AUTOMATIC.
OPTION CODES              : 00007006
** VIDEO Config' *****:
SECOND VIDEO ENCODER      : ON.
USER SETING Video Encoder : OFF.
TELETEXT                  : id=016, pts=off, start line=07, dis' lines (20-
                          5)=0000
VIDEO Interval Test Signal: VBI LINES = 17,18.
VIDEO Vertical Time Code  : VBI LINES = 14,14.
WIDE Screen Signaling    : ON (MPEG VIDEO).
VIDEO Programming System  : OFF.
CLOSE Caption            : ON (MPEG VIDEO).
SOUND Mode Control       : OFF.
** OPTION CARD Config' ***:
XILINX2 (OPTION)         : ON.
DIGITAL INTERFACE (SDI)  : ON.
VIDEO SYNC LOCK          : OFF.
SECOND AUDIO              : ON.
** CONTROL PORT Config' **:
CONTROL OPERATION        : By Software Xon-Xoff, Echo on , Burst msg on .
CONTROL RATE             : 115200 Baud.
** DATA HSD-LSD Config' **:
DATA1 OUTPUT TYPE       : RS422 (MSB-LSB).
DATA1 CLK                (dec) : 08202531 Bit/Sec.
DATA1 MPEG2 FILTER      : PES PAYLOAD.
DATA2 OUTPUT TYPE       : RS232.
DATA2 CLK                (dec) : 115057 Baud.
DATA2 MPEG2 FILTER      : DVB DATA STREAMING.
** FRONT-END Config' *****:
FRONT END TYPE           : DVBS-CAS2693A (1-45) BSDE3.
```

Figure 3-31: Product Status / Product Revision Overlay - Example

```

PRODUCT COMPONENT (hard & soft) Versions :
CPU - SOFTWARE           : MC68302-20 - Rev 02-00.50 Oct 14 2001 08:37:48.
DECODER CARD LAYOUT     : SP340      B - .
MPEG2-DVB DEMUX         : DMX-GTX   C0 - Microcode 1.30.
A/V DECODER             : AVIA-60xL E0 - Microcode 0.22.
VIDEO ENCODER           : SAA7129   H - .
AUDIO DAC                : CS4341    A - .
XILINX1                 : XCS40x1   A - .
BACK PANEL (OPTION)     : OPTIMA     A - 0334.
AUDIO2 DECODER          : CS4922    A - Microcode 4.01.
XILINX2                 : XCS40x1   A - .
    
```

Figure 3-32: Product Status / Product Setups Overlay - Example

```

PRODUCT SERVICE SETUPS :
Num | Frequency (GHz) | Symbol R (Msm) | Viterbi | LNB | Service
ID
*** | *****
      *****
000 | 01.488000 | 27.50000 | AUTO | 18V + 22KHz | 0x0006
001 | 01.488000 | 27.50000 | AUTO | 18V + 22KHz | 0x0001
002 | 01.488000 | 27.50000 | AUTO | 18V + 22KHz | 0x0002
003 | 01.488000 | 27.50000 | AUTO | 18V + 22KHz | 0x0003
004 | 01.488000 | 27.50000 | AUTO | 18V + 22KHz | 0x0004
005 | 01.488000 | 27.50000 | AUTO | 18V + 22KHz | 0x0005
006 | 01.488000 | 27.50000 | AUTO | 18V + 22KHz | 0x0006
007 | 01.488000 | 27.50000 | AUTO | 18V + 22KHz | 0x0007
008 | 01.488000 | 27.50000 | AUTO | 18V + 22KHz | 0x0008
009 | 01.488000 | 27.50000 | AUTO | 18V + 22KHz | 0x0009
    
```


Figure 3-33: Stream PSI/SI / Program Association Table (PAT) Overlay -Example

```
HEADER Information: Current Applicable Version 04, with 001 (001) Sections.
Transport Stream ID : 00C8
Network PID       : 0010
Program num.     | Program Map PID
*****          | *****
0001             | 0400
0002             | 0401
0003             | 0402
0004             | 0403
0005             | 0404
0006             | 0405
0007             | 0406
0008             | 0407
0009             | 0408
000A             | 0409
```

Figure 3-34: Stream PSI/SI / Program Map Table (PMT) Overlay - Example

```
HEADER Information: Current Applicable Version 1B, with 001 (001) Sections.
Program info:
Pcr PID         : 00A5
Stream Type     | PID | ES_info
*****         | ****| *****
Video MPEG2.   | 00A5 | CA Descriptor.
               |     | STREAM IDENTIFIER Descriptor.
Audio MPEG1.   | 0064 | CA Descriptor.
               |     | STREAM IDENTIFIER Descriptor.
Private Packet. | 002F | CA Descriptor.
               |     | STREAM IDENTIFIER Descriptor.
               |     | TELETEXT (English) Descriptor.
User Private(81) | 0021 | STREAM IDENTIFIER Descriptor.
```

Figure 3-35: Stream PSI/SI / Service Description Table (SDT) Overlay - Example

```

HEADER Information: Current Applicable Version 16, with 001 (001) Sections.
Service | Type | Descriptor
***** | ***** | *****
0001 | Encrypt | Digital Television, MTV Networks, MTV2 Pop Channel.
0002 | Encrypt | Digital Television, MTV Networks, MTV 3.
0003 | Encrypt | Digital Television, MTV Networks, Bloomberg.
0004 | Encrypt | Digital Television, MTV Networks, MTV2.
0005 | Encrypt | Digital Television, MTV Networks, MTV H.
0006 | Encrypt | Digital Television, MTV Networks, MTV 1.
0007 | Encrypt | Digital Television, MTV Networks, VH1.
