



Ultra-Compact Series

UHF/VHF Broadcast Transmitters



User manual

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3 Acronyms and Abbreviations

ASI	Asynchronous Serial Interface
BER	Bit Error Rate
CAM	Conditional Access Module
CCM	Constant Coding and Modulation
CI	Common Interface
DVB-S	Digital Video Broadcasting - Satellite
DVB-S2	Digital Video Broadcasting - Satellite version 2
DVB-T	Digital Video Broadcasting - Terrestrial
DVB-T2	Digital Video Broadcasting - Terrestrial version 2
EDI	Encapsulated DAB Interface (DAB TS over IP)
ETI	Ensemble Transport Interface (DAB)
FEC	Forward Error Correction
GbE	Gigabit Ethernet (Transport stream over IP)
GLONASS	Globalnaya navigatsionnaya sputnikovaya Sistema (Russian GNSS)
GNSS	Global Navigation Satellite System
GPS	Global Positioning System (American GNSS)
GUI	Graphical User Interface
ISDB-T	Integrated Services Digital Broadcasting - Terrestrial
ISI	Input Stream Identifier
ISSY	Input Stream Synchronization
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LNB	Low Noise Block-Downconverter
LPU	Low Power Unit – the exciter/driver in a higher power transmitter
MER	Modulation Error Ratio
MIP	Mega Frame Initialization Packet
MPEG	Moving Picture Experts Group
PA	Power amplifier
PLS	Physical Layer Scrambling
PS	Power Supply
PSK	Phase Shift Keying
PSU	Power Supply Unit
QAM	Quadrature amplitude modulation
QPSK	Quadrature Phase Shift Keying
RF	Radio-Frequency
RMS	Root Mean Square
SAT	Satellite receiver for repeater operation
SFN	Single Frequency Network
SIP	Second frame Initial Packet
SMPTE	Society of Motion Picture and Television Engineers (ATSC TS)
SNMP	Simplified Network Management Protocol
TER	Terrestrial RF receiver for gap-filler operation
TS	Transport Stream
UHF	Ultra-High Frequency
VCM	Variable Coding and Modulation
VHF	Very High Frequency

Table 1: Acronyms and abbreviations

4 General information

4.1 General safety practices

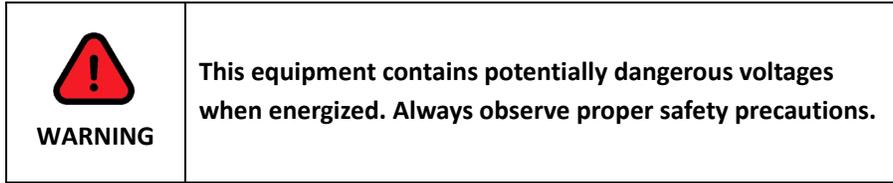
Regardless of how well electrical equipment is designed, personnel can be exposed to dangerous electrical shocks when protective covers are removed for maintenance or other activities. Therefore, it is incumbent on the user to see that all safety regulations are consistently observed and that each individual assigned to the equipment has a clear understanding of the first aid to be provided in the case of electrical shock (see following pages).

In addition, these safety practices must be followed:

- ✓ Do not attempt to adjust unprotected circuit controls or to dress leads with power on.
- ✓ Always avoid placing parts of the body in series between ground and circuit points.
- ✓ To avoid burns, do not touch heavily loaded or overheated components without precautions.
- ✓ Remember that some semiconductor cases and solid-state circuits carry high voltages.
- ✓ Do not assume that all danger of electrical shock is removed when the power is off. Charged capacitors can retain dangerous voltages for a long time after power is turned off.
- ✓ Do not take chances. Be fully trained. GatesAir equipment should be operated and maintained by fully qualified personnel.
- ✓ Do not service equipment alone and do not perform internal adjustments of this unit unless another person capable of rendering first aid and resuscitation is present.

 NOTE	This section is not intended to contain a complete statement of all safety precautions that should be observed by personnel while using this electronic equipment or others. GatesAir shall not be responsible for injury or damage resulting from improper procedures or from equipment use by improperly trained or inexperienced personnel.
--	--

4.2 Product safety information



When connecting power to the equipment, please follow these important recommendations:

- ✓ This product is intended to operate from a power source that will not apply more than 110% of the voltage specified on the rear panel between the supply conductors or between any supply conductor and ground. Transient surge suppression protection on the incoming AC mains power line is highly recommended to avoid voltage excursions beyond this range.
- ✓ This equipment is grounded through the green/yellow physical earth conductor of the power cord. To avoid electrical shock, always ensure that the green/yellow physical earth conductor has a direct, uninterrupted path to ground at the AC mains source.
- ✓ Upon loss of the protective-ground connection, all accessible conductive parts (including parts that may appear to be insulated) can render an electric shock.
- ✓ To avoid a fire hazard, use only fuses of the correct type, voltage rating, and current rating. Refer fuse replacement to qualified service personnel.
- ✓ To avoid explosion, do not operate this equipment in an explosive atmosphere.
- ✓ To avoid personal injury, do not remove the product covers or panels. Do not operate the product without the covers and panels properly installed.

4.3 Electrical safety precautions

All potentially dangerous parts to which maintenance personnel have access are labeled with danger identification stickers having a yellow background.

The symbol below denotes the presence of hazardous energy levels.



A hazardous energy level is defined as a stored energy level of 20 J or more, or an available continuous power level of 240 VA or more, at a potential of 2 V or more.

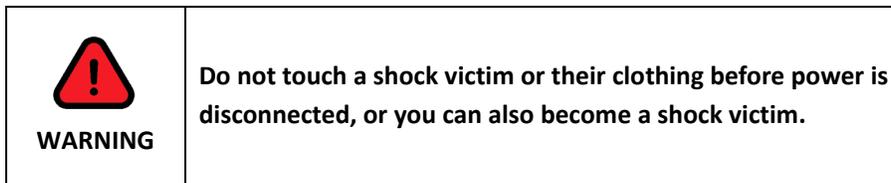
4.4 First aid procedures

Personnel engaged in the installation, use, and maintenance of the equipment must be familiar with the theory and practice of first aid.

4.4.1 First aid in case of electric shock

A muscle spasm or unconsciousness may render a victim unable to free himself from the source of the electric shock. If a person seems unable to free himself while receiving an electric shock, disconnect the power before attempting to help.

If power cannot be turned off immediately, very carefully loop a length of dry non-conducting material (such as a rope, insulating material, or clothing) around the victim and pull him free of the power source. Carefully avoid touching him or his clothing until he is completely free of the power source.



4.4.2 First aid in case of burns

4.4.2.1 Extensive burns and broken skin

- Cover area with clean sheet or a clean cloth.
- Do not break blisters, remove tissue, remove any clothing that is stuck to the skin, and apply an ointment.
- Treat victim according to the type of accident.
- Arrange transportation to a hospital as quickly as possible.
- If arms or legs are affected, keep them elevated.

If medical help is not available within an hour and the victim is conscious and not vomiting, give a solution of salt and baking soda: 1 teaspoon of salt and half of baking soda for every 250 ml of water. Make the victim slowly drink half a glass of solution four times during a period of 15 minutes. Stop administering the solution if vomiting occurs.

Do not administer alcoholic beverages.

4.4.2.2 Less severe burns

- Apply cold gauze compresses (not iced) using a cloth as clean as possible.
- Do not break blisters, remove tissue, remove any clothing that is stuck to the skin, and apply an ointment.
- If necessary, put on clean, dry clothes.
- Treat the victim according to the type of accident.
- Arrange transportation to a hospital as quickly as possible.
- If arms or legs are affected, keep them elevated.

4.4.2.3 Emergency resuscitation technique



Step 1

Check the victim for unresponsiveness. If there is no response, **immediately call for medical assistance** and then return to the person.



Step 2

Position the person flat on their back. Kneel by their side and place one hand on their forehead and the other under their chin. Tilt their head back and lift their chin until their teeth almost touch. Look and listen for breathing.



Step 3

If they are not breathing normally, pinch their nose and cover their mouth with yours. Give two full breaths. The person's chest will rise if you are giving enough air.



Step 4

Put the fingertips of your hand on the victim's Adam's apple; slide them into the groove next to the windpipe. Feel for a pulse. If you cannot feel a pulse or are unsure, move on to the next step.



Step 5

Position your hands in the center of the chest between the nipples. Place one hand on top of the other.



Step 6

Push down firmly two inches. Push on their chest 15 times.

CONTINUE WITH TWO BREATHS AND 15 PUMPS. REPEAT THIS CYCLE UNTIL HELP ARRIVES.

4.5 Declarations of conformity



GatesAir S.r.l.
Via G. Di Vittorio, 17
25125 Brescia - Italy
Tel: +39 030.3539080 - Fax +39 030.2683019
C.F e P.IVA: IT 04100540980 - REA BS 588377
info.italy@gatesair.com
gatesair.com

EU DECLARATION OF CONFORMITY (DoC)

We, *GatesAir S.r.l.*
Via G. Di Vittorio 17
25125 Brescia
Italy

declare under our sole responsibility that the product:



Product name: *UAXT-15-UC, UAXT-30-UC, UAXT-50-UC, UAXT-80-UC, UAXT-130-UC, UAXT-150-UC, UAXT-200-UC, UAXT-350-UC-2U, UAXT-35-UC-3U, UAXT-600-UC, UAXT-300-UC, UAXT-400-UC, UAXT-550-UC, UAXT-700-UC*

Trade name: *GatesAir*

Type or model: *Maxiva UAXT Ultracompact Digital TV Transmitter/Transposers Gap Fillers*

to which this declaration states, is in conformity with the essential set out in article 3 of Directive 2014/53/EU on radio equipment has been demonstrated.

That the equipment is in conformity with the following relevant Union harmonisation legislation:

- Directive 2014/53/EU on radio equipment.
- Directive 2014/30/EU relating to Electromagnetic Compatibility.
- Directive 2014/35/EU relating to electrical equipment designed for used within certain voltage limits.
- Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment [RoHS].

That the equipment is in conformity with the following harmonised standards:

Safety Requirements for radio transmitting equipment	EN 60215:1989+A1:92+A2:94 EN 62311:2008 EN 50385:2002
EMC Standard Common technical requirements meeting article 3.1(b) of Directive 2014/53/EU and article 6 of Directive 2014/30/EU	EN 301 489-1 v2.2.3 EN 301 489-14 v1.2.1 EN 301 489-3 v2.1.1
Electromagnetic compatibility and Radio spectrum Matters (ERM); Transmitting equipment for the Terrestrial - Digital Video Broadcast Service	EN 302 296-2 EN 300 744 v1.6.2 EN61000-3-2 EN61000-3-3 ETSI TS 101191 ETSI TR 101290, ETSI TS 102773 ETSI TS 102831

Place and date of issue [of this Doc]: Brescia, 03/31/2020.

Signed by or for the manufacturer:

Name: *Giovanni Andrea Luca Saleri*
Title: *Managing Director*

GatesAir S.r.l.





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Mason, OH USA 45040
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SUPPLIER DECLARATION of CONFORMITY

Manufacturer:

GatesAir, Inc.
3200 Wismann Ln
Quincy, IL 62305, USA



Applicant:

GatesAir, Inc.
5300 Kings Island Dr. Ste 101
Mason, OH 45040

Equipment declared compliant by this Declaration:

Product Series: Maxiva UAXT and VAXT Ultra-Compact Air-Cooled Digital TV Transmitters:
Models: UAXT-15-UC, UAXT-30-UC, UAXT-50-UC, UAXT-80-UC, UAXT-130-UC, UAXT-150-UC, UAXT-200-UC, UAXT-350-UC-2U, UAXT-350-UC-3U, UAXT-600-UC, UAXT-300-UC, UAXT-400-UC, UAXT-550UC, UAXT-700-UC

VAXT-80-UC, VAXT-150-UC, VAXT-250-UC, VAXT-450-UC, VAXT-500-UC, VAXT-700-UC
VAXT-50L-UC, VAXT-200L-UC, VAXT-400L-UC

Standards: FCC 47 CFR parts 2, 73 and 74
Test Report: GA-REG-20-001, GA-REG-20-002

We hereby certify that the above product has been tested by GatesAir and complied with the FCC official limits. These products are to be marketed in the US accordance to FCC Rules based on the standard 47 CFR Part 2, 73 and 74. The tests were performed in accordance to the procedures from ANSI C63.4-2014, IEEE 1631-2008, ATSC A-64B.



John Harmon – Compliance Engineer
10 JAN 2020



5 General description

The GatesAir Ultra-Compact series is a range of broadcast transmitters/gap-fillers providing power levels from 1 to 600W rms in UHF Bands IV/V or in VHF Band III (depending on model). Housed in either a 1RU, 2RU, or 3RU standard 19" rack chassis, depending on power level, they are among the most compact broadcast transmitters on the market. The advanced engineering and attention to detail in their design, their ease of maintenance, and their wide variety of applications make these units the products of reference in low-power broadcasting worldwide.

The various transmitter styles making up the Ultra-Compact series are shown on the following page in Figure 1.

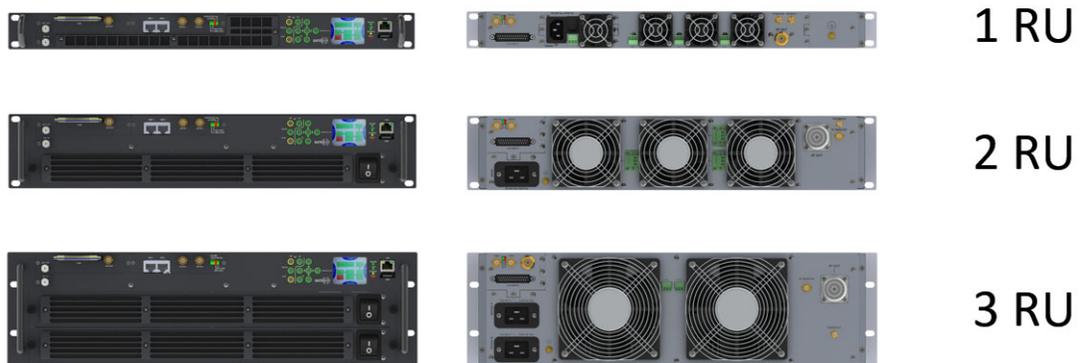
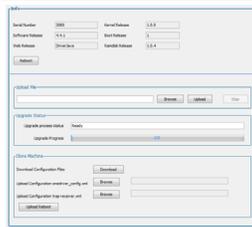


Figure 1: Transmitter styles in Ultra-Compact product family

 <p>NOTE</p>	<p>This manual addresses Ultra-Compact units with an HTML-based interface. Earlier versions of the Ultra-Compact family featured a Java-based user interface like the light-gray screen shown on the right. please refer to manual DOCX-00004 for Ultra-Compact units with a java-based interface.</p>	
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The heart of the system is the modulator board, with firmware compatible with many different worldwide modulation standards, such as DVB-T, DVB-T2, ISDB-Tb, ATSC, DAB, DAB+, PAL, and NTSC. It also features adaptive linear and non-linear pre-correction for both analogue and digital modulation formats for excellent transmitted signal quality at all times. Two slots are available on the exciter front panel for the installation of a variety of input boards to suit each customer’s needs. Multiple input board options are currently available:

- A multistream DVB-S/S2 Satellite Receiver with integrated CAM
- A board with four ASI inputs
- A board with two ASI inputs and two Gigabit Ethernet inputs (*Transport Stream over IP*)

- A board with ETI/EDI inputs for DAB
- An RF receiver board for operation as a repeater or iso-frequency gap-filler
- A regenerative RF receiver board with full demodulation to baseband for operation as a regenerative repeater
- A board with analogue video and audio inputs, as well as ASI, for analogue television

The unit also houses an optional high-stability GPS/GNSS receiver which allows an "all-in-one" solution for the implementation of an SFN network.

For ease of maintenance, the power supply is modular and can be easily extracted. The front panel air filters can be easily cleaned while the transmitter is still operating.

The equipment is remotely controlled through SNMP protocol and an HTML web GUI interface. Four dry contacts and 4 photo-coupled opto-isolators are available to provide compatibility with existing remote control systems, while a front panel LCD display allows basic monitoring and control from the front panel.

5.1 Use as exciter in larger transmitter systems

In addition to serving as a standalone transmitter or gap-filler, an Ultra-Compact unit may also be employed as the exciter/driver for a larger air-cooled or liquid-cooled transmitter system featuring one or more external power amplifiers. In such cases, the information provided in this manual is supplemented by information found in an accompanying transmitter system manual, which addresses the external high power stages and the operation of the larger system as a whole.

Additionally, certain user interface web pages described in this manual may make references to external PA stages. Some of these data items will either not be present or can be safely disregarded when the Ultra-Compact is operated as a standalone transmitter/gap-filler.

6 Technical Specifications

 NOTE	<p>The specifications given here are for general reference and are subject to change without prior notice. please consult the product brochure on the Gatesair website (www.gatesair.com) for the most up-to-date product specifications.</p>
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6.1 System and Transmitter Specifications

Working frequency band	UHF Band IV and V or VHF Band III
Frequency resolution	1 Hz
RF output connector	N female or DIN 7-16 female
VSWR	1.10

Table 2: System specifications

6.1.1 UHF Band IV & V, Digital Modulation

Model	Output power before bandpass filter (W rms)				Rack Units
	COFDM Broadband 470-830 MHz	ATSC Broadband 470-830 MHz			
UAXT-15G2-UC	15W	20W			1RU
UAXT-30G2-UC	30W	40W			1RU
UAXT-50G2-UC	50W	70W			1RU
UAXT-80G2-UC	80W	130W			1RU
UAXT-130G2-UC	130W	130W			1RU
UAXT-150G2E-UC	150W	150W	(470-700 MHz)		1RU
UAXT-200G2-UC	200W	300W			2RU
UAXT-350G2-UC-2U	350W	400W			2RU
UAXT-350G2-UC-3U	350W	600W			3RU
UAXT-600G2-UC	600W	750W			3RU

Model	COFDM Broadband 470-700 MHz	COFDM Wideband 120 MHz BW	ATSC Broadband 470-700 MHz	ATSC Wideband 120 MHz BW	Rack Units
UAXT-300G2E-UC	250W	300W	350W	400W	2RU
UAXT-400G2E-UC	400W	400W	400W	400W	2RU

UAXT-550G2E-UC	450W	550W	700W	800W	3RU
UAXT-700G2E-UC	650W	700W	900W	1000W	3RU

Table 3: UHF output power levels, digital

6.1.2 VHF Band I & III, Digital Modulation

Model	Output power before bandpass filter (W rms)			Rack Units
	COFDM Broadband 170-240 MHz	DAB Broadband 170-240 MHz (>33dB MER)	ATSC Broadband 170-240 MHz	
VAXT-15G2-UC	15W	15W	20W	1RU
VAXT-30G2-UC	30W	30W	40W	1RU
VAXT-80G2-UC	80W	80W	120W	1RU
VAXT-150G2-UC	150W	150W	150W	1RU
VAXT-250G2-UC	250W	300W	350W	2RU
VAXT-450G2-UC	450W	450W	450W	2RU
VAXT-500G2-UC	500W	550W	700W	3RU
VAXT-700G2-UC	700W	750W	900W	3RU

Model	COFDM Broadband 54-70/70-88 MHz	ATSC Broadband 54-70/70-88 MHz			Rack Units
VAXT-50LG2-UC	50W	70W			1RU
VAXT-200LG2-UC	200W	300W			2RU
VAXT-400LG2-UC-3U	400W	400W			3RU

Table 4: VHF output power levels, digital

6.1.3 UHF Band IV & V, Analogue Modulation

Model	Peak sync (10% sound) 470-830 MHz	Rack Units
UAXT-AN-50G2-UC	50W	1RU
UAXT-AN-70G2-UC	70W	1RU
UAXT-AN-125G2-UC	125W	1RU
UAXT-AN-220G2-UC	220W	1RU
UAXT-AN-250G2-UC	250W	1RU

UAXT-AN-600G2-UC	600W	2RU
UAXT-AN-1200G2-UC	1200W	3RU

Table 5: UHF output power levels, analogue

6.1.4 VHF Band I & III, Analogue Modulation

Model	Peak sync (10% sound) 170-240 MHz	Rack Units
VAXT-AN-50G2-UC	50W	1RU
VAXT-AN-70G2-UC	70W	1RU
VAXT-AN-200G2-UC	200W	1RU
VAXT-AN-250G2-UC	250W	1RU
VAXT-AN-600G2-UC	600W	2RU
VAXT-AN-1200G2-UC	1200W	3RU
VAXT-AN-1500G2-UC	1500W	3RU

Model	Peak sync (10% sound) 54-70/70-88 MHz	Rack Units
VAXT-AN-125LG2-UC	125W	1RU
VAXT-AN-600LG2-UC	600W	2RU
VAXT-AN-1200LG2-UC	1200W	3RU

Table 6: VHF output power levels, analogue

6.2 Modulator Specifications

6.2.1 DVB-T/T2 Modulator

Standard	EN300744, EN302304, EN302755, TS101191, TS102773 (T2-MI), TS102034
Inputs	4x ASI BNC (f), 75 Ohm or 2x ASI BNC (f), 75 Ohm and 2x RJ45 TS oIP Seamless switch between ASI inputs. Hierarchical and not-hierarchical (DVB-T)
Channel bandwidth	6-7-8 MHz
FFT	1K (DVB-T2), 2K, 4K, 8K, 8K ext. (DVB-T2), 16K & 16K ext. (DVB-T2), 32K & 32K ext. (DVB-T2)
Code Rate	All modalities available according to the standard Block Short or Normal (DVB-T2) DVB-T: Reed-Solomon (204, 188)

	DVB-T2: BCH, LDPC
Guard interval	1/32, 1/16, 1/8, 1/4, 19/256 (DVB-T2), 19/128 (DVB-T2), 1/128 (DVB-T2)
Constellation	QPSK, 16QAM, 64QAM, 256QAM (DVB-T2). Rotated and non-rotated (DVB-T2)
SFN	Complies with ETSI EN 101 191
MISO Processing	Supported

Table 7: DVB-T/T2 modulator specifications

6.2.2 ISDB-Tb Modulator

Standard	ABNT NBR 15601, ABNT NBR 15603
Inputs	4x ASI TS/BTS BNC (f), 75 Ohm or 2x ASI TS/BTS BNC (f), 75 Ohm and 2x RJ45 TS/BTS oIP
FFT	Mode 1 (2K), Mode 2 (4K), Mode 3 (8K)
Code Rate	1/2, 2/3, 3/4, 5/6, 7/8
Guard interval	1/4, 1/8, 1/16, 1/32
Hierarchical modulation	Up to 3 layers
Constellation	QPSK, 16QAM, 64QAM
Time interleaver	Supported
Partial reception	Supported

Table 8: ISDB-Tb modulator specifications

6.2.3 ATSC Modulator

Standard	A/53, A/110
Inputs	4x ASI/SMPTE-310M BNC (f), 75 Ohm or 2x ASI/SMPTE-310M BNC (f), 75 Ohm and 2x RJ45 TS oIP
Modulation	8-VSB
Input bit rate	19.39 Mbit/s
Bandwidth	6 MHz
Max. processing delay	Up to 1 second (programmable)

Table 9: ATSC modulator specifications

6.2.4 DAB/DAB+/T-DMB Modulator

Standard	EN 300 401
Inputs	4x ETI(NI) or ETI(NA), compliant with G.703/G.704 standard (ETSI EN 300 799), with automatic detection or 2x ETI BNC (f), 75 Ohm and 2x EDI TSoIP
Transmission modes	Mode I, II, III, IV

Network modes	MFN or SFN
Protection levels	All protection levels supported

Table 10: DAB/DAB+/T-DMB modulator specifications

6.2.5 Analogue Modulator

Standard	B, G, D, K, M, N, I
Inputs	Video BNC (f), 75 Ohm, Audio Mini-QG "Mini XLR", 6 Pin (m), 600 Ohm
Color standards	PAL, NTSC

Table 11: Analogue modulator specifications

6.3 Satellite receiver and CI specifications

Standard	ETSI EN 300 421 (QPSK) (DVB-S) ETSI EN 302 307 (QPSK, 8PSK, 16APSK) (DVB-S2) ETSI EN 50083-9 (ASI) ETSI EN 50221 (Common Interface)
DVB-S2	VCM, CCM, Multi Stream and Single Stream, Normal & Short FEC frames
Symbol Rate	1 - 45 Msymb/s (DVB-S) 2 - 45 Msymb/s (DVB-S2)
Constellation	QPSK, 8PSK, 16APSK
FEC	Automatic, All modalities available according to the standard. Block Short or Normal DVB-S: Reed-Solomon (204,188) DVB-S2: BCH, LDPC
Roll-Off	0.2, 0.25, 0.35
Input connector	F(f), 75 Ω
Frequency	L-band, 930-2250 MHz
LNB control voltage	Off, +13/18 Vdc, 22 KHz, 0.25 A (overload protection)
RF input level	40 - 100 dbuV (with attenuator)
ASI Output	Standard ASI-C MPEG-2 ISO/IEC 13818-1
Output connector	BNC(f), 75 Ohm
Modality	188 bytes
Max. input bitrate	80 Mbps (CAM limit: 72 Mbps)
CAM interface	PCMCIA DVB-CI Common Interface
CA mode (Conditional Access)	Multicrypt, Simulcrypt
CAS Support	Mediaguard, Viaccess, Irdeto, Conax, BISS with Professional multiprogram CAM (descrambling of up to

	24 Elementary Streams) Betacrypt, Cryptoworks, Nagravision with standard consumer CAM (descrambling of up to 4 services).
--	---

Table 12: Satellite receiver and CI specifications

6.4 Repeater / gap-filler specifications

<i>RF input</i>	
Signal type	One DTV channel (DVB-T/H/T2, ISDB-T/Tb, ATSC)
Frequency range	170 to 862 MHz (agile tuning)
Sensitivity	-75 to -15 dBm
Selectivity	> 60 dB \pm 4.2 MHz
NF (Pi=-50 dBm)	< 6 dB
Conversion type	Direct base band conversion (Zero IF)
Return loss	> 15 dB
Connector	N (f), 50 Ohm
<i>Echo canceller</i>	
Cancellation level	40 dB, typical
Cancellation window	20 μ sec
Doppler cancellation	Yes
Maximum echo level	+15 dBc (over the main signal), typical
Total delay	< 10 μ sec

Table 13: Repeater / gap-filler specifications

6.5 GPS receiver specifications (optional)

Input connector	N(f), 50 Ohm
Input / Monitor output 10 MHz	BNC(f), 75 Ohm
Input / Monitor output 1 PPS	BNC(f), 75 Ohm
Phase noise	-140 dBc/Hz @ 10 kHz -150 dBc/Hz @ 100 kHz
Stability	1e-12 / 24 H with disciplined OCXO
Hold-over stability	5 μ s after 5 hours (optional 1 μ s after 24 hours)

Table 14: GPS receiver specifications

6.6 General specifications

Operating temperature range	-5°C to +45°C
Storage temperature range	-10°C to +60°C
Maximum relative humidity	90%, non-condensing
Maximum operating altitude	2500 m. above sea level (>2500 m. optional)
Management	LCD screen, Web GUI, SNMP, GPIO
Firmware upgrade	USB, LAN
Power supply	Single phase 100-240 V~ 50/60 Hz, IEC320 C14 or C20 plugs.

Table 15: General specifications

6.7 Mechanical specifications

Chassis	1U, 2U, or 3U rack 19"
Width	482 mm
Height	43.6 mm (1RU) 87.1 mm (2RU) 130.8 mm (3RU)
Depth	460,5 mm excluding fans
Weight	7.5 kg (1RU) 14 kg (2RU) 21 kg (3RU)

Table 16: Mechanical specifications

7 Control panels and connections

7.1 Front panel

The front panel features basic monitoring control functions as well as two expansion slots for optional input boards.

Some input boards can only be installed in one of the available slots. Refer to the appropriate section to determine which boards are compatible with the left or right expansion slots.

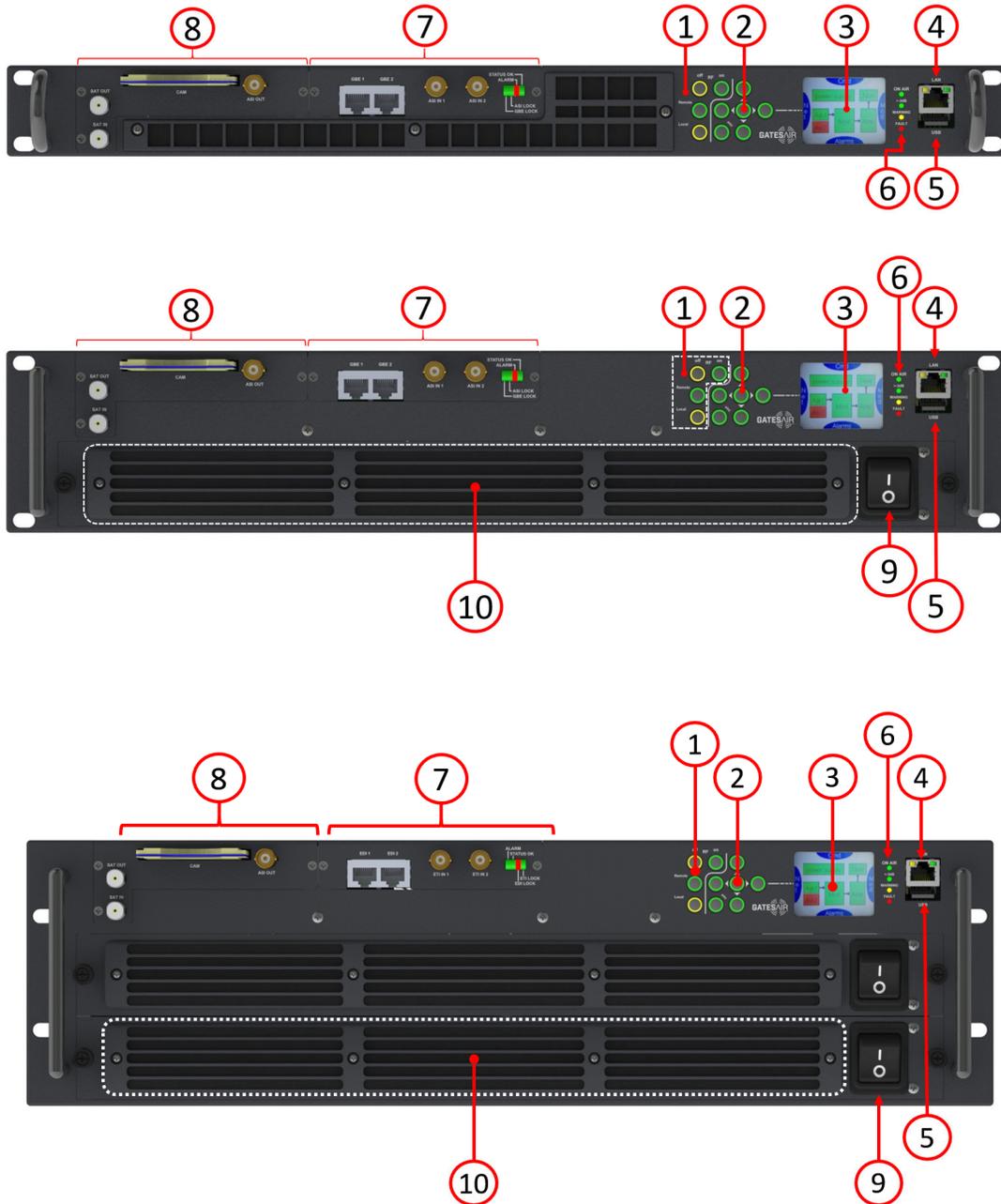


Figure 2: Front panel, all models

Ref.	Description
1	On-Off and Local-Remote pushbuttons.
2	LCD display navigation buttons.
3	LCD display screen.
4	Ethernet management connector (10/100).
5	USB connector for firmware upgrade.
6	Summary status LEDs [ON AIR] = unit is transmitting [>-3dB] = output power is below -3dB threshold [WARNING] = a warning condition exists [FAULT] = an alarm condition exists
7	Right input board slot
8	Left input board slot
9	AC main switch (2RU and 3RU only)
10	Power supply module (2RU and 3RU only)

Table 17: Front panel controls and connections

7.2 ASI inputs board (front panel)

The ASI inputs module can only be installed in the right slot.



Figure 3: ASI inputs board front panel

Ref.	Description
1	LED status indicators for the modulator: [ALARM] = on -> alarm, blinking -> warning. [STATUS] = on -> OK, blinking -> equipment in stand-by.
2	BNC female connectors, 75 Ohm, ASI 1, 2, 3, 4 inputs.

Table 18: ASI inputs board controls and connections

7.3 ASI + analog Audio and Video inputs board (front panel)

The ASI + analog audio and video module can only be installed in the right slot.



Figure 4: ASI + analog Audio and Video inputs board front panel

Ref.	Description
1	LED status indicators for the modulator: [ALARM] = on -> alarm, blinking -> warning. [STATUS] = on -> OK, blinking -> equipment in stand-by.
2	BNC female connector, 75 Ohm, ASI 1 or analog video input.
3	BNC female connectors, 75 Ohm, ASI 2, 3, 4 inputs.
4	Mini-QG "Mini-XLR" connector, 6-pin male, 600 Ohm, analog audio inputs.

Table 19: ASI + analog Audio and Video inputs board controls and connections

7.4 ASI + GbE inputs board (front panel)

The ASI + GbE module can be installed in either the left or right slot.

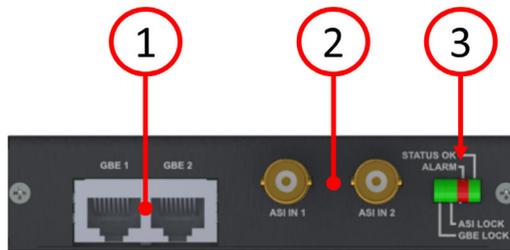


Figure 5: ASI + GbE inputs board front panel

Ref.	Description
1	RJ45 connectors for Gigabit Ethernet (GbE) input, 10/100/1000.
2	BNC female connectors, 75 Ohm, ASI 1 and 2 inputs.
3	LED status indicators for the modulator. [GBE LOCK] = GbE signal correctly locked. [ASI LOCK] = ASI signal correctly locked. [ALARM] = on -> alarm, blinking -> warning.

[STATUS] = on -> OK, blinking -> equipment in stand-by.

Table 20: ASI + GbE inputs board controls and connections

7.5 ETI + EDI inputs board (front panel)

The ETI + EDI module can be installed in either the left or right slot.

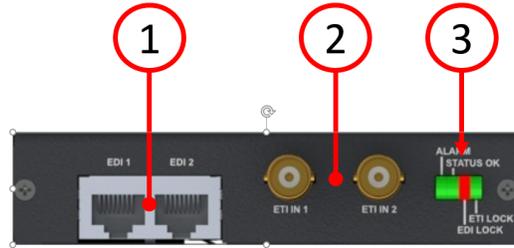


Figure 6: ASI + GbE inputs board front panel

Ref.	Description
1	RJ45 connectors for EDI input
2	BNC female connectors, 75 Ohm, ETI 1 and 2 inputs.
3	LED status indicators for the modulator. [EDI LOCK] = EDI signal correctly locked. [ETI LOCK] = ETI signal correctly locked. [ALARM] = on -> alarm, blinking -> warning. [STATUS] = on -> OK, blinking -> equipment in stand-by.

Table 21: ETI + EDI inputs board controls and connections

7.6 Repeater / gap-filler input board (front panel)

The repeater/gap-filler module (terrestrial receiver) can only be installed in the left slot. It can either be a simple repeater with frequency transposition or a “regenerative” repeater with complete demodulation and remodulation.

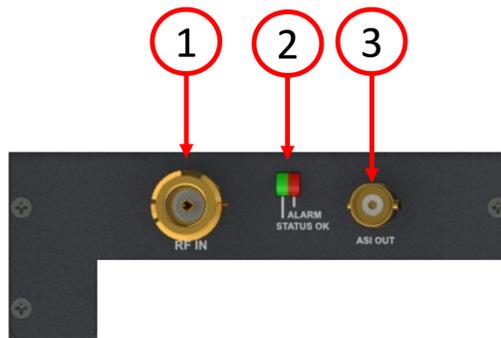


Figure 7: Repeater / gap-filler input board front panel

Ref.	Description
1	N female connector, 50 Ohm, RF input coming from the receiving antenna. (-75 to -15 dBm)
2	LED status indicators [Lock] = RF input signal correctly locked. [Alarm] = RF input signal absent or squelch circuit active.
3	BNC female connector, 75 Ohm, recovered ASI stream output (regenerative version only) (800 mVpp)

Table 22: Repeater / gap-filler input board controls and connections

7.7 Satellite receiver board (front panel)

The satellite receiver module can only be installed in the left slot.

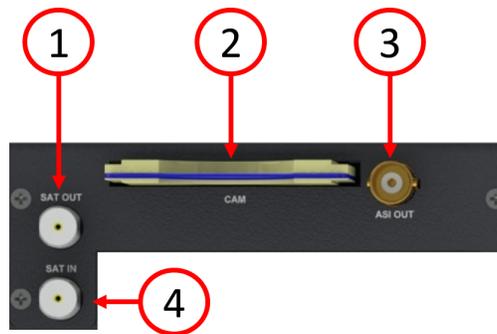


Figure 8: Satellite receiver board front panel

Ref.	Description
1	F female connector, 75 ohm, L Band signal monitor output.
2	Conditional Access Module.
3	BNC female connector 75 Ohm, ASI signal monitor output. (800 mVpp)
4	F female connector, 75 Ohm, L Band signal input coming from the external LNB module. (40 - 100 dbuV)

Table 23: Satellite receiver board controls and connections

7.8 Rear panel

The rear panel provides the main connection points to the equipment. The RF amplifier module and the power supply are removable without the need to open the chassis in the case of 1RU models. One or two power supplies are removable from the front panel in the case of 2RU and 3RU models.

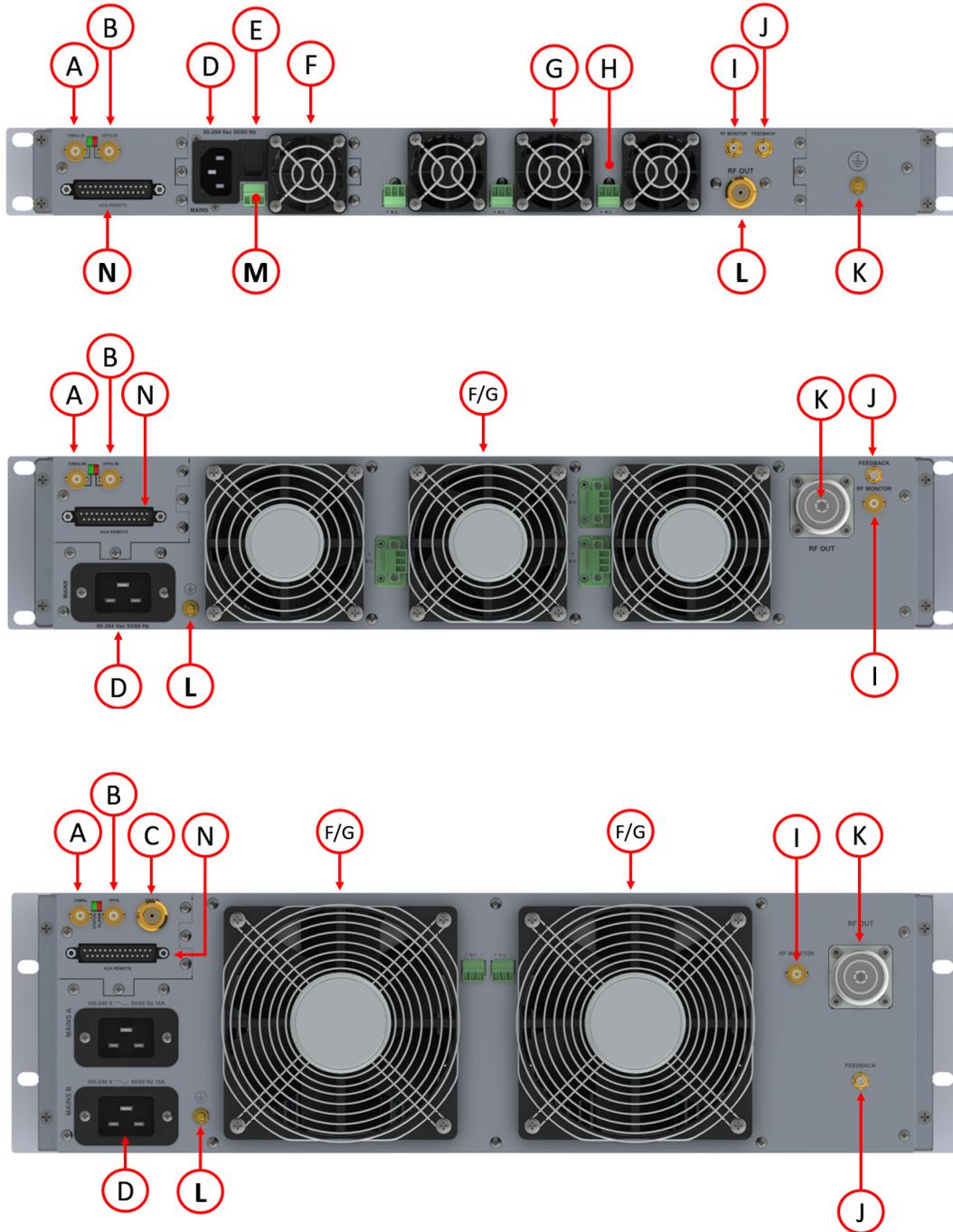


Figure 9: Rear panel, all models

Ref.	Description																																																				
A	BNC female connector, 10 MHz reference signal input or output. (5 Vpp TTL)																																																				
B	BNC female connector, 1 PPS reference signal input or output. (5 Vpp TTL, 100µs)																																																				
C	N female connector, GPS antenna input. Switchable antenna power (5V @ 100mA max.)																																																				
D	IEC320 plug, AC mains input.																																																				
E	AC mains power supply switch.																																																				
F	Cooling fan of the power supply module.																																																				
G	Cooling fans of the RF amplifier module.																																																				
H	RF amplifier module (removable) (1RU only).																																																				
I	SMA female connector (1RU), BNC female connector (2RU/3RU), 50 Ohm, RF monitor output. (0 dBm typical)																																																				
J	SMA female connector, 50 Ohm, external RF feedback input. (0 dBm...-20 dBm)																																																				
K	N female connector (1RU), DIN 7-16 (2RU/3RU), 50 Ohm, RF output.																																																				
L	Chassis grounding post.																																																				
M	Switching power supply module (removable) (1RU only).																																																				
N	<p>DB25 connector for auxiliary remote control and monitoring.</p> <p><i>OPTOs: close to pin 5 issue command or satisfy interlock</i> <i>ALARMS: relay closure pins A-to-B = alarm</i></p> <table border="1"> <tbody> <tr> <td>1</td> <td>GND</td> <td>14</td> <td>GND</td> </tr> <tr> <td>2</td> <td>OPTO Dummy Load Interlock</td> <td>15</td> <td>NOT USED</td> </tr> <tr> <td>3</td> <td>OPTO Reset Modulator</td> <td>16</td> <td>NOT USED</td> </tr> <tr> <td>4</td> <td>OPTO Reboot Equipment</td> <td>17</td> <td>ALARM TS Input A</td> </tr> <tr> <td>5</td> <td>GND OPTO</td> <td>18</td> <td>ALARM TS Input B</td> </tr> <tr> <td>6</td> <td>NOT USED</td> <td>19</td> <td>ALARM RF Output A</td> </tr> <tr> <td>7</td> <td>485 TX+</td> <td>20</td> <td>ALARM RF Output B</td> </tr> <tr> <td>8</td> <td>485 TX-</td> <td>21</td> <td>ALARM Power Supply A</td> </tr> <tr> <td>9</td> <td>485 RX+</td> <td>22</td> <td>ALARM Power Supply B</td> </tr> <tr> <td>10</td> <td>485 RX-</td> <td>23</td> <td>ALARM GPS A</td> </tr> <tr> <td>11</td> <td>NOT USED</td> <td>24</td> <td>ALARM GPS B</td> </tr> <tr> <td>12</td> <td>OPTO Standby Interlock</td> <td>25</td> <td>+28 V</td> </tr> <tr> <td>13</td> <td>+28V</td> <td></td> <td></td> </tr> </tbody> </table>	1	GND	14	GND	2	OPTO Dummy Load Interlock	15	NOT USED	3	OPTO Reset Modulator	16	NOT USED	4	OPTO Reboot Equipment	17	ALARM TS Input A	5	GND OPTO	18	ALARM TS Input B	6	NOT USED	19	ALARM RF Output A	7	485 TX+	20	ALARM RF Output B	8	485 TX-	21	ALARM Power Supply A	9	485 RX+	22	ALARM Power Supply B	10	485 RX-	23	ALARM GPS A	11	NOT USED	24	ALARM GPS B	12	OPTO Standby Interlock	25	+28 V	13	+28V		
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4	OPTO Reboot Equipment	17	ALARM TS Input A																																																		
5	GND OPTO	18	ALARM TS Input B																																																		
6	NOT USED	19	ALARM RF Output A																																																		
7	485 TX+	20	ALARM RF Output B																																																		
8	485 TX-	21	ALARM Power Supply A																																																		
9	485 RX+	22	ALARM Power Supply B																																																		
10	485 RX-	23	ALARM GPS A																																																		
11	NOT USED	24	ALARM GPS B																																																		
12	OPTO Standby Interlock	25	+28 V																																																		
13	+28V																																																				

Table 24: Rear panel controls and connections

8 Installation

 NOTE	<p>Ultra-compact series transmitters are often employed as the LPU/exciter/driver for a larger, higher power transmitter. In such cases, please refer to the installation instructions provided in the separate transmitter manual.</p> <p>DOCX-00002: ULX-OP/VLX-OP liquid-cooled transmitters DOCX-00003: UAX-OP/VAX-OP air-cooled transmitters</p>
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An Ultra-Compact series unit is easily installed in a standard EIA 310 equipment rack. The procedure provided here refers to the Ultra-Compact series transmitter when used as a standalone low-power transmitter or repeater.

STEP 1: Open the shipping box(es) and all verify the absence of any shipping damages. Notify GatesAir immediately to report any shipping damage detected. The box(es) should contain:

- One Ultra-Compact transmitter/gap-filler.
- One USB drive with user manual and MIB files (SNMP).
- An AC mains power cord.

STEP 2: Install the equipment in a standard EIA 310 rack. The vertical space required is 1 RU. Allow sufficient separation from any high temperature equipment in the same rack and verify the absence of any obstacles in the airflow (front to rear).

STEP 3: Verify that the equipment rack is properly RF grounded to the equipment site common ground point to minimize damage during a lightning event.

STEP 4: Verify that the AC mains power source is appropriate, measuring it with a voltmeter when possible. This equipment is designed to operate on 90-264 VAC, 50/60 Hz, single-phase power.

STEP 5: Verify that the green/yellow AC mains safety ground wire has a complete un-interrupted return path to the physical ground (PE) of the AC mains source to minimize the risk of accidental electrocution.

STEP 6: Connect the RF output connector to the RF output filter or other suitable 50 ohm load.

STEP 7: Connect the AC mains power cord to the socket on the back of the device. The last programmed configuration will be loaded.

STEP 8: Connect the GPS receiving antenna if needed for SFN operation. If a GPS antenna is required, it is strongly recommended to install a proper surge arrester between the antenna cable and GPS antenna input of the transmitter.

STEP 9: Perform any other required connections (local ASI inputs, external GPS references, satellite LNB cable, terrestrial antenna cable, etc.).

STEP 10: Switch on the unit by means of the integrated AC mains switch. The front panel LCD screen should light after a brief delay.

STEP 11: Set any needed modulator configurations by means of the web GUI using the IP address listed on the LCD screen Network menu. Refer to Section 9.8 and Section 10 for more information.

STEP 12: Allow unit to warm up and verify proper operation and signal quality.

STEP 13: End of procedure.

9 LCD user interface

The front panel LCD screen provides a summary display of important operational parameters. It also provides an easy means of determining the IP addresses of the front and rear RJ-45 connectors. This allows connection to the equipment via the web GUI interface discussed in Section 10.

Navigation among the various screens in the LCD menu carrousel is via the left and right navigation buttons found immediately to the left of the screen, as detailed in Figure 10.

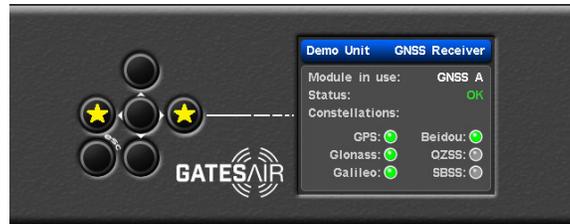


Figure 10: LCD menu navigation

In addition, certain parameters can be modified directly from the front panel by pressing the center button while in local control mode. The setting to be modified highlights in yellow, as shown in Figure 11.

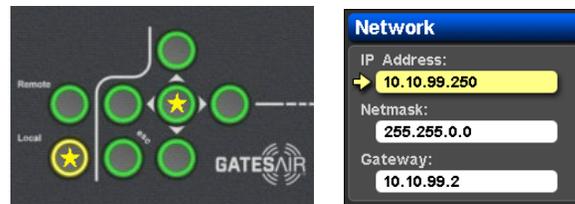


Figure 11: Edit LCD menu items

The remainder of this section provides information on the contents of the various LCD menus. Note that the screen content will vary slightly to what is shown here according to the frequency band (VHF, UHF), modulation standard (ATSC, DVB, ISDB, DAB, etc.), and fitted options (satellite, gap-filler, GbE, SFN, etc.)

9.1 LCD Home menu

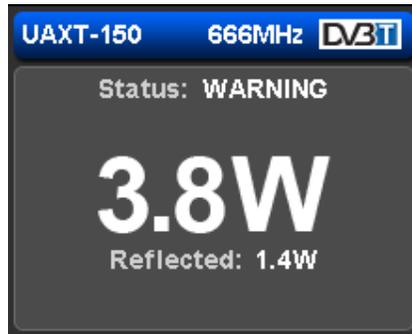


Figure 12: LCD Home menu

Name	Function
Title bar	Displays the equipment model, the channel frequency, and the modulation format.
Status	Indicates the current operational status of the unit. [OPERATIVE] = The unit is transmitting normally. [WARNING] = The unit is transmitting but one or more warning conditions exist. [FAULT] = The unit is switched on, but one or more warning conditions exist. [INTERLOCK] = The unit is being forced off due to an unsatisfied interlock. [RF OFF] = The unit is in standby.
Forward Power	Displays the output forward power in watts.
Reflected Power	Displays the output reflected power in watts.

Table 25: LCD Home menu

9.2 LCD Modulation menu

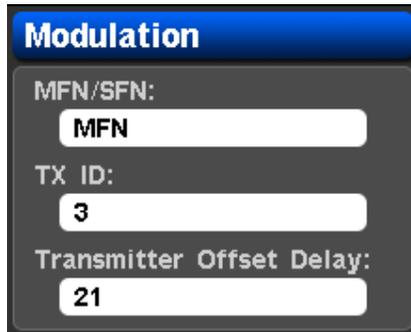


Figure 13: Modulation LCD menu

Name	Function
MFN/SFN	Displays the current network operation mode. [MFN] = Multi-Frequency Network. Unsynchronized operation with other transmitters in network. [SFN] = Single-Frequency Network. Synchronized operation with other transmitters in network.
TX ID	Displays the Transmitter ID value in SFN operation.
Transmitter Offset Delay	Displays the Transmitter Offset Delay in microseconds in SFN operation.

Table 26: LCD Modulation menu

9.3 LCD Input Status menu

The appearance of the Input Status menu changes according to the input switching mode: Manual, Auto, or Seamless.

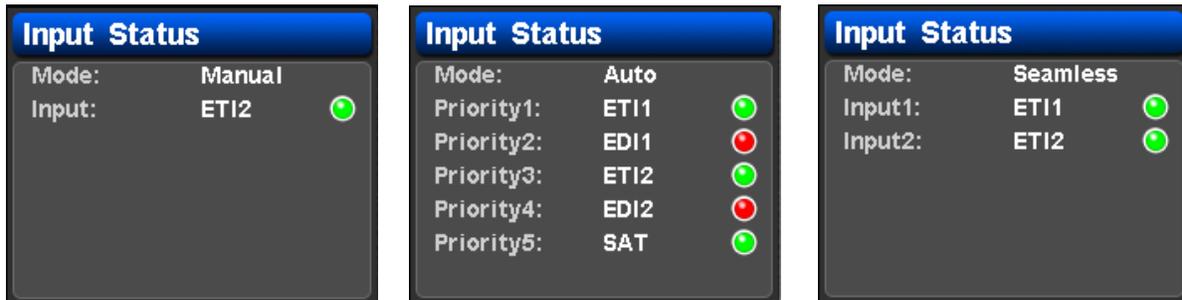


Figure 14: Input Status LCD menus

Name	Function
Mode	<p>Displays the current input switching mode.</p> <p>[Manual] = the input to be used is selected by the user. [Auto] = the system automatically selects the valid input with the highest priority. [Seamless] = the system provides hitless automatic switching between two synchronized inputs.</p>
Input	<p>Displays the input currently selected to feed the modulator.</p> <p>[SAT] = satellite receiver. [ASI] = asynchronous serial 1,2,3,4. [GbE] = gigabit ethernet 1,2. [TER] = terrestrial receiver. [ETI] = DAB ensemble transport interface 1,2. [EDI] = DAB IP interface 1,2.</p>
Priority	<p>Displays the selection priority for the various inputs in auto switching mode.</p>
Status LEDs	<p>Indicates the presence and validity of the transport streams from the various inputs.</p> <p>[green] = A valid transport stream is present at the input. [yellow] = A valid transport stream is present at the input but contains some errors. [red] = No valid transport stream is present at the input.</p>

Table 27: Input Status LCD menu

9.4 LCD Input Configuration menu

The appearance of the Input Configuration menu changes according to the input switching mode: Manual, Auto, or Seamless.

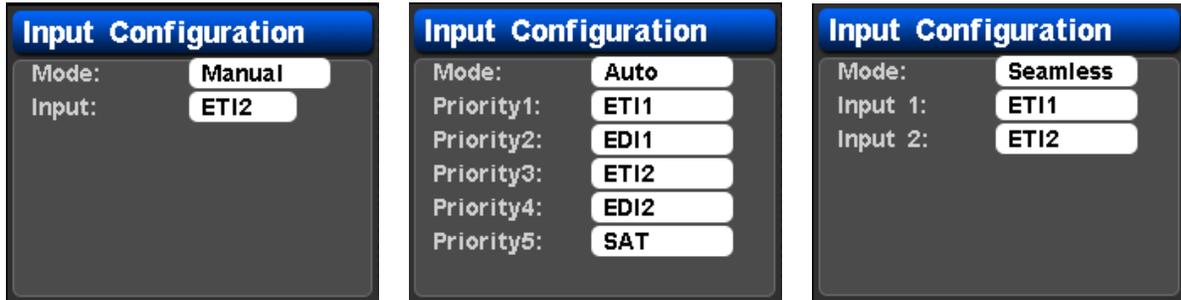


Figure 15: Input Configuration LCD menu

Name	Function
Mode	<p>Sets the current input switching mode.</p> <p>[Manual] = the input to be used is selected by the user. [Auto] = the system automatically selects the valid input with the highest priority. [Seamless] = the system provides hitless automatic switching between two synchronized inputs.</p>
Input	<p>Sets the input currently selected to feed the modulator.</p> <p>[SAT] = satellite receiver. [ASI] = asynchronous serial 1,2,3,4. [GbE] = gigabit ethernet 1,2. [TER] = terrestrial receiver. [ETI] = DAB ensemble transport interface 1,2. [EDI] = DAB IP interface 1,2.</p>
Priority	<p>Sets the selection priority for the various inputs in auto switching mode.</p>

Table 28: Input Configuration (Auto-Switch) LCD menu

9.5 LCD Performance menu

The Performance menu is present for only certain modulation formats.

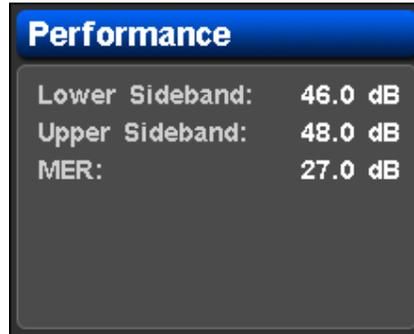


Figure 16: Performance LCD menu

Name	Function
Lower Sideband	Displays the adjacent-channel IMD sideband level in decibels at the lower channel edge.
Upper Sideband	Displays the adjacent-channel IMD sideband level in decibels at the upper channel edge.
MER	Displays the modulation error ratio in decibels.

Table 29: Performance LCD menu

9.6 LCD Power Supply menu

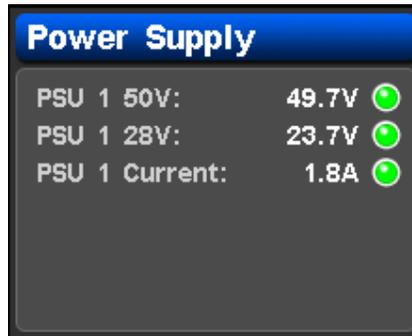


Figure 17: Power Supply LCD menu

Name	Function
PSU 1 50V	<p>Displays the voltage measured at the 50V output of power supply 1 in volts.</p> <p>[green] = The power supply voltage is within the user-set high and low limits. [red] = The power supply voltage is outside the user-set high and low limits.</p>
PSU 1 28V	<p>Displays the voltage measured at the 28V output of power supply 1 in volts.</p> <p>[green] = The power supply voltage is within the user-set high and low limits. [red] = The power supply voltage is outside the user-set high and low limits.</p>
PSU 1 Current	<p>Displays the load current being supplied by power supply 1 in amperes.</p> <p>[green] = The power supply current is below the user-set limit. [red] = The power supply current is above the user-set limit.</p>

Table 30: Power Supply LCD menu

9.7 LCD Cooling menu

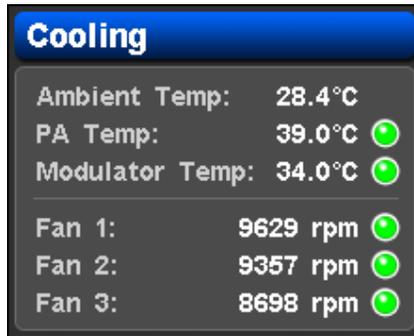


Figure 18: Cooling LCD menu

Name	Function
Ambient Temp	Displays the ambient temperature in degrees centigrade.
PA Temp	Displays the power amplifier temperature in degrees centigrade. [green] = The temperature is below the factory-set limit. [red] = The temperature is above the factory-set limit.
Modulator Temp	Displays the modulator board temperature in degrees centigrade. [green] = The temperature is below the factory-set limit. [red] = The temperature is above the factory-set limit.
Fan 1,2,3	Displays the fan speed in revolutions per minute for fans 1,2 and 3. [green] = The fan speed is above the factory-set limit. [red] = The fan speed is below the factory-set limit.

Table 31: Cooling LCD menu

9.8 LCD Network menu

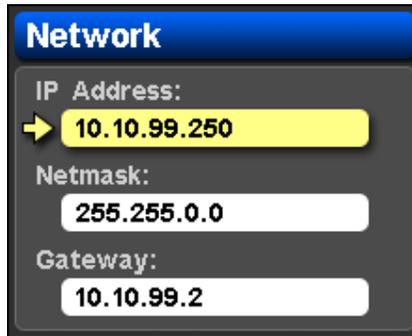


Figure 19: Network LCD menu

Name	Function
IP Address	Sets the IP address in IPv4 format. This the IP address used to access the web GUI discussed in Section 10.
Netmask	Sets the netmask in IPv4 format.
Gateway	Sets the gateway in IPv4 format.

Table 32: Network LCD menu

10 Web GUI user interface

All models are equipped with a web-based GUI (Graphic User Interface) for simple and intuitive monitoring and configuration via a RJ-45 connector available on the front panel.

10.1 Login window

Three levels of GUI access are available on the web interface home page by pressing the blue Login button at the upper left:

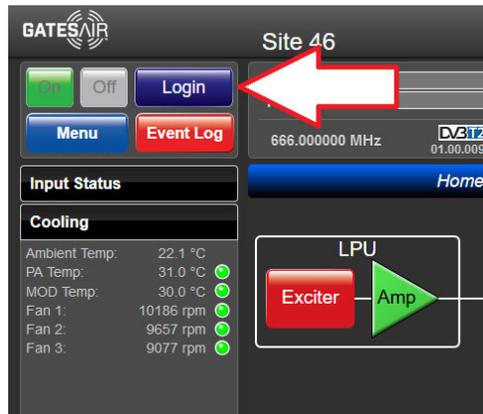


Figure 20: Login button

Pressing the Login button invokes a pop-up box to enter login credentials.

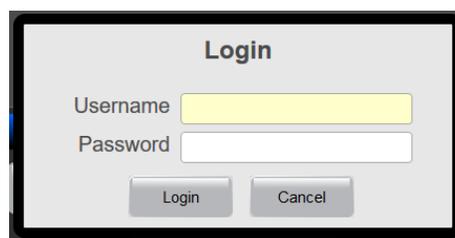


Figure 21: Login popup box

Each level of GUI access has its default username and password.

Username	Default Password	Authorizations
admin	admin	User account management only
user	user	Read/Write access
guest (not logged in)	----	Read only access

Table 33: Default passwords

The administration (admin) login option leads to a special series of pages for the sole purpose of user account management. See Section 10.53 for more details.

10.2 Navigation tree

Navigation through the tree structure of various sub-pages is either via the blue **Menu** button pulldown or graphically by clicking on any of the home screen block diagram elements.

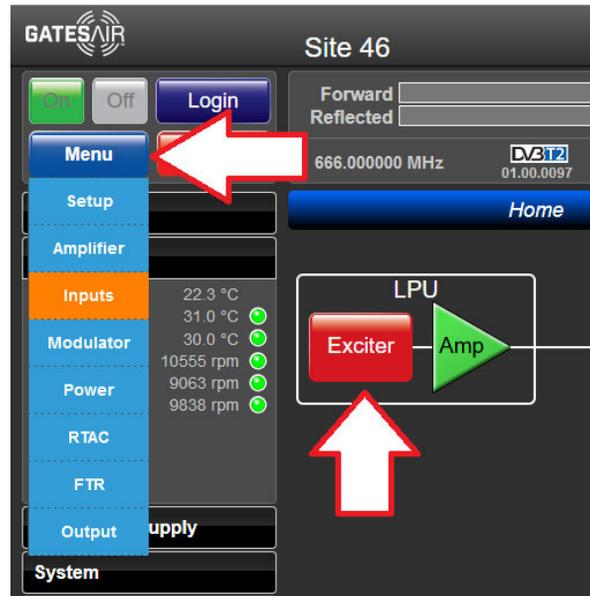


Figure 22: GUI navigation

The remainder of this section provides information on the contents of the various GUI screens. Note that the screen content will vary slightly according to the frequency band (VHF, UHF), modulation standard (ATSC, DVB, ISDB, DAB, etc.), and fitted options (satellite, gap-filler, GbE, SFN, etc.).

The pages detailed in this section are presented in the order in which they appear in the blue **Menu** button navigation tree.

10.3 GUI Home Screen

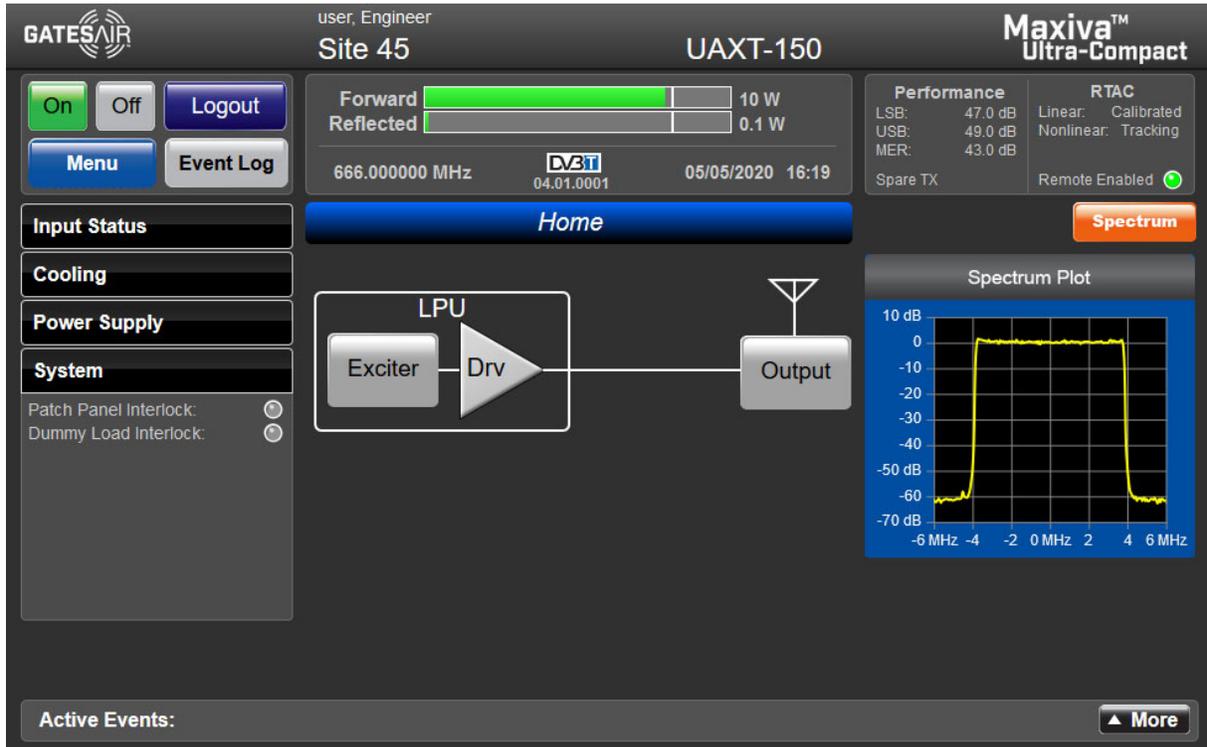


Figure 23: GUI Home screen

Name	Function
On	Switches the unit on to begin transmitting. [green] = the unit is switched on. [gray] = the unit is not switched on.
Off	Switches the unit off to stop transmitting. [red] = the unit is switched off. [gray] = the unit is not switched off.
Logout	Manages the user's login status. [Logout] = The user is currently logged in. Pressing this button logs the user out. [Login] = The user is currently not logged in. Pressing this button launches a dialogue window to enter login credentials.
Menu (Home)	Launches a navigational tree menu to provide easy access to various GUI pages.
Event Log	Opens a log of recently recorded events.

Name	Function
<i>Input Status pulldown</i>	
Active Mode	<p>Displays the input transport stream switching mode.</p> <p>[Manual] = the user manually selects the transport stream input to drive the modulator.</p> <p>[Seamless] = the system seamlessly chooses between two synchronized transport streams for hitless switching.</p> <p>[AutoSwitch] = the system automatically selects the valid transport stream with the highest priority to drive the modulator.</p>
Active Input	<p>Displays which input is currently driving the modulator.</p> <p>[SAT] = satellite receiver.</p> <p>[ASI] = asynchronous serial 1,2,3,4.</p> <p>[GbE] = gigabit ethernet 1,2.</p> <p>[TER] = terrestrial receiver.</p> <p>[ETI] = DAB ETI input 1,2</p> <p>[EDI] = DAB IP input 1,2</p> <p>An LED indicates whether the input is ok/valid.</p> <p>[green] = input is ok/valid.</p> <p>[red] = input is not ok/has errors/is missing.</p>
Seamless Input 1,2	<p>In the case where the Active Mode = Seamless Switching, displays which two inputs have been selected for hitless switching and their status.</p>
AutoSwitch Priority 1,2,3,4,5	<p>In the case where Active Mode = AutoSwitch, displays the switching priority assigned to each input and their status.</p>
<i>Cooling pulldown</i>	
Ambient Temp	<p>Displays the ambient temperature in degrees centigrade.</p>
PA Temp	<p>Displays the power amplifier temperature in degrees centigrade.</p> <p>[green] = the temperature is below the factory-set limit.</p> <p>[red] = the temperature is above the factory-set limit.</p>
MOD Temp	<p>Displays the modulator board temperature in degrees centigrade.</p> <p>[green] = the temperature is below the factory-set limit.</p> <p>[red] = the temperature is above the factory-set limit.</p>
Fan 1,2,3	<p>Displays the fan speed in revolutions per minute for fans 1,2 and 3.</p> <p>[green] = the fan speed is above the factory-set limit.</p> <p>[red] = the fan speed is below the factory-set limit.</p>

Name	Function
<i>LPU Power Supply pulldown</i>	
PS 1,2 50V	<p>Displays the voltage measured at the 50V output of power supply 1 in volts.</p> <p>[green] = the power supply voltage is within the user-set high and low limits. [red] = the power supply voltage is outside the user-set high and low limits.</p>
PS 1,2 28V	<p>Displays the voltage measured at the 28V output of power supply 1 in volts.</p> <p>[green] = the power supply voltage is within the user-set high and low limits. [red] = the power supply voltage is outside the user-set high and low limits.</p>
PS 1,2 Current	<p>Displays the load current being supplied by power supply 1 in amperes.</p> <p>[green] = the power supply current is below the user-set limit. [red] = the power supply current is above the user-set limit.</p>
<i>System pulldown</i>	
Stand By	<p>Indicates the status of the hardware Standby command found on the rear panel DB25 connector.</p> <p>[green] = the Standby loop is closed, satisfied. [red] = the Standby loop is open, not satisfied. [gray] = the Standby loop check is disabled, not used in this Tx configuration</p>
Load Interlock	<p>Indicates the status of the Load interlock loop found on the rear panel DB25 connector.</p> <p>[green] = the interlock loop is closed, satisfied. [red] = the interlock loop is open, not satisfied. [gray] = the dummy Load interlock status check is disabled, not used in this Tx configuration</p>
<i>Upgrade pulldown</i>	
Progress	<p>Indicates the upgrade progress in percent when an upgrade is taking place.</p>
Idle	<p>Indicates the status of the upgrade process.</p> <p>[Waiting] = information is being gathered on the current software versions. [Checking] = the software versions are being checked to determine if an upgrade is required. [Upgrading] = an upgrade is being applied. [Idle] = no upgrade is taking place presently.</p>

Name	Function
<i>Bargraph display</i>	
Forward	Displays the output forward power in watts.
Reflected	Displays the output reflected power in watts.
<i>Performance</i>	
LSB	Displays the adjacent-channel IMD sideband level in decibels at the lower channel edge.
USB	Displays the adjacent-channel IMD sideband level in decibels at the upper channel edge.
MER	Displays the modulation error ratio in decibels.
RTAC Linear	<p>Indicates the status of the linear precorrector, which corrects frequency response and group delay errors at the output.</p> <p>[Bypass] = the linear precorrector is inactive. [Waiting] = linear pre-correction process waiting to start. [Control AGC] = linear pre-correction process started, RF feedback signal level stabilization step. [Calibrating] = linear pre-correction process started, coefficient calculation step. [Calibrated] = linear precorrection is fully operational. [Error] = linear precorrection process failed. [Old Calibration] = the coefficients are stale due to a reboot or new calibration failure.</p>
RTAC Nonlinear	<p>Indicates the status of the nonlinear precorrector, which corrects linearity and intermodulation errors at the output.</p> <p>[Init] = start command to precorrector, awaiting answer [Started] = the precorrector is fully operational. [Tracking] = the precorrector is fully operational with memories. [Hold] = the precorrector is fully operational, but the calculation of the coefficients is frozen. [Bypass] = the precorrector is inactive. [Error] = the nonlinear precorrection process failed.</p>
Remote	<p>Indicates whether the unit is in remote or local control mode, as determined by the front panel Local/Remote pushbuttons.</p> <p>[Enabled, green] = commands can be issued remotely via the GUI, SNMP, or the parallel REMOTE port. [Disabled, yellow] = commands cannot be issued remotely via the GUI, SNMP, or the parallel REMOTE port.</p>

Name	Function
<i>Block Diagram</i>	
Block diagram	Displays the summary status of the major system functions by means of intuitive red-yellow-green-gray blocks. Clicking on a block leads to pages related to the function in question.
<i>Spectrum Plot</i>	
Spectrum	Provides a display of the transmitted signal spectrum, when pressed.
<i>Active Events display bar</i>	
Active Events	Displays any active faults or warning messages. Changes color to yellow or red depending on the severity of the condition. Only the highest priority message is displayed.
More	Opens a pop-up display to list all active fault and warning messages.

Table 34: GUI Home screen

10.4 Home > System > Network > Net Config

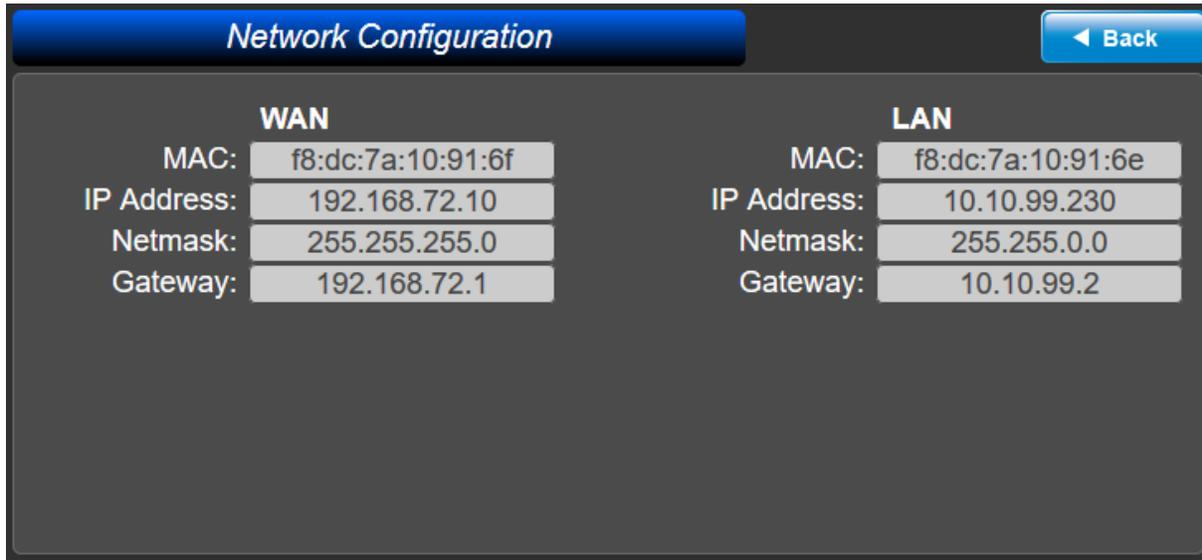


Figure 24: Home > System > Network > Net Config

Name	Function
<i>WAN</i>	
MAC	Displays the MAC address of the rear IP port.
IP Address	Sets the IP address of the rear IP port.
Netmask	Sets the netmask of the rear IP port.
Gateway	Sets the gateway of the rear IP port.
<i>LAN</i>	
MAC	Displays the MAC address of the front IP port.
IP Address	Sets the IP address of the front IP port.
Netmask	Sets the netmask of the front IP port.
Gateway	Sets the gateway of the front IP port.

Table 35: Home > System > Network > Net Config

10.5 Home > System > Network > Time Source

The Time Source page manages the automatic calibration of the system clock used to time stamp entries in the GUI Event Log.

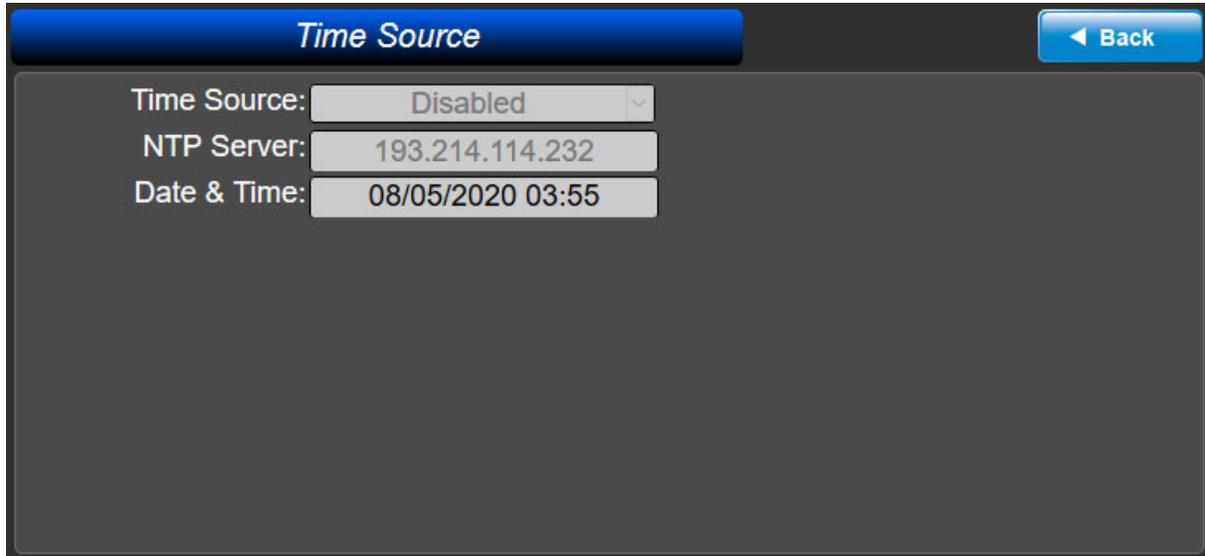


Figure 25: Home > System > Network > Time Source

Name	Function
Time Source	Determines the source for system time calibration, if any. [Disabled] = Allow the system time to free run. [NTP] = set the system time via an NTP server. [GPS] = set the system time via the GNSS receivers.
NTP Server	Sets the address for an NTP server for system time calibration.
Date & Time	Displays the current system time.

Table 36: Home > System > Network > Time Source

10.6 Home > System > Network > SNMP

The screenshot shows the SNMP configuration interface. At the top, there's a blue bar with 'SNMP' and a 'Back' button. Below it, there are two buttons: 'MIB Config' and 'Traps'. The main configuration area is divided into several sections:

- Port:** 161
- SNMP Version:** V3
- Community Names:**
 - SNMP User 1:** Read-Only 1: [password], Read-Write 1: [password]
 - SNMP User 2:** Read-Only 2: [password], Read-Write 2: [password]
- MIB-2 System Group:** System Contact, System Name, System Location
- SNMPv3 User 1:** User Name: user, Security Level: AuthPriv, Auth Password: [password], Auth Protocol: MD5, Priv Password: [password], Priv Protocol: DES
- SNMPv3 User 2:** User Name: [empty], Security Level: NoAuthNoPriv, Auth Password: [empty], Auth Protocol: None, Priv Password: [empty], Priv Protocol: None

Figure 26: Home > System > Network > SNMP

Name	Function
MIB Config	Leads to the SNMP MIB Selection page.
Traps	Leads to the SNMP Traps/Informs page.
Port	Selects the port number to be used. [161, 8170...8179]. Port 161 is the default.
SNMP Version	Selects the SNMP version. [v1, v2c, v3]
<i>Community Names - SNMP User 1,2</i>	
Read-Only 1:	Sets a password that allows an SNMP GET to be performed. Default is <i>public</i> .
Read-Write 1:	Sets a password that allows an SNMP SET to be performed. Default is <i>private</i> .
<i>MIB-2 System Group</i>	
System Contact:	Sets the name of the person responsible for the equipment.
System Name:	Sets the name of the equipment.

Name	Function
System Location:	Sets the location of the equipment.
<i>SNMPv3 User 1,2</i>	
User Name:	Sets the SNMPv3 username.
Security Level:	Sets the SNMPv3 Authentication and Privacy security level. [NoAuthNoPriv] = No v3 authentication and no v3 privacy. [AuthNoPriv] = v3 authentication but no v3 privacy. [AuthPriv] = v3 authentication and v3 privacy.
Auth Password:	Sets the SNMPv3 authentication password.
Auth Protocol:	Selects the SNMPv3 authentication protocol. [None, MD5, SHA, 128-SHA/224, 192-SHA/256, 256-SHA/384, 384-SHA/512]
Priv Password:	Sets the SNMPv3 privacy password.
Priv Protocol	Sets the SNMPv3 privacy protocol. [None, DES, AES128]

Table 37: Home > System > Network > SNMP

10.7 Home > System > Network > SNMP > MIB Config (SNMP MIB Selection)

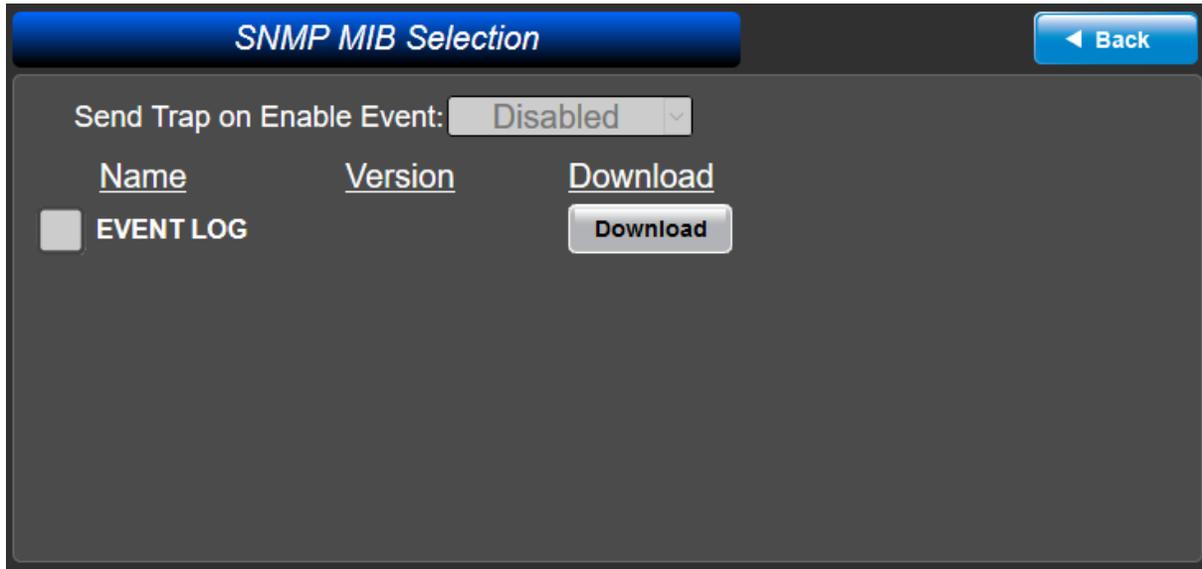


Figure 27: Home > System > Network > SNMP > MIB Config

Name	Function
Send Trap on Enable Event	Determines whether an SNMP trap will be sent whenever a new MIB is enabled. [Disabled] = do not send a trap. [Enabled] = send a trap.
Name	Lists the names of the available MIBs.
Version	Lists the version number of the available MIBs.
Download	Allows the MIB to be downloaded for inspection, loading into an NMS.

Table 38: Home > System > Network > SNMP > MIB Config

10.8 Home > System > Network > SNMP > Traps (Traps/Informs)



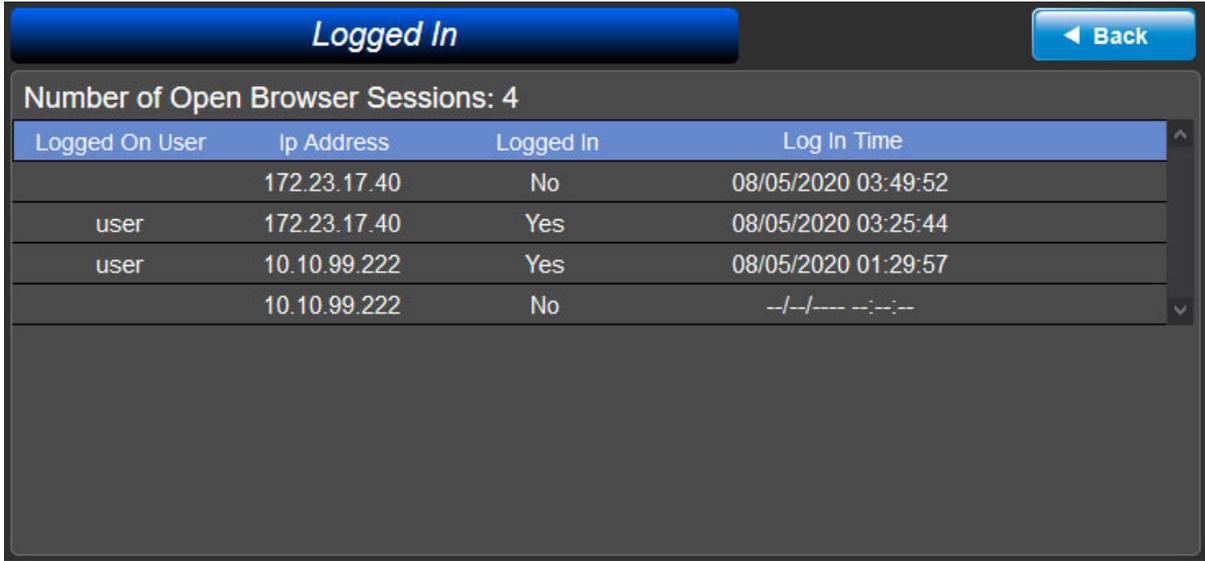
Figure 28: Home > System > Network > SNMP > Traps

Name	Function
Host 1,2,3	Provides trap/inform sending to up to three different destinations.
Address	Sets the target IP address for traps/informs being sent out from the unit.
Port	Sets the port on the trap/inform target IP address. Default is port 162.
SNMP Version	Sets the SNMP version. [v1, v2c, v3]
SNMP User Name	Sets the SNMPv3 username.
Security Level	Sets the SNMPv3 Authentication and Privacy security level. [NoAuthNoPriv] = No v3 authentication and no v3 privacy. [AuthNoPriv] = v3 authentication but no v3 privacy.