0008 | Encrypt | Digital Television, MTV Networks, Sci-Fi UK.
0009 | Encrypt | Digital Television, MTV Networks, MTV F.
000A | Encrypt | Digital Television, MTV Networks, MTV 5.
    
```

Figure 3-36: Stream PSI/SI / Network Information Table (NIT) Overlay - Example

```

IRD NETWORK MEMORY CONTAIN 001 DVB STREAMS:
  Satellite net (001) -VIACOM MUX 1:
SATELLITE DELIVERY SYSTEM.
Frequency | Position | Modulate | Symbol R | FEC
***** | ***** | ***** | ***** | ***
01124150 | 0130, Eastern, Linear-vertical | QPSK | 00275000 | 3/4
    
```

3.5.4.3. Other Advance Run Sub-Menu

The Other Advance Run Sub-Menu enables a group of advanced commands.

CAUTION

Advanced functions are to be operated ONLY by the authorized Scopus personnel. Unauthorized operation may create in unpredicted results

4. MAINTENANCE

4.1. General

This chapter provides maintenance instructions for the CODICO® IRD-2600 and IRD-2800 Integrated Receiver Decoders. These instructions include test procedures and faults isolation directives.

4.2. Safety Instructions

WARNING

Whenever it is suspected that safety protection is impaired, the IRD equipment must be made inoperative and secured against unintended operation and the appropriate servicing authority must be informed.

Safety is likely to be impaired if, for example, the equipment fails to perform the intended functions or shows visible damage.

Servicing and maintenance instructions are for qualified personnel only. To reduce the risk of shock and damage to equipment, do not perform any servicing and maintenance unless you are qualified to do so.

4.2.1. Safety Precautions

The equipment described in this manual contains parts that are connected to the electrical power supply. This is a potentially lethal voltage.

For correct and safe use of IRD equipment, it is essential that operating and servicing personnel follow generally accepted safety procedures in addition to the safety precautions specified in this manual. Specific warning and caution statements, where applicable, appear throughout this manual.

Warnings, Cautions and/or symbols are marked on the IRD hardware where necessary.

4.2.2. Caution and Warning Statements

Throughout this manual, the following caution and warning symbols are used:

CAUTION SYMBOL

The CAUTION symbol is used to indicate correct operation or maintenance in order to prevent damage to, or destruction of, equipment or other property.

WARNING SYMBOL

The WARNING symbol is used to indicate a potential hazard that requires correct procedures or practices in order to prevent personal injury.

4.3. Test Procedures

4.3.1. Power-Up Check.

Power Up the IRD and check:

- Internal fan start.
- LCD panel on the front panel Lights –up.
- Perform initialisation sequence according to the directions in paragraph 2.6.

4.3.2. Maintenance Check Serviceability Check

After performing any installation, initialization, or configuration to the IRD-2600 or IRD-2800 Integrated Receiver Decoder, maintenance checks should be performed to ensure that the unit is serviceable.

A Video Monitor must be connected to the IRD-2600 in order to perform the check.

Table 4-1 provides a systematic instruction for performing a serviceability check.

Table 4-1: Serviceability Check

#	CHECK
1	Verify that the LCD Status Message reads ALL OK
2	Check for Video Picture on monitor
3	Toggle between Composite and S-VIDEO modes
4	Check Audio channels Left and Right

4.3.3. Audio/Video Stream Test

In the event that no video or audio output is received, perform a test with the internal decoder audio/video stream.

1. From the Status Message, press the down arrow.
The System Menu is displayed.
2. Select the Test Menu.
The current operation shows NONE.
3. Select the NTSC Stream.
Press ENTER.
Listen for the Test Sound (a brief musical sample) from the monitor speakers
4. A Standard Test Pattern should be displayed on the TV Monitor.
5. When both Video and Audio tests are complete, return the TEST mode to the NONE state. If you received any errors during the test, contact your vendor.

4.4. Common Status Messages

After the IRD initialization is completed, the IRD LCD displays the Common Status Message. This message provides information on the IRD status and includes the following:

- General Status message (see paragraph 4.4.1).
- Hardware Failure messages (see paragraph 4.4.2).
- BIT Stream warning messages (see paragraph 4.4.3).
- Service Warning (see paragraph 4.4.4).

4.4.1. General Status Messages

The General Status messages are displayed on the IRD Main display, providing the IRD status information. Figure 4-1 shows the structure of the message and table 5-1 lists and describes the messages available

Figure 4-1: General Status Message Example



The top line consists of three fields:

- Left field – the message, as listed in Table 4-2.
- Center(to the right) field - when “ALL OK!” message is displayed, this field displays the service type provided (TV, Radio, DATA, etc.).
- Right field - when “ALL OK!” message is displayed, this field displays the IRD operation status:
 - FRE: Free to Air, i.e., No CA descriptors
 - CAS: Conditional Access System, i.e., CA descriptors detected.
 - EN1: Enabled SLOT 1, i.e., descrambling of the selected service is possible by module in slot 1.
 - EN2: Enabled SLOT 2, i.e., descrambling of the selected service is possible by module in slot 2.

The bottom line displays the service mode.

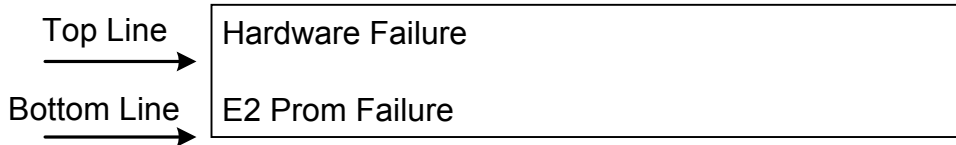
Table 4-2 General Messages

MESSAGE	TYPE	DESCRIPTION
ALL OK!	System	System initialized and ready for use
Internal Test	System	The system is performing an internal test on all components and configurations.