Name	Function
	[AuthPriv] = v3 authentication and v3 privacy.
Auth Password	Sets the SNMPv3 authentication password.
Auth Protocol	Selects the SNMPv3 authentication protocol. [None, MD5, SHA, 128-SHA/224, 192-SHA/256, 256-SHA/384, 384-SHA/512]
Priv Password	Sets the SNMPv3 privacy password.
Priv Protocol	Sets the SNMPv3 privacy protocol. [None, DES, AES128]
Type	Sets the SNMP notifications as being either traps or informs. [Trap, Inform]
Retries Interval	Sets the number of minutes the unit will wait before re-sending an unacknowledged inform.
Retries Times	Sets the number of times the unit will attempt to re-send an unacknowledged inform.
Max Outstanding PDUs	Sets the number of unacknowledged informs the unit will hold its buffer and keep trying to resend.
Pending	Displays how many informs are in the buffer waiting to be acknowledged.
Timeouts	Displays how many times an inform went unacknowledged from the receiving end.
Overflow	Displays how many informs were lost because the buffer overflowed with unacknowledged informs.
Max Pending	Provides a read out the highest number of informs that were ever parked in the buffer at one time since the system was last rebooted.

Table 39: Home > System > Network > SNMP > Traps

10.9 Home > System > Network > Logged In



Logged In			
Number of Open Browser Sessions: 4			
Logged On User	Ip Address	Logged In	Log In Time
	172.23.17.40	No	08/05/2020 03:49:52
user	172.23.17.40	Yes	08/05/2020 03:25:44
user	10.10.99.222	Yes	08/05/2020 01:29:57
	10.10.99.222	No	--/--/---- --:--:--

Figure 29: Home > System > Network > Logged In

Name	Function
Number of Open Browser Sessions	Displays how many remote browser sessions are currently in contact with the unit at the present time.
Logged On User	Displays the account username.
IP Address	Lists any users who are actively logged in at the present time.
Logged In	Displays whether the user is fully logged in. [Yes] = user has logged in as <i>User</i> or <i>Admin</i> . [No] = user has <i>Guest</i> -level read-only access.
Log In Time	Displays the login time and date for all logged in users.

Table 40: Home > System > Network > Logged In

10.10 Home > System > Service

Figure 30: Home > System > Service

Name	Function
Station Name	Sets the site name.
Model Number	Sets the equipment model or identifier.
Serial Number	Lists the unit's serial number.
Display Format	Sets the date format based on a 24-hour clock. [MM/DD/YYYY, DD/MM/YYYY, YYYY/MM/DD]
Offset from UTC	Sets offset hours relative to universal time coordinated (also referred to as GMT). [-12:00 ... +13:00]
Date (MM/DD/YYYY)	Displays the current date in the selected format. The date can be set here if NTP/GPS as an external time source is disabled.
Time (24 Hour)	Displays the current time. The current time can be set here if NTP/GPS as an external time source is disabled.
Set Time	Saves the date and time settings after being manually changed. NTP/GPS as an external time source must be disabled to set the time manually
Feature Key	Sets/Displays a feature key used to unlock certain modulation standards.
(Option LEDs)	Indicates which modulations standards are currently unlocked in software.

Table 41: Home > System > Service

10.11 Home > Setup > Config Sets (Configuration Sets)

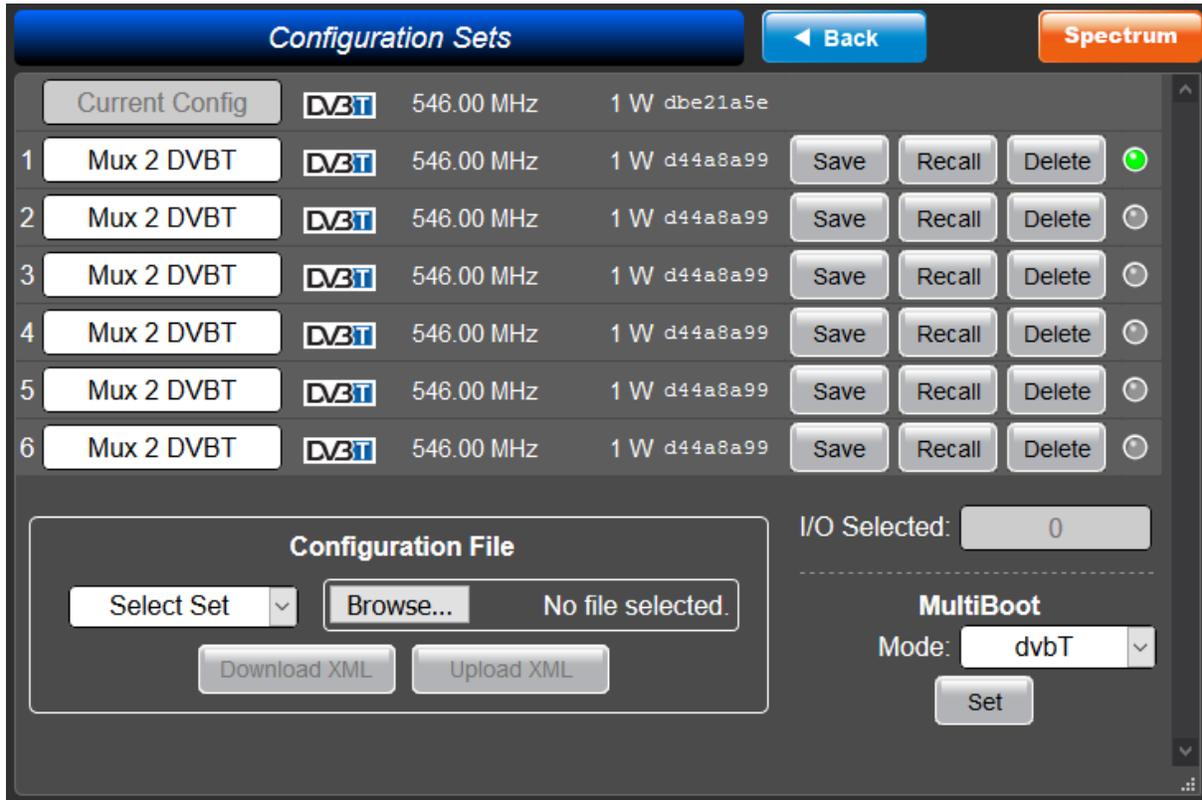


Figure 31: Home > Setup > Config Sets

Name	Function
Current Config	Displays the parameters of the currently invoked configuration.
Buttons 1-6	Displays the parameters of up to six saved configuration sets. Information displayed includes modulation format (logo), channel frequency in MHz, RF power in watts, and a unique identifier code for the configuration. [green] = this configuration is currently invoked. [gray] = the configuration is in reserve.
Save	Saves the current operating parameters to memory as a configuration set. Remember to save any changes before changing to a different configuration!!
Recall	Recalls and invokes a stored configuration set.
Delete	Deletes a stored configuration set from memory.
I/O Selected	Displays the hardware selection according to the logic status of the SETUP M1- SETUP M6 pins available in the Dub 15A connector on the rear panel. (not applicable, this model)

Name	Function
<i>Configuration File</i>	
Select Set	Determines into which configuration set location a file can be uploaded or downloaded to/from the hard disk. [Config Set 1...6]
Browse	Launches a dialog box to specify a location on the hard disk to upload or download a configuration file.
Download XML	Downloads the configuration set as an xml file. The file can be reviewed with a text editor such as Notepad.exe.
Upload XML	Uploads an xml configuration file into the specified configuration set location.
<i>MultiBoot</i>	
Mode	Selects a modulation format for transmitters equipped with the MultiBoot option. [DVB-T, DVB-T2]
Set	Invokes the modulation format selected in the MultiBoot Mode pulldown menu.

Table 42: Home > Setup > Config Sets

10.12 Home > System > Update (Software Management)

The Software Management page provides the ability to upload new software versions into the controller. A software update procedure is provided in Section 11.3.2 of this manual.

Software Management Back Spectrum

Software **Upload** Reset Configuration

Current Version: Onedriver_01.02.0019

Status	Name	Version	Software P/N	Size	Notes	Activate	Delete
Active	Onedriver	01.02.0019	861-1172-012 B	66,148k	View		
Not Active	Onedriver	01.02.0012	861-1172-012 B	65,240k	View	Activate	Delete
Not Active	Onedriver	01.00.0097	861-1172-012 A	65,076k	View	Activate	Delete
Not Active	Onedriver	01.00.0085	861-1172-012 A	62,080k	View	Activate	Delete
Not Active	DEV/DEV-ONEDRIVER	00.00.0000	861-1172-012 A	61,960k	View	Activate	Delete

Software Management Back Spectrum

Software **Upload** Reset Configuration

Upload Browse

Uploading:

Status

Software Management Back Spectrum

Software Upload **Reset** Configuration

Restart: Perform a soft-reset to restart the software (approx 2-5 seconds).

Reboot: Perform a hard-reset to additionally re-initialize hardware (approx 10-20 seconds).

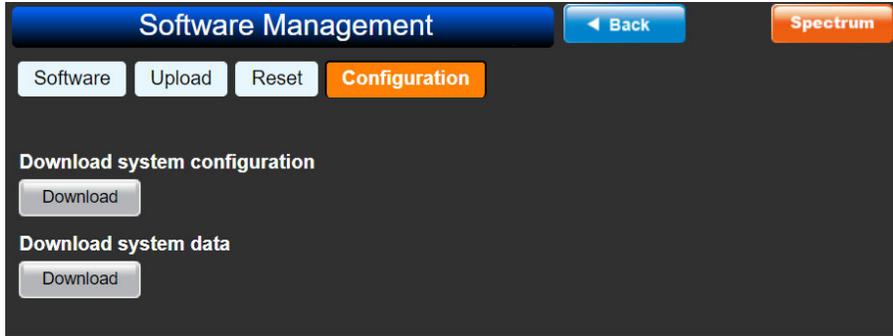


Figure 32: Home > System > Update

Name	Function
<i>Software</i>	
Current Version	Displays which version of software is currently running in the unit.
Status	Displays the status of different version of software. [Active] = this version is currently active/running. [Not Active] = this version had been loaded on board but is currently in reserve/not running.
Name	Displays the name of the software.
Version	Displays the version number of the software.
Software P/N	Displays the part number of the software.
Size	Displays the size of the software.
Notes	Launches a pop-up window with a display of release notes.
Activate	Activates the software and deactivates any other versions.
<i>Upload</i>	
Upload	Launches the file uploading process.
Browse	Launches a dialog box to select a file to upload on the local PC.
Uploading	Provides a bar graph display of the uploading process.
Status	Provides a textual readout of the uploading process.
<i>Reset</i>	
Restart	Performs a soft reset to restart the software (approx. 2-5 seconds of interruption)
Reboot	Performs a hard reset to reinitialize both the hardware and software (approx. 10-20 seconds of interruption)
<i>Configuration</i>	
Download system Configuration	Downloads an xml file containing information of the current system configuration.
Download system data	Downloads an xml file with a complete data set of transmitter telemetry.

Table 43: Home > System > Update

10.13 Home > System > Version

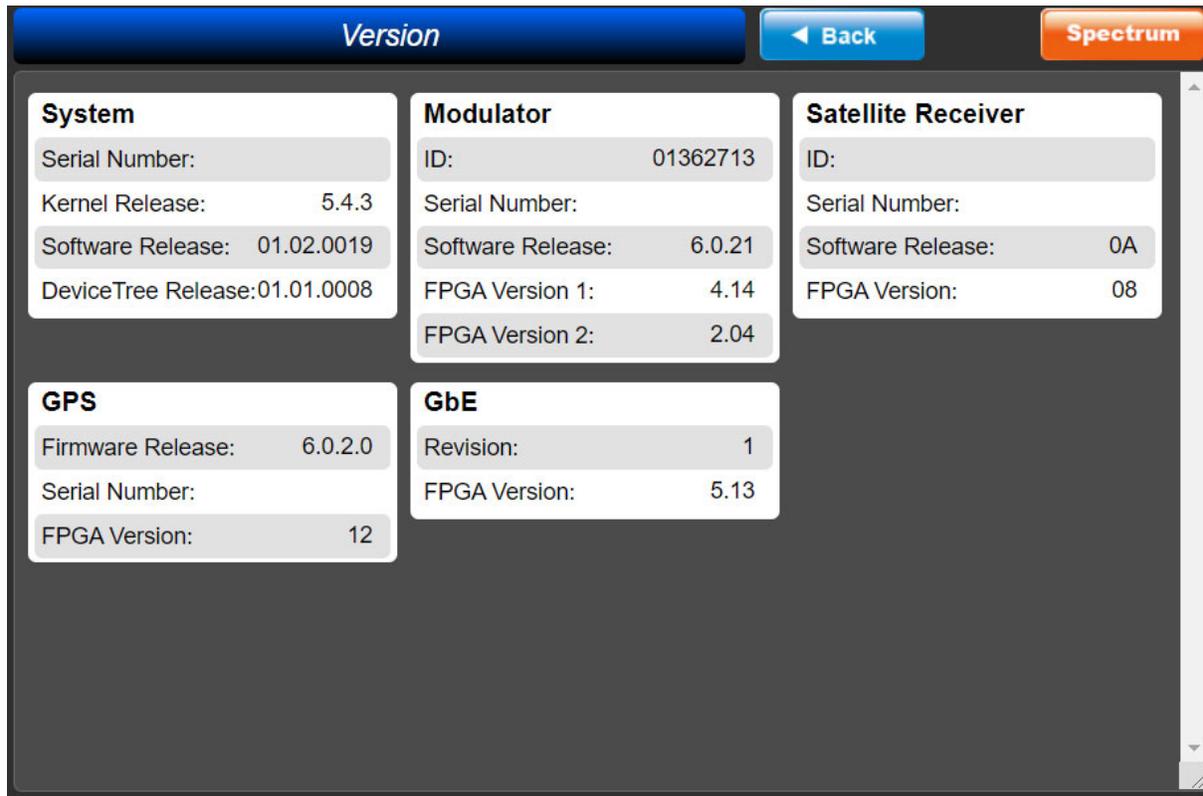


Figure 33: Home > System > Version

Name	Function
Serial Number	Displays the serial number of the controller.
Kernel Release	Displays the release number of the Linux kernel on the controller.
Software Release	Displays the release number of the software currently running on a microcontroller (CPU).
FPGA Version	Displays the version of the firmware loaded on an FPGA.

Table 44: Home > System > Version

10.14 Home > Setup > Log Setup (Event Log Setup)

The Event Log Setup allows the customization of the Event Log by setting the behavior triggered by individual events.



Figure 34: Home > Setup > Log Setup

Name	Function
Enable	Suppresses an event when unchecked.
Message	Describes the event in question.
Status	Indicates that the event is currently active when lit red.
Type	Sets the priority of the event. [Fault] = red/high priority. [Warning] = yellow/medium priority. [Info] = none/low priority.

Name	Function
RF Mute	Sets whether the event triggers a mute of the reference outputs. (not used in this application)
Web Log	Sets whether the event will appear in the web GUI event log.
Trap	Sets whether the event triggers the sending of an SNMP trap/inform.
Check / Uncheck All	Allows the user to quickly check or uncheck the same attribute in all events. [Enable, RF Mute, Web Log, E-mail, Relay 1...4, Trap 1...3]
Log Web commands	Causes commands originating from web GUI to be recorded in the event log when checked.
Log LCD commands	Causes commands originating from the front panel LCD to be recorded in the event log when checked.
Log SNMP commands	Causes commands originating from SNMP to be recorded in the event log when checked.

Table 45: Home > Setup > Log Setup

10.15 Home > Amplifier > Drive (Amplifier)



Figure 35: Home > Amplifier > Drive

Name	Function
<i>RF Output Status</i>	
Power (W)	Displays the RF forward power at the output in watts.
Power (dBm)	Displays the RF forward power at the output in dBm. (decibels over one milliwatt)
Reflected Power (W)	Displays the RF reflected power at the output in watts.
Reflected Power (dBm)	Displays the RF reflected power at the output in dBm. (decibels over one milliwatt)
ALC Status	<p>Displays the operational status of the automatic level control (ALC) loop.</p> <p>[Running] = the ALC loop is maintaining a constant RF output power.</p> <p>[Stopped] = the ALC loop has stopped because the transmitter is switched off or because the ALC has failed to reach the power target (low gain).</p>

Name	Function
<i>Alarms</i>	
Temperature (degC)	<p>Displays the power amplifier temperature in degrees centigrade.</p> <p>[green] = the temperature is below the factory-set alarm threshold.</p> <p>[red] = the temperature is above the factory-set alarm threshold.</p>
RF Forward High	<p>Indicates the status of the RF forward power level at the output.</p> <p>[green] = the forward power is below the factory-set alarm threshold.</p> <p>[red] = the forward power is above the factory-set alarm, threshold.</p>
RF Forward Low (-1.5 dB)	<p>Indicates the status of the RF forward power level at the output.</p> <p>[green] = the forward power is within -1.5 dB of full power.</p> <p>[red] = the forward power is below -1.5 dB of full power.</p>
RF Forward Low (-3 dB)	<p>Indicates the status of the RF forward power level at the output.</p> <p>[green] = the forward power is within -3 dB of full power.</p> <p>[red] = the forward power is below -3 dB of full power.</p>
RF Forward Low (-7 dB)	<p>Indicates the status of the RF forward power level at the output.</p> <p>[green] = the forward power is within -7 dB of full power.</p> <p>[red] = the forward power is below -7 dB of full power.</p>
RF Reflected High	<p>Indicates the status of the RF reflected power level at the output.</p> <p>[green] = the reflected power is above the factory-set alarm threshold.</p> <p>[red] = the reflected power is below the factory-set alarm threshold.</p>

Table 46: Home > Amplifier > Drive

10.16 Home > Amplifier > Power Amp

The Home > Amplifier > Power Amplifier page presents information communicated back to the Ultra-Compact driver from the external PA stage in larger systems featuring external power amplifiers. Accordingly, it will not be present in standalone Ultra-Compact systems. Additionally, all telemetry and alarms reported here originate in the external PA stage. This could have ramifications when using the information on this page for system troubleshooting purposes.



Figure 36: Home > Amplifier > Power Amplifier

Name	Function
<i>RF Output Status</i>	
Power (W)	Displays the system output power in watts.
Power (dBm)	Displays the system output power in decibels over one milliwatt.

Name	Function
Reflected Power (W)	Displays the system reflected power in watts.
Reflected Power (dBm)	Displays the system reflected power in decibels over one milliwatt.
LPU in use	Displays which LPU is currently active in dual drive systems.
Hardware Reset	Resets the controller internal to the external PA stage, should it become unresponsive.
Current Meters	Display the current being drawn by each amplifier pallet in the PA stage. e.g. PAL2 = left-hand pallet #2, PAR2 = right-hand pallet #2.
Fan meters (rpm)	Displays the speed of the PA stage fans in rpms.
Temperature (°C)	Displays the PA stage temperature in degrees centigrade.
<i>Alarms</i>	
Temperature (°C)	Indicates the PA stage temperature alarm status. [green] = the PA stage temperature is within limits. [yellow] = the PA stage temperature is issuing a warning because it is approaching the alarm threshold. [red] = the PA stage temperature is above the alarm threshold.
RF Forward High	Indicates the PA stage high forward power alarm status. [green] = the system forward power is ok/within limits. [red] = the system forward power is excessive.
RF Forward Low	Indicates the PA stage low forward power alarm status. [green] = the system forward power is ok/within limits. [red] = the system forward power is too low.
RF Reflected High	Indicates the PA stage high reflected power alarm status. [green] = the system reflected power is low/ok. [red] = the system reflected power is too high.
Current	Indicates the PA stage high current alarm status. [green] = the current to RF pallet is ok. [red] = the current to one or more RF pallet(s) is excessive.
RS485 Comms	Indicates the status of the RS-485 serial communications between the LPUs and the external PA stage. [green] = the RS485 communications are ok. [red] = the RS-485 communications link to the PA stage is faulty/missing.
Fans	Indicates the status of the cooling fans in the external PA stage.

Name	Function
	<p>[green] = all PA stage fans are operating properly. [red] = one or more PA stage fans has low/no rpms.</p>
PSU 1,2,3 Status	<p>Indicates the status of the power supply modules in the external PA stage.</p> <p>[green] = the referenced PA stage power supplies is ok. [red] = the reference PA stage power supply has an internal fault.</p>
LPU 1,2 Status	<p>Indicates the status of the LPU(s) as perceived by the PA stage via the RS-485 communication between the units.</p> <p>[green] = the referenced LPU is not reporting an internal fault to the PA stage controller. [red] = the referenced LPU is reporting an internal fault to the PA stage controller.</p>
Reset Alarms	Clears any latched alarms stored in the external PA stage.

Table 47: Home > Amplifier > Power Amplifier

10.17 Home > Inputs [DVB, DTMB]

The contents of the Input page(s) will change according to the modulation standard. This section addresses the Inputs screen for DVB-T/DVB-T2/DTMB.



Figure 37: Home > Inputs [DVB]

Name	Function
Config	Navigates to the Input Configuration page.

Name	Function
GbE	Navigates to the GbE Interface pages
<i>Inputs status display</i>	
Input	Lists the available inputs. [ASI, GbE, Sat, Ter]
Lock	Indicates lock status of the input. [green] = the input is present/locked. [grey] = the input is missing.
Bitrate	Displays the bitrate of the input in bits per second.
Format	Displays the packet size in bytes.
Select	Indicates the selection status of the input. [green] = the input is feeding the modulator. [gray] = the input is in reserve, not selected.
Alarm	Indicates the operational status of the input. The checking of the presence or integrity of the input signal is carried out when the input is manually selected or if it is managed by the seamless. [red] = the input stream has one or more error conditions. [gray] = the input stream is valid or not selected.
<i>Seamless</i>	
Switch Seamless Enable	Indicates the activation of seamless input switching. [green] = seamless switching has been enabled. [gray] = seamless switching has not been enabled.
Seamless Locked	Indicates the operational status of seamless input switching. [green] = seamless switching is taking place. [gray] = seamless switching is not currently enabled.
TS ID Different	Indicates whether the two inputs selected for seamless switching have identical TS ID (Transport Stream ID) values. [green] = the two input streams have the same TS ID values. [red] = the two input streams have the different ID values, and seamless switching is thus impossible.
TS Aligned	Indicates the synchronization status of the two inputs selected for seamless switching. [green] = the two inputs are synchronized. [grey] = the two inputs are not synchronized, and seamless switching is thus impossible.
TS Delay 1-2	Displays the relative time delay between the two inputs selected for seamless switching. A value of zero indicates that the two streams are time-aligned.

Name	Function
Input Selected	Displays the input currently connected to the modulator. [Input 1,2]
Input1 MIP	Indicates the presence of a MIP (Mega-Frame Initialization Packet) in the incoming transport stream. [green] = a MIP is present in the stream. [gray] = no MIP is present in the stream.
Input2 MIP	Indicates the presence of a MIP (Mega-Frame Initialization Packet) in the incoming transport stream. [green] = a MIP is present in the stream. [gray] = no MIP is present in the stream.
Input1 Network Delay	Displays the network delay value in milliseconds being requested by the MIP when present.
Input2 Network Delay	Displays the network delay value in milliseconds being requested by the MIP when present.
<i>Input 1/2 ETR 290</i>	
Reset	Resets the error counters for this section.
TS ID	Displays the transport stream ID. [red] = The TS ID of the other seamless switch input is different. [grey]= The TS ID is same to that available in the other seamless switch input.
Sync Lost	Displays the number of sync loss errors since the error counter was last reset. [green] = An error event has not yet occurred. [red] = Indicates that a Sync Lost event has occurred which causes the counter to increment.
Sync Byte Error	Displays the number of sync byte errors since the error counter was last reset. The "Sync_byte_error" event is detected as soon as the correct synchronization byte (0x47) does not appear after 188 or 204 bytes. [green] = An error event has not yet occurred. [red] = Indicates that an Sync Byte Error event has occurred, which causes the counter to increment.
PAT Error	Displays the number of errors in the PAT (Program Association Table) since the error counter was last reset. A PAT error occurs when the PAT table does not occur at least every 0.5 seconds in the Packet Elementary stream with PID 0 or the table has the Scrambling_control_field not set to 00. [green] = An error event has not yet occurred. [red] = Indicates that a PAT error event has occurred, which causes the counter to increment.

Name	Function
PAT Error 2	<p>Displays the number of errors in the PAT (Program Association Table) since the error counter was last reset. A PAT Error 2 occurs:</p> <ul style="list-style-type: none"> - when the PAT table does not occur at least every 0.5 seconds in the Packet Elementary stream with PID 0. - when the table has the Scrambling_control_field not set to 00. - when a section with table_id other than 0x00 is found on PID 0x0000 (in the stream there are other tables other than PAT which are conveyed in Packet Elementary stream with PID 0). <p>[green] = An error event has not yet occurred. [red] = Indicates that a PAT Error 2 event has occurred, which causes the counter to increment.</p>
Continuity Error	<p>Displays the number of continuity counter errors (MPEG packet order) since the error counter was last reset. This event occurs in the presence of packets with wrong arrival order or lost packets.</p> <p>[green] = An error event has not yet occurred. [red] = Indicates that a Continuity Error event has occurred, which causes the counter to increment.</p>
PMT Error	<p>Displays the number of errors in the PMT (Program Map Table) since the error counter was last reset. A PMT Error occurs when the PMT does not occur at least every 0.5 seconds on the PID which is referred to in the PAT or the table has the Scrambling_control_field not set to 00.</p> <p>[green] = An error event not yet occurred. [red] = Indicates that a PMT Error event has occurred, which causes the counter to increment.</p>
PMT Error 2	<p>Displays the number of errors in the PMT (Program Map Table) since the error counter was last reset. A PMT Error 2 occurs when:</p> <ul style="list-style-type: none"> - The PMT does not occur at least every 0.5 seconds on the PID which is referred to in the PAT. - The Scrambling_control_field in the table is not 00 for all packets containing information on sections with table_id 0x02 (PMT) on each program_map_PID which is referred to in the PAT. <p>[green] = An error event has not yet occurred. [red] = Indicates that an PMT Error 2 event has occurred, which causes the counter to increment.</p>
CRC Error	<p>Displays the number of CRC errors (byte corruption) since the error counter was last reset. CRC error checking occurs in the CAT, PAT, PMT, NIT, EIT, BAT, SDT or TOT tables.</p> <p>[green] = An error event has not yet occurred.</p>

Name	Function
	[red] = Indicates that an CRC Error event has occurred, which causes the counter to increment.
User PID Error	Displays the number of times the user-selected PID did not arrive in the pre-defined interval since the error counter was last reset. [green] = An error event has not yet occurred. [red] = Indicates that a User PID Error event has occurred, which causes the counter to increment.

Table 48: Home > Inputs [DVB]

10.18 Home > Inputs [DVB, DTMB] > Config (Input Configuration)

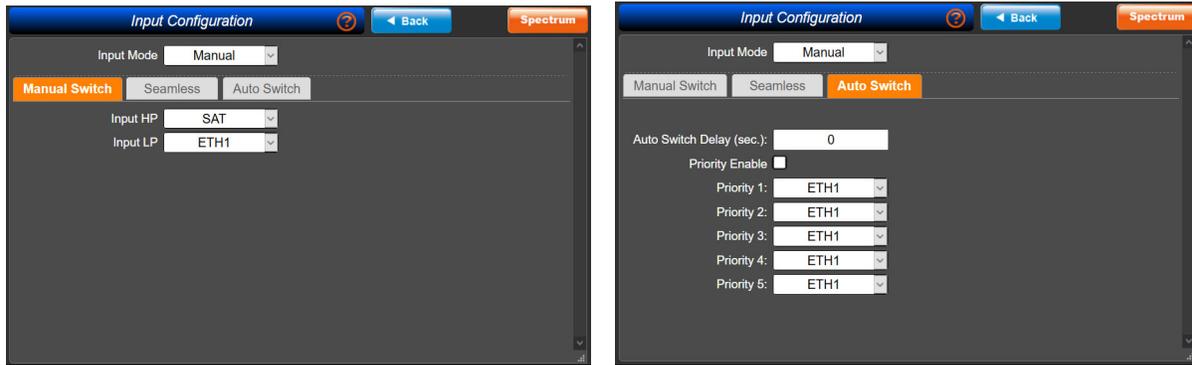


Figure 38: Home > Inputs [DVB] > Config > Manual and Auto Switch

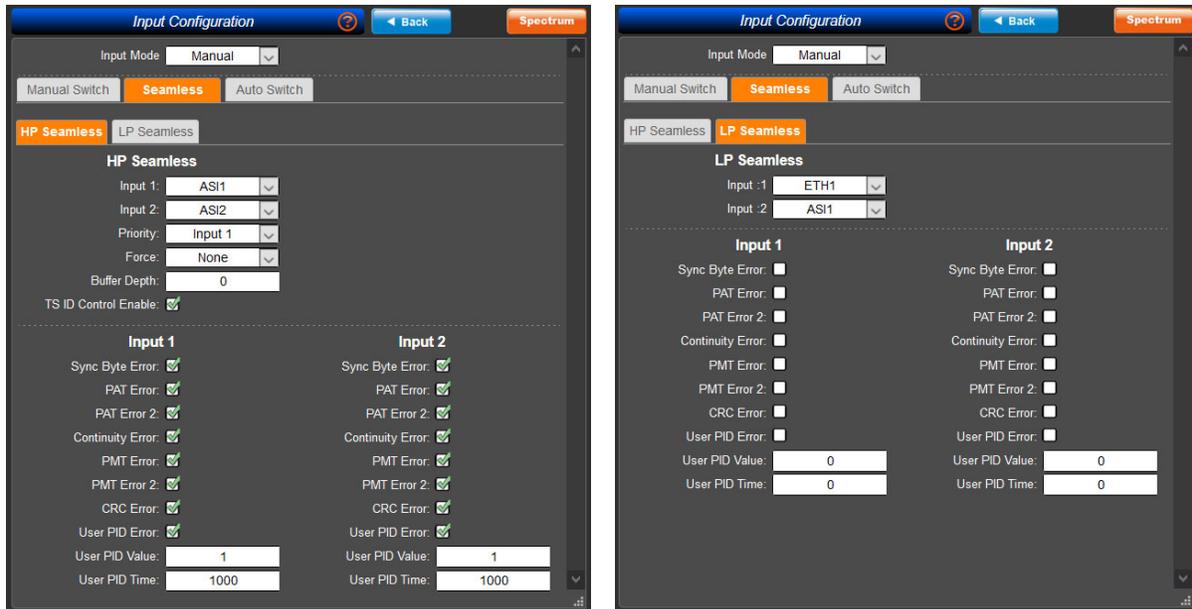


Figure 39: Home > Inputs [DVB] > Config > HP and LP Seamless

Name	Function
Input Mode	<p>Sets the input selection mode.</p> <p>[Manual] = User manually choses the input from a pull down menu.</p> <p>[Seamless] = System seamlessly switches between two input streams if they are identical and can be synchronized.</p> <p>[Auto Switch] = System automatically selects the stream from a prioritized list of possibilities.</p>
<i>Manual Switch</i>	
Input HP	<p>Sets the input to be used for the high priority stream. [ETH 1, ASI 1, ETH 2, ASI 2, SAT, TER]</p>
Input LP	<p>Sets the input to be used for the low priority stream.</p>

Name	Function
	[ETH 1, ASI 1, ETH 2, ASI 2, SAT, TER]
<i>Auto Switch</i>	
Auto Switch Delay	Sets a delay in seconds before switching away from a bad/invalid input.
Priority Enable	Forces input substitutions to be made according to a series of priorities assigned below.
Priority 1-6	Assigns a switching priority to each input. Priority 1 is the highest priority, priority 6 the lowest. [ETH 1, ASI 1, ETH 2, ASI 2, SAT, TER]
<i>Seamless (HP/LP)</i>	
Input 1, 2	Sets the input source to be used as input 1, 2 for seamless switching. [ETH 1, ASI 1, ETH 2, ASI 2, SAT, TER]
Priority	Sets the input priority for seamless switching. [None] = when both input transport streams are valid, continue using the last selected input. [Input 1] = always use input 1 when it is valid. [Input 2] = always use input 2 when it is valid.
Force	Disables seamless switching and forces the manual selection of one of the inputs. [None] = seamless switching can take place. [Input 1] = always use input 1, regardless. [Input 2] = always use input 2, regardless.
Buffer Depth (bytes)	Sets the seamless switching input buffer depth in bytes.
TS ID Control Enable	When checked, allows seamless switching only between those transport streams with identical TS ID values.
<i>Input 1,2</i>	
Sync Byte Error	Enables checking for Sync Byte errors.
PAT Error	Enables checking for PAT errors.
PAT Error 2	Enables checking for PAT2 errors.
Continuity Error	Enables checking for continuity errors.
PMT Error	Enables checking for PMT errors.
PMT Error 2	Enables checking for PMT2 errors.
CRC Error	Enables checking for CRC errors.
User PID Error	Enables checking for presence/periodicity errors in a user-defined PID value.
User PID Value	Sets a user PID number for User PID Error checking.
User PID Time	Sets a time interval in which the User PID must periodically arrive to avoid a User PID Error alarm condition.

Table 49: Home > Inputs [DVB] > Config

10.19 Home > Inputs > GBE (GbE Interface IP1, 2)

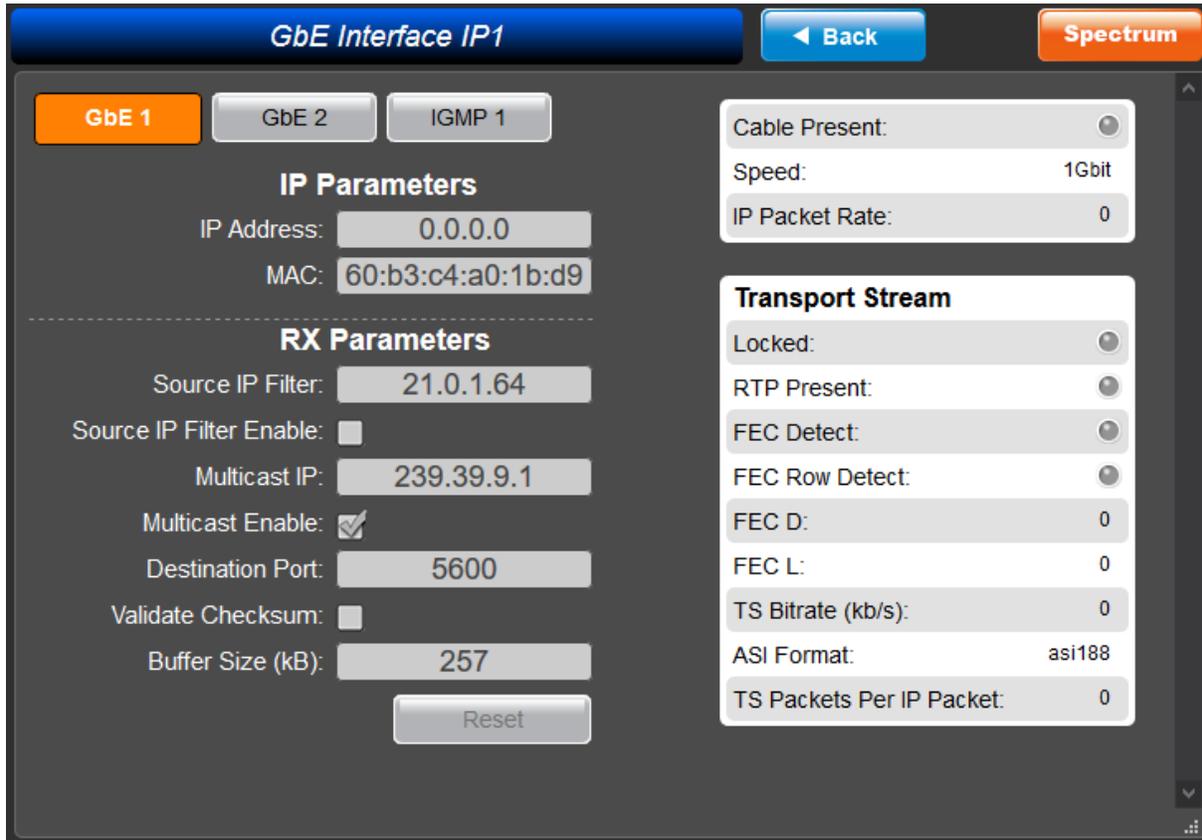


Figure 40: Home > Inputs > GBE

Name	Function
GbE 1,2	Navigates the GbE 1 or GbE 2 Interface page.
IGMP 1,2	Navigates the IGMP 1 or IGMP 2 page.
<i>IP Parameters</i>	
IP Address	Sets the IP address of the GbE input port.
MAC	Displays the MAC of the GbE input port.
<i>RX Parameters</i>	
Source IP Filter	Sets the IP address for a source IP filter. The modulator will accept only GbE packets coming from this address.
Source IP Filter Enable	Enables the source IP filter described above.
Multicast IP	Sets an IP address for multicast distribution. The modulator will accept any multicast packets sent to this address.
Multicast Enable	Enables the use of multicast distribution.
Destination Port	Sets the destination port for multicast distribution.
Validate Checksum	Enables the validation of the received checksum to ensure that the GbE packets are not corrupted.

Name	Function
Buffer Size (kB)	Sets the receiver buffer size in kilobytes.
Reset	Resets the GbE input board if it should it become unresponsive.
Cable Present	Indicates whether a cable with an active signal is connected to the GbE input port. [green] = a valid signal is present at the input. [gray] = no signal is present at the input.
Speed	Displays the speed of the Ethernet connection. [10 Mbit/s, 100 Mbit/s, 1 Gbit/s]
IP Packet Rate	Displays the IP packet rate in packets per second
<i>Transport Stream LEDs</i>	
Locked	Indicates whether the incoming stream is valid/locked. [green] = the incoming stream is locked. [gray] = the incoming stream is absent.
RTP Present	Indicates whether the incoming stream conforms to RTP. (Real Time Protocol) [green] = the incoming stream is RTP-based. [gray] = the incoming stream is absent.
FEC Detect	Indicates whether the incoming stream contains FEC. (Forward Error Correction) [green] = FEC information has been detected in the stream. [yellow] = [red] = [gray] = no FEC information has been detected in the stream.
FEC Row Detect	Indicates whether the modulator has successfully detected a 2D the FEC matrix structure (both column and row) [green] = The FEC matrix structure has been successfully [gray] = The FEC matrix structure has not been successfully detected or no FEC is present.
FEC D	Displays the number of detected FEC matrix rows.
FEC L	Displays the number of detected FEC matrix columns.
TS Bitrate (kb/s)	Displays the bitrate of the received transport stream in kilobits per second.
ASI Format	Displays the number of bytes in the ASI transport stream packet.
TS Packets per IP Packet	Displays the number of transport stream packets per IP packet.

Table 50: Home > Inputs > GBE

10.20 Home > Inputs > GbE > IGMP 1, 2



IGMP 1 Back Spectrum

IGMP Version:

SourceNumber	IP Address
1	10.10.99.4

Figure 41: Home > Inputs > GbE > IGMP 1, 2

Name	Function
IGMP Version	Sets the IGMP (Internet Group Management Protocol) version. [V3, V2]
IGMP V3 IP Table	Establishes a table of source IP addresses for IGMP V3. The modulator requires multicast packets originating from source IP addresses to be found in the table.
SourceNumber	Identifies the row in the table.
IP Address	Sets the source IP address from which to accept multicast packets.
Add	Provides the ability to add new source IP addresses to the table.
Remove	Provides the ability to remove source IP addresses from the table.
Remove All	Removes all source IP addresses from the table.

Table 51: Home > Inputs > GbE > IGMP 1, 2

10.21 Home > Inputs [DAB]

The contents of the Input page(s) will change according to the modulation standard. This section addresses the Inputs screen for DAB.

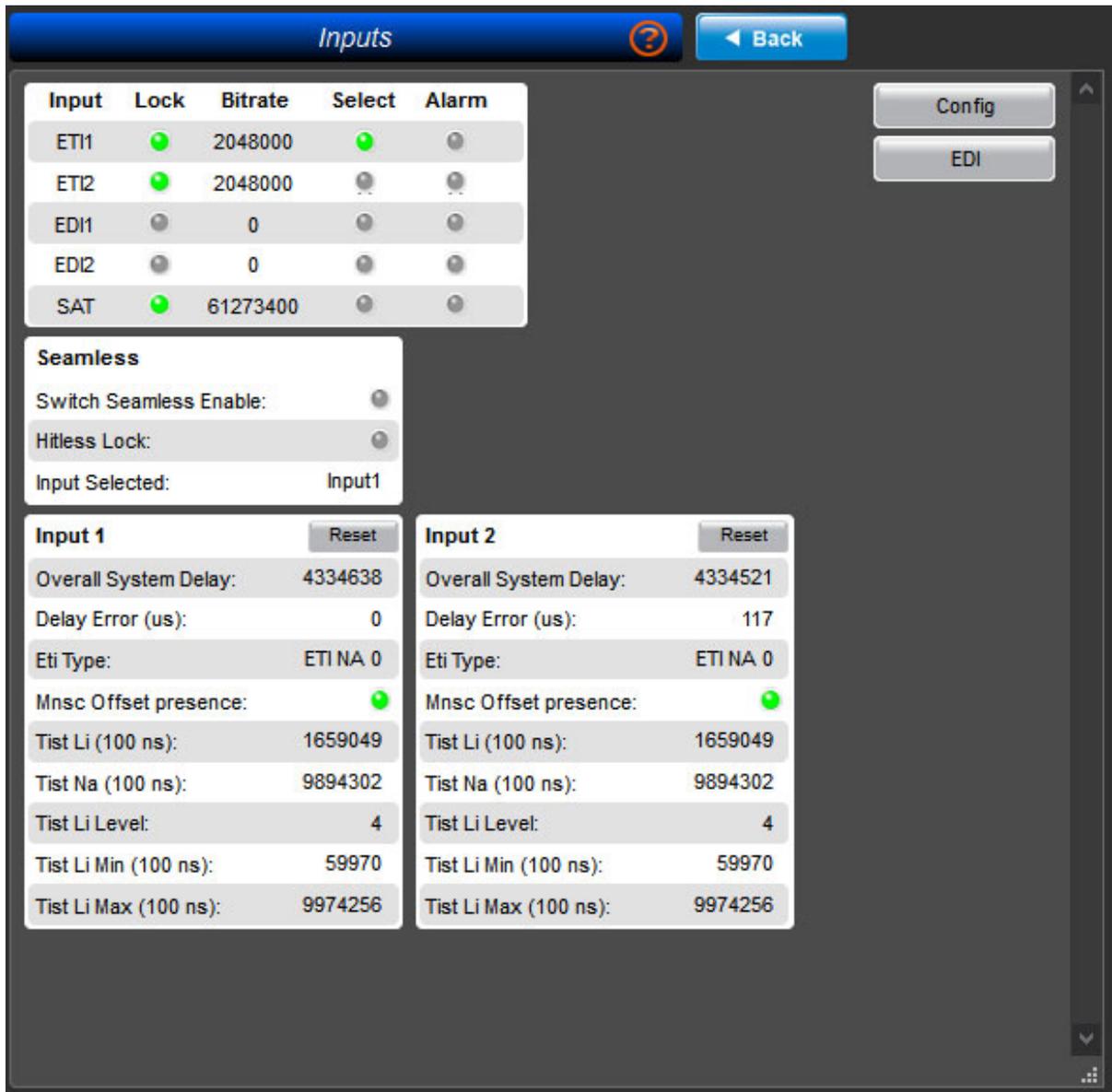


Figure 42: Home > Inputs [DAB]

Name	Function
Config	Navigates to the Inputs Configuration page.
EDI	Navigates to the EDI Inputs Configuration page.
Input	Lists the available inputs.
Lock	Indicates whether the incoming signal is locked.

Name	Function
	<p>[green] = The input signal is locked/present. [gray] = The input signal is unlocked/absent.</p>
Bitrate	Displays the bitrate of the input signal in bits per second.
Select	<p>Indicates whether the input is currently selected to feed the modulator.</p> <p>[green] = The input is connected to the modulator. [gray] = The input signal is not connected to the modulator.</p>
Alarm	<p>Indicates whether the input has an out-of-tolerance condition.</p> <p>[green] = The input stream is ok/valid. [gray] = The input stream is bad/invalid.</p>
<i>Seamless</i>	
Switch Seamless Enable	<p>Indicates if the seamless switching function is activated.</p> <p>[green] = Seamless switching has been activated. [gray] = Seamless switching has not been activated.</p>
Hitless Lock	<p>Indicates if the input streams selected for seamless switching are within the time window to perform seamless switching.</p> <p>[green] = The input signals can be seamlessly switched. [gray] = The input signals cannot be seamlessly switched.</p>
Input Selected	Displays which input designated for seamless switching is currently being applied to the modulator. [1,2]
<i>Input 1, 2</i>	
Reset	Resets the statistics counters.
Overall System Delay	Displays the current network delay in 100ns increments.
Delay Error (us)	Displays the current delay error due to 1PPS synchronization error for input FIFO buffer management.
ETI Type	Displays the ETI input signal type. [ETI NI, ETI NA]
MNSC Offset Presence	<p>Indicates the presence of offset delay setting information in the MNSC of the incoming stream.</p> <p>[green] = Offset delay information is present in the MNSC. [gray] = Offset delay information is not present in the MNSC.</p>
TIST LI (100 ns)	Displays the repetition rate of the timestamp in the ETI LI layer in 100 ns increments.
TIST NA (100 ns)	Displays the repetition rate of the timestamp in the ETI NA layer (where applicable) in 100 ns increments.

Name	Function
TIST LI Level	Displays the TIST LI level of the incoming ensemble.
TIST LI Min (100 ns)	Displays the maximum recorded interval for the TIST LI timestamp in 100 ns increments.
TIST LI Max (100 ns)	Displays the minimum recorded interval for the TIST LI timestamp in 100 ns increments.

Table 52: Home > Inputs [DAB]

10.22 Home > Inputs [DAB] > Config (Input Configuration)

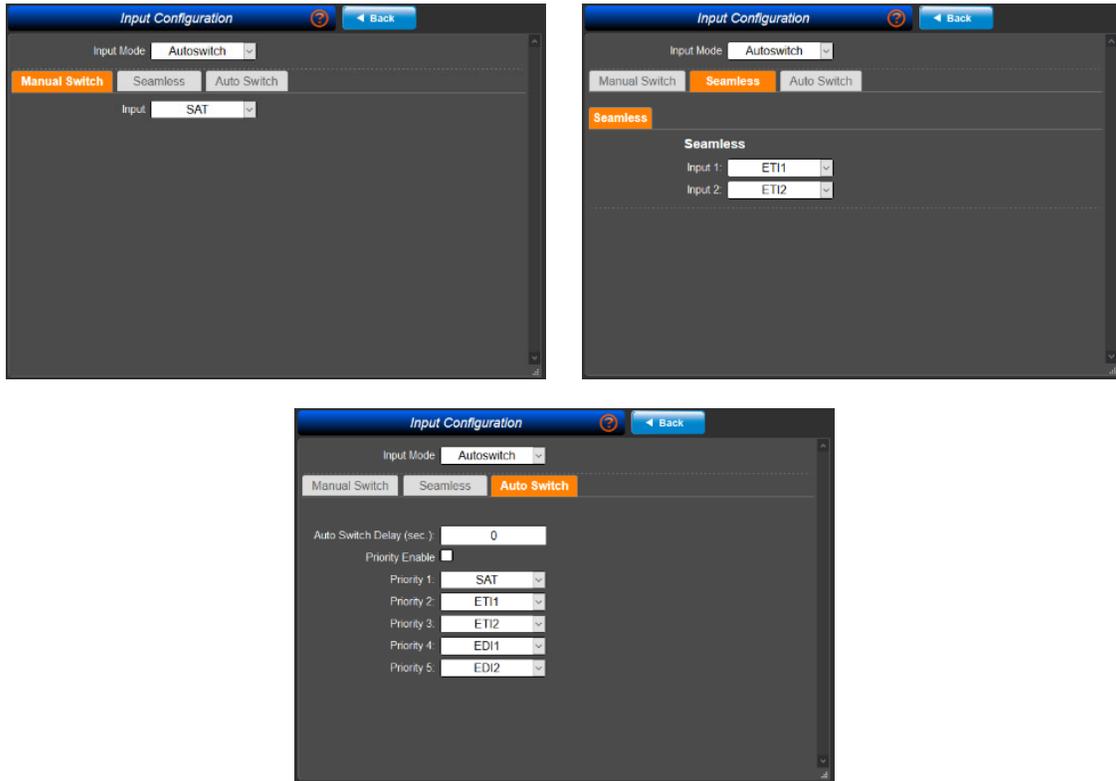


Figure 43: Home > Inputs [DAB] > Config

Name	Function
Input Mode	<p>Sets the input selection mode.</p> <p>[Manual] = User manually choses the input from a pull down menu.</p> <p>[Seamless] = System seamlessly switches between two input streams if they are identical and can be synchronized.</p> <p>[Auto Switch] = System automatically selects the stream from a prioritized list of possibilities.</p>
<i>Manual Switch</i>	
Input	<p>Manually selects the input stream to apply to the modulator.</p> <p>[ETI1, ETI2, EDI1, EDI2, SAT]</p>
<i>Seamless</i>	
Input 1, 2	<p>Selects the two inputs to considered for seamless switching. [ETI1, ETI2, EDI1, EDI2, SAT]</p>
<i>Auto Switch</i>	
Auto Switch Delay (sec)	<p>Sets the delay of the automatic input switching function</p>
Priority Enable	<p>Allows the assignment of switching priority between available inputs when checked.</p>

Name	Function
Priority 1,2,3,4,5	Assigns a selection priority to the various input streams. Priority 1 is the highest priority.

Table 53: Home > Inputs [DAB] > Config

10.23 Home > Inputs [DAB] > EDI (EDI Input Config)

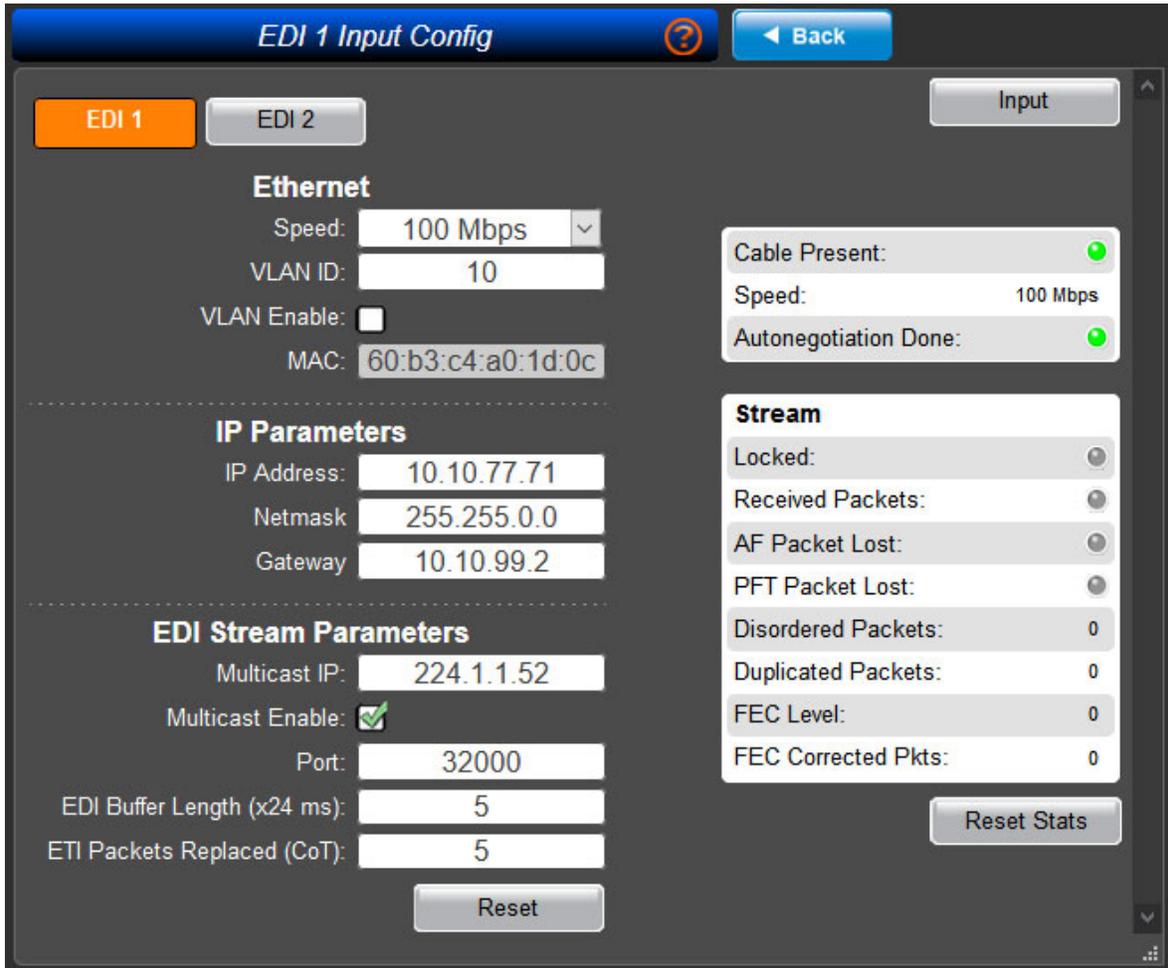


Figure 44: Home > Inputs [DAB] > EDI

Name	Function
Input	Navigates to the Inputs page.
EDI 1 / EDI 2	Navigates to subpages to review the parameters of the EDI 1 or EDI 2 inputs.
<i>Ethernet</i>	
Speed	Sets the speed of the incoming EDI stream. [Auto, 10 Mbps, 100 Mbps, 1000 Mbps]
VLAN ID	Sets the Virtual LAN ID for selective packet reception at the input.
VLAN Enable	Enables the Ethernet interface to support VLAN tagging (802.1Q) when checked.
MAC	Displays the physical MAC address of the EDI network interface.

Name	Function
<i>IP Parameters</i>	
IP Address	Sets IP address of the EDI input in IPv4 format. e.g. 192.168.0.100.
Netmask	Sets the subnet mask of the EDI input in IPv4 format. e.g. 255.255.255.0
Gateway	Sets the IP address of the gateway in IPv4 format. e.g. 192.168.0.100.
<i>EDI Stream Parameters</i>	
Multicast IP	Sets the multicast IP address for the transport stream to be received in IPv4 format.
Multicast Enable	Enables the IGMP protocol when checked.
Port	Sets the destination port of incoming stream
EDI Buffer Length (x24 ms)	Sets the size of the input buffer. Each unit entered in this field adds a delay of 24 ms. Note that this buffer introduces a delay to the signal at the input, potentially affecting SFN mode operation if set too high.
ETI Packets Replaced (CoT)	Sets the number of contiguous missing packets the system can replace with null packets to assure the Continuity of Transmission (C.o.T.) according to Annex 5 of TS102693
Reset	Resets the EDI Input board should it become unresponsive.
Cable Present	Indicates if a LAN cable is connected to the EDI input. [green] = A LAN cable is connected to the EDI input. [gray] = No LAN cable is connected to the EDI input.
Speed	Displays the Ethernet connection speed for the EDI input. [10 Mbit/s, 100 Mbit/s, 1 Gbit/s]
Autonegotiation Done	Indicates whether auto-negotiation of the Ethernet speed has been selected. [green] = auto-negotiation has been selected. [gray] = auto-negotiation has not been selected.
<i>Stream</i>	
Locked	Indicates whether an EDI input stream has been locked onto. [green] = EDI input stream is present/locked. [gray] = EDI input stream is absent/unlocked.
Received Packets	Displays the number of AF frames received every second.
AF Packet Lost	Displays the number of AF frames lost every second.
PFT Packet Lost	Displays the number of PFT frames lost every second (Protection, Fragmentation & Transportation)
Disordered Packets	Displays the number of packets already received but not related to the same/current ETI frame.
Duplicated Packets	Displays the number of duplicated packets (i.e. received by two different sources).

Name	Function
FEC Level	Displays the received FEC level, which is equal to the number of packets that can be restored +1.
FEC Corrected Pkts	Displays the number of packets successfully corrected with forward error correction.
Reset Stats	Resets the statistics counters.

Table 54: Home > Inputs [DAB] > EDI

10.24 Home > RX Sat (Satellite Receiver)

Satellite Receiver
Back
Spectrum

RF

Tuner Lock: ●

IF Frequency (MHz): 1887

Power (dBuV): 61

Power (dBm): -46

Standard: DVB-S2

Link Margin (dB): 6.0

Frequency Error (kHz): -639

C/N (dB): 11.5

BER: <1x10e8

CAM Service Descrambled

Set	Name	Status
	CAM Name: RailwayPro0800500	
	CAM Part n.:	
	CAM s/n:	
	CAM sw ver.:	

CAM Reset

DVB-S2

ISI Lock: ●

ISI: 4

Constellation: 8PSK

RollOff: 0.20

FEC Mode Code: 3/5

FEC Frame: Normal

ISSY: Off

Pilot Recognized: On

PLS Code Active: 131070

BCH BER: <10-8

PER: <10-8

Uncorrected Bytes: 0

Single/Multiple Input: Multiple Streams

NR of Input Streams: 7

CCM/VCM: VCM

Stream Type: TS

Smart Card

Operator: RAIWAY

Classes:

Rights: 02/12/2021

Serial Number: 747648303

Download Info

TS

Transport Stream ID: 0

Bit Rate (Mbps): 5.30

Network ID: 0

OTA

OTA Present: ●

OTA Valid: ●

Update Mode: Auto

Module ID: ---

Module ID Version: 0

OUI: 31850

Hardware Model: 1

Software Model: 1

Hardware Version: 1

Software Version: 1

Figure 45: Home > RX Sat

Name	Function
Config	Navigates to the Satellite Configuration page.
<i>RF</i>	
Tuner Lock	Indicates the lock status of the satellite receiver. [green] = the receiver has locked onto a valid signal. [gray] = the receiver is not locked onto a valid signal
IF Frequency (MHz)	Displays the IF frequency in megahertz.
Power (dBuV)	Displays the received signal strength in decibels over one microvolt. The box turns red when the value is below the threshold. (status alarm active)
Power (dBm)	Displays the received signal strength in decibels over one milliwatt. The box turns red when the value is below the threshold. (status alarm active)
Standard	Displays the modulation format of the received signal.
Link Margin (dB)	Displays the link margin in decibels.
Frequency Error (kHz)	Displays the frequency error of the received signal in kilohertz.
C/N(dB)	Displays the C/N (Carrier to Noise) of the received signal in decibels. The box turns red when the value is below the threshold. (status alarm active)
BER	Displays the BER (bit error rate) of the received signal. The box turns red when the value is below the threshold. (status alarm active)
<i>DVB-S2</i>	
ISI Lock	Indicates the reception and decoding of the input stream identifier.
ISI	Display the number identifier of the input stream currently being decoded.
Constellation	Displays the modulation constellation of the received signal.
Rolloff	Displays the rolloff factor of the received signal.
FEC Mode Code	Displays the fractional rate for the forward error correction.
FEC Frame	Displays the FEC frame length/type. [Normal, Short]
ISSY	Displays information about input stream synchronization. [On, Off]
Pilot Recognized	Displays if pilots to facilitate receiver synchronization are present [On, Off]
PLS Code Active	Displays the physical signal layer signal code being employed in the received signal
BCH FER	Displays the Frame Error Ratio at the BCH decoder output.
PER	Displays the Packet Error Ratio at the channel decoder output. The box turns red when the value is below the threshold. (status alarm active)

Name	Function
Uncorrected Bytes	Display a count of uncorrectable TS packet errors.
Single/Multiple Input	Reports the presence of a single or multiple input streams. [Single] = only one transport stream is carried by the Rf carrier. [Multi] = several transport streams are carried by the RF carrier.
NR of Input Streams	Displays the number of TS streams in a Multiple input case.
CCM/VCM	Displays whether constant or variable coding and modulation is being used. [CCM] = Constant Coding and Modulation is being used. [VCM] = Variable Coding and Modulation is being used.
Stream Type	Displays the input stream type: [TS] = Transport Stream. [GCS] = Generic Continuous Stream. [GSE] = Generic Stream Encapsulation. [GFPS] = Generic Fixed-Length Packetized Stream.
<i>TS</i>	
Transport Stream ID	Displays the ID value of the demodulated transport stream.
Bit Rate (Mbps)	Displays the bitrate of the demodulated transport stream in megabits per seconds.
Network ID	Displays the network ID value of the demodulated transport stream.
<i>CAM Service Descrambled</i>	
Name	Displays the name of the available scrambled service
Status	Indicates whether the scrambled service has been descrambled. [Descrambled, green] = the service is being successfully descrambled. [Descrambled, red] = the selected service cannot be descrambled. Please check the CAM compatibility and your subscription access rights in the smart card. [Not Descrambled, gray] = the service is not being descrambled.
Set	Selects the service to descramble.
CAM Name	Displays the name of the conditional access module.
CAM Part No.	Displays the CAM part number.
CAM S/N	Displays the CAM serial number.
CAM SW Ver.	Displays the software version loaded in the CAM.
CAM Reset	Resets the CAM, should it become unresponsive.

Name	Function
<i>Smart Card</i>	
Operator	Displays the provider name.
Classes	TBD
Dates Rights	Displays the time that access has been granted to the stream.
Serial Number	Displays the serial number of the smart card.
Download Info	Refreshes the subscription information contained in the smart card. This operation could affect the regular decryption of the services in progress
<i>OTA</i>	
OTA Present	Indicates that a datacasting service reserved to the receiver has been identified in the tuned TS stream and downloading is in progress.
OTA Valid	Indicates that the data from OTA service have been downloaded correctly.
Update Mode	<p>Indicates the way in which the information (upgrade firmware FW or remote command set) downloaded from OTA is processed:</p> <p>[Auto] = the receiver immediately performs the FW upgrade or remote command set.</p> <p>[Timed] = the receiver performs the FW upgrade or remote command set at a certain time.</p> <p>[Manual] = (After reboot): the receiver performs the FW upgrade or remote command set after the transmitter is restarted.</p>
Module ID	<p>Displays the module ID of the OTA information. The information transmitted with OTA to the receivers is contained in modules each of them has a specific function.</p> <p>[decoderControl, autoUpdate, changeCheckIP, tsInterface, tsParser, TSC_driver, videoDecoder]</p>
Module ID Version	Displays the version of the received datacast OTA module.
OUI	<p>Displays the Organization Unique Identifiers, a unique code that identifies the manufacturer of the receiver.</p> <p>The Gatesair code is 31850.</p>
Hardware Model	Displays the hardware model value for OTA compatibility as per ETSI TS 102 006.
Software Model	Displays the software model value for OTA compatibility as per ETSI TS 102 006.
Hardware Version	Displays the hardware version value for OTA compatibility as per ETSI TS 102 006.
Software Version	Displays the software version value for OTA compatibility as per ETSI TS 102 006.

Table 55: Home > RX Sat

10.25 Home > RX Sat > Config (Satellite Receiver Config)

Satellite Receiver Config
?
◀ Back
Spectrum

Local Oscillator:

Frequency:

Symbol Rate:

LNB Supply: ▼

DiSeqC: ▼

ISI:

Multi Stream Mode: ▼

PLS Configuration

PLS Mode: ▼

PLS 1 Code:

PLS 2 Code:

PLS 3 Code:

Alarm Threshold

RF Level Th On (dB):

RF Level Th Off (dB):

C/N On (dB):

C/N Off (dB):

BER On: ▼

BER Off: ▼

Alarm On Delay (s):

Alarm Off Delay (s):

PER On: ▼

PER Off: ▼

CAM Service Descrambled

Service	Enable
Rai 1	<input type="checkbox"/>
Rai 2	<input type="checkbox"/>
Rai 3	<input type="checkbox"/>
Rai Radio1	<input type="checkbox"/>
Rai Radio2	<input type="checkbox"/>
Rai Radio3	<input type="checkbox"/>
Test HEVC main10	<input type="checkbox"/>
Rai News 24	<input type="checkbox"/>

OTA

OUI:

RX ID:

RX Group:

BISS CAM

Service To Set: ▼

BISS Mode: ▼

Service ID (hex):

Session Word (hex):

Injected ID (hex):

Figure 46: Home > RX Sat > Config

Name	Function
Local Oscillator	Sets the local oscillator frequency in megahertz.
Frequency	Sets the carrier frequency in megahertz.
Symbol Rate	Sets the symbol rate in ksymbols per second.

Name	Function
LNB Supply	Sets the LNB power supply voltage. [Off, 13V, 18V, 13V 22kHz, 18V 22kHz]
DiSeqC	<p>Sets whether the DiSeqC power and control protocol will be used between the receiver and antenna.</p> <p>[Not used] = DiSeqC is not used.</p> <p>[DiSeqC 1.0] = Allows switching between up to 4 satellite sources from multiswitch.</p> <p>[DiSeqC 1.1] = Allows switching between up to 16 sources from multiswitch.</p> <p>[Tone Burst] = Allows switching between SAT A and SAT B.</p> <p>[DiSeqC Command] = Allows sending a specific text command defined by the user on the DiSeqC BUS</p>
ISI	Sets the input stream identifier of the stream to be decoded.
Multi Stream Mode	Sets whether the expected received signal contains a single or multiple transport streams. [Single Stream, Multi Stream]
<i>PLS Configuration</i>	
PLS Mode	<p>Sets which physical layer signaling code to use from a bank of possible selections to recover the scrambled frames after demodulation in DVB-S2 mode.</p> <p>[PLS 1, PLS 2, PLS 3] = use the selected PLS code, as entered in the fields directly below.</p> <p>[PLS Loop] = cycle through PLC code settings 1-2-3 to find a possible match.</p>
PLS 1,2,3 Code	Sets different physical layer signaling code to be used to decode the received signal. [0...262141]
<i>Alarm Threshold</i>	
RF Level Th On (dBm)	Sets the threshold for RF carrier absence in dBm. The alarm will activate when the received RF signal drops below this threshold. [-3dBm...-100 dBm]
RF Level Th Off (dBm)	Sets the threshold for RF carrier presence in dBm. The alarm will clear when the received RF signal rises above this threshold. [-3dBm...-100 dBm]
C/N On (dB)	Sets the threshold for unacceptable carrier-to-noise ratio in decibels. The alarm will activate when the carrier-to-noise ratio falls below this threshold.
C/N Off (dB)	Sets the threshold for acceptable carrier-to-noise ratio in decibels. The alarm will clear when the carrier-to-noise ratio rises above this threshold.
BER On	Sets the threshold for unacceptable bit error ratio according to the selected pulldown menu value. The alarm will activate when the bit error ratio rises above this threshold.
BER Off	Sets the threshold for acceptable bit error ratio according to the selected pulldown menu value. The alarm will clear when the bit error ratio falls below this threshold.

Name	Function
Alarm On Delay (s)	Sets a time delay in seconds before registering a new alarm to ignore transitory alarm conditions. [0...255]
Alarm Off Delay (s)	Sets a time delay in seconds before clearing an old alarm to prevent multiple messages from a flickering alarm condition. [0...255]
PER On	Sets the threshold for unacceptable packet error rate according to the selected pulldown menu value. The alarm will activate when the packet error rate rises above this threshold.
PER Off	Sets the threshold for acceptable packet error rate according to the selected pulldown menu value. The alarm will clear when the packet error rate falls below this threshold.
<i>CAM Service Descrambled</i>	
Service	Displays the names of the available scrambled services.
Enable	Selects the indicated service to be descrambled.
Download List	Updates/reloads the list of available scrambled services.
<i>OTA</i>	
OUI	Sets the OUI (Organization Unique Identifiers) to identify the manufacturer of the receiver. Nominal value is 31850.
RX ID	Sets the receiver identification number for receiving future OTA data streams.
RX Group	Sets the receiver group number for receiving future OTA data streams.
Reset Rxsat	Resets the satellite receiver, should it become unresponsive.
<i>BISS CAM</i>	
Service to Set	Sets the service to which to apply the entered keys for descrambling. Up to three services can be descrambled. [All, Service 1, Service 2, Service 3]
BISS Mode	Sets the BISS mode for descrambling. [1(8-byte key), 1(6-byte key), E(ESW key)]
Service ID (hex)	Sets the ID number of the service to be descrambled.
Session Word (hex)	Sets the session word of the service to be descrambled.
Injected ID (hex)	Sets the injected ID value for BISS-E mode.
Set Keys	Transmits the entered key information to the CAM.
Clear Keys	Erases the key information in the CAM for the selected service.

Table 56: Home > RX Sat > Config

10.26 Home > RX Ter (Regenerative Transposer)



Figure 47: Home > RX Ter

Name	Function
Config	Navigates to the Regenerative Transposer Configuration page.
Lock On	Indicates whether the receiver has locked to a valid incoming RF signal. [green] = the receiver is locked to an incoming signal. [gray] = the receiver is not locked to an incoming signal.
Input Level (dBm)	Displays the received signal strength in decibels over one milliwatt.
Frequency (kHz)	Displays the tuning setting of the receiver for the RF channel center frequency in kilohertz.
Frequency Offset (kHz)	Displays the frequency offset of the received signal in kilohertz.
TS Bitrate (bit/s)	Displays the bitrate in bits per second of the received signal.
<i>Alarms</i>	
Tuner Unlock	Indicates the lock status of the tuner.

Name	Function
	[red] = The receiver is not locked to an incoming signal. [gray] = No alarm
RF Input Low	Indicates the status of the incoming signal RF level. [red] = The received signal strength is too low. [gray] = No alarm
RF Input S/N Low	Indicates the status of the signal-to-noise ratio of the incoming RF signal. [red] = The received signal to noise ratio is too low. [gray] = No alarm
RF Input MER Low	Indicates the status of the modulation error ratio of the incoming RF signal. [red] = The received signal MER is too low. [gray] = No alarm

Table 57: Home > RX Ter

10.27 Home > RX Ter > Config (Regenerative Transposer)

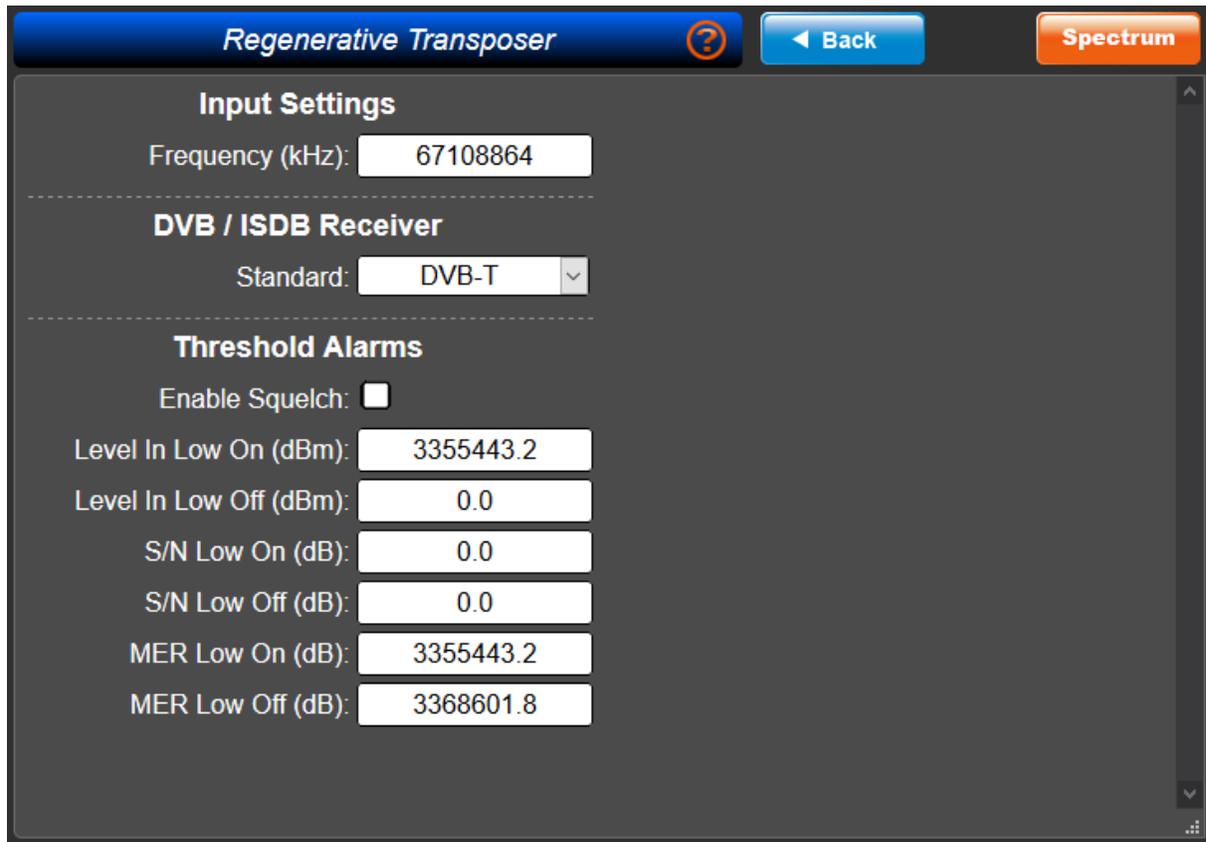


Figure 48: Home > RX Ter > Config

Name	Function
<i>Input Settings</i>	
Frequency (kHz)	Sets the center channel frequency of the receiver tuner in kilohertz.
<i>DVB/ISDB Receiver</i>	
Standard	Sets the modulation standard to be received. [DVB-T, DVB-T2 Base, DVB-T2 Lite, ISDB-T]
<i>Threshold Alarms</i>	
Enable Squelch	Enable the squelch function - the receiver mutes its output when the incoming RF signal is too weak.
Level in Low On (dBm)	Sets the incoming RF signal level in dBm below which the RF Input Low alarm will activate.
Level in Low Off (dBm)	Sets the incoming RF signal level in dBm above which the RF Input Low alarm will be cleared.
S/N Low On (dB)	Sets the incoming RF signal-to-noise ratio in dB below which the RF Input S/N Low alarm will activate.
S/N Low Off (dB)	Sets the incoming RF signal-to-noise ratio in dB above which the RF Input S/N Low alarm will be cleared.

Name	Function
MER Low On (dB)	Sets the incoming RF signal MER level in dB below which the RF Input MER Low alarm will activate.
MER Low Off (dB)	Sets the incoming RF signal MER level in dB above which the RF Input MER Low alarm will be cleared.

Table 58: Home > RX Ter > Config

10.28 Home > Modulator > DVB-T

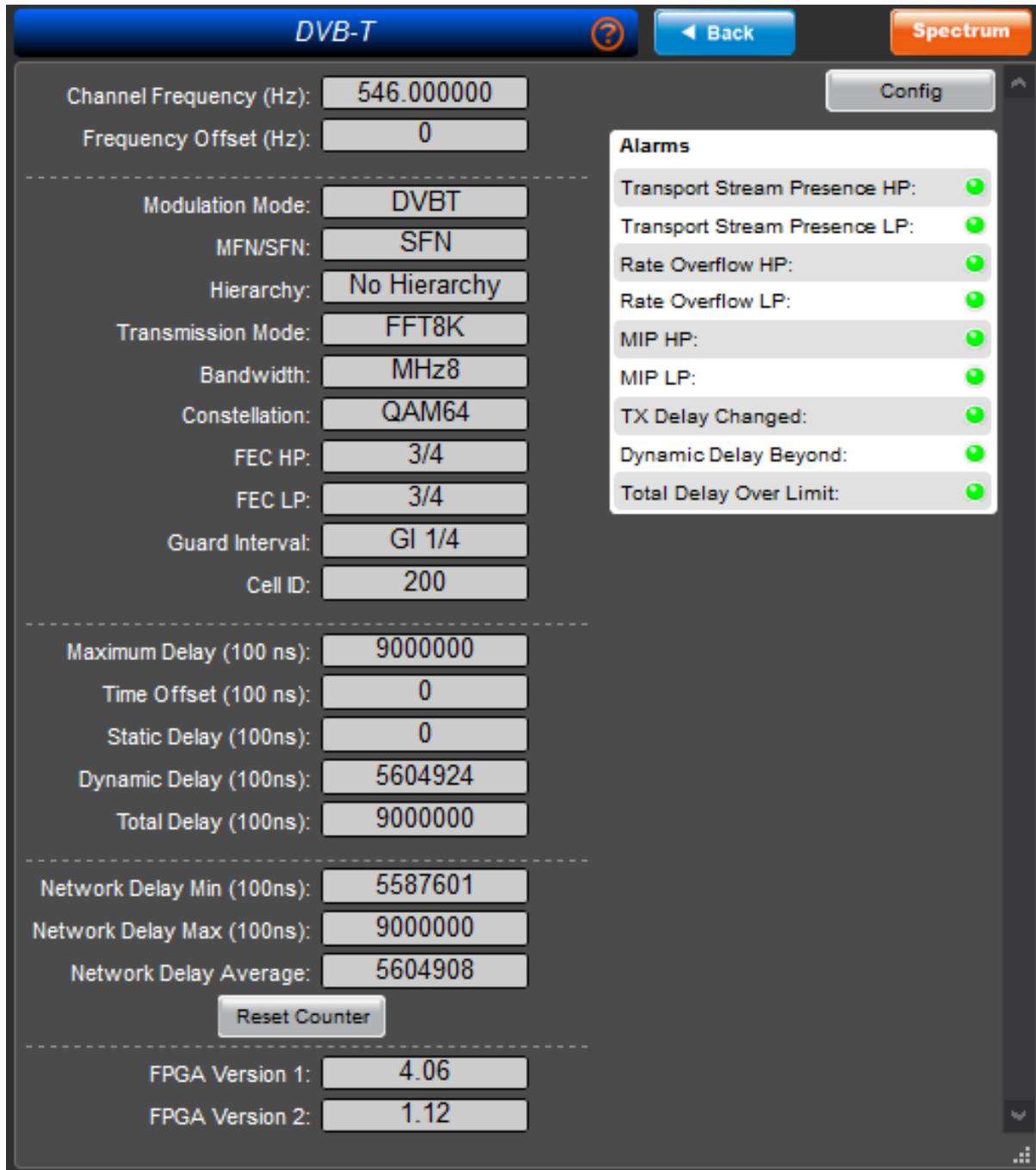


Figure 49: Home > Modulator > DVB-T

Name	Function
Config	Navigates to the DVB-T Configuration page.
Channel Frequency (MHz)	Displays the transmission channel center frequency in megahertz.

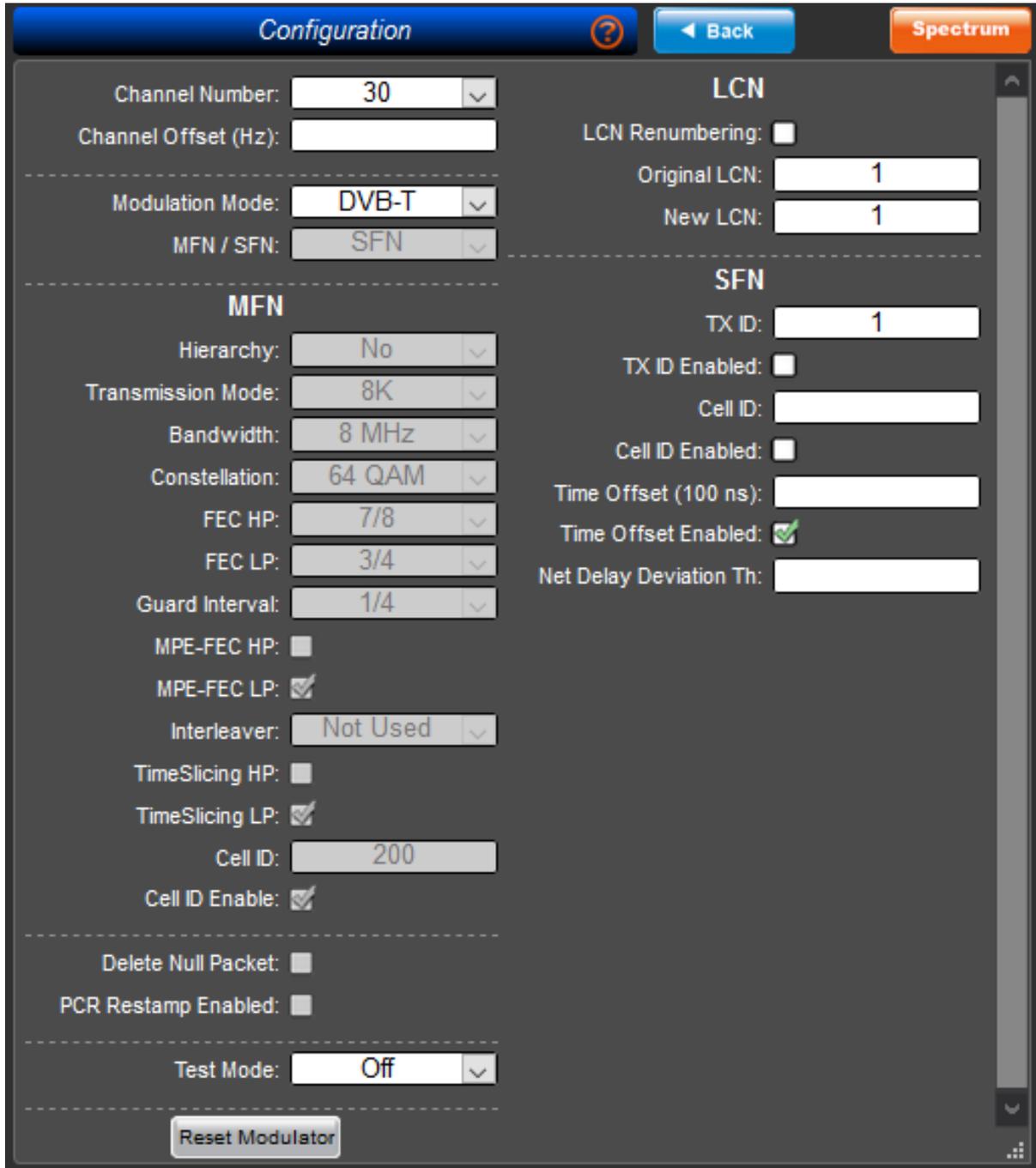
Name	Function
Frequency Offset (Hz)	Displays any frequency offset in the transmission channel in hertz.
Modulation Mode	Displays the modulation mode. [DVB-T, DVB-H]
MFN/SFN	Displays whether single frequency network (SFN) or multiple frequency network (MFN) mode is activated. [MFN, SFN]
Hierarchy	Displays whether hierarchical modulation is being employed. [No, Alpha 1, Alpha 2, Alpha 4]
Transmission Mode	Displays the transmission mode (number of RF carriers) being employed. [2K, 4K, 8K]
Bandwidth	Displays the channel RF bandwidth. [6 MHz, 7 MHz, 8 MHz]
Constellation	Displays the modulation constellation being employed. [QPSK, 16 QAM, 64 QAM]
FEC HP	Displays the forward error correction ratio being employed for the high priority stream. [1/2, 2/3, 3/4, 5/6, 6/7, 7/8]
FEC LP	Displays the forward error correction ratio being employed for the low priority stream. [1/2, 2/3, 3/4, 5/6, 6/7, 7/8]
Guard Interval	Displays the guard interval fractional length being employed. [1/32, 1/16, 1/8, 1/4]
Cell ID	Displays the Cell ID value being applied.
Maximum Delay (100 ns)	Displays the Maximum Delay setting (delay target) in 100 nanosecond increments. (SFN mode)
Time Offset (100 ns)	Displays any user-set time offset being applied locally in 100 nanosecond increments. (SFN mode)
Static Delay (100ns)	Displays the static delay resulting from internal processing delays in 100 nanosecond increments. (SFN mode)
Dynamic Delay (100ns)	Displays the dynamic delay being applied to compensate for network distribution delays in 100 nanosecond increments. (SFN mode)
Total Delay (100ns)	Displays the total delay resulting from all sources (offset delay + static delay + dynamic delay) in 100 nanosecond increments. (SFN mode)
Network Delay Min (100ns)	Displays the minimum network distribution delay since the last reset of the counter in 100 nanosecond increments. (SFN mode)
Network Delay Max (100ns)	Displays the maximum network distribution delay since the last reset of the counter in 100 nanosecond increments. (SFN mode)
Network Delay Average (100ns)	Displays the average network distribution delay since the last reset of the counter in 100 nanosecond increments. (SFN mode)
Reset Counter	Resets the statistics tracking the network distribution delay.
FPGA Version 1	Displays the firmware revision of internal FPGA 1.
FPGA Version 2	Displays the firmware revision of internal FPGA 2.