4.4.2. Hardware Failure Messages

The Hardware failure messages are displayed on the IRD Main Status display as shown in Figure 4-2, which shows the structure of the messages. Table 4-3 lists the messages and provides information about the detected failure type and possible reasons for the failure. It also advise the corrective action required.

Figure 4-2: Hardware Failure Message – example



The top line displays the HARDWARE FAILURE Message.

The bottom line displays the problem type.

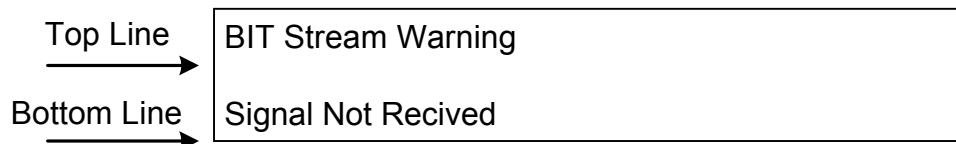
Table 4-3 Hardware Failure Messages

PROBLEM	TYPE	POSSIBLE REASON	CORRECTIVE ACTION
Demux-GTX Failure	Fault	Hardware Problem	Repair in Scopus Network Technologies
Audio/Video Decoder Failure	Fault	Hardware Problem	Repair in Scopus Network Technologies
Audio2 Decoder Failure	Fault	Hardware Problem	Repair in Scopus Network Technologies
Video Encoder1 Failure	Fault	Hardware Problem	Repair in Scopus Network Technologies
Video Encoder2 Failure	Fault	Hardware Problem	Repair in Scopus Network Technologies
Audio1 Dac Failure	Fault	Hardware Problem	Repair in Scopus Network Technologies
Video Output Failure	Fault	Hardware Problem	Repair in Scopus Network Technologies
SDI Output Failure	Fault	Hardware Problem	Repair in Scopus Network Technologies
E2Prom Failure	Fault	Hardware Problem	Repair in Scopus Network Technologies
XLINX1 Failure	Fault	Hardware Problem	Repair in Scopus Network Technologies
XLINX1 FIFO Failure	Fault	Hardware Problem	Repair in Scopus Network Technologies
XLINX1 RAM Failure	Fault	Hardware Problem	Repair in Scopus Network Technologies
XLINX2 (Option) Failure	Fault	Hardware Problem	Repair in Scopus Network Technologies
XLINX2 RAM Failure	Fault	Hardware Problem	Repair in Scopus Network Technologies
FRONT END FAILURE	Fault	Hardware Problem	Repair in Scopus Network Technologies

4.4.3. BIT Stream Warning Messages

The BIT Stream Warning messages are displayed on the IRD Main Status display. Figure 4-3 shows the structure of the message and Table 4-4 lists the messages and provides information about the detected failure types and possible reasons for the failure. It also advise the corrective action required.

Figure 4-3: BIT Stream Warning Message Example



The top line displays the BIT Stream Warning Message

The bottom line displays the problem type.

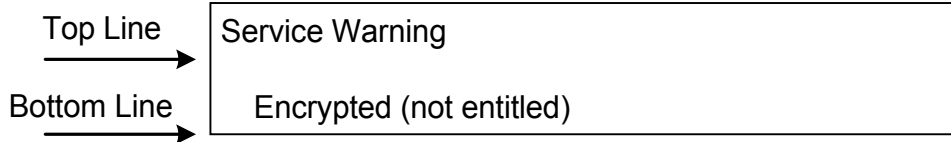
Table 4-4: Bit Stream Warning

PROBLEM	TYPE	POSSIBLE REASON	CORRECTIVE ACTION
RECEIVER			
Signal Not Received	Warning	Input Signal Problem	Set to correct parameters
Demodulator Not Sync	Warning	Input Signal Problem	Set to correct parameters
Viterbi Not Sync	Warning	Input Signal Problem	Set to correct Parameters
Deinterleaver Not Sync	Warning	Input Signal Problem	Set to correct Parameters
Front End Not Locked	Warning	Input Signal Problem G703 Lock problem	Set to correct Parameters, or repair in Scopus Network Technologies
DECODER			
No Sync (0x47) Detected	Warning	Bit Stream Problem Decoder Problem	Set to correct Parameters, or call Scopus Professional Service.

4.4.4. Service Warning Messages

The Service Warning messages are displayed on the IRD Main Status display. Figure 4-4 shows the structure of the message and Table 4-5 lists the messages and provides information about the detected failure types, possible reasons for the failure. It also advises the corrective action required to mend it.

Figure 4-4: Service Warning Message Example



The top line displays the BIT Stream Warning Message.

The bottom line displays the problem type.

Table 4-5: Service Warning

SERVICE WARNING	TYPE	POSSIBLE REASON	CORRECTIVE ACTION
Not Active in PSI-SI	Warning	Operation Fault	The current selected service is NOT included in the PSI/SI table in the stream. Select another service
Encrypted (Not Entitled)	Warning	The user is not entitled to view this service Applicable for CAS-5000 encrypted COAICO® services.	Select another service.

Appendix A. Operational Menu Trees

The Operational Menus provided on the front panel of CODICO® IRD-2600 and IRD-2800 Integrated Receiver Decoders enables the operator to control, configure and monitor the operation of the IRD according to the parameters required by the particular DVB System.