Name	Function
<i>Alarms</i>	
Transport Stream Presence HP	<p>Indicates the presence of the high priority transport stream.</p> <p>[green] = the transport stream is present. [red] = the transport stream is absent.</p>
Transport Stream Presence LP	<p>Indicates the presence of the low priority transport stream.</p> <p>[green] = the transport stream is present. [red] = the transport stream is absent.</p>
Rate Overflow HP	<p>Indicates the status of the transport stream buffer for the high priority stream.</p> <p>[green] = the buffer is within range. [red] = the buffer is overflowing because the incoming data rate is too high.</p>
Rate Overflow LP	<p>Indicates the status of the transport stream buffer for the low priority stream.</p> <p>[green] = the buffer is within range. [red] = the buffer is overflowing because the incoming data rate is too high.</p>
MIP HP	<p>Indicates the presence of a megafame initialization packet in the high priority stream. The monitoring of this alarm is enabled only when the device has SFN modulation enabled.</p> <p>[green] = an MIP is present in the stream. [red] = no MIP is present in the stream.</p>
MIP LP	<p>Indicates the presence of a megafame initialization packet in the low priority stream. The monitoring of this alarm is enabled only when the device has SFN modulation enabled.</p> <p>[green] = an MIP is present in the stream. [red] = no MIP is present in the stream.</p>
TX Delay Changed	<p>Indicates that the Network delay parameter, calculated from the timestamp data contained in the MIP, has caused an abrupt resynchronization of the modulator. The monitoring of this alarm is enabled only when the device has SFN modulation enabled.</p> <p>[green] = the Maximum Delay setting has not changed. [red] = the Maximum Delay setting has recently changed.</p>
Dynamic Delay Beyond	<p>Indicates whether the average dynamic delay needed to compensate the incoming stream is within acceptable limits set by the user. The monitoring of this alarm is enabled only when the device has SFN modulation enabled.</p> <p>[green] = the averaged dynamic delay is within limits.</p>

Name	Function
	[red] = the averaged dynamic delay has exceeded the limits.
Total Delay Over Limit	Indicates whether the Total Delay of the transmitted signal is in accordance with the desired Maximum Delay setting. The monitoring of this alarm is enabled only when the device has SFN modulation enabled. [green] = the total delay is correct. [red] = the total delay is too great, beyond the Maximum Delay setting.

Table 59: Home > Modulator > DVB-T

10.29 Home > Modulator > DVB-T > Config (Configuration)



The screenshot shows the 'Configuration' screen for DVB-T. It is divided into several sections:

- Channel Settings:** Channel Number (30), Channel Offset (Hz) (empty).
- Modulation Mode:** DVB-T, MFN / SFN: SFN.
- LCN (Logical Channel Number):** LCN Renumbering (unchecked), Original LCN (1), New LCN (1).
- SFN (Service ID):** TX ID (1), TX ID Enabled (unchecked), Cell ID (empty), Cell ID Enabled (unchecked), Time Offset (100 ns) (empty), Time Offset Enabled (checked), Net Delay Deviation Th (empty).
- MFN (Multiplex Frequency Network):** Hierarchy (No), Transmission Mode (8K), Bandwidth (8 MHz), Constellation (64 QAM), FEC HP (7/8), FEC LP (3/4), Guard Interval (1/4), MPE-FEC HP (unchecked), MPE-FEC LP (checked), Interleaver (Not Used), TimeSlicing HP (unchecked), TimeSlicing LP (checked), Cell ID (200), Cell ID Enable (checked).
- Other Settings:** Delete Null Packet (unchecked), PCR Restamp Enabled (unchecked), Test Mode (Off).

A 'Reset Modulator' button is located at the bottom of the configuration screen.

Figure 50: Home > Modulator > DVB-T > Config

Name	Function
Channel Number	Sets the transmission channel number. [14 ... 69]
Channel Offset (Hz)	Sets an optional frequency offset to the transmission channel in hertz.
Modulation Mode	Sets the modulation mode. [DVB-T, DVB-H]

Name	Function
MFN / SFN	<p>Sets whether the unit belongs to a single frequency network.</p> <p>[MFN] = multiple frequency mode: no effort is made to synchronize transmission delay.</p> <p>[SFN] = single frequency mode: information from the MIP and 1 PPS signals is used to synchronize the transmission delay.</p>
<i>MFN</i>	
Hierarchy	Sets whether hierarchical modulation is employed. [No, Alpha 1, Alpha 2, Alpha 4]
Transmission Mode	Sets the number of RF carriers. [2K, 4K, 8K]
Bandwidth	Sets the RF channel bandwidth. [6 MHz, 7 MHz, 8 MHz]
Constellation	Sets the modulation constellation. [QPSK, 16 QAM, 64 QAM]
FEC HP	Sets the forward error correction code rate for the high priority stream. [1/2, 2/3, 3/4, 5/6, 6/7, 7/8]
FEC LP	Sets the forward error correction code rate for the low priority stream. [1/2, 2/3, 3/4, 5/6, 6/7, 7/8]
Guard Interval	Sets the guard interval length as a fraction of the symbol length. [1/32, 1/16, 1/8, 1/4]
MPE-FEC HP	Enables use of multiprotocol encapsulation - forward error correction for the high priority stream in DVB-H mode.
MPE-FEC LP	Enables use of multiprotocol encapsulation - forward error correction for the low priority stream in DVB-H mode.
Interleaver	Sets whether an interleaver is employed in DVB-H mode. [Native, In-depth]
TimeSlicing HP	Sets whether time slicing is employed on the high priority stream. (DVB-H mode)
TimeSlicing LP	Sets whether time slicing is employed on the low priority stream. (DVB-H mode)
Cell ID	Sets the value for Cell ID to be inserted locally, if enabled.
Cell ID Enable	Enables the insertion a locally-modified Cell ID value in the transmitted signal.
Delete Null Packet	Enables the deletion of null packets from the incoming transport stream.
PCR Restamp Enabled	Enables the modification of the program clock reference information (timestamps) in the incoming transport stream.
Test Mode	<p>Enables test modes to allow RF transmission when no transport stream is present.</p> <p>[Off] = no test mode, modulate RF signal with transport stream.</p> <p>[PRBS] = modulate RF signal with pseudo-random data.</p> <p>[CW] = transmit a single continuous wave RF carrier.</p>
Reset Modulator	Resets the modulator, should it become unresponsive.

Name	Function
<i>LCN</i>	
LCN Renumbering	Enables local modification of the logical channel number (virtual channel)
Original LCN	Sets the original logical channel number to be modified.
New LCN	Sets the new logical channel number to be inserted.
<i>SFN</i>	
TX ID	Sets the TX ID value to be inserted locally.
TX ID Enabled	Enables the insertion of a locally-modified TX ID value.
Cell ID	Sets the Cell ID value to be inserted locally.
Cell ID Enabled	Enables the insertion of a locally-modified Cell ID value.
Time Offset (100 ns)	Sets a locally-applied time delay offset to this transmitter only.
Time Offset Enabled	Enables the application of the time delay offset to this transmitter.
Dynamic Delay Deviation Th (100 ns)	Sets the alarm threshold for the deviation of the average dynamic delay.

Table 60: Home > Modulator > DVB-T > Config

10.30 Home > Modulator > DVB-T2



Figure 51: Home > Modulator > DVB-T2

Name	Function
T2 Config	Navigates to the DVB-T2 Configuration page.
T2 Frame	Navigates to the DVB-T2 Framing page.
T2 PLP	Navigates to the DVB-T2 PLP page.
T2 FEF	Navigates to the DVB-T2 FEF page.
T2 Ind Address	Navigates to the DVB-T2 Individual Address page.
Profile On Air	Displays which DVB-T2 profile is currently being transmitted. [Base, Lite]

Name	Function
Bandwidth	Displays the current RF channel transmission bandwidth. [1.7 MHz, 5 MHz, 6 MHz, 7 MHz, 8 MHz, 10 MHz]
Network Mode	Displays the current network mode. [MFN] = multiple frequency network, transmitter does not require frequency and time synchronization. [SFN] = single frequency network, transmitter must be synchronized to all other transmitters in the network.
Frequency Output (Hz)	Displays the RF channel center frequency in hertz.
Frequency TI-MI (Hz)	Displays the L1 post signaling frequency information contained in the incoming T2-MI stream
Preamble Mixed	Displays whether mixed preamble types are permitted. [Yes, No]
MISO Group	Displays to which MISO group this transmitter belongs for improved SFN reception diversity. [Group 1, Group 2]
Version	Displays the DVB-T2 version supported for compatibility. [1.1.1, 1.2.1, 1.3.1]
Input Stream Type	Indicates the types of the Tx input streams carried within the current T2 super-frame [TS] = Transport Stream. [Generic Stream] = GSE [i.2] and/or GFPS and/or GCS, but not TS. [TS + Generic Stream] = TS and at least one of GSE, GFPS, GCS
Regen Flag	Displays the value of the regen flag, a 3-bit field indicating how many times the DVB-T2 signal has been re-generated
<i>Base</i>	
Cell ID	Displays the Cell ID value for the DVB-T2 Base profile.
Network ID	Displays the Network ID value for the DVB-T2 Base profile.
System ID	Displays the System ID value for the DVB-T2 Base profile.
<i>T2 SFN</i>	
Network Margin	Displays the network margin in 100 nanosecond increments. This is the storage delay being added in the modulator to reach the network delay goal.
Total Delay	Displays the total delay resulting from all sources (offset delay + static delay + dynamic delay) in 100 nanosecond increments. (SFN mode)
Netw. Delay Min (100ns)	Displays the minimum network distribution delay since the last reset of the counter in 100 nanosecond increments. (SFN mode)
Netw. Delay Max (100ns)	Displays the maximum network distribution delay since the last reset of the counter in 100 nanosecond increments. (SFN mode)

Name	Function
Network Delay Average	Displays the average network distribution delay since the last reset of the counter in 100 nanosecond increments. (SFN mode)
Reset Counter	Resets the statistics tracking the network distribution delay.
<i>Alarms</i>	
Transport Stream Presence	Indicates the presence of a transport stream at the input to the modulator. [green] = the transport stream is present. [red] = the transport stream is absent.
Input Stream	Indicate the validity of the incoming transport stream. [green] = the transport stream is valid. [red] = the transport stream has errors/is invalid.
Rate Overflow	Indicates the status of the transport stream buffer for the incoming transport stream. [green] = the buffer is within range. [red] = the buffer is overflowing because the incoming data rate is too high.
MI Presence	Indicate the presence of T2-MI (Modulator Interface) information in the incoming transport stream. [green] = T2-MI information is present. [red] = no T2-MI information is present.
Unsupported MI Frame	Indicates the presence of incompatible T2-MI information in the incoming transport stream. [green] = the T2-MI information is all compatible. [red] = incompatible T2-MI information is present.
MI Continuity	Indicates the status of the T2 super-frame continuity counter for the incoming transport stream. [green] = no super-frame continuity errors have occurred. [red] = super-frame continuity errors have occurred.
MI CRC	Indicates the status of the T2-MI cyclical redundancy check to detector bit stream corruption in the incoming transport stream. [green] = no CRC error have occurred. [red] = CRC errors have occurred, indicating some data corruption.
Wrong Configuration	Indicates the validity of the current DVB-T2 configuration setting. [green] = the requested settings are a valid combination. [red] = the requested settings are not a valid combination.

Name	Function
Output Timing:	<p>Indicates the status of the timing of the transmitted signal with respect to the maximum delay target setting. The monitoring of this alarm is enabled only when the device has SFN mode enabled.</p> <p>[green] = the output timing is correct, and the transmitted signal is properly synchronized. [red] = the output timing is not correct, and the transmitted signal is not synchronized with the rest of the network.</p>
Internal	<p>Indicates the internal status of the modulator.</p> <p>[green] = the modulator status is ok. [red] = the modulator has internal errors.</p>
Dynamic Delay Beyond	<p>Indicates the status of the dynamic delay being applied to the incoming transport stream with respect to its long-term average value. The monitoring of this alarm is enabled only when the device has SFN mode enabled.</p> <p>[green] = the required dynamic delay is close to its long term average. [red] = the required dynamic delay has deviated from its long-term average, thus indicating possible distribution network instabilities.</p>
Total Delay Over Limit	<p>Indicates whether the Total Delay of the transmitted signal is in accordance with the desired Maximum Delay setting. The monitoring of this alarm is enabled only when the device has SFN modulation enabled.</p> <p>[green] = the total delay is correct. [red] = the total delay is too great, beyond the Maximum Delay setting.</p>

Table 61: Home > Modulator > DVB-T2

10.31 Home > Modulator > DVB-T2 > Config (DVB-T2 Configuration)

Figure 52: Home > Modulator > DVB-T2 > Config

Name	Function
Save	Saves the proposed changes to memory. This button appears only when on-screen fields have been changed by the user.
Cancel	Cancel the proposed changes. This button appears only when on-screen fields have been changed by the user.
Configuration Mode	Sets whether the DVB-T2 configuration parameter are set manually or automatically.

Name	Function
	[Manual] = certain configuration set locally on this GUI page. [Auto] = configurations are set by the incoming transport stream as programmed at the network headend.
Preset	Allows rapid configuration of certain parameters according to industry-standard presets. [VV001-CR35, VV003-CR23, VV004-8KFFT, VV035-DTG052, VV036-DTG091, VV848]
Valid	Indicates whether the current ensemble of configuration settings is a valid combination. [green] = the combination of configuration settings is valid. [red] = the combination of configuration settings is not valid.
OFDM Sym	Displays the number of OFDM symbols per T2 frame.
Frame Duration	Displays the T2 frame duration in microseconds.
Symbol Duration	Displays the OFDM symbol duration in microseconds.
Capacity (cell)	Displays the number of data cells per T2 frame (subcarriers per data symbol x data symbols per T2 frame). This value is reduced by pilot subcarriers and L1 signaling cells.
FEC Size (cell)	Displays the size of the FEC blocks in data cells.
<i>DVB-T2 Upconverter</i>	
Channel Number	Sets the transmitted RF channel number.
Frequency Offset	Sets any frequency offset in hertz to be applied to the RF transmission channel frequency.
Delay PPS Alarm (s)	Sets the delay in seconds for reporting an alarm upon the loss of the 1 PPS time reference signal.
<i>Test Mode</i>	
Test Mode	Enables test modes to allow RF transmission when no transport stream is present. [Off] = no test mode, modulate RF signal with transport stream. [PRBS] = modulate RF signal with pseudo-random data. [CW] = transmit a single continuous wave RF carrier.
Reset	Resets the modulator, should it become unresponsive.

NOTE: These sub-screens appear when Configuration Mode = Auto.

Name	Function
<i>General</i>	
<i>T2 Base</i>	
Mute	Disables the decoding of the T2-MI PID value.
'T2 MI PID Base	Sets the T2-MI PID value manually when enabled.
Enable	Enables the local setting/override of certain select parameters.

Name	Function
Cell ID	<p>Sets the Cell ID value to be set locally, when enabled.</p> <p>[green] = individual addressing function "Cell ID" is present in the T2-MI packets [gray] = The individual addressing function "Cell ID" is not available in the T2-MI packets</p>
Network ID	Sets the Network ID value to be set locally, when enabled
System ID	Sets the System ID value to be set locally, when enabled
MISO Group	<p>Sets the MISO group to be set locally, when enabled [Group 1, Group 2]</p> <p>[green] = The individual addressing function "MISO group" is present in the T2-MI packets [gray] = The individual addressing function "MISO group" is not available in the T2-MI packets</p>
ACE PAPR	<p>Sets the ACE PAPR peak reduction scheme to be set locally, when enabled.</p> <p>[green] = The individual addressing function "ACE PAPR" is present on the T2-MI packets [gray] = The individual addressing function "ACE PAPR" is not available on the T2-MI packets</p>
<i>T2 Lite</i>	
Mute	Disables the decoding of the T2-MI Lite PID value.
'T2 MI PID Lite	Sets the T2-MI Lite PID value manually when enabled.
Enable	Enables the local setting/override of certain select parameters.
Cell ID	<p>Sets the Cell ID value to be set locally, when enabled.</p> <p>[green] = The individual addressing function "Cell ID" is present in the T2-MI packets [gray] = The individual addressing function "Cell ID" is not available in the T2-MI packets</p>
Network ID Lite	Sets the Network ID value to be set locally, when enabled
System ID Lite	Sets the System ID value to be set locally, when enabled
MISO Group Lite	<p>Sets the MISO group to be set locally, when enabled [Group 1, Group 2]</p> <p>[green] = The individual addressing function "MISO group" is present in the T2-MI packets [gray] = The individual addressing function "MISO group" is not available in the T2-MI packets</p>
Force Network Mode	<p>Locally overrides the SFN mode setting from the incoming transport stream.</p> <p>[None (Auto)] = do not override original setting.</p>

Name	Function
	[MFN] = force transmitter into MFN mode. [Relative SFN] = force transmitter into relative SFN mode, ignoring the absolute timestamp data coming from TI-MI.
Force FEF PRBS	Locally forces insertion of pseudo-random data into the future extension frames.
L1 Post Freq	Sets whether the L1 post signaling frequency field is overwritten locally or retains the original information found in the incoming T2-MI stream. [local] = overwrite according to the know local frequency setting. [MI] = retain original information found in incoming T2-MI stream.
MI-CRC32 Errors	Sets the application of cyclical redundancy code checks for possible corruption of the incoming transport stream. [Enable All Checks] = perform CRC checks on all data. [Enable L1 CRC32 Checks] = perform CRC checks on only Layer 1 data. [Disable All Checks] = perform no CRC checks.
<i>SFN</i>	
Local Delay (us)	Sets an individual time offset to be applied locally in microseconds. (SFN mode)
<i>Individual Addressing Functions</i>	
TX ID	Sets the transmitter ID number for individual transmitter addressing, the ability to configure a single transmitter with information sent from the network headend.

Table 62: Home > Modulator > DVB-T2 > Config (Config mode = auto)

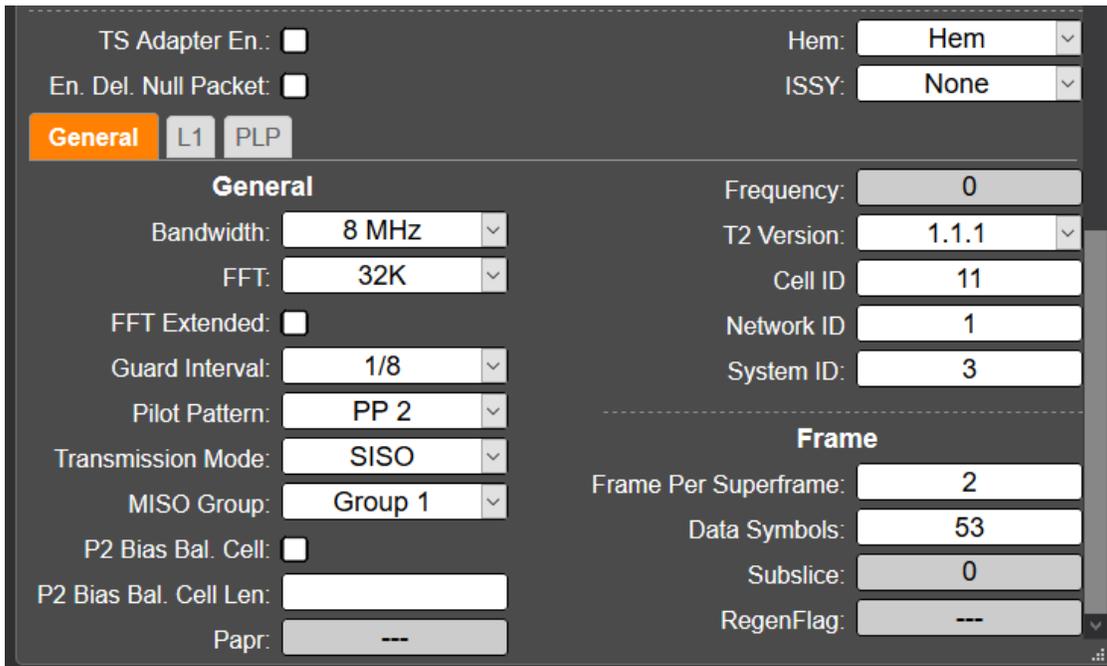


Figure 53: Home > Modulator > DVB-T2 > Config > General (Config mode = manual)

NOTE: These sub-screens appear when Configuration Mode = Manual.

Name	Function
TS Adapter En	Enables transport stream rate adaptation.
En Del Null Packet	Enables the deletion of null packets from the incoming transport stream.
HEM	Sets whether High Efficiency Mode is active. In High Efficiency mode, further stream specific optimizations may be performed to reduce signaling overhead. [N/A] = not applicable [Normal] = High Efficiency Mode is not active. [HEM] = High Efficiency Mode is active.
ISSY	Sets the length of the Input Stream Synchronization (ISSY) field used to synchronize multiple PLPs upon reception. [None] = No ISSY [Short] = 2-byte format [Long] = 3-byte format
<i>General</i>	
Bandwidth	Sets the RF channel bandwidth. [1.7 MHz, 5 MHz, 6 MHz, 7 MHz, 8 MHz, 10 MHz]
FFT	Sets the number of RF carriers. [1K, 2K, 4K, 8K, 16K, 32K]

Name	Function
FFT Extended	Sets whether extended bandwidth mode is used. (i.e. additional RF carriers added to each band edge)
Guard Interval	Sets the length of the extension added to beginning of FFT symbol to prevent intersymbol interference. The guard interval is entered as a fraction of the useful symbol duration. [1/32, 1/16, 1/8, 1/4, 1/128, 19/128, 19/256]
Pilot Pattern	Sets the predefined scattered pilot pattern used for the data OFDM symbols [PP1 ... PP8]
Transmission Mode	Activates MISO functionality for improved SFN performance in areas of signal overlap. [SISO] = Single Input, Single Output. Traditional method with no special processing. [MISO] = Multiple Input, Single Output. Special processing to improve reception by antenna diversity receivers.
MISO Group	Defines to which group a transmitter in a MISO network belongs, thus determining the pattern of cell processing. [Group 1, Group 2]
P2 Bias Bal Cell	Enables the insertion of P2 bias balancing cells, special cells inserted into the P2 symbols to reduce the imbalance of 1s and 0s (bias) in the L1 signaling.
P2 Bias Bal Cell Len	Sets the number of P2 bias balancing cells per P2 symbol.
PAPR	Displays the PAPR scheme currently being employed. T2_VERSION 1.1.1: [No PAPR, ACE-PAPR, TR-PAPR, Both ACE+TR] T2_VERSION 1.2.1: [L1-ACE + TR on P2 symbols only, L1-ACE + ACE, L1-ACE + TR, L1-ACE + ACE + TR]
Frequency	Displays the RF channel center frequency in Hertz.
T2 Version	Sets the DVB-T2 version for compatibility. [1.1.1, 1.2.1, 1.3.1]
Cell ID	Sets a value that identifies a geographic cell in a DVB-T2 network.
Network ID	Sets a value that uniquely identifies the current DVB network.
System ID	Sets a value that uniquely identifies a T2 system within the DVB network.
<i>Frame</i>	
Frame Per Superframe	Sets the number of T2 frames per super frame. A Super-frame is composed of a set of consecutive T2-frames. [2...255]
Data Symbols	Sets the number of data symbols per T2 frame.
Subslice	Sets the number of subslices per T2 frame.

Name	Function
RegenFlag	Displays the value of the regen flag, a 3-bit field indicating how many times the DVB-T2 signal has been re-generated

Table 63: Home > Modulator > DVB-T2 > Config (Config mode = manual)

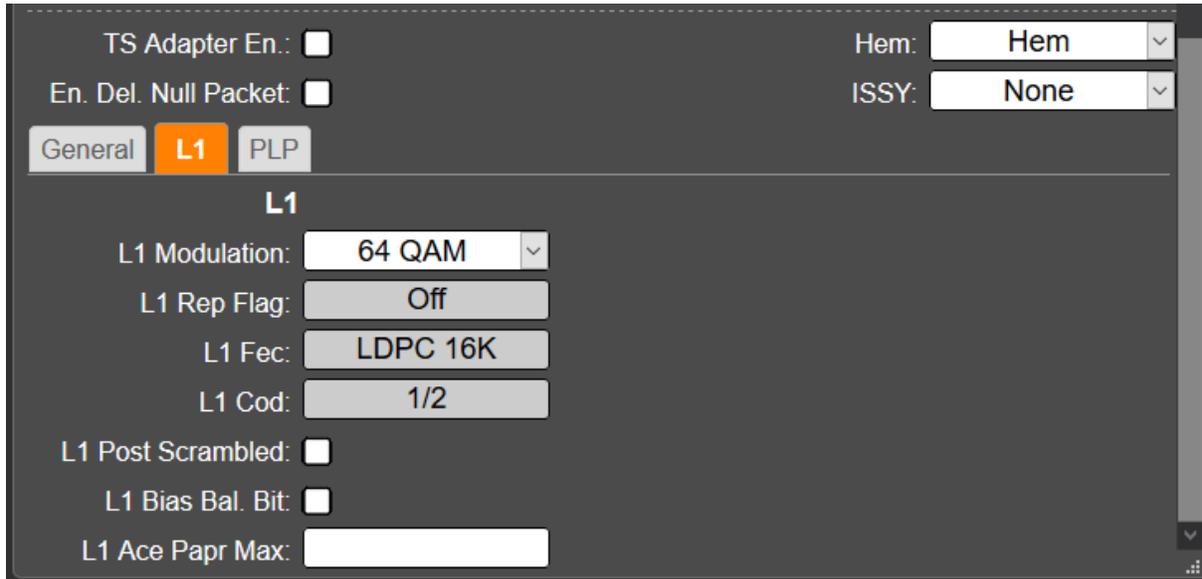


Figure 54: Home > Modulator > DVB-T2 > Config > L1

Name	Function
<i>L1</i>	
L1 Modulation	Sets the modulation type for Layer 1 [BPSK, QPSK, 16 QAM, 64 QAM]
L1 Rep Flag	Displays whether L1 repetition is enabled.
L1 FEC	Displays the L1 forward error correction type. [16K LPDC, 64K LPDC]
L1 COD	Displays the L1 forward error correction code rate. [1/2, 3/5, 2/3, 3/4, 4/5, 5/6]
L1 Post Scrambled	Enables L1 post signaling scrambling.
L1 Bias Bal. Bit	Enables the insertion of L1 bias balancing bits, unused bits within the L1 signaling fields which are set to reduce the imbalance of 1s and 0s (bias) in the L1 signaling.
L1 ACE PAPR Max	Sets the maximum correction applied by L1-ACE algorithm. [0...7]

Table 64: Home > Modulator > DVB-T2 > Config > L1

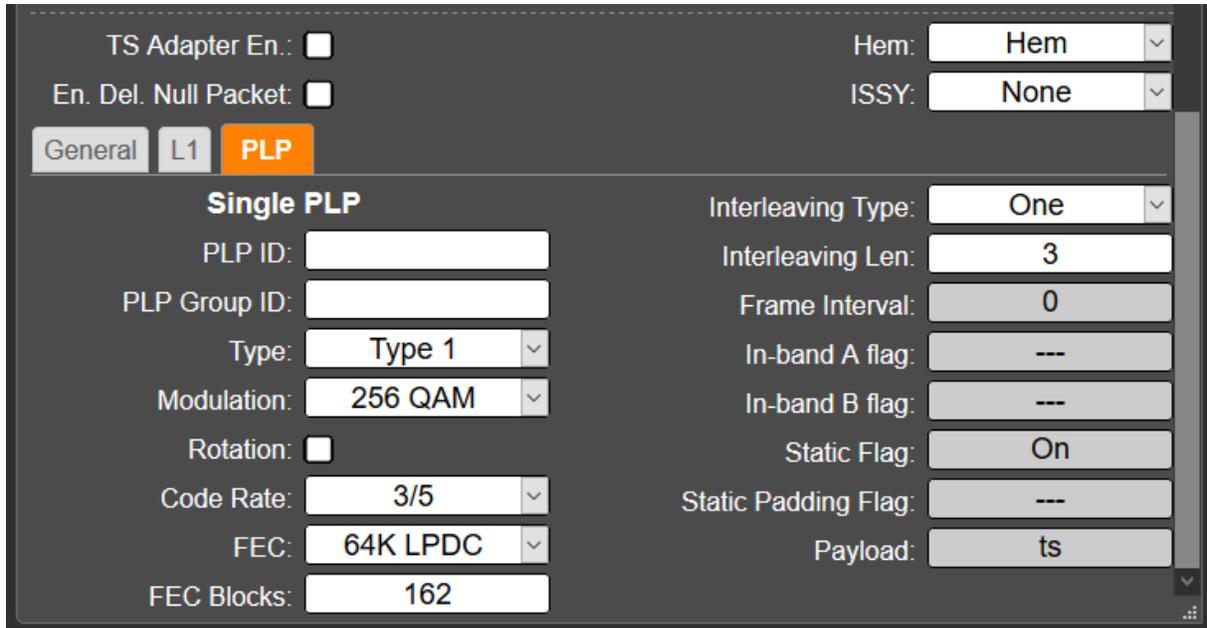


Figure 55: Home > Modulator > DVB-T2 > Config > PLP

Name	Function
<i>Single PLP</i>	
PLP ID	Sets the PLP ID value.
PLP Group ID	Sets the PLP Group ID value.
Type	Sets the type of PLP. [Common, Type 1, Type 2]
Modulation	Sets the modulation constellation for the PLP. [QPSK, 16 QAM, 64 QAM, 256 QAM]
Rotation	Enables constellation rotation.
Code Rate	Sets the FEC code rate for the PLP. [1/2, 3/5, 2/3, 3/4, 4/5, 5/6]
FEC	Sets the type of FEC. [16K LPDC, 64K LPDC]
Num FEC Blocks	Sets the number of blocks per time interleaving frame.
Interleaving Type	Sets the interleaving mode. [One] = one T2 frame per interleaver frame. [Multiple] = multiple T2 frames per interleaver frame.
Interleaving Len	Sets the interleaving length in T2 frames.
Frame Interval	Displays the T2-frame interval (IJUMP) within the super-frame for the associated PLP.
In-band A Flag	Displays the presence of type A in-band signaling. Type A signaling: L1/L2 update information and co-scheduled information.
In-band B Flag	Displays the presence of type B in-band signaling. Type B signaling: additional information on PLP and ISSY.

Name	Function
Static Flag	<p>Displays whether the static flag is present to indicate whether the scheduling for the current PLP varies from T2-Frame to T2-Frame or remains static.</p> <p>[Off] = the dynamic L1-post signaling fields may change at any time</p> <p>[On] = the dynamic L1-post signaling fields shall change only at a superframe boundary and only when a configuration change is indicated by the L1_CHANGE_COUNTER</p>
Static Padding Flag	<p>Indicates whether BBFRAME padding is used other than for in-band signaling.</p> <p>[Off] = the value of DFL for the current PLP may vary from BBFRAME to BBFRAME.</p> <p>[On] = all BBFRAMEs but the first shall have the same length. (see ETSI EN 302 755 for further information)</p>
Payload	<p>Displays the data payload type for the PLP.</p> <p>[TS] = Transport Stream.</p> <p>[GCS] = Generic Continuous Stream.</p> <p>[GSE] = Generic Stream Encapsulation.</p> <p>[GFPS] = Generic Fixed-Length Packetized Stream.</p>

Table 65: Home > Modulator > DVB-T2 > Config > PLP

10.32 Home > Modulator > DVB-T2 > Framing (DVB-T2 Framing)

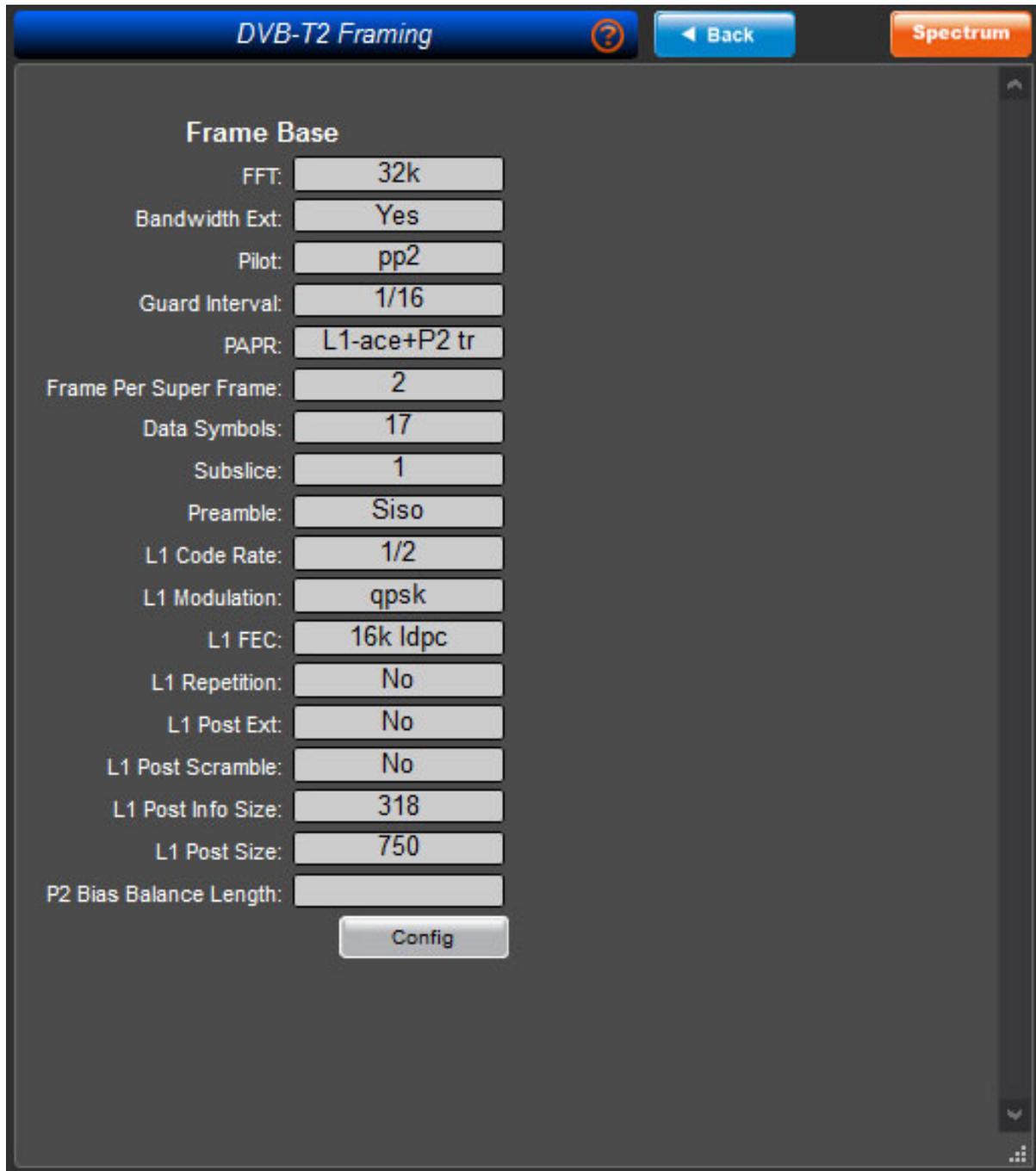


Figure 56: Home > Modulator > DVB-T2 > Framing

Name	Function
Config	Navigates to the DVB-T2 Configuration page.
<i>Frame Base</i>	
FFT	Displays the FFT size for the base frame. [1K, 2K, 4K, 8K, 16K, 32K]

Name	Function
Bandwidth Ext	Displays whether bandwidth extension mode is currently active. [Yes, No]
Pilot	Displays the scattered pilot option currently in use. [PP1...PP8]
Guard Interval	Displays the guard interval length currently in use. [1/32, 1/16, 1/8, 1/4, 1/128, 19/128, 19/256]
PAPR	<p>Displays the PAPR (peak to average power reduction) scheme currently in use.</p> <p>ACE = Active Constellation Extension TR = Tone Reservation</p> <p>[L1 ACE, P2 TR] = L1-ACE is used and TR is used on P2 symbols only. [L1 ACE, ACE] = L1-ACE and ACE only are used. [L1 ACE, TR] = L1-ACE and TR only are used [L1 ACE, P2 ACE & TR] = L1-ACE, ACE and TR are used.</p>
Frame Per Super Frame	Displays the number of frames per super frame.
Data Symbols	Displays the number of data symbols per T2 frame.
Subslice	Displays the number of subslices per T2 frame.
Preamble	<p>Displays the preamble type currently in use.</p> <p>[SISO] = Single Input, Single Output. Traditional method with no special processing. [MISO] = Multiple Input, Single Output. Special processing to improve reception by antenna diversity receivers.</p>
L1 Code Rate	Displays the L1 code rate currently in use. [1/2, 3/5, 2/3, 3/4, 4/5, 5/6]
L1 Modulation	Displays the L1 modulation type currently in use. [BPSK, QPSK, 16 QAM, 64 QAM]
L1 FEC	Displays the L1 forward error correction type currently in use. [16K LPDC, 64K LPDC]
L1 Repetition	Displays whether the L1 repetition option is currently active. [Yes, No]
L1 Post Ext	Displays whether the L1 post signaling extension is currently active. [Yes, No]
L1 Post Scramble	Displays whether the L1 post signaling is scrambled. [Yes, No]
L1 Post Info Size	Displays the size of the information part of the L1-post signaling data block, in bits.
L1 Post Size	Displays the size of the L1 post signaling block in OFDM cells.
P2 Bias Balance Length	Displays the number of P2 bias balancing cells per P2 symbol.

Table 66: Home > Modulator > DVB-T2 > Framing

10.33 Home > Modulator > DVB-T2 > PLP (DVB-T2 PLP)

Figure 57: Home > Modulator > DVB-T2 > PLP

Name	Function
Config	Navigates to the DVB-T2 Configuration page.

<i>PLP Base</i>	
PLP Number	Displays the number of the base PLP.
Index	Selects a PLP among those present to be displayed.
ID	Displays the ID number of the base PLP, an 8-bit field that uniquely identifies a PLP in the T2 system. [1...65535]
Group	Displays the group number of the base PLP, an 8-bit field identifying the specific PLP group within the T2 system with which the current PLP is associated. [0...255]
Type	Displays the type of the base PLP. [Common] = PLP can have exactly one sub-slice per T2-frame. [Type 1] = PLP can have exactly one sub-slice per T2-frame. [Type 2] = PLP can have between 2 and 6480 sub-slices per T2-frame.
Modulation	Displays the modulation type of the base PLP. [QPSK, 16 QAM, 64 QAM, 256 QAM]
Code Rate	Displays the forward error correction code rate of the base PLP. [1/2, 3/5, 2/3, 3/4, 4/5, 5/6]
Rotation	Displays whether constellation rotation is currently active for the base PLP. [On, Off]
FEC	Displays the forward error correction type applied to the base PLP. [LDPC 64K, LDPC 16K]
Mode	Displays whether high efficiency mode is currently active. [Normal, HEM]
Blocks	Displays the number of FEC blocks per T2 frame?
NPD	Displays whether null packet deletion is activated. [On, Off]
ISSY	Displays the length of the Input Stream Synchronization (ISSY) field used to synchronize multiple PLPs upon reception. [None] = No ISSY present [Short] = 2-byte format [Long] = 3-byte format
IL Type	Displays the type of interleaver being applied. [One] = one T2 frame per interleaver frame. [Multiple] = multiple T2 frames per interleaver frame.
IL Length	Displays the number of T2 frames in an interleaving frame.
Frame int	Displays the frame interval setting, the difference in frame index between successive T2 frames to which a particular PLP is mapped.
In Band A	Displays whether type A in-band signaling is being employed. Type A signaling: L1/L2 update information and co-scheduled information.

In Band B	Displays whether type B in-band signaling is being employed. Type B signaling: additional information on PLP and ISSY.
Bitrate PLP (bps)	Displays the bitrate in bits per second for the PLP.
Payload Type	Displays the payload type for the base PLP. [TS] = Transport Stream. [GCS] = Generic Continuous Stream. [GSE] = Generic Stream Encapsulation. [GFPS] = Generic Fixed-Length Packetized Stream.

Table 67: Home > Modulator > DVB-T2 > PLP

10.34 Home > Modulator > DVB-T2 > FEF (DVB-T2 FEF)



Figure 58: Home > Modulator > DVB-T2 > FEF

Name	Function
Config	Navigates to the DVB-T2 Configuration page.
<i>FEF Base</i>	
Type	Displays the type of future extension frame in use for the Base profile.
Length (100ns)	Displays the length of the future extension frame in 100 nanosecond increments.
Interval	Displays the number of T2-frames between FEFs.
<i>FEF Lite</i>	
Type	Displays the type of future extension frame in use for the Lite profile.
Length (100ns)	Displays the length of the future extension frame in 100 nanosecond increments.
Interval	Displays the number of T2-frames between FEFs.

Table 68: Home > Modulator > DVB-T2 > FEF

10.35 Home > Modulator > DVB-T2 > IA (DVB-T2 Individual Access)

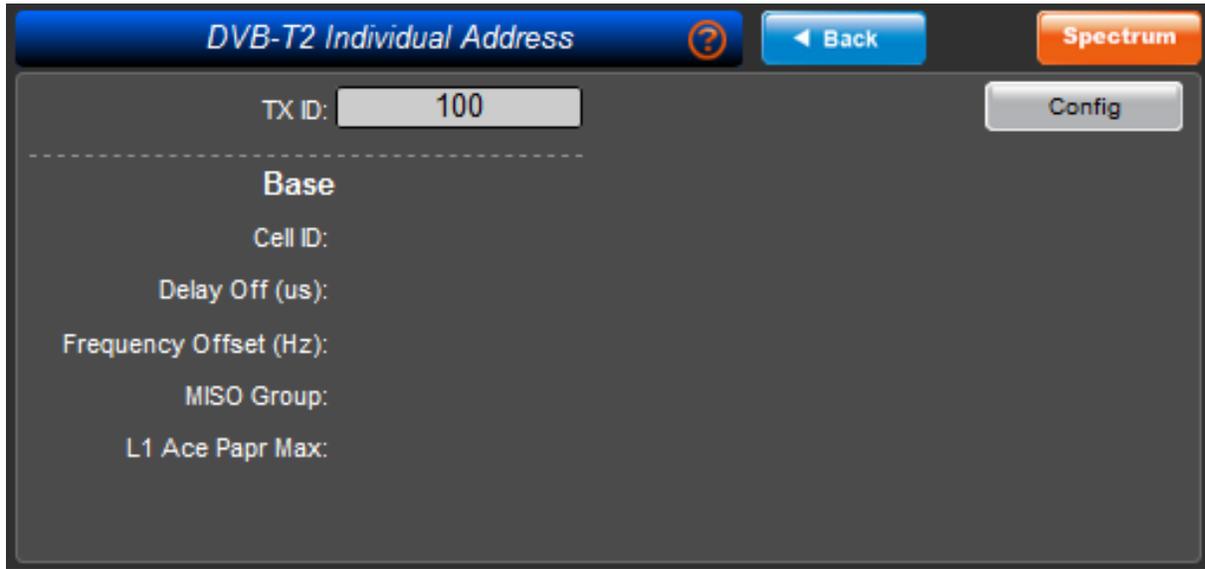


Figure 59: Home > Modulator > DVB-T2 > IA

Name	Function
Config	Navigates to the DVB-T2 Configuration page.
TX ID	Displays the individual TX ID value for this transmitter.
<i>Base</i>	
Cell ID	Displays the cell ID value being set remotely for this unit.
Delay Off (us)	Displays the delay offset value in microseconds being set remotely for this unit.
Frequency Offset (Hz)	Displays the frequency offset value in hertz being set remotely for this unit.
MISO Group	Displays the MISO group value being set remotely for this unit.
L1 ACE PAPR Max	Displays the peak-to-average ratio reduction value being set remotely for this unit.

Table 69: Home > Modulator > DVB-T2 > IA

10.36 Home > Modulator > DAB (DAB Modulator)

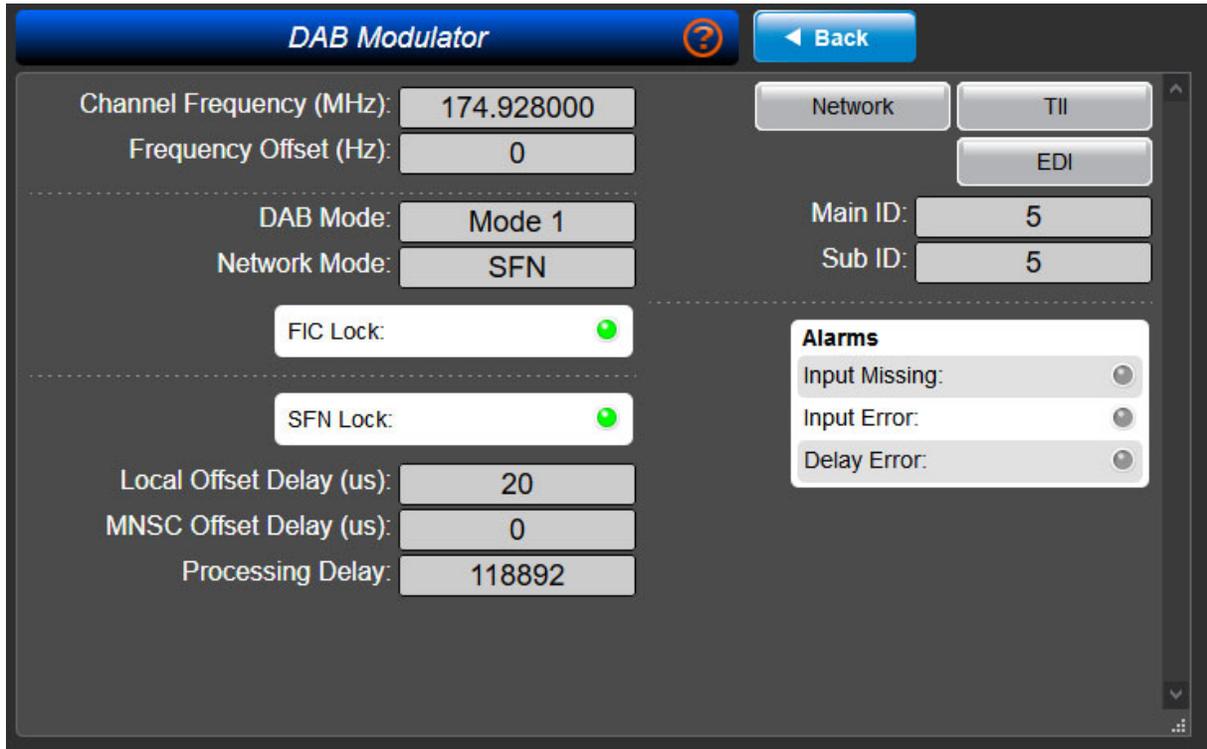


Figure 60: Home > Modulator > DAB

Name	Function
Network	Navigates to the DAB Network Settings page.
TII	Navigates to the DAB TII Settings page.
EDI	Navigates to the EDI Input Configurations page.
Channel Frequency (MHz)	Displays the channel center frequency in Megahertz.
Frequency Offset (Hz)	Displays any channel frequency offset in Hertz.
DAB Mode	Displays the DAB mode. [1...4]
Network Mode	Displays the Network mode [SFN, MFN]
FIC Lock	Indicates that the Fast Information Channel has been locked onto. [green] = The FIC is present/locked. [gray] = The FIC is absent/unlocked.
SFN Lock	Indicates that SFN lock has been achieved. i.e. delay synchronization has been achieved and is within the limit specified for SFN operation. [green] = Output synchronization is compatible with SFN operation.

Name	Function
	[gray] = Output synchronization is not compatible with SFN operation.
Local Offset Delay (us)	Displays the static offset delay if Offset Delay Control = Local has been selected.
MNSC Offset Delay (us)	Displays the MNSC offset delay if Offset Delay Control = MNSC has been selected.
Processing Delay	Displays the amount of delay occurring in the transmitter in microseconds.
Main ID	Shows the Main ID value currently being applied.
Sub ID	Shows the Sub ID value currently being applied.
<i>Alarms</i>	
Input Missing	Indicates whether an input stream is missing. [red] = An input stream is missing. [gray] = No input streams are missing.
Input Error	Indicates whether an input stream has errors. [red] = An input stream has errors. [gray] = No input stream has errors.
Delay Error	Indicate whether the delay of the transmitted signal is within SFN limits. [red] = The delay is not within acceptable limits. [gray] = The delay is within acceptable limit or SFN synchronization is not required.

Table 70: Home > Modulator > DAB

10.37 Home > Modulator > DAB > Network (DAB Network Settings)

Figure 61: Home > Modulator > DAB > Network

Name	Function
Network Mode	Sets the network synchronization mode. [MFN] = Multi-Frequency Network: delay not synchronized. [SFN] = Single Frequency Network: delay synchronization required.
Offset Delay Control	Determines whether delay settings will be set locally or by the MNSC of the incoming stream. [Local] = The delay is set locally in the fields immediately below. [MNSC] = The offset delay is set by the Multiplex Network Signalling Channel of the incoming stream.
Offset Delay (us)	Sets of static offset delay to be applied if Offset Delay Control = Local has been selected.
Transmitter Delay (us)	Sets a static delay added to compensate when transmitters from different suppliers are used in the same SFN network.
<i>Sat Feed Input</i>	
Stream PID Number	Sets the PID number of ETI stream encapsulated in MPEG-TS to be used.
TS Input Compressed	Enables TS decompression when checked.
<i>DAB Upconverter</i>	
Channel Number	Sets the channel frequency according to DAB channel assignments [5A...13F]

Name	Function
Frequency Offset (Hz)	Sets an optional channel frequency offset in Hertz.
Delay PPS Alarm (s)	Sets the 1 PPS alarm delay time in seconds. The 1 PPS absent alarm will be suppressed while the unit tries to regenerate the 1 PPS signal.
Test Mode	Sets whether a test signal is transmitted. [Off] = Disables all test modes. [PRBS] = Transmit a pseudo-random data stream. [CW] = Transmit a single RF carrier at mid-channel.
Reset Modulator	Resets the modulator board.
Transmitter Address	Sets the individual transmitter address. Filters information addressed to this transmitter in the input stream.

Table 71: Home > Modulator > DAB > Network

10.38 Home > Modulator > DAB > TII (TII Settings)

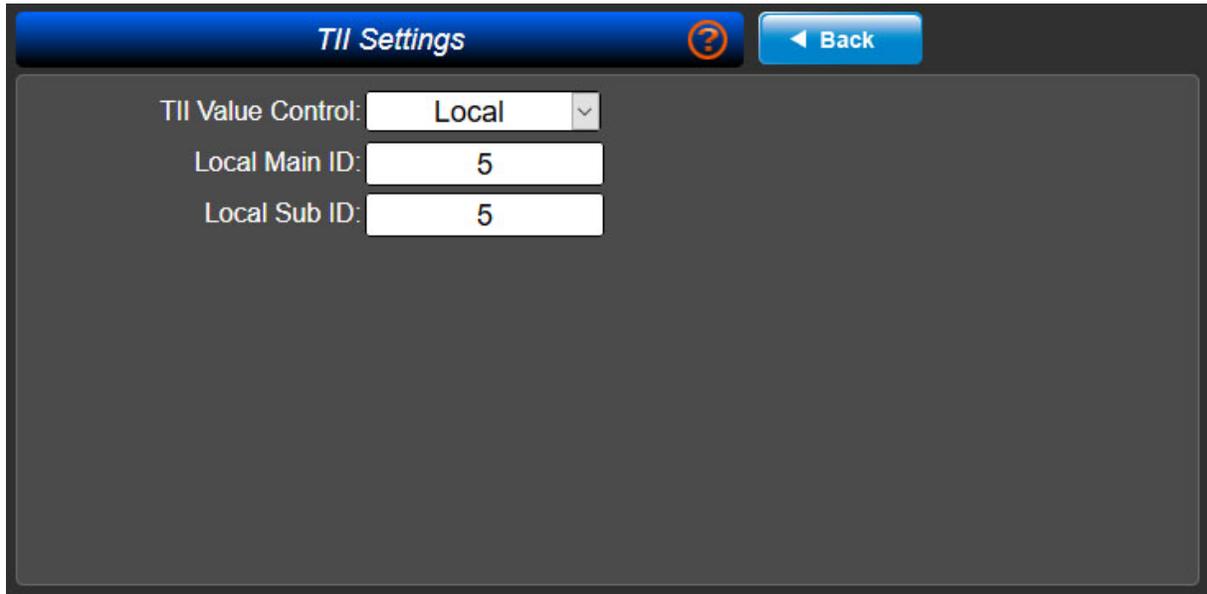


Figure 62: Home > Modulator > DAB > TII

Name	Function
TII Value Control	Sets whether the source of TII information is the MNSC from input stream or locally set values. [Local] = use the values set in the fields below. [MNSC] = use the values contained in the Multiplex Network Signalling Channel (MNSC) of the input stream.
Local Main ID	Sets the Main ID if the TII source selected is Local.
Local Sub ID	Sets the Sub ID if the TII source selected is Local

Table 72: Home > Modulator > DAB > TII

10.39 Home > Modulator > DAB > EDI

See Section 10.23 : Home > Inputs [DAB] > EDI

10.40 Home > Modulator > DTMB



Figure 63: Home > Modulator > DTMB

Name	Function
Config	Navigates the DTMB modulator configuration page.
<i>MPEG/SIP</i>	
Bitrate Adaptation	Displays whether bitrate adaptation is being employed to achieve the desire bitrate. [Yes, No]
SIP Status	Displays the status of the SIP packet in the incoming transport stream. [Ok] = the SIP packet is present and valid. [Missing] = the SIP packet is not present.

Name	Function
	[N/A] = Not Applicable because the network mode is MFN.
<i>SFN</i>	
Network Operation	Displays the mode of RF network operation. [MFN] = Multi-Frequency Network, no output synchronization required. [SFN] = Single Frequency Network, all transmitters in the network must be synchronized in frequency and modulation content.
TX ID	Displays the TX ID value to identify an individual transmitter in a SFN network. Certain settings in the incoming SIP packet can be addressed to individual transmitters based on their TX ID value.
Output Process Time (us)	Displays the delay adjustment in microseconds being applied to compensate for delays occurring after the modulator in the RF chain. This is a user adjustable setting on the configuration page.
Local Delay Adjust (us)	Displays the delay adjustment in microseconds being applied to this transmitted to optimize SFN coverage. This is a user adjustable setting on the configuration page.
Maximum Delay (us)	Displays the overall synchronization delay goal in microseconds for all transmitters in the SFN network. This value is read from the SIP packet. The modulator will emit the SIP packet at the 1PPS plus the Max Network Delay (...plus any Local Delay Adjust and minus any Output Process Time).
Distribution Delay (us)	Displays the calculated delay in microseconds of the transport stream distribution network based on the extra storage delay being applied at the modulator input to achieve the network Maximum Delay goal at the output.
SIP Delay Adjust (us)	Displays any local delay in microseconds being commanded by the SIP packets in the incoming transport stream.
SIP Frequency Offset (Hz)	Displays any RF frequency offset value in Hertz being commanded by the SIP packets in the incoming transport stream.
<i>Framing</i>	
Bandwidth	Displays the RF channel bandwidth.
Carriers	Displays the number of RF carriers. [Single] = a single RF carrier is transmitted. [Two-Pilot] = a single RF carrier is augmented with two pilot tones. [Multi] = 3780 RF carriers are transmitted (OFDM)
Guard Interval	Displays the symbol guard interval. [PN420(1/9), PN945(1/9), PN595(1/6)]
Guard Interval PN	Displays the initial condition of the PN sequences in the frame headers.

Name	Function
	[Variable] = use the definition of the table in the standard. [Constant] = use an initial condition of index 0 for all signal frames.
Constellation	Displays the modulation constellation. [4QAM, 16QAM, 32QAM, 64QAM]
LDPC Rate	Displays the fractional LDPC code rate. [0.4, 0.6, 0.8]
Time Interleaver	Displays the time interleaver length in symbols. [240, 720]
<i>Alarms</i>	
TS Presence	Indicates the status of the transport stream at the input to the modulator. [green] = a valid transport stream is present at the input. [gray] = a valid transport stream is not present at the input.
SIP Presence	Indicates the status of SIP packets in the incoming transport stream to the modulator. [green] = the presence of SIP packets has been detected in the incoming transport stream. [gray] = no incoming SIP packets have been detected.

Table 73: Home > Modulator > DTMB

10.41 Home > Modulator > DTMB > Config (DTMB Configuration)

The screenshot shows the 'DTMB Configuration' window with the following settings:

- Frequency:** Channel Number: 29, Channel Offset (Hz): 0
- MPEG/SIP:** MIP Type: MIP, Bitrate Adaptation: , Mute If No SIP: , SIP Packet Removal:
- SFN:** Network Operation: MFN, TX ID: 30, Output Process Time (us): 0.0, Local Delay Adjust (us): 0.0
- Framing:** Bandwidth: 8 MHz, Carriers: Multi, Guard Interval: PN420 (1/9), Guard Interval PN: Constant, Constellation: 64QAM, LDPC Rate: 0.6, Time Interleaver: 720
- Test:** DC Test Tone:

Figure 64: Home > Modulator > DTMB > Config

Name	Function
Frequency	
Channel Number	Sets the transmitted RF channel frequency [13...35]
Channel Offset (Hz)	Sets any transmitted RF channel frequency offset in Hertz.

Name	Function
<i>MPEG/SIP</i>	
MIP Type	Sets the type of initialization packet to be processed from the incoming transport stream for certain modulator and delay settings. [MIP, SIP]
Bitrate Adaptation	Enables the insertion of null packets and PCR restamping to achieve the desired bitrate in MFN mode.
Mute if no SIP	Mutes the RF output when no SIP packets are detected in the incoming transport stream when checked.
SIP Packet Removal	Enables the removal of SIP packets from the transport stream when checked.
<i>SFN</i>	
Network Operation	<p>Sets the mode of RF network operation.</p> <p>[MFN] = Multi-Frequency Network, no output synchronization required.</p> <p>[SFN] = Single Frequency Network, all transmitters in the network must be synchronized in frequency and modulation content.</p>
TX ID	Sets the TX ID value in single frequency networks.
Output Process Time (us)	Set the output process time to compensate for delays occurring after the modulator in the RF chain. Positive values entered here will cause the signal to be emitted from the modulator sooner to meet the final network delay goal.
Local Delay Adjust (us)	Sets a local delay offset to be applied to only this transmitter to optimize SFN coverage.
<i>Framing</i>	
Bandwidth	Sets the RF channel bandwidth in megahertz.
Carriers	<p>Sets the number of modulated RF carriers.</p> <p>[Single] = a single RF carrier is transmitted.</p> <p>[Two-Pilot] = a single RF carrier is augmented with two pilot tones.</p> <p>[Multi] = 3780 RF carriers are transmitted (OFDM)</p>
Guard Interval	Sets the symbol guard interval. [PN420(1/9), PN945(1/9), PN595(1/6)]
Guard Interval PN	<p>Sets the initial condition of the PN sequences in the frame headers.</p> <p>[Variable] = use the definition of the table in the standard.</p> <p>[Constant] = use an initial condition of index 0 for all signal frames.</p>
Constellation	Sets the modulation constellation. [4QAM, 16QAM, 32QAM, 64QAM]
LDPC Rate	Sets the fractional LDPC code rate. [0.4, 0.6, 0.8]
Time Interleaver	Sets the time interleaver length in symbols. [240, 720]

Name	Function
<i>Test</i>	
DC Test Tone	Enables the output of single CW test carrier in the center of the channel when checked. This is typically used for checking the channel frequency.

Table 74: Home > Modulator > DTMB > Config

10.42 Home > Power (Power Supply)

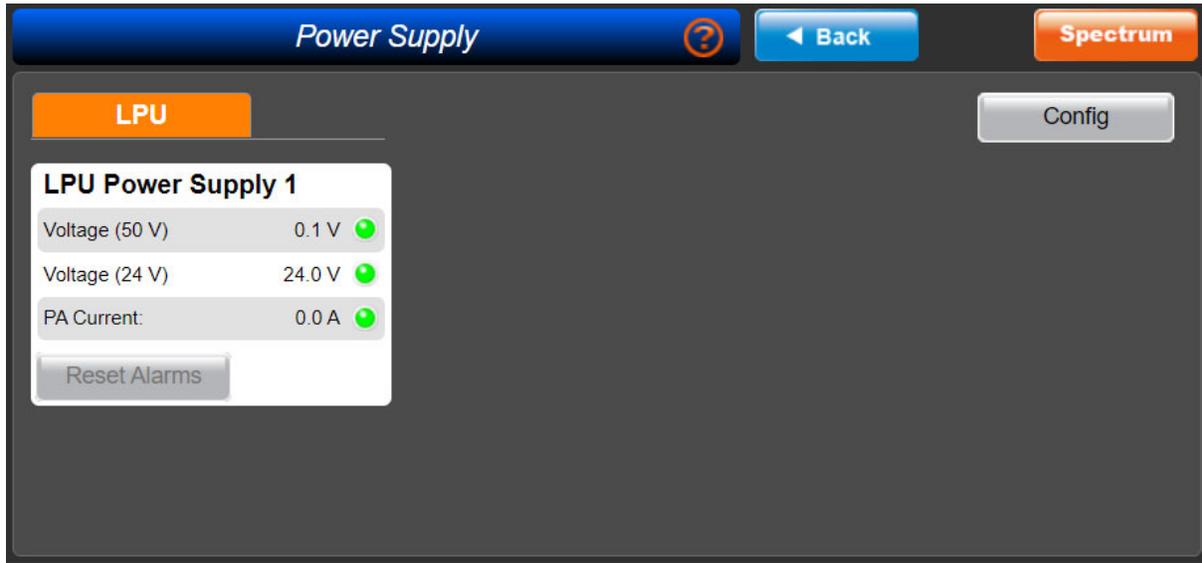


Figure 65: Home > Power

Name	Function
<i>Power Supply</i>	
Voltage (50V)	Displays the voltage and alarm status of the power supply 50V output. [green] = the output voltage is within the user-defined high and low alarm limits. [red] = the output voltage is outside the user-defined high and low alarm limits.
Voltage (24V)	Displays the voltage and alarm status of the power supply 24V output. [green] = the output voltage is within the user-defined high and low alarm limits. [red] = the output voltage is outside the user-defined high and low alarm limits.
Current PA	Displays the level in amperes and alarm status of the current to the power amplifier stage. [green] = the PA current is below the user-defined alarm limit. [red] = the PA current is above the user-defined alarm limit.
Config	Navigates to the Power Supply Configuration page.

Table 75: Home > Power

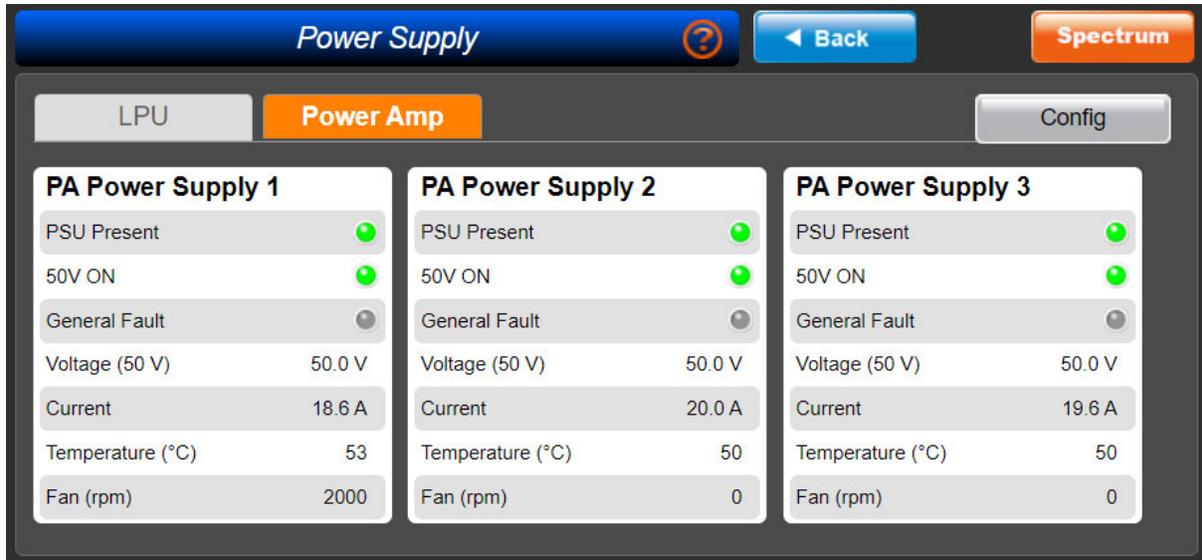


Figure 66: Home > Power > Config > Power Amp

NOTE: The Power Amp tab is only present in models with an external PA stage.

Name	Function
<i>Power Supply 1,2,3 (not present all models)</i>	
PSU Present	Indicates that the power supply module is installed. [green] = the PS module is installed. [gray] = the PS module is absent.
50V ON	Indicates that the power supply module is switched on and outputting voltage. [green] = the PS module is switched on. [gray] = the PS module is switched off.
General Fault	Indicates that the power supply module has an internal fault condition. [red] = the PS module has an internal fault condition. [gray] = the PS module is ok/has no faults.
Voltage (50 V)	Displays the voltage being supplied by the PS module in volts.
Current	Displays the current being supplied by the PS module in amperes.
Temperature (°C)	Displays the internal temperature of the PS module in degrees centigrade.
Fan (rpm)	Displays the speed in rpms of the fan internal to the PS module.

Table 76: Home > Power > Power Amp

10.43 Home > Power > Config (Power Supply Configuration)

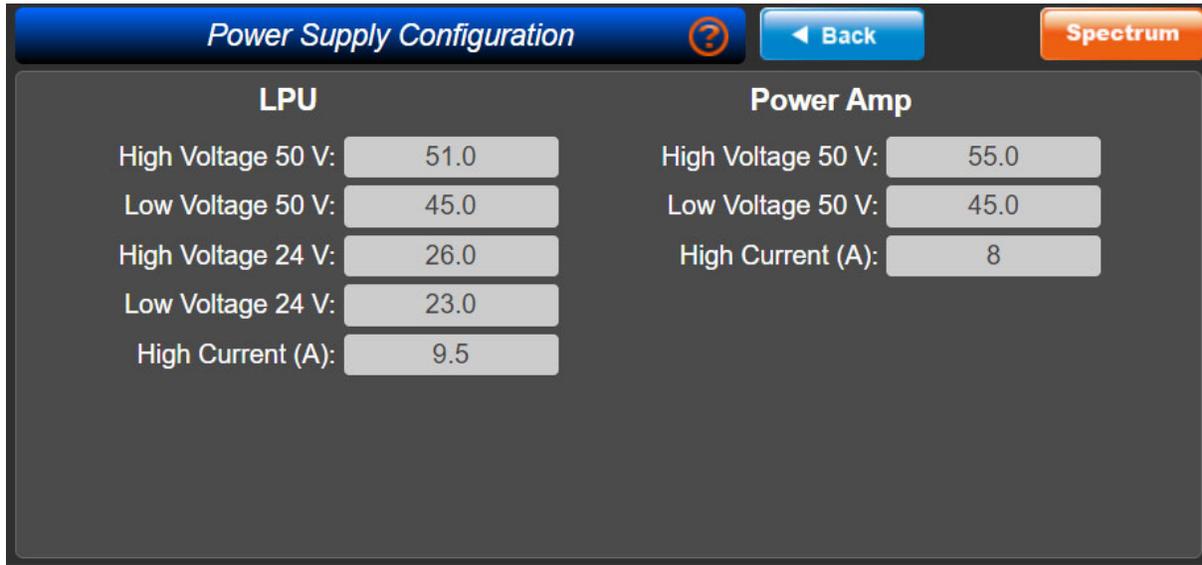


Figure 67: Home > Power > Config

Name	Function
<i>LPU</i>	
High/Low Voltage (50V)	Sets the high or low voltage alarm threshold for the power supply 50V output.
High/Low Voltage (24V)	Sets the high or low voltage alarm threshold for the power supply 24V output.
High Current (A)	Sets the high current alarm threshold for the power supply current load.
<i>Power Amp (not present all models)</i>	
High Voltage 50V	Sets the overvoltage alarm threshold for the external PA module.
Low Voltage 50V	Sets the undervoltage alarm threshold for the external PA module.
High Current (A)	Sets the overcurrent alarm threshold for the external PA module.

Table 77: Home > Power > Config

10.44 Home > RTAC



Figure 68: Home > RTAC

Name	Function
Non-Linear Precorrection Status	<p>Indicates the status of the nonlinear precorrector, which corrects linearity and intermodulation errors at the output.</p> <p>[Init] = the precorrector is starting/initializing. [Started] = the precorrector is is fully operational. [Tracking] = the precorrector is fully operational with memories. [Hold] = the precorrector is fully operational but the calculation of the coefficients is frozen. [Bypass] = the precorrector is inactive. [Error] = the Nonlinear precorrection process failed.</p>
Linear Precorrection Status	<p>Indicates the status of the linear precorrector, which corrects frequency response and group delay errors at the output.</p> <p>[Bypass] = the linear precorrector is inactive. [Waiting] = the linear pre-correction process waiting to start.</p>

Name	Function
	<p>[Control AGC] = the linear pre-correction process has started, and the RF feedback signal is undergoing level stabilization.</p> <p>[Calibrating] = the linear pre-correction process has started, and the coefficients are being calculated.</p> <p>[Calibrated] = linear precorrection is fully operational.</p> <p>[Error] = the linear precorrection process failed.</p> <p>[Old Calibration] = the linear calibration is old/expired due to a reboot or new calibration failure.</p>
Non-Linear Feedback Level	Displays the level in dBm of the RF feedback sample for the non-linear corrector.
Linear Prec. Feedback Alarm	<p>Indicates whether the feedback signal for linear precorrection is acceptable. This check is performed only when the linear precorrector is active.</p> <p>[green] = the linear feedback sample is acceptable.</p> <p>[red] = The linear feedback sample has an insufficient level for the correct functioning of the linear precorrector</p>
Config	Navigates to the RTAC Configuration page.

Table 78: Home > RTAC

10.45 Home > RTAC > Config (RTAC Configuration)

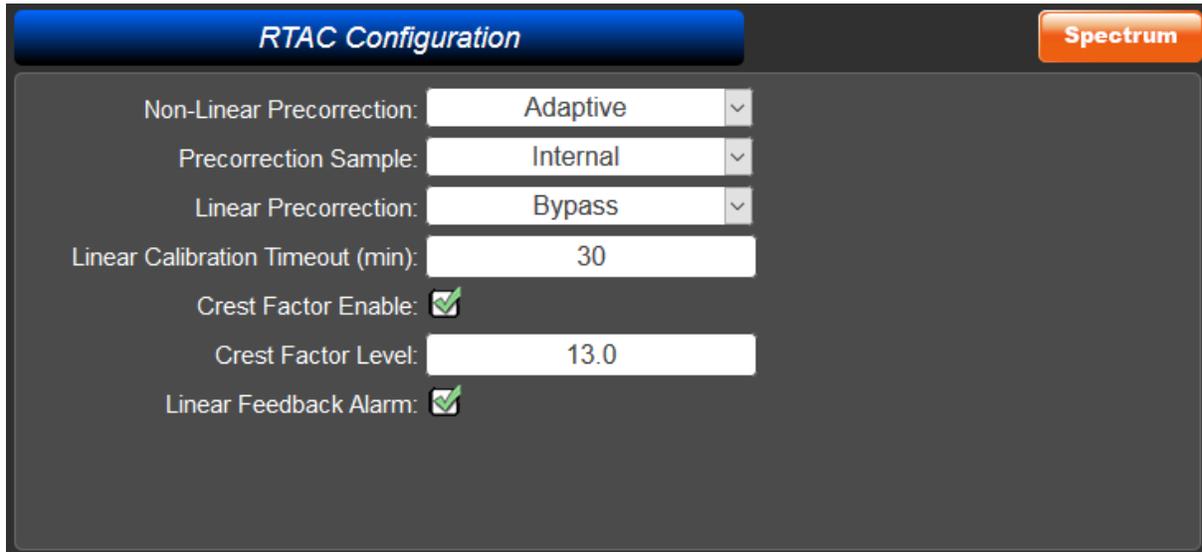


Figure 69: Home > RTAC > Config

Name	Function
Non-Linear Precorrection	<p>Sets the operating mode of the non-linear precorrector.</p> <p>[Bypass] = disables the precorrector.</p> <p>[Hold] = freezes the precorrector with a fixed correction curve.</p> <p>[Adaptive] = allows the precorrector to track the RF output signal and continuously update its correction curve.</p>
Precorrection Sample	<p>Sets the feedback sample source for the non-linear precorrector.</p> <p>[Internal] = the precorrector uses an internal feedback sample from after the final amplifier, thus correcting for only those linearity errors arising inside the unit itself.</p> <p>[External] = the precorrector uses an external feedback sample from the rear panel, thus allowing correction for linearity errors arising in one or more external high power stages.</p>
Linear Precorrection	<p>Sets the operating mode of the linear precorrector.</p> <p>[Bypass] = disables the precorrector.</p> <p>[Single Pass] = the precorrector performs a single adaptation then maintains a fixed correction curve.</p> <p>[Continuous] = the precorrector tracks the RF output signal and continuously updates its correction curve.</p>
Linear Calibration Timeout (min)	<p>Sets the refresh interval for the linear precorrection in minutes. The linear precorrection coefficients are recalculated once the time limit has expired.</p>

Name	Function
Crest Factor Enable	Enables crest factor reduction (selective signal clipping) to reduce the peak to average ratio of the output signal. This can prevent excessive signal peaks from damaging downstream amplifying stages.
Crest Factor Level	Sets the peak to average ratio level in dB of the output signal after the application of crest factor reduction.
Linear Feedback Alarm	Enables a linear feedback alarm to signal an insufficient level of the feedback sample for the correct operation of the linear precorrector.

Table 79: Home > RTAC > Config

10.46 Home > FTR (Frequency & Timing Reference)

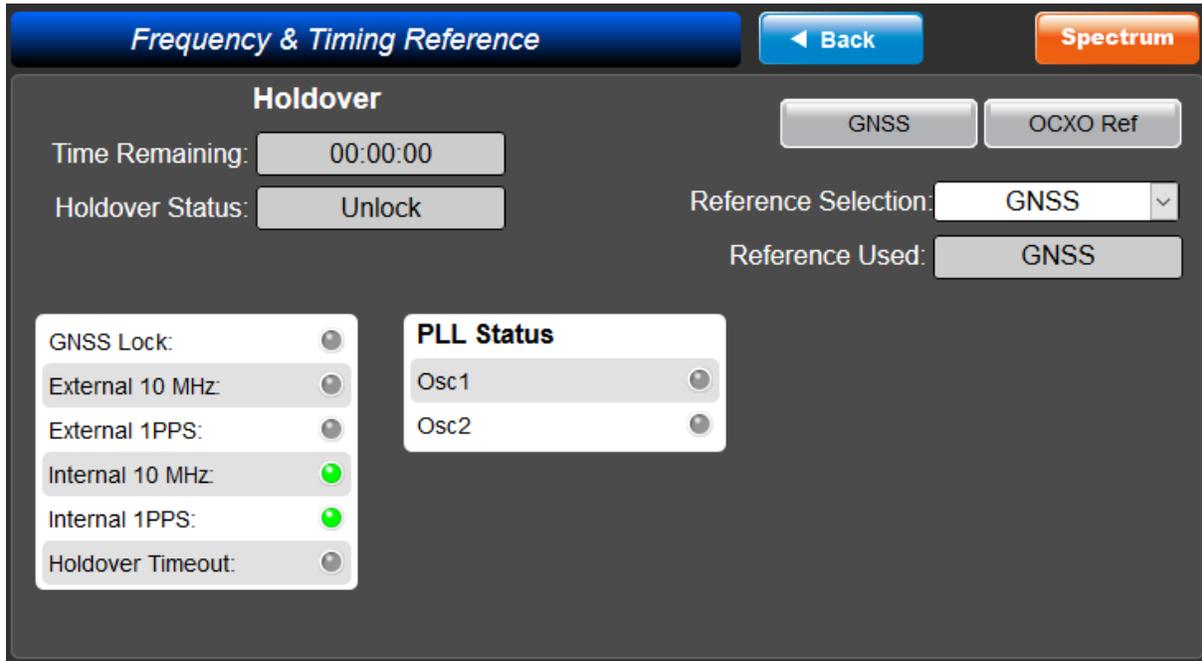


Figure 70: Home > FTR

Name	Function
<i>Holdover</i>	
Time Remaining	When in holdover mode, displays the amount of free-running time remaining before holdover expires.
Holdover Status	<p>Indicates the status of the frequency and time reference signals being supplied to the modulator.</p> <p>[Lock, green] = The internal OCXO is locked to a GNSS signal or external reference signals supplied at the rear panel.</p> <p>[Holdover] = The internal OCXO is free-running due the absence of a GNSS signal, but its FTR outputs are still considered valid because insufficient time has passed for it to drift off frequency.</p> <p>[Unlock] = The OCXO is considered unlocked.</p> <p>[Holdover Time] = When holdover is active and the reference signal returns, the system waits about 15 seconds to evaluate the stability of the reference input signal before exiting the holdover state. If the signal is stable, the state switches to "Lock", otherwise the holdover status returns.</p> <p>[Warm Up] = the system is transitioning states.</p>
<i>Reference signal LEDs</i>	
GNSS Lock	Indicates the operational status of the on-board GNSS receiver used to discipline the internal OCXO.

Name	Function
	<p>[green] = the receiver has locked on to usable GNSS signals.</p> <p>[gray] = the receiver has not locked on to usable GNSS signals.</p>
External 10 MHz	<p>Indicates the presence of an external 10 MHz reference signal at the rear panel.</p> <p>[green] = an external 10 MHz reference signal is present.</p> <p>[gray] = an external 10 MHz reference signal is not present.</p>
External 1PPS	<p>Indicates the presence of an external 1 PPS reference signal at the rear panel.</p> <p>[green] = an external 1 PPS reference signal is present.</p> <p>[gray] = an external 1 PPS reference signal is not present.</p>
Internal 10 MHz	<p>Indicates the presence of the 10 MHz reference output supplied to the modulator.</p> <p>[green] = the modulator is receiving a valid 10 MHz signal.</p> <p>[gray] = the modulator is not receiving a valid 10 MHz signal.</p>
Internal 1PPS	<p>Indicates the presence of the 1 PPS reference output supplied to the modulator.</p> <p>[green] = the modulator is receiving a valid 1 PPS signal.</p> <p>[gray] = the modulator is not receiving a valid 1 PPS signal.</p>
Holdover Timeout	<p>Indicates the status of the holdover countdown.</p> <p>[red] = the holdover countdown has expired and the OCXO is considered unlocked.</p> <p>[gray] = the OCXO is not in holdover or the holdover countdown has not expired.</p>
PLL Status Osc1	<p>Indicates the status of the clock generator for the RF output DAC.</p> <p>[grey] = The clock generator is working/ok.</p> <p>[red] = The clock generator is faulty.</p>
PLL Status Osc2	<p>Indicates the status of the clock generator for RF feedback input ADC.</p> <p>[grey] = The clock generator working/ok.</p> <p>[red] = The clock generator is faulty.</p>
GNSS	Navigates to the FTR GNSS page.
OCXO Ref	Navigates to the FTR OCXO page.
Reference Selection	Selects which frequency and time references signals (10 MHz & 1 PSS) are to be used by the FTR engine. See Figure 71

Name	Function
	<p>below for a graphical representation of the Reference Selection and FTR GNSS > BNC I/O settings.</p> <p>[GNSS] = The reference signals generated by the GNSS receiver are used to lock the OCXO (FTR engine) that provides the time and frequency references to the modulator</p> <p>[External Holdover] = The reference signals coming from the rear panel will be used to lock the OCXO (FTR engine) that provides the time and frequency references to the modulator</p> <p>[External Bypass] = The reference signals coming from the rear panel will be applied directly to the modulator. No Holdover function is available.</p> <p>[Auto] = Select the frequency and time references to be applied to the modulator according to their availability (e.g. GNSS, Ext Reference)</p>
Reference Used	<p>Displays which frequency and time reference signals are currently being used by the FTR engine.</p> <p>[GNSS] = the internal FTR signals is locked to GNSS Rx and being used by the modulator (holdover is available).</p> <p>[External Holdover] = the internal FTR signals is locked to External ref and being used by the modulator (holdover is available).</p> <p>[External Bypass] = the external FTR signals from the rear panel are being used by the modulator (no holdover available).</p>

Table 80: Home > FTR

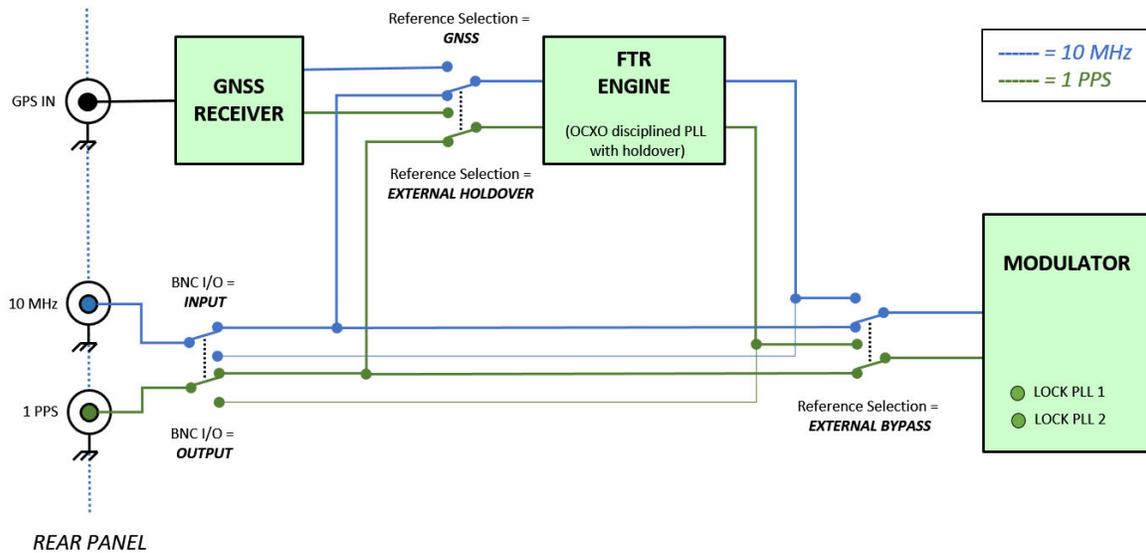


Figure 71: Block diagram of reference management

10.47 Home > FTR > GNSS (FTR GNSS)

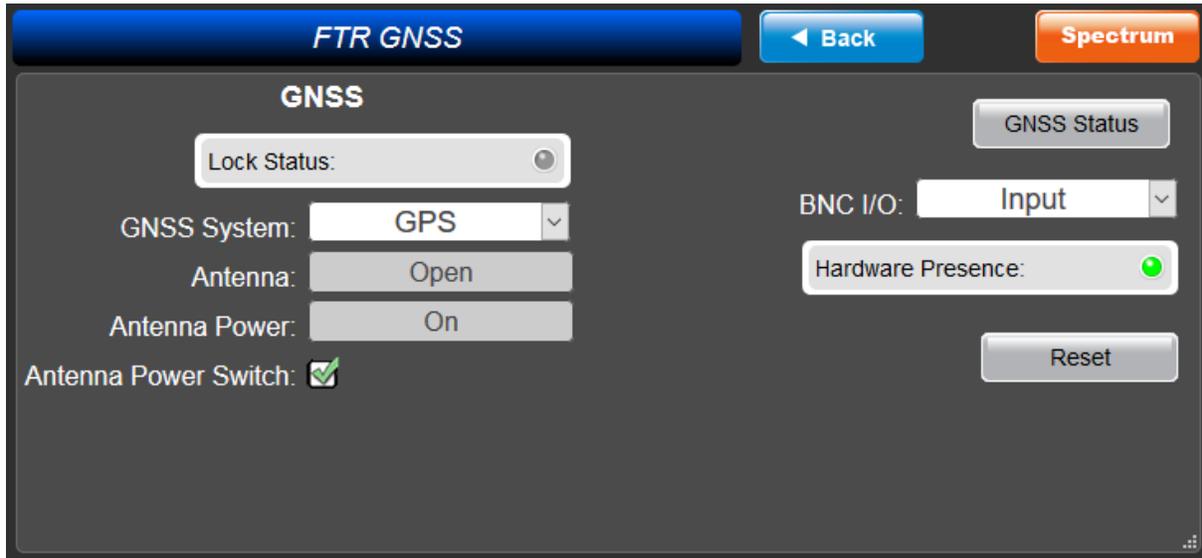


Figure 72: Home > FTR > GNSS

Name	Function
<i>GNSS</i>	
Lock Status	Indicates the lock status of the GNSS receiver. [green] = the GNSS receiver is locked to satellite signals. [gray] = the GNSS receiver is unlocked.
GNSS System	Selects the GNSS system to be used as the frequency and time reference source. [GPS] = Global Positioning System. [GLONASS] = GLOBal NAVigation Satellite System.
Antenna	Displays the status of the external GNSS antenna connected to the antenna input. [Init] = antenna is initializing. [Unknown] = antenna status cannot be determined. [OK] = antenna is ok, normal operation. [Short] = antenna is short circuited. [Open] = antenna is open circuited.
Antenna Power	Displays the status of the power supply for the external GNSS antenna. [On, Off, Unknown]
Antenna Power Switch	Enables the power supply for the external GNSS antenna when checked.
GNSS Status	Navigates to the GNSS Status page.
BNC I/O	Sets the I/O direction of the 1 PPS and 10 MHz BNC connectors on the rear panel.

Name	Function
	[Input] = connectors will accept external 1 PPS and 10 MHz signals as inputs. [Output] = connectors will output the internally-generated 1 PPS and 10 MHz signals.
Hardware Presence	Indicates the hardware presence status of the GNSS receiver card. [green] = the GNSS receiver is installed. [gray] = the GNSS receiver is not installed.
Reset	Resets the GNSS receiver card should the card become unresponsive.