Navigation in the operational trees requires prior knowledge of the main menu structure and the options available in each menu of a particular unit. Chapter 3, Operation provides all the information required to use the extended operational menu tree.

This appendix provides quick and full diagrams of the operational menu trees for the various IRD configurations available:

- DSNG Configuration (see Figure A-1).
- QPSK Configuration (see Figure A-2).
- QAM Configuration (see Figure A-3).
- G.703 Configuration (see Figure A-4).
- ATM (DVB-PDH) Configuration (see Figure A-5).

All configurations share a common initialization phase and Main Menu structure, as described in paragraph 3.1.1.3. Common Status Messages will also be displayed on the LCD in case of hardware failure or general-purpose information. For a description of the Status Messages, please refer to paragraph 4.4.

A dotted menu selection in the diagrams indicates that the availability of this option is dependent upon the system configuration. For example, Password control is available as an option for the IRD. Once a session has been initiated via the Password, the password is bypassed on repeated entry to the MAIN MENU.

NOTE

*Unless specifically marked, all items are applicable for **both** the IRD-2600 and the IRD-2800.*

*Items marked by double asterix (**) are available **ONLY** for IRD-2600.*

*Items marked by a hart triple asterix (***) are available **ONLY** for IRD-2800.*

Figure A-1: DSNG IRD Front Panel Menu Tree

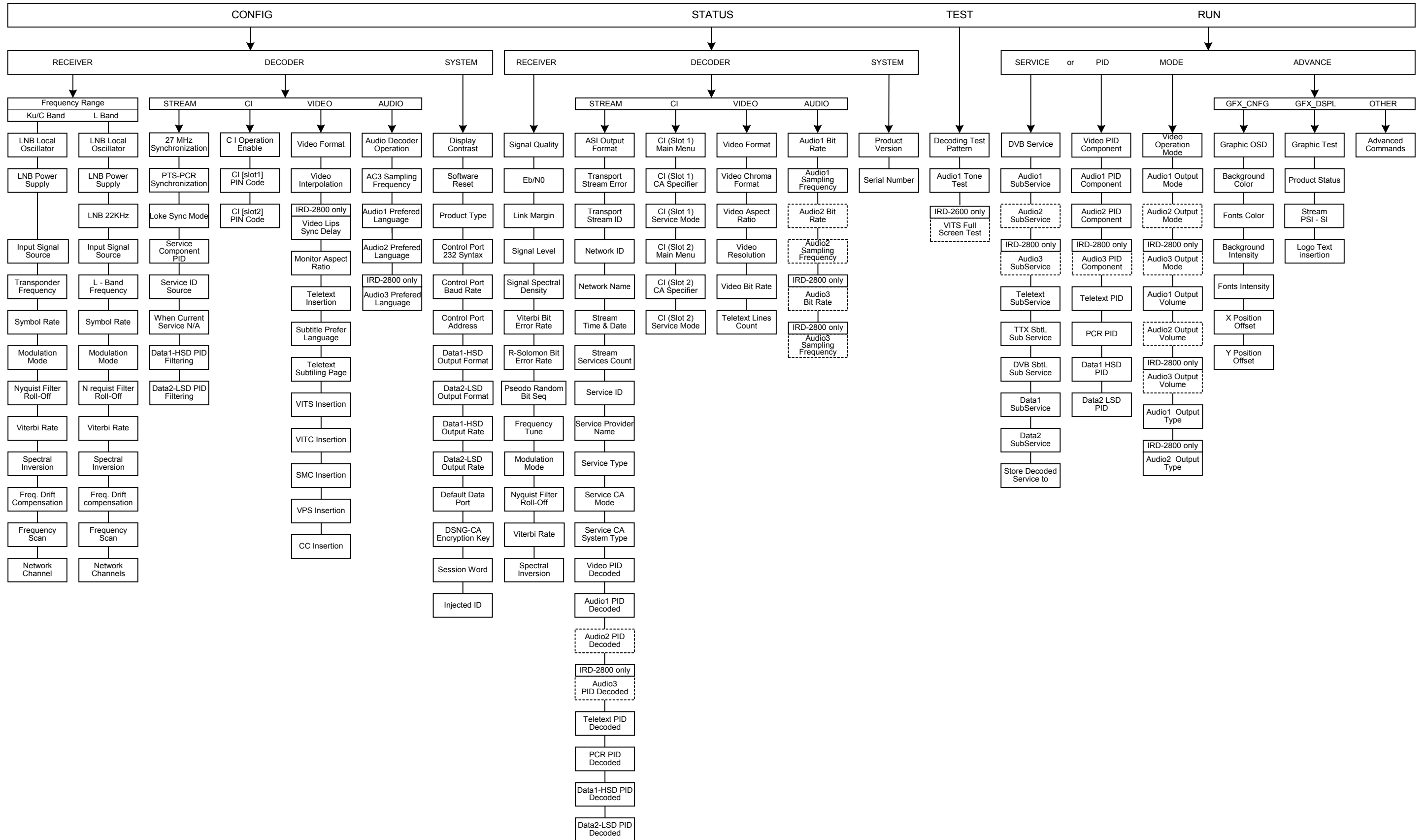


Figure A-2: QPSK IRD Front Panel Menu Tree

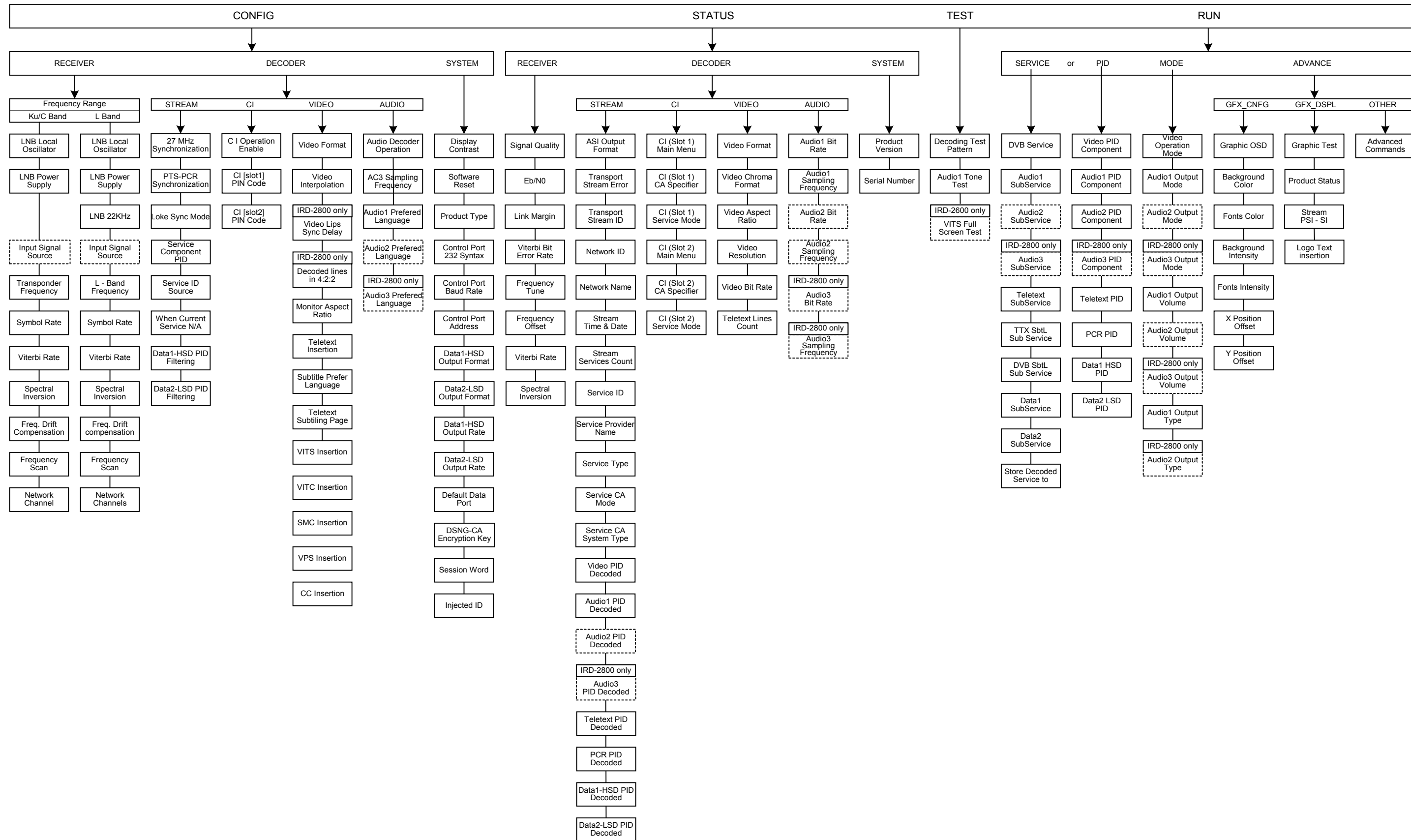


Figure A-3: QAM IRD Front Panel Menu Tree

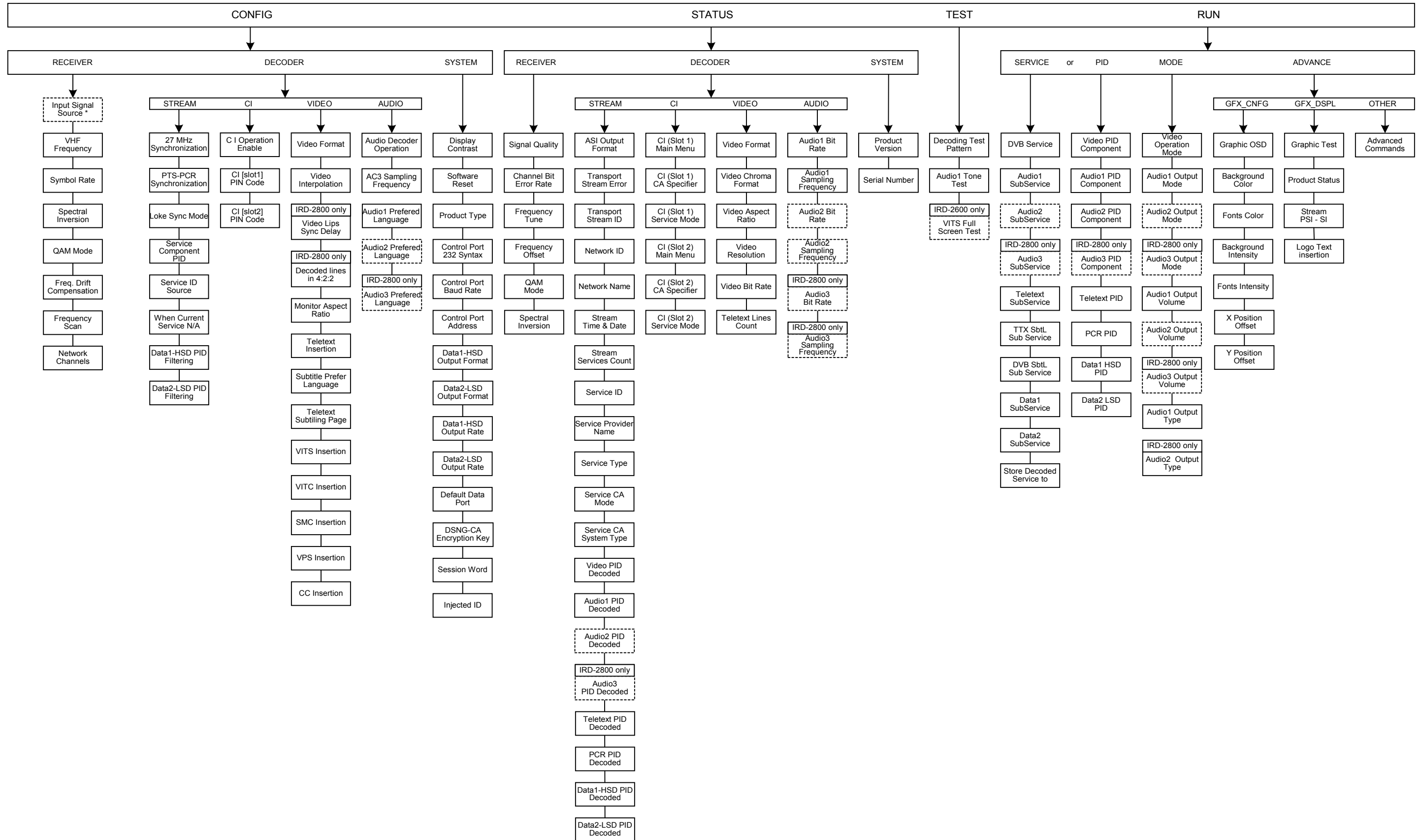


Figure A-4: G.703 IRD Front Panel Menu Tree

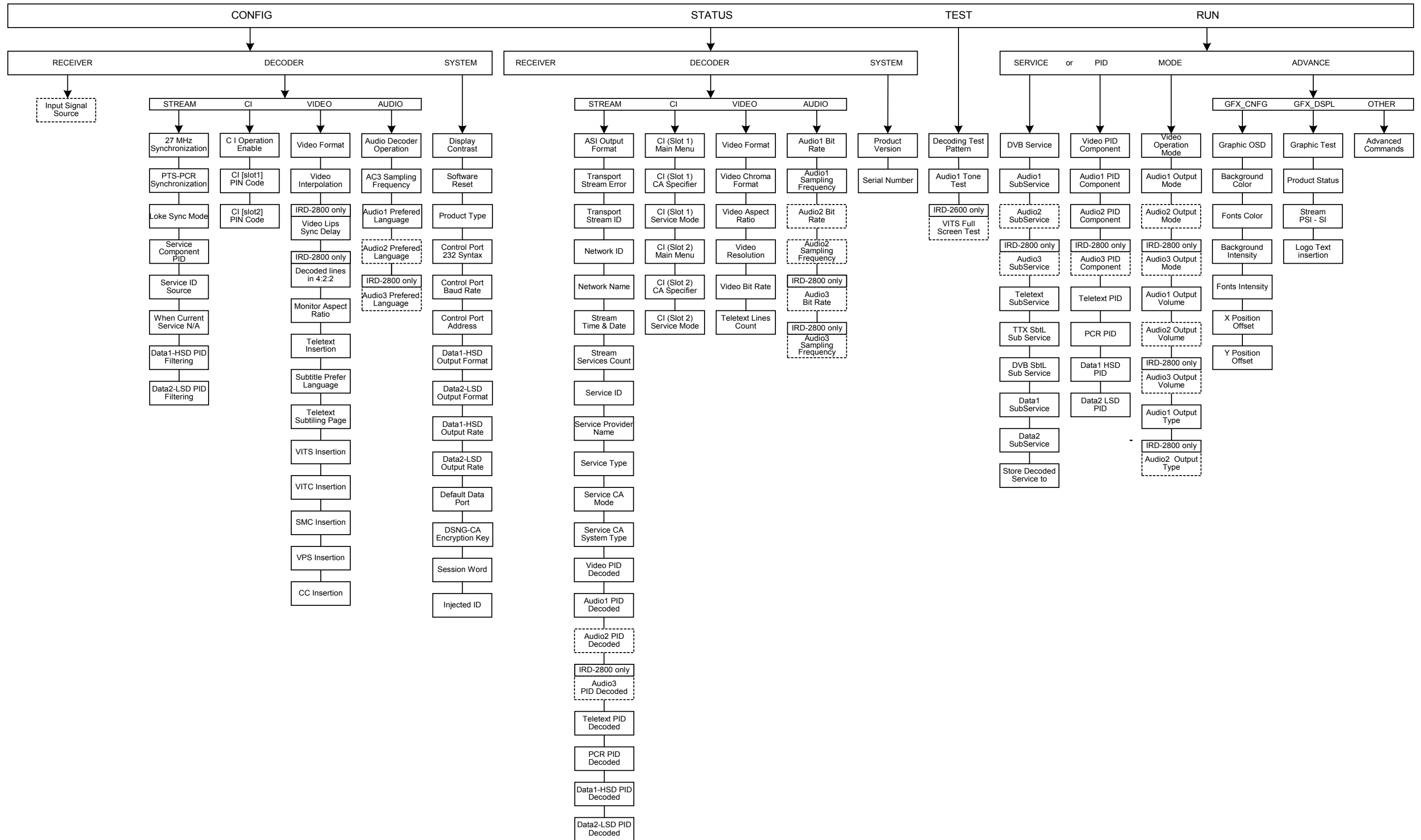
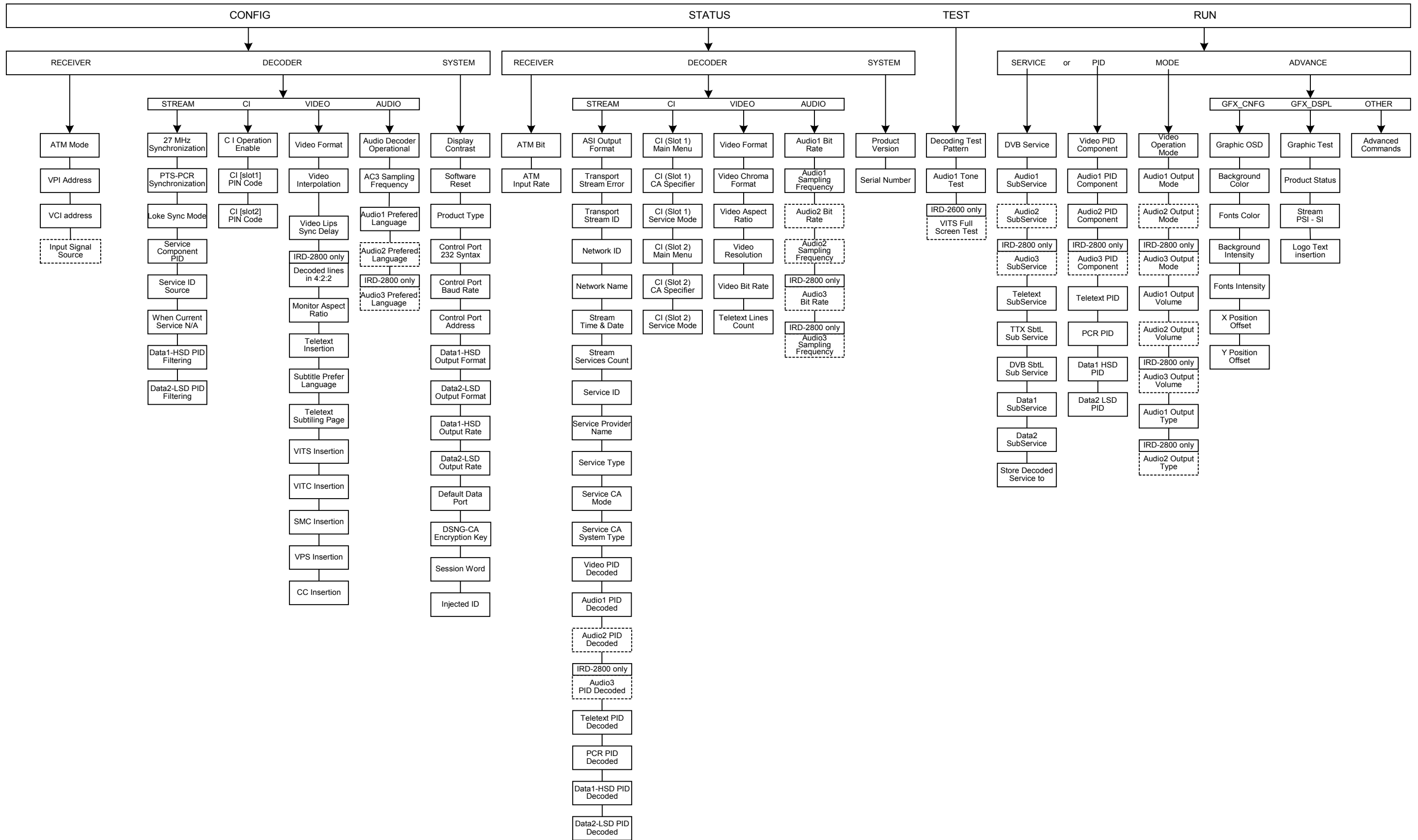


Figure A-5: ATM IRD Front Panel Menu Tree



Appendix B. LNB Theory Of Operation

B.1 Why is an LNB needed?