Table 81: Home > FTR > GNSS

10.48 Home > FTR > OCXO (FTR OCXO)



Parameter	Value
Frequency (kHz)	10000.00
Holdover Voltage (V)	2.54
Holdover Time (min)	30
Holdover Countdown	0
Time Interval Error (nsx10)	5
Offset TIE (nsx10)	0
1PPS Policy	Auto

Figure 73: Home > FTR > OCXO

Name	Function
Frequency (kHz)	Displays the frequency of the internal OCXO in kilohertz.
Holdover Voltage (V)	Displays the control voltage reference applied to the OCXO to maintain 10 MHz stability when in holdover mode.
Holdover Time (min)	Sets the time limit for how long the 10 MHz and 1 PPS reference outputs will be considered valid upon the loss of GNSS discipline. Setting is chosen as a function of the hourly/daily drift of the OCXO when free running.
Holdover Countdown	Displays the time remaining in holdover mode, when active.
Time Interval Error (ns x 10)	Display the current time interval error (phase error) for the 1 PPS output in 1/10 nanosecond intervals.
Offset TIE (ns x 10)	Sets the time interval error offset (phase offset) for the 1 PPS output in 1/10 nanoseconds intervals.
1PPS Policy	<p>Establishes the policy for the 1 PPS reference to be supplied to the modulator should the selected reference source become unlocked.</p> <p>[Always Off] = the 1 PPS signal is not sent to the modulator.</p> <p>[Always On] = the 1 PPS signal is always sent to the modulator.</p> <p>[Auto] = the 1 PPS signal is sent to modulator when the GNSS receiver is locked or 1PPS External is present/locked or Holdover mode is active.</p> <p>Note: If the Reference Selection on the Home > FTR screen is set to "External Bypass", these rules are not valid</p>

Name	Function
	because the 1PPS external signal is routed directly to the modulator.

Table 82: Home > FTR > OCXO

10.49 Home > FTR > GNSS > GNSS Status

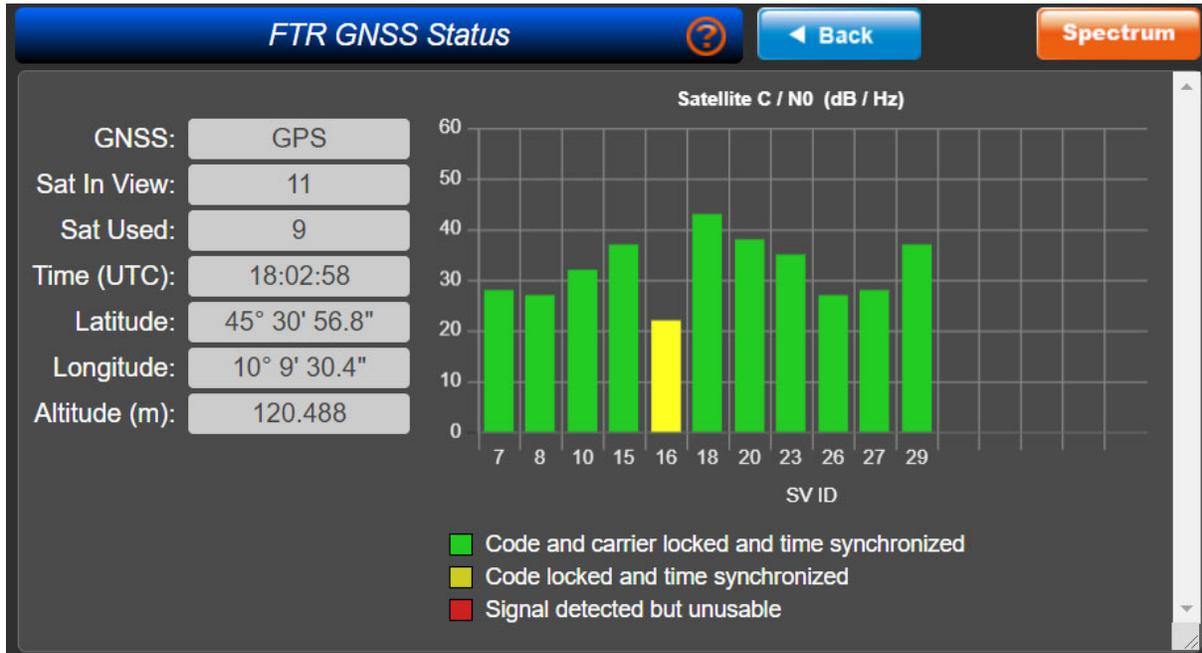


Figure 74: Home > FTR > GNSS > GNSS Status

Name	Function
GNSS	Indicates which GNSS systems are currently being tracked. [GPS] = American system. [GLONASS] = Russian system.
Sats In View	Displays the number of satellites currently being received.
Sats Used	Displays the number of satellites currently being tracked.
Time (UTC)	Displays the current time determined by GNSS.
Time (UTC)	Displays the current time determined by GNSS.
Latitude	Displays the current system latitude as determined by GNSS.
Longitude	Displays the current system longitude as determined by GNSS.
Altitude (m)	Displays the current system altitude as determined by GNSS.
Satellite C/NO (dB/Hz)	Provides a bar graph of the signal strength of the various satellites currently being tracked.

Table 83: Home > FTR > GNSS > GNSS Status

10.50 Home > Output (Output Configuration)

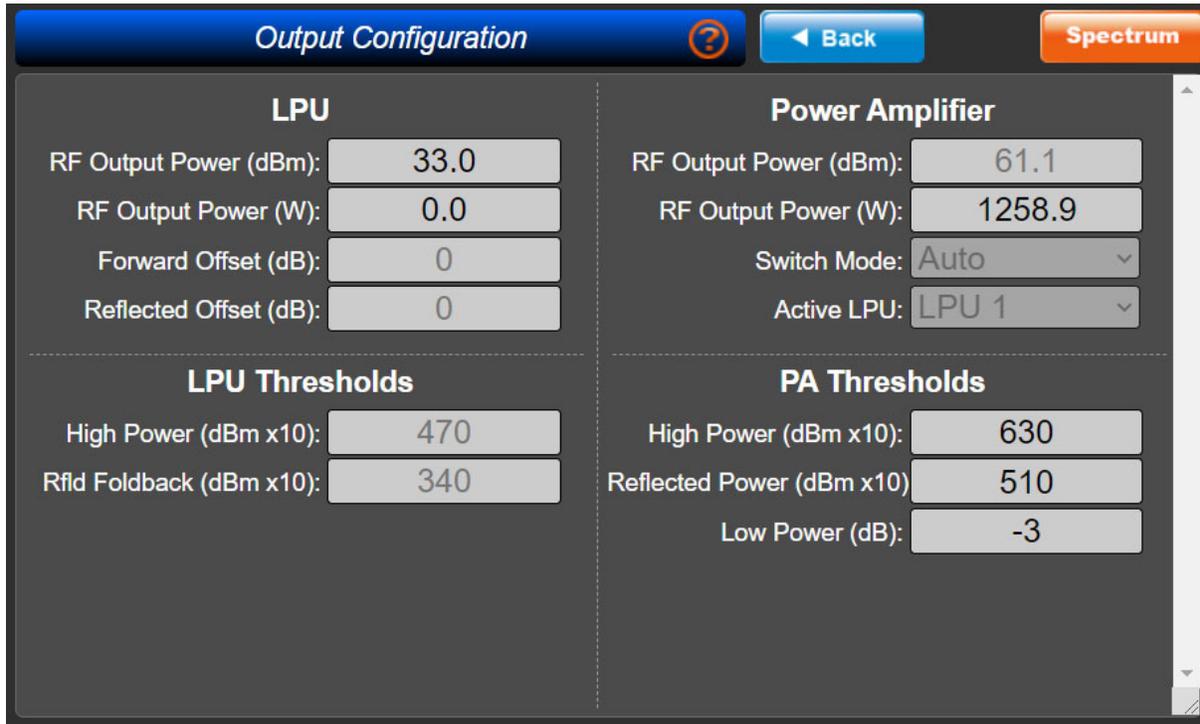


Figure 75: Home > Output

Name	Function
<i>LPU</i>	
RF Output Power (dBm)	Sets the target RF output power level in dBm (decibels over one milliwatt) in lower power systems without an external PA stage. The automatic level control (ALC) loop will attempt to maintain this RF output power level.
RF Output Power (W)	Displays the target RF output power level in watts. The automatic level control (ALC) loop will attempt to maintain this RF output power level.
Forward Offset (dB)	Displays the offset in decibels to be applied to the forward power reading during factory calibration.
Reflected Offset (dB)	Displays the offset in decibels to be applied to the reflected power reading during factory calibration.
<i>LPU Thresholds</i>	
High Power Threshold (dBm x 10)	Displays the high power alarm threshold as set in the factory. The scale is dBm x 10. (e.g. 33.0 dBm = 330)
Rfld Foldback Threshold (W x 10)	Displays the reflected foldback threshold as set in the factory. The scale is watts x 10. (e.g. 10.5 W = 105)
<i>Power Amplifier (not present all models)</i>	
RF Output Power (dBm)	Sets the forward output level in dBm for the transmitter system in models with an external power amplifier.

Name	Function
RF Output Power (W)	Displays the forward output level setting in watts for the transmitter system in models with an external power amplifier.
Switch Mode	Sets the LPU switchover mode in dual drive systems. [Auto] = the system automatically switched to the reserve LPU when the active LPU suffers a failure. [Manual] = the user manually selects the active LPU via the field immediately below.
Active LPU	Sets the active LPU to drive the power amplifier stages when manual switch mode is selected. [LPU 1, LPU 2]
<i>PA Thresholds (not present all models)</i>	
High Power (dBm x 10)	Sets the overpower alarm threshold for the system power reading returned from the external PA stage. Scale is dBm x 10 (e.g. 630 = 63.0 dBm)
Reflected Power (dBm x 10)	Sets the reflected power alarm threshold for the system reflected power reading returned from the external PA stage. Scale is dBm x 10 (e.g. 510 = 51.0 dBm)
Low Power (dB)	Sets the low power alarm threshold for the system power reading returned from the external PA stage in dBs relative to full power.

Table 84: Home > Output

10.51 Event Log

The Event Log is accessed via a button on the Home page. It provides a historical record of alarms, warnings, information, and events. Consult Section 12 for more information on interpreting the various event log messages.

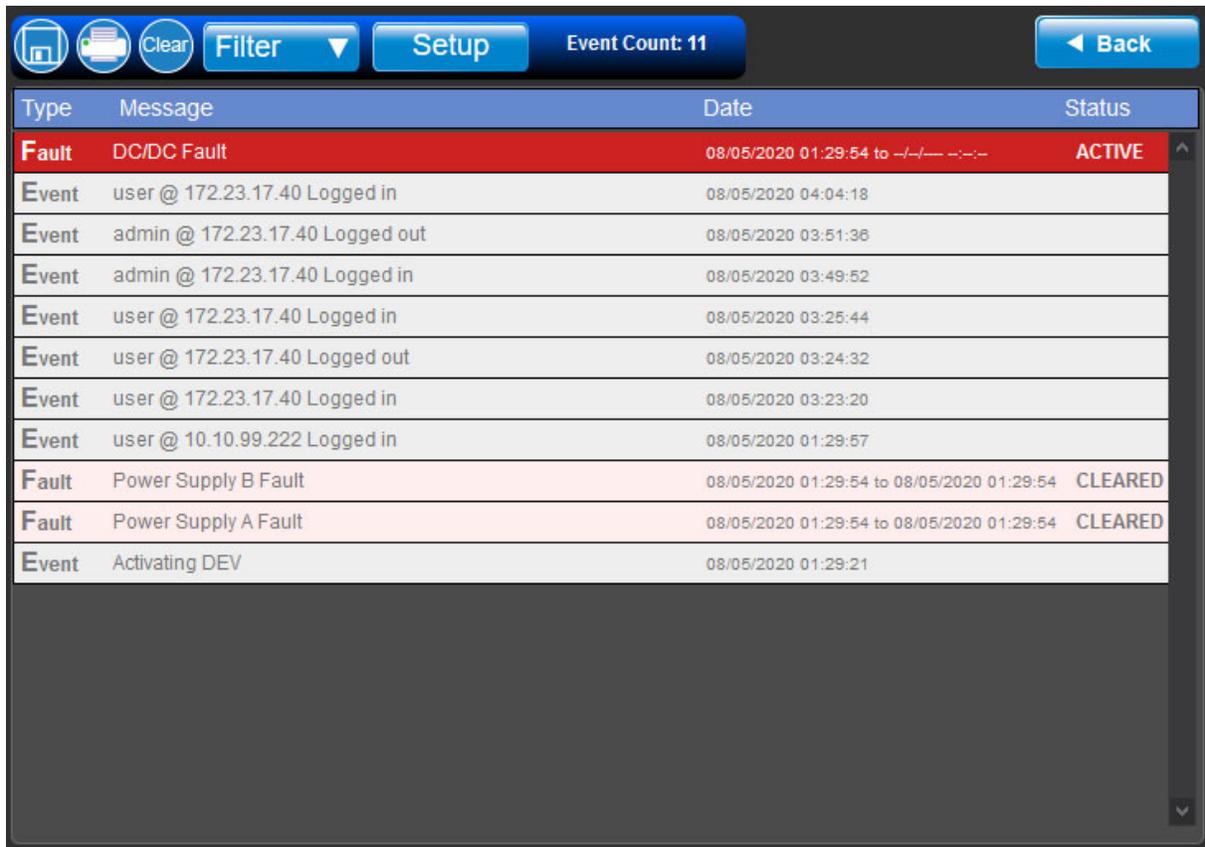


Figure 76: Event Log

Name	Function
Disk icon	Saves the event log to disk on the local PC.
Printer icon	Prints the event log.
Clear	Clears all non-active events from the event log.
Filter	<p>Launches a pop-up window where the on-screen display of the event can be modified.</p> <p>[Active + Cleared] = display both active (current) and cleared (historical) events. [Active Only] = display only active events. [Cleared Only] = display only cleared event.</p> <p>[Faults, Warnings, Information, Events] = suppresses the display of this type of event when unchecked.</p>
Setup	Lead to the Event Log Setup page.

Name	Function
Event Count	Displays the number of events currently listed in the event log.
Type	Indicates the type/priority of the event log entry. [FAULT] = a red/high priority condition. [WARNING] = a yellow/medium priority condition. [INFO] = a lower priority condition. [EVENT] = an event not related to an alarm condition.
Message	Describes the recorded event.
Date	Displays the start and end times for the recorded event.
Status	Indicates whether the condition described by the event is still ongoing. [ACTIVE] = condition still exists. [CLEARED] = condition no longer exists.

Table 85: Event Log

10.52 Home [Block Diagram] > Exciter > I/O (D Sub 25)

The I/O page manages the DB25 parallel remote control connector on the rear panel. As of this printing, it is accessed via a block in the **Exciter** block diagram element on the **Home** page.

Pin	Type	Function	Trigger	Active	Status
1	GND	GND	-	-	NA
2	INPUT	LOAD INTERLOCK	LEVEL	CLOSED	INACTIVE
3	INPUT	RESET MOD	LEVEL	CLOSED	INACTIVE
4	INPUT	REBOOT	LEVEL	CLOSED	INACTIVE
5	GND	GND OPTO	-	-	NA
6	-	NOT USED	-	-	NA
7	-	RS485 TX+	-	-	NA
8	-	RS485 TX-	-	-	NA
9	-	RS485 RX+	-	-	NA
10	-	RS485 RX-	-	-	NA
11	-	NOT USED	-	-	NA
12	INPUT	STAND BY	LEVEL	CLOSED	INACTIVE
13	PSUPPLY	+28V	-	-	NA
14	GND	GND	-	-	NA
15	-	NOT USED	-	OPEN	NA
16	-	NOT USED	-	-	NA
17	RLY0 COM	RLY0 COMMON	-	-	NA
18	RLY0 NC	INPUT ALARM	LEVEL	OPEN	ACTIVE
19	RLY1 COM	RLY1 COMMON	-	-	NA
20	RLY1 NC	RF ALARM	LEVEL	OPEN	ACTIVE
21	RLY2 COM	RLY2 COMMON	-	-	NA
22	RLY2 NC	PSU ALARM	LEVEL	OPEN	INACTIVE
23	RLY3 COM	RLY3 COMMON	-	-	NA
24	RLY3 NC	GPS ALARM	LEVEL	OPEN	INACTIVE
25	PSUPPLY	+28V	-	-	NA

Figure 77: Home > Exciter > I/O

Name	Function
Pin	Displays the pin on the rear panel DB15 TLC/TLS port. [1...15]
Type	Displays the direction/function of the pin. [Input] = remote control command in. [Output] = remote control status out.

Name	Function
Function	Displays the remote control function assigned to the pin.
Trigger	<p>Indicates the transitional behavior of this pin.</p> <p>[LEVEL] = the logic state toggles with steady-state changes in level.</p> <p>[EDGE] = the logic state toggles with high-low transitions.</p> <p>[---] = does not apply.</p>
Active	<p>Sets the polarity of this pin.</p> <p>[Closed] = condition is true when pin is connected to its common pin.</p> <p>[Open] = condition is true when pin is not connected to its common pin.</p>
Status	<p>Displays the current steady-state logic state on this pin.</p> <p>[CLOSED] = pin is currently connected to its common pin.</p> <p>[OPEN] = pin is currently not connected to its common pin.</p>

Table 86: Home > Exciter > I/O

10.53 Administrator Login

Logging in with the special administrator level login leads to a special page for the management of user accounts and passwords.

Username	Permission Group	Max Logins	Idle Timeout	New User	
admin	Admin	0	0	Edit	
eng	Engineer	0	0	Edit	Delete
user	Engineer	0	0	Edit	Delete

Figure 78: Administrator login, user account management

Name	Function
Username	Displays the account username.
Permission Group	Displays the account permission group. [Admin] = used for making changes to user account settings, but no operational control is available. [Engineer] = used for operational control, but no access to user account settings is available.
Max Logins	Displays the maximum number of simultaneous logins permitted for the account.
Idle Timeout	Displays the amount of time a session using this account can remain idle before it is automatically logged out. Setting this value to zero allows the account to remain logged in indefinitely.
New User	Opens a new screen where a new user account can be configured.
Edit	Opens a new screen where the current user account can be modified.
Delete	Deletes the user account.

Table 87: Administrator Login

10.54 Administrator Login > Edit User Information

New User Information

Username

Password

Confirm Password

Permission Group Admin ▼

Max Simultaneous Logins (0 = No limit)

Idle Timeout (minutes; 0 = No timeout)

Figure 79: Administrator Login > Edit User Information

Name	Function
Username	Sets the account username.
Password	Sets the account password.
Confirm Password	Input box to confirm the account password.
Permission Group	<p>Sets the account permission group.</p> <p>[Admin] = used for making changes to user account settings, but no operational control is available.</p> <p>[Engineer] = used for system control, but no access to user account settings is available.</p> <p>[Operator] = used for system monitoring, no operational commands nor access to user account settings are available.</p>
Max Simultaneous Logins	Sets the maximum number of simultaneous logins permitted for the account.
Idle Timeout	Sets the amount of time a session using this account can remain idle before it is automatically logged out. Setting this value to zero allows the account to remain logged in indefinitely.
Save	Saves the proposed changes.
Cancel	Discards the proposed changes.

Table 88: Administrator Login > Edit User Information

11 Maintenance

The Ultra-Compact series has been designed to require a minimum of maintenance. This section outlines various maintenance interventions required to keep the equipment operating properly and is intended for qualified personnel only.

11.1 Good maintenance practices

Always observe these good maintenance practices when performing maintenance interventions on the equipment.

11.1.1 Remove AC mains power

Many of the procedures discussed in this section require access to restricted areas of the internal workings of the unit. In the interest of personnel safety, AC mains power should always be completely removed from the equipment before removing any of its modules or access covers. AC mains power can be removed by disconnecting the IEC line cord(s) from the rear panel. In the case of redundant power supplies (3RU models), there will be two line cords to be disconnected.

 WARNING	This equipment contains potentially lethal voltages when energized. Always observe proper safety precautions.
--	--

11.1.2 Observe ESD precautions

Before removing or replacing any PCB assembly within the equipment, ensure that proper precautions are taken against electrostatic discharge (ESD). The icon in Figure 80, when present, indicates the need to take proper ESD precautions to prevent equipment damage. Circuit boards and other sensitive parts shipped from GatesAir typically arrive in conductive ESD-safe bags/packaging, as shown in Figure 80. Likewise, any sensitive parts returned to GatesAir should be shipped back in ESD-safe bags/packaging.

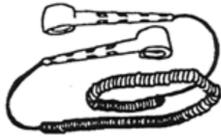


Figure 80: ESD caution icon = take ESD precautions

If electronic parts must be touched during installation or repair, the technician performing the work must be equipped with the anti-static protection devices shown below.



Elastic ESD wristband fixed on the technician’s wrist.



Flexible ESD cords connected to the elastic wristband and a special plug on the workbench highlighted with the ESD warning label indicating that it is connected to ground to prevent electrostatic charge build-up.

11.1.3 Proper handling of Beryllium Oxide

Beryllium in the form of Beryllium Oxide (BeO) is used in the construction of some components contained in this equipment, most notably flanged RF terminations and occasionally other ceramic insulators.

This material, when in the form of fine powder or vapor can cause respiratory problems if inhaled into the lungs. In its solid form, as used herein, can be handled quite safely, but it is prudent to avoid conditions that favor the formation of dust due to abrasion of the surfaces.

Because of this risk, great care should be taken when removing and disposing of these components. Do not throw them in containers for generic waste material, industrial or domestic, or send via mail. They must be packed separately and clearly identified to show the nature of the risk, then safely disposed of by authorized personnel for toxic waste.

 WARNING	<p>This label is used for components containing beryllium oxide.</p> <div style="text-align: center;">  </div> <p>Beryllium oxide dust is dangerous if inhaled.</p>
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11.2 Routine Maintenance

Discussed below are various maintenance interventions that are typically required during normal operation.

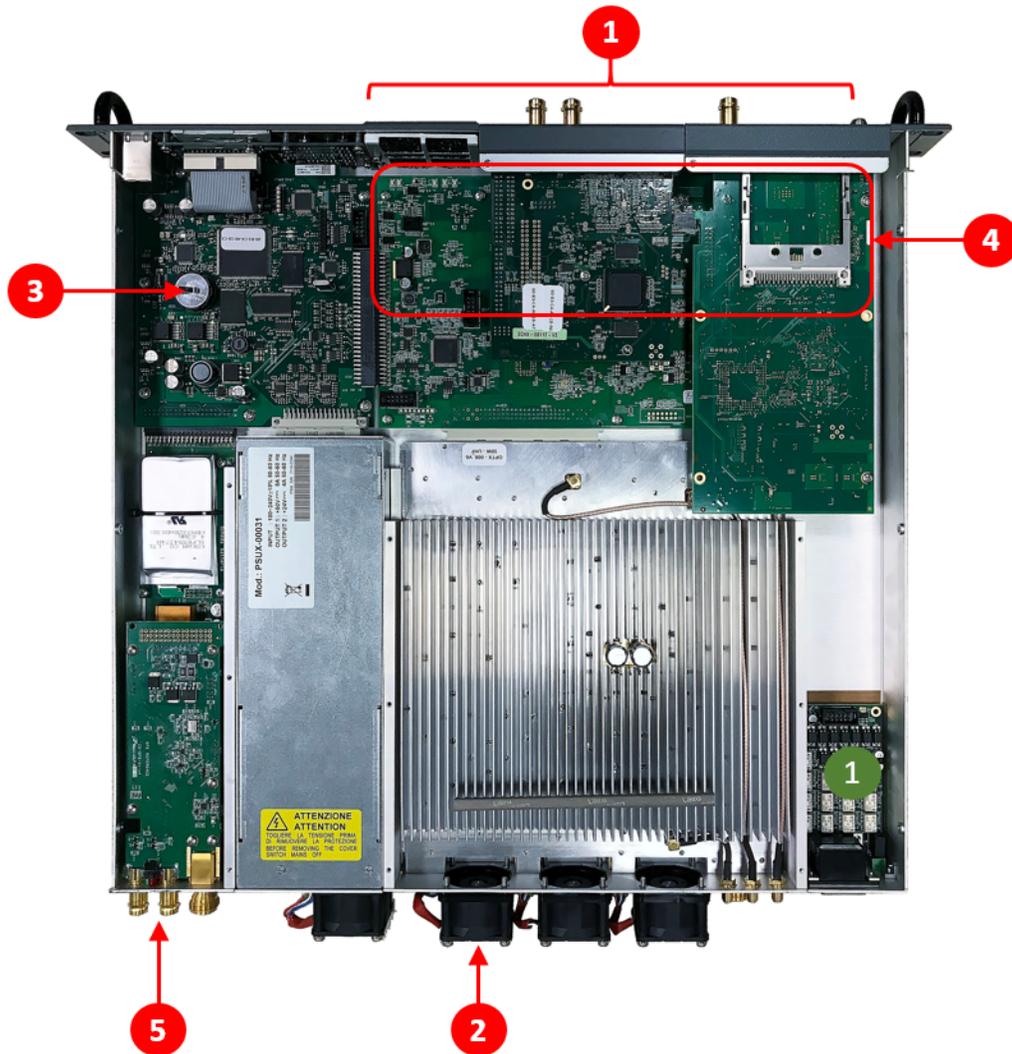


Figure 81. Routine maintenance procedures

No.	Type	Maintenance instructions
1	Cleaning the air filter	<p>The air filter on the front panel should be cleaned every 2-3 months or whenever it is visibly dirty or obstructed. You do not need to switch off the transmitter nor remove the filter to clean it.</p> <ul style="list-style-type: none"> - Vacuum the dust from the air filter on the front panel with a shop-vac type vacuum cleaner. - Use the vacuum cleaner brush nozzle to remove stubborn dust deposits.

No.	Type	Maintenance instructions
2	Fan replacement	<p>The fans have an expected MTBF of about 60,000 hours. A fan at end-of-life will make more noise than usual or exhibit reduced speed/rpms on the GUI interface. A fan can be replaced while the transmitter remains on air.</p> <ul style="list-style-type: none"> - Contact GatesAir/reseller to obtain a replacement fan. For 1RU models, specify, if possible, whether the fan is for the power supply or RF amplifier, as the polarity of the wires is reversed depending on the fan location. - Disconnect the faulty fan. - Remove the four screws that fasten the fan to the back panel. - Disassemble the fan and its grill from the panel. - Transfer the grill to the new fan. - Install the new fan with the four screws from the original fan. - Compare the polarity of the wires according to the label on the fan and the silkscreen legend on the rear panel. It may be necessary to change the position of the wires within the connector (1RU models). - Plug the fan connector into the back panel and verify that the fan is spinning correctly. - If the fan does not spin, see the previous note on the polarity of the wires and reverse the position of the wires in the fan connector.
3	Replacing the clock battery	<p>The battery for the on-board real time clock must be replaced every two years or whenever the time and date information is lost on the GUI interface.</p> <ul style="list-style-type: none"> - Remove the AC mains power to the unit. - Remove the unit from the rack. - Remove the top cover. - Replace the watch battery (CR2016) on the controller. - Put the top cover back on. - Place the unit back into service.
4	Dust removal inside the unit	<p>The internal workings of the unit must be cleaned periodically to eliminate dust build-up. Depending on the degree and type of ambient air pollution, dust deposits can be corrosive and cause circuit damage in the long term, particularly at the front edge of the modulator board, given its proximity to the cooling air inlet.</p> <p>To remove accumulated dust, use a dry natural bristle brush and a shop-vac type vacuum cleaner.</p> <p>(!) Never use any type of chemical solvent (!)</p> <p>(!) Note that the air friction in the vacuum hose can create an electrostatic charge. If the vacuum cleaner nozzle is metal, it must be attached to the ground of the chassis to avoid any damage caused by electrostatic discharges (!)</p> <ul style="list-style-type: none"> - Remove AC mains power to the unit. - Remove the unit from the rack. - Remove the top cover. - Remove the left and right input boards, if possible, to have full access to the modulator. The procedure for removing these boards can be found elsewhere in this manual.

No.	Type	Maintenance instructions
		<ul style="list-style-type: none">- Vacuum the dust with the shop vacuum, using the dry brush to dislodge stubborn deposits.- Reinstall the input boards as necessary.- Replace the top cover.- Place the unit back into service.
5	Verification of interlock circuits	The proper functioning of the interlock circuit(s) should be verified on a periodic basis (e.g. yearly). Actuate or temporarily disconnect any thermal switches, door switches, failsafe switches, patch panel switches, etc. in the interlock loop to simulate an alarm condition. Verify that RF output is inhibited and that the corresponding alarm message appears in the GUI Event Log.

Table 89: Routine maintenance procedures

11.3 Extraordinary Maintenance

This section includes maintenance operations that may be required on an exceptional basis.

11.3.1 Changing the operating channel

The frequency of the transmitter can be changed at any time. However, this requires a short interruption of transmission, usually only a few seconds. The user must be logged into the GUI to perform the steps described in this procedure.



CAUTION

Even if the transmitter is fully agile in frequency, the external RF system may not be. Any frequency selective external components such as filters, combiners, antennas must be re-tuned to the new channel before switching the transmitter back on.

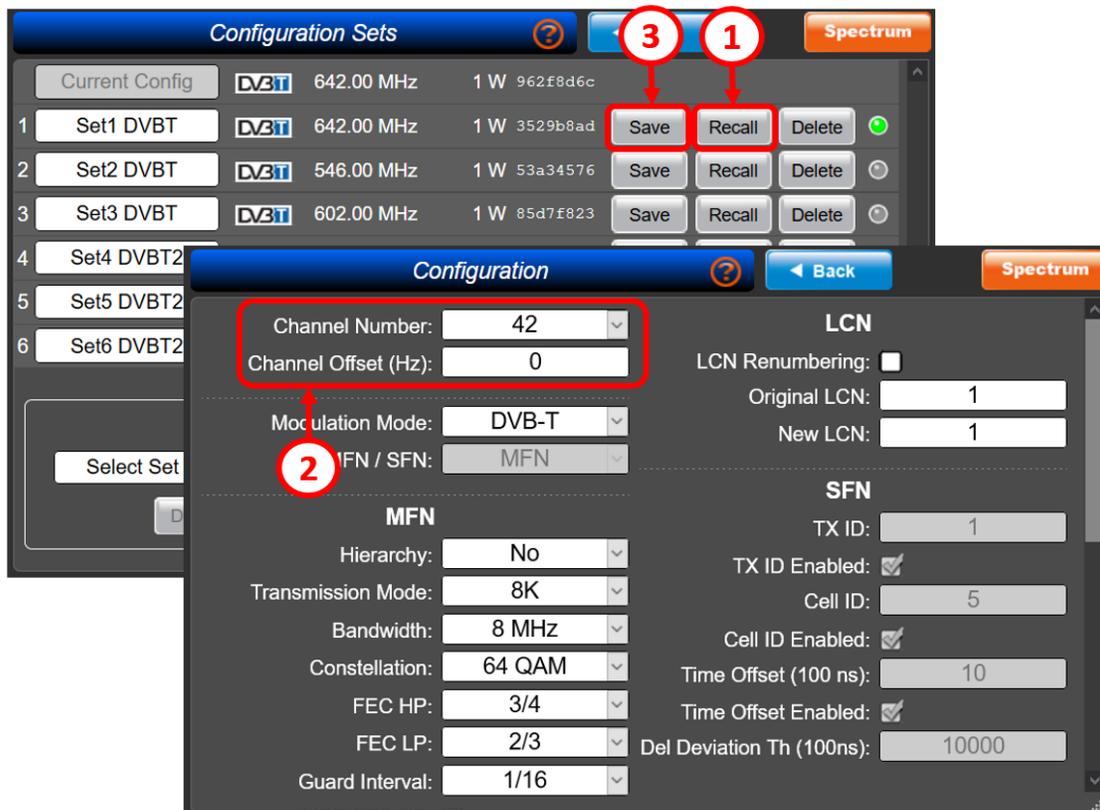


Figure 82: Change operating channel

STEP 1: If the desired operating configuration has already been stored previously, navigate to **Home > Setup > Config Sets** and press the **Recall** button for the desired configuration. The channel and operating configuration will change automatically.

STEP 2: If the desired operating channel has never been used before, navigate to the **“Modulator > Config”** section of the web GUI. The exact path will vary slightly according to the modulation

standard. (e.g. DVB-T, DVB-T2, ATSC, etc.). Choose the desired channel from the **Channel Number** pulldown menu, if present. Otherwise, input the desired channel center frequency in the **Channel Frequency** field, if present. The RF output will shut down and return on the new channel.

STEP 3: Make any other changes to the operational settings, as desired, and return to **Home > Setup > Config Sets** to save the new configuration as a new configuration set, as desired, by pressing the Save button for the corresponding set position number.

STEP 4: End of procedure.

11.3.2 Software Update

Periodic software updates are generally not required. The software should **NOT** be updated unless GatesAir has provided specific instructions to do so to correct a shortcoming in its functioning. The update file supplied by GatesAir will have a *.multi* extension.

 NOTE	<p>A software update may require up to a 10-minute interruption of transmission.</p>
--	--

The user must be logged into the GUI to perform the steps described in this procedure.

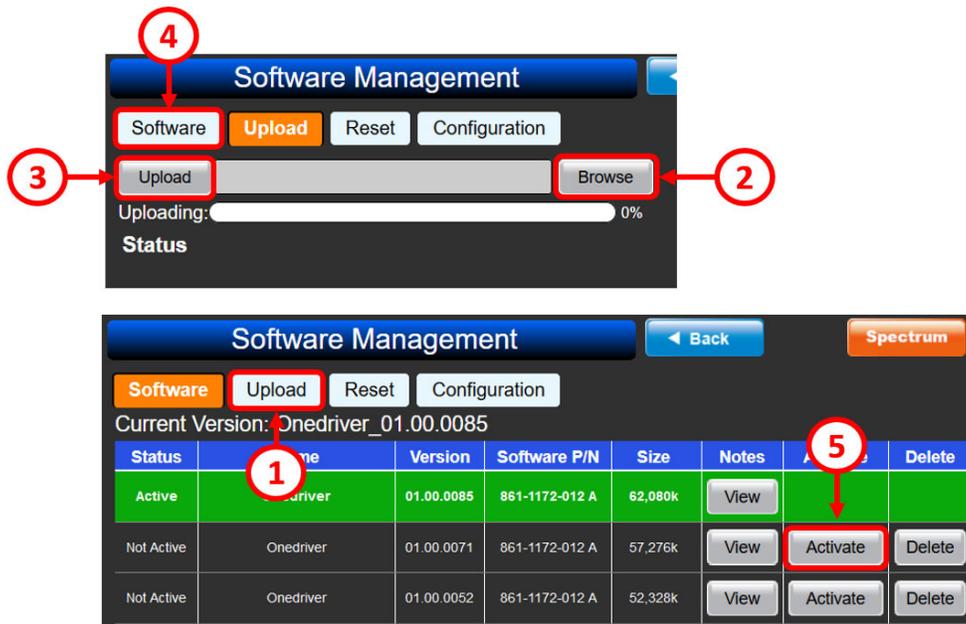


Figure 83: Update software

- STEP 1: Navigate to **Home > Setup > Update** on the web GUI. If the software package has already been uploaded to memory and is listed in the table of available software versions, skip directly to step 5. Otherwise, press the **Upload** button to navigate to the software upload page.
- STEP 2: Press the **Browse** button and select a suitable upgrade file package on the hard drive. The update file supplied by GatesAir will have a *.multi* extension.
- STEP 3: Press the **Upload** button to load the selected upgrade file into on-board memory.
- STEP 4: Once the file has been uploaded, press the **Software** button to return to the main upgrade page.
- STEP 5: Press the **Activate** button for the desired software version to put it into effect. The equipment will switch off for several minutes and reboot using the new software version.
- STEP 6: End of procedure.

11.3.3 Power reading calibration

Power metering calibration information is stored on board the RF amplifier module. Power measurements are calibrated in the factory versus both frequency and level (linearity) before shipment. Therefore, it is not necessary to revisit their calibration in the field, even after a change of channel or power level.

11.3.4 Preparing a replacement transmitter/gap-filler

The easiest way to configure a replacement unit before placing it into service is to clone the unit to be replaced by copying and transferring its configuration file.

During cloning, the following settings are copied to the new unit:

- Frequency
- Power level
- Temperature and voltage alarm threshold levels
- Operational settings (modulator, input, SAT receiver, GPS)

The following settings are not copied to the new transmitter unit for security reasons or other reasons of practicality:

- Passwords
- IP/LAN addresses of the host controller (GUI)
- The general system data found on the **Home > Setup > Service** tab of the GUI
- The installed hardware and software options
- The firmware in the modulator and other boards (*this requires a software update with a .multi file*)
- The power measurement calibrations stored in the RF Amplifier (*these are specific to the RF detectors on board each amplifier module*)

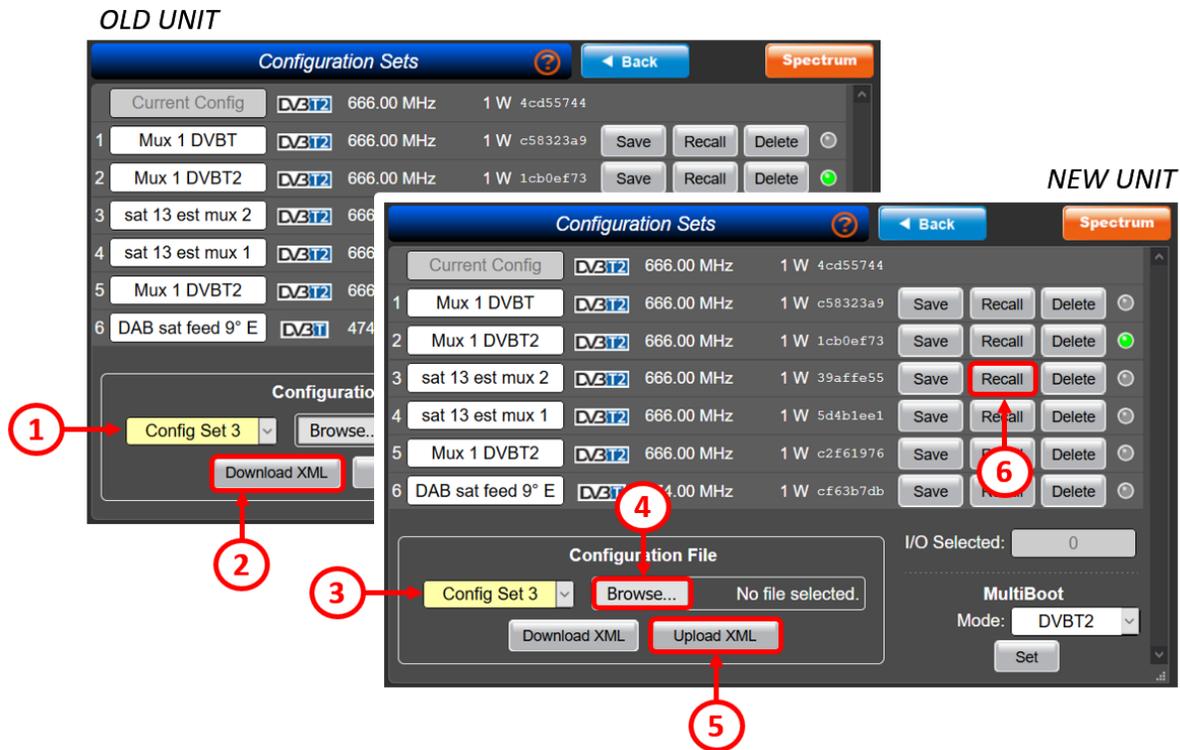


Figure 84: Prepare replacement unit

- STEP 1: Download the configuration file of the unit to be replaced by navigating to **Home > Setup > Config Sets** and selecting a configuration set to be copy. (Note: the currently active configuration can also be downloaded from an alternate location at **Home > Setup > Update > Configuration**)
- STEP 2: Press the **Download XML** button and follow the prompts to save the file to a suitable hard disk location.
- STEP 3: Navigate to **Home > Setup > Config Sets** on the new unit to be placed into service and choose a configuration set into which to load the configuration file from the unit being retired from service.
- STEP 4: Press the **Browse** button to locate the configuration file to be uploaded from the hard disk.
- STEP 5: Press the **Upload XML** button to launch the configuration file upload process.
- STEP 6: Once the configuration file has been uploaded to the desired configuration set (set #3 in the example in Figure 84), press the **Recall** button to place it into service. The equipment should adopt the settings carried over from the old unit via the configuration file.
- STEP 7: Those settings not conveyed by the configuration file must be set by hand, as needed. (see explanation at start of procedure)
- STEP 8: End of procedure.

11.4 Replace a defective part (1RU models)

This section describes replacing the main internal components of the 1RU transmitter/gap-filler models. A subsequent section provides similar information for the 2RU and 3RU model of the Ultra-Compact series. When the Ultra-Compact unit is used as the LPU/driver in larger transmitter system, refer to the accompanying transmitter system manual for maintenance information on the external PA stage components.

11.4.1 List of user replaceable components (1RU)

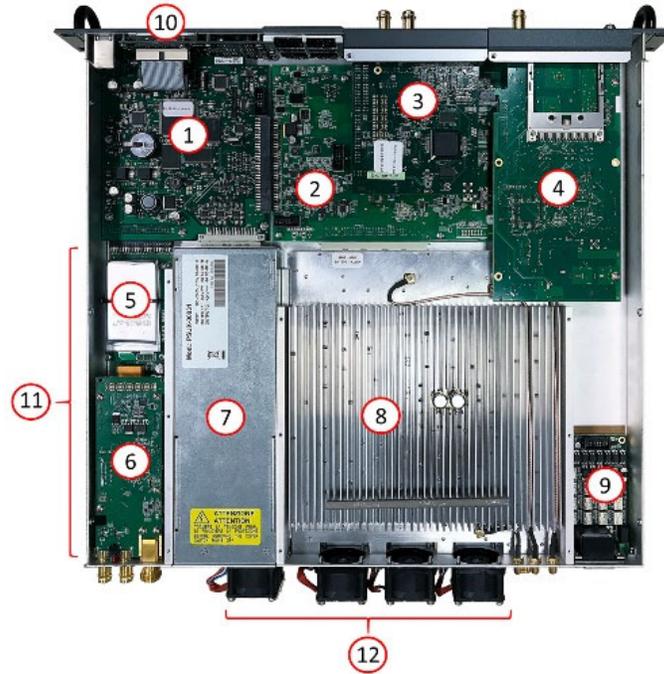


Figure 85: Major replaceable parts, 1RU models

No.	Name	Part number
1	Controller	OPTX-SCHX-00426
2	Modulator	OPTX-SCHX-00101 OPTX-SCHX-00183 for select DVB-T2 models
3	Inputs ASI + GbE	OPTX-00046
	Inputs ASI Seamless	OPTX-00016
	Inputs 2x ASI	OPTX-00014
	Inputs ASI Seamless + Audio	OPTX-00018
	Inputs ASI A/V + NICAM	OPTX-00112
	Inputs DAB 4x ETI	OPTX-00037
	Inputs DAB ETI 3Ch	OPTX-00144
	Inputs DAB 2x ETI + 2x EDI	OPTX-00111
4	Receiver - Satellite	OPTX-00010
	Receiver - Repeater/gap-filler	OPTX-00012
	Receiver - Regenerative repeater DVB-T/2	OPTX-00013

No.	Name	Part number
	Receiver - Regenerative repeater ATSC	OPTX-00029
5	Battery board	SCHX-00008
6	Reference - GPS receiver	OPTX-00005
	Reference - 10MHz-1PPS inputs	OPTX-00006
7	Power supply	PSUX-00031
8	RF amplifier - 30W UHF	OPTX-00009
	RF amplifier - 50W UHF	OPTX-00008
	RF amplifier - 80W UHF	OPTX-00032
	RF amplifier - 130W UHF	OPTX-00047
	RF amplifier - 150W UHF	OPTX-00157
	RF amplifier - 80W VHF B3	OPTX-00049
	RF amplifier - 130W VHF B3	OPTX-00104
	RF amplifier - 150W VHF B3	OPTX-00137
9	Interlock board (optional)	SCHX-0503
10	Front panel display	LCDX-00001
11	DB25 board	SCHX-00018
12	Fan	FANX-00028

Table 90: Major replaceable parts, 1RU models

11.4.2 Procedure for replacing the main internal components (1RU)

 NOTE	The procedure for replacing a fan is in the "Periodic Maintenance" section.
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Tools needed:

- Phillips/cross screwdriver (PHI 1)
- Hex driver (5 mm)

STEP 1: Find the serial number of the unit on the adhesive label on the lid or the side of the chassis.