A signal from a satellite is a very low power signal. The satellite reception dish does a first amplification by reflecting and concentrating the signal received into one focus point. The LNB, mounted exactly at this point in front of the parabolic dish, further amplifies this signal because it is still very weak. This amplified satellite signal cannot be sent directly though a coax cable. Due to the still very high frequency (10 to 13GHz) sending this signal directly into a coax cable would result in very high signal loss.

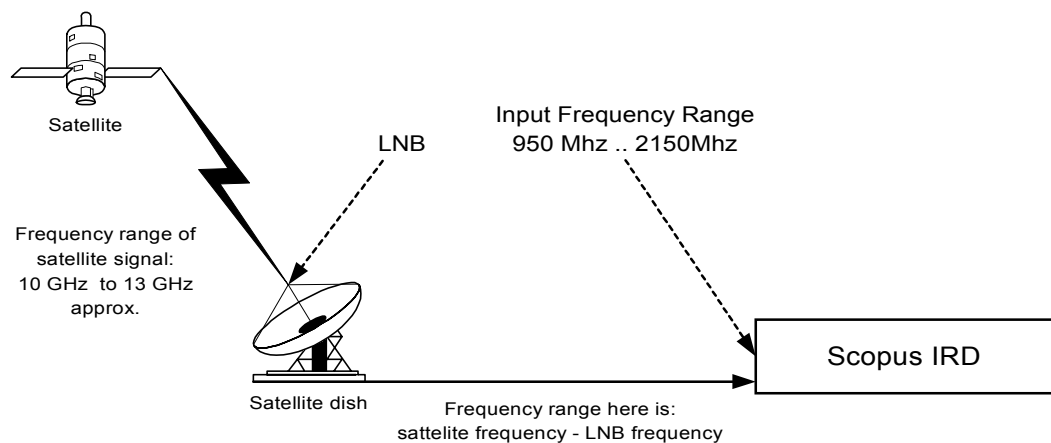
This is why the LNB also converts the signal into a lower frequency. The LNB Frequency determines over how many Mhz the signal is converted downwards.

Example:

11929: Mhz Satellite frequency:
-10750: Mhz LNB frequency:
=1179: Mhz Signal frequency to IRD

The signal that is sent from the LNB to the IRD device has to be within the IRD input frequency range (0.950Ghz to 2.150Ghz, or 950Mhz to 2150Mhz). The following figure shows a basic set up for satellite reception.

Figure B-1: Basic Setup for Receiving A Satellite Signal



B.2 Frequency Calculation IRD + LNB

As demonstrated in the previous example, the LNB determines the actual reception frequency range. The reception frequency range of the IRD and LNB together is calculated as shown in the next example:

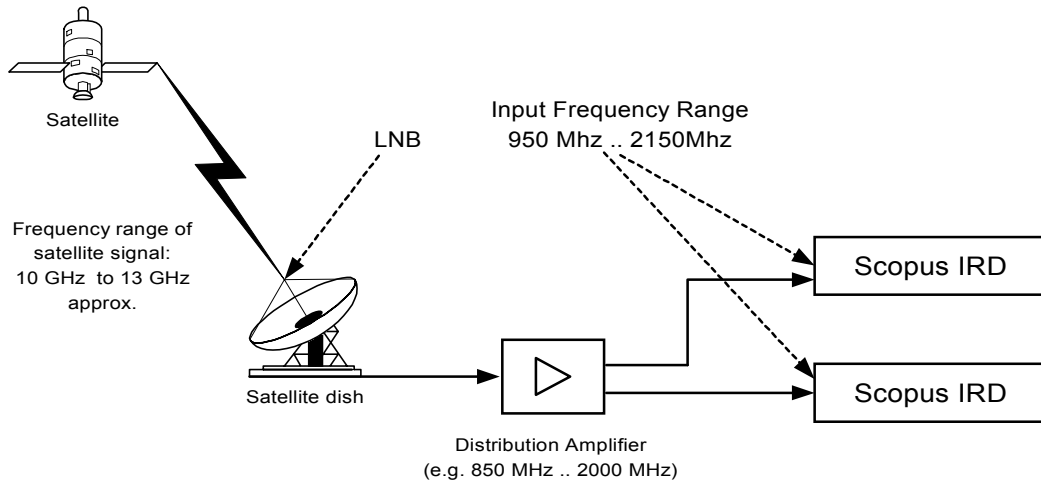
LNB frequency: = 10750 Mhz.

Input frequency range:= (950 + 10750) (2150 + 10750) Mhz
= 11700 Mhz ..12900 Mhz

B.3 Use of a Splitter or Distribution (band) Amplifier

When multiple IRDs are receiving their signal from one satellite dish, a passive splitter or active distribution amplifier/splitter can be used. The following figure displays signal reception for multiple IRDs.

Figure B-2: Basic Set Up For IRDs Sharing One Satellite Reception Dish



In Figure B-2 a distribution amplifier is used that limits the frequency reception range of the whole system (IRDs, distribution amplifier and satellite dish with LNB). The distribution amplifier only passes frequencies between 850 MHz up to 2000 MHz while the IRDs are capable of tuning to frequencies between 950 MHz up to 2150 MHz. The IRDs will not receive any signal between 2000 MHz and 2150 MHz because the distribution amplifier blocks this range. The calculation of the reception range of this example set-up is as shown below:

Combined frequency range = 950 MHz . 2000 MHz. (Amplifier + IRD).

(Example) LNB frequency = 10750 MHz.

System Input frequency range = (950 + 10750) (2000 + 10750) MHz
= 11700 MHz .. 12750 MHz.

B.4 Calculating the L-Band Frequency

To calculate the L-Band Frequency:

L-Band frequency = FS - FLO

Where:

- FS = transponder transmitting frequency.
- FLO = LNB local oscillator frequency.

Examples:

- For LNBs with a single Local Oscillator: 10 GHz
- For universal (Ku band) LNBs:
Low Band Local Oscillator: 9.750 GHz
High Band Local Oscillator: 10.600 GHz

The available L-Band frequency range is 0.950000 to 2.150000 GHz

The following is a numerical example:

For the group of station programs handled by the TV1 multiplexer, the transponder frequency is 12.012 GHz.

- For LNBs with a single Local Oscillator:
L-Band frequency = 12.012000 - 10.000000 = 2.012000 GHz
- For Universal (Ku band) LNB oscillator selected:
L-Band frequency = 12.012000 - 10.600000 = 1.412000 GHz

B.5 Calculating Symbol Rate

To Calculate the Symbol Rate for QPSK configuration:

$$\text{Symbol Rate} = \frac{BR}{FEC * 2} \text{ MSymbol/sec}$$

Where:

BR = Bit Rate

FEC = Forward error correction = Viterbi rate x Reed Solomon rate

$$FEC = \text{Viterbi rate} \times \frac{188}{204}$$

To Calculate the Symbol Rate for QAM configuration:

$$\text{Symbol Rate} = \frac{BR}{\text{Reed_Solomon_x_QAM}} \text{ Msymbols / sec}$$

Where:

BR = Bit Rate

$$\text{Reed Solomon} = \frac{188}{204}$$

QAM = 4 for QAM 16, 5 for QAM 32, 6 for QAM 64, 7 for QAM 128, or 8 for QAM 256.

NOTE

It is important to input the Symbol rate accurately, including all decimal places that are given.