STEP 2: Contact GatesAir or a GatesAir representative to request a replacement part. Customer support personnel will be able to determine the correct model, hardware revision level, and software version (if applicable) for the replacement part based on the serial number provided.

 NOTE	Whenever possible, GatesAir recommends that you verify the software revisions loaded onto the machine using the GUI interface. GatesAir maintains a record of the software versions at the time of shipment, but may not have records of any software updates performed subsequently.
--	---

STEP 3: Remove AC mains power to the unit.

STEP 4: Disconnect any cables and remove the unit from the rack.

STEP 5: Remove the top cover by unscrewing 17 screws to gain access to the major internal parts of the unit.

STEP 6: Follow the instructions in the following table to remove the individual internal parts.

No.	Name	Disassembly instructions
1	Controller	<ul style="list-style-type: none"> - Remove the Modulator (see Item 2) - Remove the front panel (see Item 10 for Front Panel Display and skip the two final steps) - Remove the six screws that fix the Controller to the chassis - Disconnect the Controller from the DB25 board and Power supply
2	Modulator	<ul style="list-style-type: none"> - Remove the Receiver board if present (see Item 4) - Remove the Input board, if present (see Item 3) - Remove the RF amplifier (see Item 8) - Remove the hexagonal spacer that fixes the Modulator to the chassis - Remove the eight screws that attach the Modulator to the chassis - Disconnect the Modulator from the Controller
3	Inputs board, right slot	<ul style="list-style-type: none"> - Remove the two screws from the front panel - Remove the screw on top of the board - Unplug the Inputs board from the Modulator, pulling it upwards
4	Receiver board, left slot	<ul style="list-style-type: none"> - Remove the three screws from the front panel - Remove the three screws on top of the board - Unplug the Receiver board from the Modulator, pulling it upwards
5	Battery board	<ul style="list-style-type: none"> - Remove the four screws on the Battery board - Unplug the Battery board from the DB25 board, pulling it upwards
6	Reference board GPS/10 MHz	<ul style="list-style-type: none"> - Remove the three screws on the back panel - Remove the six screws that fasten the Reference board to the DB25 board below - Unplug the Reference board from the DB25 board, pulling it upwards - (!) Also remove the Battery (see Item 5) before installing the new Reference board (GPS/10 MHz) to avoid any possible circuit damage caused by energy stored in the battery (!)
7	Power supply	<ul style="list-style-type: none"> - Remove the two screws on the back panel - Extract the Power supply module from the chassis
8	RF amplifier	<ul style="list-style-type: none"> - Remove the four screws on the rear panel - Extract the RF amplifier module from the chassis
9	Interlock board	<ul style="list-style-type: none"> - Disconnect the ribbon cable from connector J3 - Remove the two screws on the back panel - Remove the Interlock board
10	Front Panel Display	<ul style="list-style-type: none"> - Remove the two handles from the front panel via the four screws on the reverse side of front panel - Remove the three screws that fasten the front panel to the drawer structure (bottom side) - Disconnect the ribbon cable between the Controller and the Front Panel Display - Remove the six screws on the top of the board - Remove the Front Panel Display from the front panel

No.	Name	Disassembly instructions
11	DB25 board	<ul style="list-style-type: none"> - Remove the Reference board (GPS/10 MHz) (see Item 6) - Remove the Battery (see Item 5) - Remove ten hexagonal spacers that fix the DB25 board to the chassis - Disconnect the DB25 board.

Table 91: Individual part removal procedures, 1RU models

STEP 7: Reverse the previous steps to install the replacement part.

STEP 8: Switch the unit on and verify that it is working properly. Change any settings as needed via the GUI interface.

 NOTE	<p>If the part being replaced is very old or of unknown origin, an update of its software/firmware may be required to ensure its compatibility (very rare). In such cases, contact GatesAir to verify the need for a software update and obtain the update file to upload. The procedure for updating the software of a single component is the same as that of the entire unit, that is, via the .multi file described in the "Software Update" entry of "Extraordinary Maintenance". Depending on the case, a .multi file may contain software for the entire system or only for individual components to be updated. The following table "List of factory configurations" provides information about the configurations applied to the various components and the techniques for modifying them.</p>
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STEP 9: End of procedure.

11.4.3 List of factory configurations

The following table provides a list of 'soft' (i.e. non-hardware) changes that are applied in the factory to the various components before the equipment is shipped.

No.	Name	Configurations
1	Controller	Core management software (<i>multi</i>) System Info (<i>GUI</i>) Passwords (<i>GUI</i>) IP/LAN addresses (<i>GUI</i>) SNMP settings (<i>GUI</i>)
2	Modulator	Modulator firmware (<i>multi</i>) Modulation settings (<i>clone, GUI</i>) Precorrection settings (<i>clone, GUI</i>) TS input settings (<i>clone, GUI</i>) Satellite/RF receiver settings (<i>clone, GUI</i>) GPS receiver settings (<i>clone, GUI</i>) Voltage and temperature alarm thresholds (<i>clone, GUI</i>)
3	Inputs board	Firmware Inputs board (<i>multi</i>)
4	Receiver board	Firmware Receiver board (<i>multi</i>)
5	Battery	None
6	Reference board (GPS/10MHz)	Firmware Reference board (<i>multi</i>)
7	Power supply	None
8	RF amplifier	RF power measurement calibrations (<i>factory</i>) FETs bias (trimmer) (<i>factory</i>) Frequency response (trimmer) (<i>Factory</i>)
9	Interlock board	None
10	Front panel display	None
11	DB25 board	None
12	Fan	None
<p>(<i>GUI</i>) = can be modified via the GUI interface (<i>clone</i>) = can be modified via a cloning the xml configuration file of another unit (<i>multi</i>) = can be modified via a software update with the upload of a <i>.multi</i> file (<i>factory</i>) = can only be modified in the factory</p>		

Table 92: Individual part modifications, 1RU models

11.5 Replace a defective part (2RU and 3RU models)

This chapter describes the replacement of the principal internal components of the 2RU and 3RU Ultra-Compact models. A preceding section provides similar information for the 1RU models in the Ultra-Compact series.

11.5.1 List of user-replaceable parts.

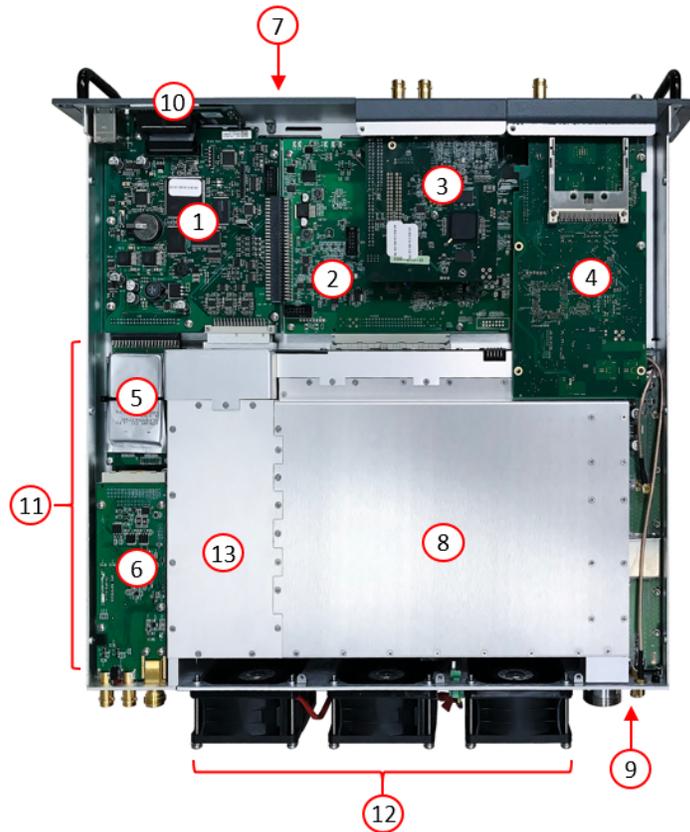


Figure 86: Major replaceable parts, 2RU and 3RU models

No.	Name	Part Number
1	Controller	OPTX-SCHX-00426
2	Modulator	OPTX-SCHX-00101 OPTX-SCHX-00183 for select DVB-T2 models
3	Inputs ASI + GbE	OPTX-00046
	Inputs ASI Seamless	OPTX-00016
	Inputs 2x ASI	OPTX-00014
	Inputs ASI Seamless + Audio	OPTX-00018
	Inputs ASI A/V + NICAM	OPTX-00112
	Inputs DAB 4x ETI	OPTX-00037
	Inputs DAB ETI 3Ch	OPTX-00144
	Inputs DAB 2x ETI + 2x EDI	OPTX-00111

No.	Name	Part Number
4	Receiver - Satellite	OPTX-00010
	Receiver - Repeater/gap-filler	OPTX-00012
	Receiver - Regenerative repeater DVB-T/2	OPTX-00013
	Receiver - Regenerative repeater ATSC	OPTX-00029
5	Battery board	SCHX-00008
6	Reference - GPS receiver	OPTX-00005
	Reference - 10MHz-1PPS inputs	OPTX-00006
7	Power supply	PSUY-00025
8	RF amplifier	See second table
9	Interlock board (optional)	SCHX-0503
10	Front panel display	LCDX-00001
11	DB25 board	SCHX-00018
12	Fan (2RU)	FANX-00005
	Fan (3RU)	FANX-00029
13	Preamplifier	See second table

Table 93: Major replaceable parts, 2RU and 3RU models. (1 of 2)

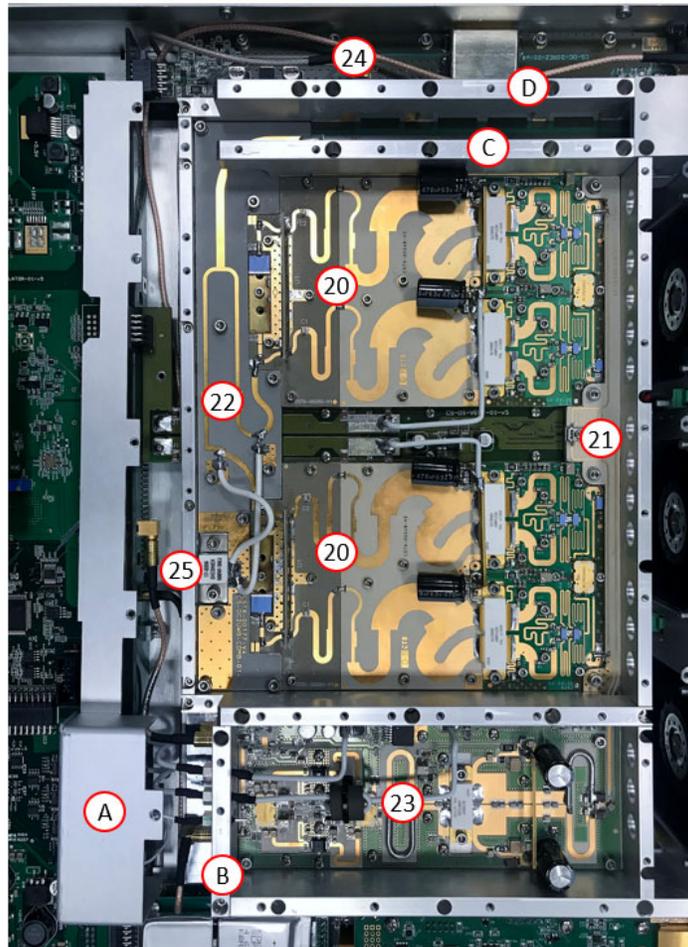


Figure 87: Major replaceable parts, 2RU and 3RU models, PA section.


NOTE
 In addition to the 2-pallet version shown above, there is also a 3-pallet version of the 3RU chassis used in the highest power ultra-compact models. a partial view of this 3-pallet version with the PA section cover removed is shown in Figure 88.

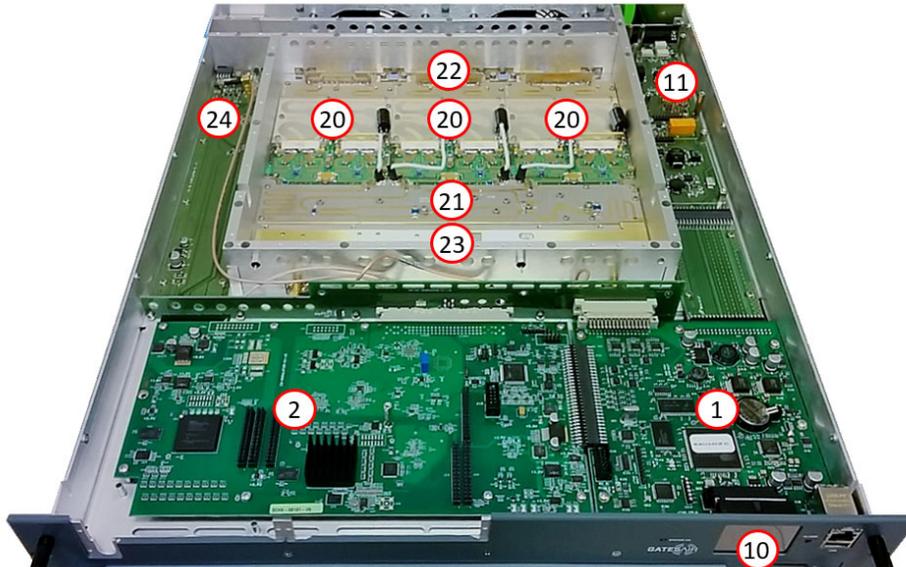


Figure 88: Major replaceable parts, 3RU 3-pallet version, partial view with PA cover removed

No.	Name	Part Number
20	PA pallet - UHF 888D (470-860)	OPTX-00073
	PA pallet - UHF 888E (470-590)	OPTX-00115
	PA pallet - UHF 888E (560-706)	OPTX-00113
	PA pallet - UHF 888E (470-706)	OPTX-00116
	PA pallet - VHF B3	OPTX-00140
	PA pallet - VHF B1 ch 2-4	OPTX-00117
	PA pallet - VHF B1 ch 5-6	OPTX-00118
21	Splitter - UHF 2X	CSTX-00176
	Splitter - UHF 3X	SCHX-00229
	Splitter - VHF B3 2X	SCHX-00376
	Splitter - VHF B1-2,3,4 2X	SCHX-00498-V1-CH_234
	Splitter - VHF B1-5,6 2X	SCHX-00498-V1-CH_5_6
22	Combiner - UHF 2X	CSTX-00177
	Combiner - UHF 3X	SCHX-00227
	Combiner - VHF B3 2X	SCHX-00377
	Combiner - VHF B1-2,3,4 2X	SCHX-00499-V1-CH_234
	Combiner - VHF B1-5,6 2X	SCHX-00499-V1-CH_5_6
23	Driver pallet / Driver FET - UHF 2X	SCHX-00182 / TRNX-00023
	Driver pallet / Driver FET - UHF 3X	SCHX-00228 / TRNX-00023

No.	Name	Part Number
	Driver pallet / Driver FET - VHF B3/B1	SCHX-00180 / TRNX-00059 / TRNX-00102
24	Directional board – UHF 2X/VHF	SCHX-00061
	Directional board – UHF 3X	SCHX-00226
	Directional board – VHF B1	SCHX-00255
25	50 ohm termination, 500W	R050R-0019
	50 ohm termination, 250W	R050R-0005

Table 94: Major replaceable parts, 2RU and 3RU models (2 of 2)

11.5.2 Procedure for replacing the main internal parts

 NOTE	The procedure for replacing a fan is in the "Periodic Maintenance" section.
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Tools needed:

- Phillips/cross screwdriver (PHI 1)
- Hex driver (5 mm)
- Allen wrench (2.5 mm)
- Allen wrench (2 mm)
- Soldering iron
- Thermal paste
- Ohmmeter

STEP 1: Find the serial number of the unit on the adhesive label on the lid or the side of the chassis.

STEP 2: Contact GatesAir or a GatesAir representative to request a replacement part. Customer support personnel will be able to determine the correct model, hardware revision level, and software version (if applicable) for the replacement part based on the serial number provided.

 NOTE	Whenever possible, GatesAir recommends that you verify the software revisions loaded onto the machine using the GUI interface. GatesAir maintains a record of the software versions at the time of shipment but may not have records of any software updates performed subsequently.
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STEP 3: Remove AC mains power to the unit.

STEP 4: Disconnect any cables and remove the unit from the rack.

STEP 5: Remove the top cover by unscrewing 17 screws to gain access to the major internal parts of the unit.

STEP 6: Follow the instructions in the following table to remove the individual internal parts.

No.	Name	Disassembly instructions
1	Controller	- Remove the Modulator (see Item 2)
2	Modulator	<ul style="list-style-type: none"> - Remove the Receiver board, if present (see Item 4) - Remove the Inputs Board, if present (see Item 3) - Remove the hexagonal spacer that fixes the Modulator to the chassis - Remove the eight screws that attach the Modulator to the chassis - Remove the six screws that attach the Controller to the chassis - Remove the front panel (see Item 10 for Front Panel Display and skip the final two steps) - Remove the Modulator and Controller pair, raising the front edge of the boards by about 20 degrees and pulling them forward - Disconnect the Modulator from the Controller
3	Inputs board	<ul style="list-style-type: none"> - Remove the two screws from the front panel - Remove the screws on top of the board - Unplug the Inputs board from the Modulator, pulling it upwards
4	Receiver board	<ul style="list-style-type: none"> - Remove the three screws from the front panel - Remove the three screws on top of the board - Unplug the Receiver board from the Modulator, pulling it upwards
5	Battery	<ul style="list-style-type: none"> - Remove the four Battery board screws - Disconnect the Battery board from the DB25 board, pulling it upwards
6	Reference board (GPS/10MHz)	<ul style="list-style-type: none"> - Remove the four screws on the back panel - Remove the six screws that fasten the Reference board to the DB25 Board below - Disconnect the Reference board from the DB25 Board, pulling it upwards - (!) Also remove the Battery (see Item 5) before installing the new Reference board (GPS/10MHz) to avoid any possible circuit damage caused by energy stored in the battery (!)
7	Power supply	<ul style="list-style-type: none"> - Loosen the two thumbscrews on the front panel - Extract the Power supply module from the chassis, pulling it forward
9	Interlock board	<ul style="list-style-type: none"> - Disconnect the ribbon cable from connector J3 - Remove the two screws on the back panel - Remove the Interlock Board
10	Front panel display	<ul style="list-style-type: none"> - Extract the Power supply(ies) (see Item 7) - Remove the two handles from the front panel via the four screws on the reverse side of the front panel - Remove the six screws that fasten the front panel to the chassis - Disconnect the ribbon cable between the Controller and Front Panel Display - Remove the six screws on top of the board - Remove the Front Panel Display board from the front panel
11	DB25 board	<ul style="list-style-type: none"> - Remove the Reference board (GPS/10MHz) (see Item 6) - Remove the Battery (see Item 5) - Remove the ten hexagonal spacers that fix the DB25 board to the chassis - Disconnect the DB25 board.

No.	Name	Disassembly instructions
20	PA pallet	<ul style="list-style-type: none"> - Remove the amplifier and preamp covers by unscrewing the 31 screws around their periphery - Measure the resistance to ground of the FET gates. One gate should measure a resistance of about 18 Ohm and the other about 300 Ohm. Resistance outside these values is a sign of a failure - Measure the resistance to ground of the FET drains. All drains should measure an "open/ floating" resistance (high impedance). Resistance outside this value is a sign of a failure - Unsolder the two tabs in the RF input and RF output of the pallet - Unsolder the 50V DC power wire. - Remove the 29 screws that attach the PA pallet to the heatsink below. - Remove the PA Pallet
21	Splitter	<ul style="list-style-type: none"> - Remove the amplifier and preamp lids by unscrewing the 31 screws around their periphery - Unsolder the three tabs at the RF input and RF outputs of the Splitter - Remove the four hexagonal screws that attach the Splitter to the underlying heatsink. - Remove the Splitter
22	Combiner	<ul style="list-style-type: none"> - Remove the amplifier and preamp lids by unscrewing the 31 screws around their periphery - Remove the metal bar (C) that divides the PA Pallet and the Directional Board via the four hexagonal fixing the bar to the heatsink - Remove the combiner load (Termination 50 Ohm) (see Item 25) - Unsolder the three tabs at in RF inputs and RF output of the Combiner - Remove the 12 hexagonal screws that fix the Combiner to the heatsink below. - Remove the Combiner
23	Driver pallet	<ul style="list-style-type: none"> - Remove the Driver FET (see Item 23b) - Unsolder the tab at the RF output of the Driver Pallet - Remove the metal cover (A) via its five fastening screws - Unsolder the wires from the three feedthrough capacitors (B) - Unsolder the pins of the two SMB connectors (B) - Remove the metal bar (B) via the three hexagonal screws holding it down - Remove the six hexagonal screws that attach the Driver Pallet to the heatsink below. - Remove the Driver Pallet
23b	Driver FET	<ul style="list-style-type: none"> - Remove the cover to the Preamp by unscrewing the 12 screws around its periphery - Measure the resistance-to-ground of the FET gates. Both gates should measure an "open/floating" resistance (high impedance). Resistance outside this value is a sign of failure - Measure the resistance-to-ground of the FET drains. Both drains should measure an "open/floating" resistance (high impedance). Resistance outside this value is a sign of failure - The Driver FET can be replaced without replacing the entire pallet. But in such cases, the idle current of the new FET must be checked with an external current shunt and the bias adjusted accordingly

No.	Name	Disassembly instructions
24	Directional board	<ul style="list-style-type: none"> - Remove the amplifier and preamp covers by unscrewing the 31 screws around their periphery - Remove the metal bar (C) that divides the PA Pallet and the Directional Board via the four hexagonal screws holding it to the heatsink below - Remove the metal bar (D) in the center of the Directional board via the five hexagonal screws holding it to the heatsink below - Unsolder the tab at the RF input of the Directional Board - Remove the screws that fasten the Directional Tab to the chassis: five on top of the board, one on the back panel of the drawer, and one on the side of the drawer. - Remove the nut from the SMA "LIN" connector on the back panel - Remove the back panel via its 11 fastening screws - Disconnect the SMB cable from the Directional board - Unplug the Directional Board, pulling it towards the rear - Disassemble the DIN 7-16 connector block, if necessary.
25	50 ohm termination	<ul style="list-style-type: none"> - Remove the amplifier and preamp lids by unscrewing the 31 screws around their periphery - Unsolder the two balun cables at the RF input to the termination - Remove the two hexagonal screws fixing the termination flange to the heatsink - Remove the termination.

Table 95: Individual part replacement procedures, 2RU and 3RU models

STEP 7: Reverse the previous steps to install the replacement part.

STEP 8: Switch the unit on and verify that it is working properly. Change any settings as needed via the GUI interface.

 NOTE	<p>If the part being replaced is very old or of unknown origin, an update of its software/firmware may be required to ensure its compatibility (very rare). In such cases, contact GatesAir to verify the need for a software update and obtain the update file to upload. The procedure for updating the software of a single component is the same as that of the entire unit, that is, via the .multi file described in the "Software Update" entry of "Extraordinary Maintenance". Depending on the case, a .multi file may contain software for the entire system or only for individual components to be updated. The following table "List of factory configurations" provides information about the configurations applied to the various components and the techniques for modifying them.</p>
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STEP 9: End of procedure.

11.5.3 List of factory configurations

The following table provides a list of 'soft' (i.e. non-hardware) changes that are applied in the factory to the various components before the equipment is shipped.

No.	Name	Configurations
1	Controller	Core management software (<i>multi</i>) System Info (<i>GUI</i>) Passwords (<i>GUI</i>) IP/LAN addresses (<i>GUI</i>) SNMP settings (<i>clone, GUI</i>)
2	Modulator	Modulator firmware (<i>multi</i>) Modulation settings (<i>clone, GUI</i>) Precorrection settings (<i>clone, GUI</i>) TS Input settings (<i>clone, GUI</i>) Satellite/RF receiver settings (<i>clone, GUI</i>) GPS receiver/Freq reference settings (<i>clone, GUI</i>) Voltage and temperature alarm thresholds (<i>clone, GUI</i>)
3	Inputs board	Firmware Inputs board (<i>multi</i>)
4	Receiver board	Firmware Receiver board (<i>multi</i>)
5	Battery	None
6	Reference/GPS board	Software/firmware GPS/10MHz (<i>multi</i>)
7	Power supply	None
8	RF amplifier	See Items 20-25
9	DB25 board	None
10	Front panel display	None
11	Interconnect board	None
12	Fan	None
13	Preamplifier	See Item 23
20	PA pallet	FETs bias (trimmer) (<i>factory</i>)
21	Splitter	None
22	Combiner	None
23	Driver pallet	FET bias (trimmer) (<i>factory</i>)
24	Directional board	None
25	50 ohm termination	None
<p>(<i>GUI</i>) = can be modified via the GUI interface (<i>clone</i>) = can be modified via a cloning the xml configuration file of another unit (<i>multi</i>) = can be modified via a software update with the upload of a <i>.multi</i> file (<i>factory</i>) = can only be modified in the factory</p>		

Table 96: Individual part modifications, 2RU and 3RU-2pallet models

12 Troubleshooting

Should problems arise during the operation of the equipment, the first step in troubleshooting is to consult the web GUI **Event Log** for alarms and other messages. **Alarm**, **Warning**, and **Info** messages can be either **ACTIVE** for conditions that are still occurring (Item 1 in Figure 89 below) or **CLEARED** for conditions that had a finite duration in the past but have since ended. (Item 2). Note that messages with a status of cleared will provide a double time stamp listing both a start and end time (Item 3), whereas events with a status of active will list no end date because the condition is still occurring (i.e. has not ended). In addition to **Alarm**, **Warning** and **Info** messages, **Event** messages may also be present to indicate when certain user interventions took place (e.g. switch on, switch off, change settings, etc.) (Item 4).

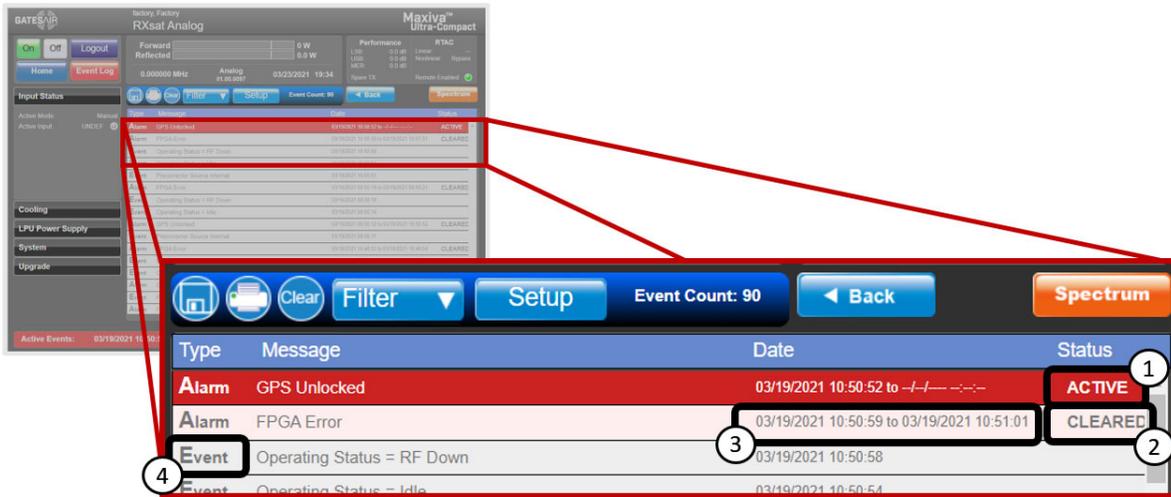


Figure 89: Selected Event Log concepts

Note that some message classes may be missing from the event log if they have been suppressed by the event log filter settings, as accessed by the **Filter** button.

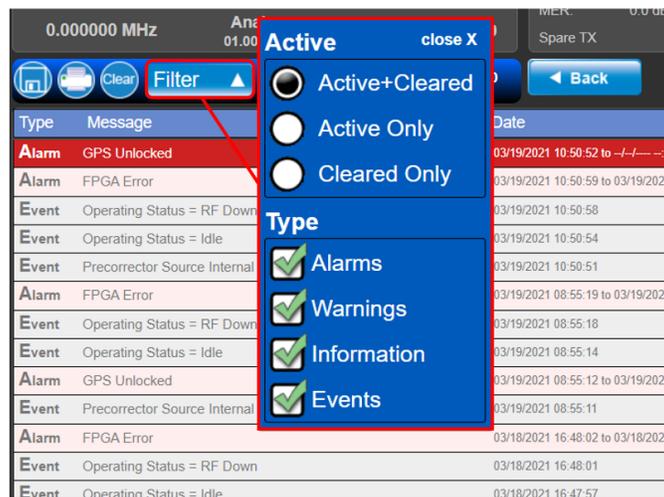


Figure 90: Event Log filtering

To aid in troubleshooting, Table 97 below provides a list of selected Event Log messages and information to aid in their interpretation. Their order follows their order of appearance in the web GUI **Log Setup** screen.

12.1 Index of selected Event Log messages

Log Message	Meaning / Suggested Interventions
TX in Local Mode	The equipment was placed into local mode to disable remote control. Press the front panel REMOTE button to reactivate remote control.
Interlock Open	Not used.
Load Interlock Open	The load interlock connection to the rear panel is open. Check the status of all safety switches in the interlock loop and ensure that there is connectivity between pins 2 and 5 of the rear panel AUX REMOTE connector.
LPU Temp. High	A high temperature is being reported by the controller. Verify that the cooling fans are working and that the air cooling path is not obstructed.
LPU Temp. High Warning	
LPU Fan Speed Low or Failure	A cooling fan is blocked or has reached end-of-life. Replace cooling fan if no obvious blockage is found.
LPU PS Voltage Out of Range	The power supply voltage is outside the user-defined thresholds. Replace power supply as needed.
LPU PS Current Out of Range	The power supply current is outside the user-defined thresholds. PS over-current could be due to a short-circuited RF FET or excessive RF output power. Search for other signs that might indicated a bad RF amplifier or RF overload condition. If no obvious signs exist, replace power supply as needed.
GPS Unlocked	The GPS receiver is unlocked. Verify the GPS antenna connection and incoming signal level. If antenna is Ok, replace Reference/GPS board as needed.
Internal 10MHz Unlocked	The time and frequency reference signal are unlocked, possibly due to GPS or external 10 MHz/1pps missing (where applicable). If GPS and/or external reference signals are OK, replace Reference/GPS board as necessary.
Internal 1PPS Unlocked	
Holdover Timeout	The holdover period for reference oscillator operation in the absence of external training signals (GPS/10MHz/1pps) has expired. Restore the missing external reference signal(s).
Oscillator 1 Fault	A PLL on the Modulator board has suffered an internal fault. Replace the Modulator board.
Oscillator 2 Fault	
External 10MHz Unlocked	An external reference signal is out of compliance, not suitable for discipline the internal oscillators. Check the quality of the external sources with an oscilloscope and/or frequency counter.
External 1PPS Unlocked	
LPU FWD power high	The transmitter has shut down and locked out because an overpower condition existed and three attempts to restart the transmitter did not resolve the problem. Verify that no RF attenuators have been removed from the drive chain or power metering sample such that the signal levels are far too high.
LPU RF Output Low (1.5dB)	
LPU RF Output Low (3dB)	

Log Message	Meaning / Suggested Interventions
LPU RF Output Low (7dB)	The RF power output level is greater than 1.5/3/7 dB the set point, possibly due to a failure in the Modulator or RF amplifier sections. Replace the Modulator or RF amplifier as needed.
LPU RFL Power High Shutback	The RF output power level has been reduced or switched off due to excessive reflected power. Check the quality of the load/antenna with a network analyzer, if available. Temporarily operate into a known-good 50 ohm dummy load to verify that transmitter itself is ok.
LPU RFL Power Foldback	
ADP: No RF Feedback	The adaptive precorrection (RTAC) cannot operate because an RF feedback sample is missing. Verify the linear and non-linear RF sample cables on the rear panel (where present).
ADP: Nonlinear Error	The automatic precorrection system is not working to an acceptable level either due to an internal failure or due to excessive distortion from RF amplifier failures or incorrect power level (overload). Verify that RF amplifier is working correctly at the correct power level. Replace Modulator board in no problems in RF amplifier discovered.
ADP: Linear Error	
PAPR limit	
Shoulder Under Threshold	
MER Under Threshold	
TX Lockout	The transmitter has switched off and locked out due to repeated alarms such as high temperature, high power, etc. Search for a repeated alarm messages in the log to discover the origin of the lockout.
RF Mute	The transmitter RF output has been inhibited due to certain alarm conditions. Which alarm conditions will cause an RF mute can be set in the Log Setup section of the web GUI. Certain are set in the factory to always cause an RF mute. (e.g. high temperature)
Modulator in Test Mode	The Modulator is transmitting a random binary stream or continuous wave carrier based on the Test Mode setting in the GUI. RF output is produced by no programme content is transmitted.
FPGA Error	The Modulator has suffered an internal failure. Replace the Modulator board.
GPS Communication Failure	A communications failure has been detected in one of the boards. Replace the indicated board.
Modulator Communication Failure	
RX Satellite Communication Failure	
Processor Communication Failure	
Satellite: Low Level	The Satellite receiver is not performing to an acceptable level, either due to an internal failure or a poor quality input signal. Replace the Satellite receiver if the problem persists with a good quality input signal.
Satellite: Unlocked	
Satellite: LNB Overload	
Satellite: C/N Above Threshold	
Satellite: PER Above Threshold	
Proc CI: Bad Decryption	The Satellite receiver is having difficulty decrypting a signal because of a bad or missing CAM/Smart Card or other internal failure. Verify permissions/settings and re-test with a different CAM/Smart Card.
Proc CI: No CAM	
Proc CI: No Smart Card	
Proc CI: Encrypted	
Off-Air Tuner: Unlocked	The gap-filler Receiver board is not performing to an acceptable level, either because it is tuned to the wrong channel, the input signal is too weak, or the incoming signal itself has poor quality. Replace the Receiver board if the problems persist even with a correctly tuned input signal of good quality.
Off-Air Tuner: Rf Level Low	
Off-Air Tuner: SNR Below Threshold	
Off-Air Tuner: MER Above Threshold	

Log Message	Meaning / Suggested Interventions
ASI 1(2,3,4): Input Unlocked	The incoming ASI transport stream has physical layer problems resulting in errors.
GBE 1(2): Unlocked	The incoming TSolP stream has physical layer problems resulting in errors.
GBE 1(2): FEC Errors	
ETR 290 Input 1(2): CC Error	The incoming transport stream is non-compliant with the ETR-290 standard. Check transport stream structure with a stream analyzer.
ETR 290 Input 1(2): CRC Error	
ETR 290 Input 1(2): PAT2 Error	
ETR 290 Input 1(2): PAT Error	
ETR 290 Input 1(2): PMT2 Error	
ETR 290 Input 1(2): PMT Error	
ETR 290 Input 1(2): Bad Sync Byte	
ETR 290 Input 1(2): Sync Lost	
ETR 290 Input 1(2): PID Error	
OTA Present	
OTA Remote Command	
OTA Ready	
OTA Error	
DVB-T2: Input Error	This is a summary alarm encompassing all alarms related to the ETR290 analysis. Activating this alarm and deactivating the Web Log option for all the individual ETR290 events on the Log Setup page can be used to keep the log from filling up with multiple ETR290 messages.
DVB-T2: Seamless Alarm	Seamless switching of the transport streams is not working, possibly due to mismatched content, mismatched delays, or other corruptions of the streams. This is generic summary alarm.
DVB-T2: Seamless Input 1(2) - No T2-MI	The TS-MI information is missing from one of the input transport streams.
DVB-T2: Seamless TS ID Mismatch	Seamless switching is not possible because the two inputs selected for seamless switching have different TS ID values.
DVB-T2: Seamless Input 1(2) Forced	Seamless switching has been suspended because the input selection has been manually forced to one of the inputs by the user.
DVB-T2: Seamless Input Priority Active	The assignment of a higher priority to one of the two seamless input by the user is in effect.
DVB-T2: Seamless Input Switched	The seamless switching function switched inputs due to a transport stream problem on the other input.
DVB-T2: No TS Available	No transport stream is available on any of the active inputs.
DVB-T2: Rate Overflow	The incoming transport stream has an incorrect data rate (too high).
DVB-T2: Unsupported Frame	The incoming transport stream contains unsupported frames.
DVB-T2: Input Stream Error	The signal is not compliant at the modulator input.
DVB-T2: Output Timing Error	SFN operation is not possible because the transmitter cannot achieve the network delay goal.
DVB-T2: T2-MI Continuity Error	The incoming transport stream is corrupted or missing information.
DVB-T2: CRC Error	
DVB-T2: T2-MI Missing	
DVB-T2: Configuration Error	The specified combination of modulator configuration setting is not compliant with the DVB-T2 standards.

Log Message	Meaning / Suggested Interventions
DVB-T2: SFN Dynamic Delay Beyond Average	The delay is the TS distribution network to the transmitter is varying excessively, thus indicating possible stability problems.
DVB-T2: SFN Total Delay Over Limit	SFN operation is not possible because the total delay at the transmitter output is beyond the system delay goal.
DAB: Ensemble not present	The transport stream is missing from the transmitter input.
DAB: Ensemble error input	The incoming transport stream is present but has internal structural problems.
DAB: Delay Error	SFN operation is not possible because the transmitter cannot achieve the network delay goal.
DAB: Seamless	Seamless switching of the transport streams is not working, possibly due to mismatched content, mismatched delays, or other corruptions of the streams. This is generic summary alarm.
DAB: Seamless Input 1, 2	There is a problem with one of two inputs selected for seamless switching.
DAB: Seamless Input Switched	The seamless switching function switched inputs due to a transport stream problem on the other input.
Bootup:Upgrade STM32 is failed	The Controller has suffered an internal failure. Replace the Controller board.
Bootup:Upgrade FPGA boot is failed	The Modulator has suffered an internal failure. Replace the Modulator board.
Bootup:Upgrade FPGA1 is failed	
Bootup:Upgrade FPGA2 is failed	
Bootup:Upgrade Gigabit is failed	The GbE input board has suffered an internal failure. Replace the GbE board.
Bootup:Upgrade EdiEti is failed	The ETI/EDI input board has suffered an internal failure. Replace the ETI/EDI input board.
Bootup:Upgrade GPS is failed	The Reference/GPS board has suffered an internal failure. Replace the Reference/GPS board.
Bootup:Upgrade RX SatRec is failed	The Satellite Receiver board has suffered an internal failure. Replace the Satellite Receiver board.
Bootup:Upgrade Power AMP is failed	The Power Amplifier has suffered an internal failure. Replace the Power Amplifier module.
Psu1(2): Voltage1 Out of Range	The main PA voltage in out of tolerance in 2RU and 3RU Ultra-compact models. Swap the PS module from spares.
Psu1(2): Voltage2 Out of Range	The secondary PA voltage in out of tolerance in 2RU and 3RU Ultra-compact models. Swap the PS module from spares.
Psu1(2): Current Out of Range	The PA current being supplied in out of tolerance in 2RU and 3RU Ultra-compact models. This may be due to excessive output power/overdrive or a damaged PA (shorted FET). Verify the correct power setting and power output. Search for other log messages indicating a damaged PA stage.
Invalid Feature key for Modulation	The user does not have the proper feature key permission for the modulation being requested. Contact GatesAir Customer Service for more information or an updated feature key.
Communication with Ext Amplifier	No communication is taking place with the external amplifier drawer in OP models with an external PA
Ext Amplifier Amp Forward Power High	The external amplifier is reporting an out-of-tolerance condition in OP models with an external PA. Verify that the LPU stage power is correct/normal by comparing to previously recorded values. Verify that an intermittent condition does not
Ext Amplifier Amp Forward Power Low	

Log Message	Meaning / Suggested Interventions
	exist in the drive cable linking the LPU output to the external PA input.
Ext Amplifier Amp Reflected Power	The external amplifier is reporting excessive VSWR in OP models with an external PA. Verify the integrity of the output transmission line and antenna. Temporarily operate into an RF dummy to determine if antenna has a problem.
Ext Amplifier Amp Temperature	The external amplifier is reporting excessive PA temperature in OP models with an external PA. Verify that its fans are operating correctly and all air passages are unobstructed.
Ext Amplifier Amp Driver1(2)	The external amplifier is reporting a problem in one of the LPUs (Drivers) in an OP model with an external PA. Because the external PA is communication with both LPUs, this is often the only indication that a problem exists in the <u>other</u> LPU than the one currently being accessed. Access the other LPU via the web browser to determine what alarm condition it is reporting.
Ext Amplifier Amp Standby	The transmitter has been commanded to enter standby or switch off via the interlock pins of the parallel remote control connector on the rear panel of the external amplifier in OP models with an external PA.
Ext Amplifier Amp Load Interlock	
Ext Amplifier Amp Communication Driver 1(2)	Serial communications have been lost to one of the LPUs (Drivers) in OP models with an external PA. Verify the integrity of the serial communication cable between the LPU and the external PA. Verify that the external PA is present and has mains power applied.
Ext Amplifier Amp Fan 1(2)	A fan is reporting is reporting low/no rpms in the external amplifier in OP models with an external PA. Verify that fan is not obstructed and replace as necessary.
Ext Amplifier PSU1(2)(3) Voltage1(2)	The PA voltage is out of tolerance in OP models with an external PA. Swap the PS module from spares.
Ext Amplifier PSU1(2)(3) Current	The PA current being supplied is out of tolerance in OP models with an external PA. This may be due to excessive output power/overdrive or a damaged PA (shorted FET). Verify the correct power setting and power output. Search for other log messages indicating a damaged PA stage.

Table 97: Index of selected Event Log messages