ISO 9001:2000
Cert. N°4500/1

User Manual
ARK-6

External Document

SCREEN SERVICE BROADCASTING TECHNOLOGIES S.p.A.
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1 Safety Instructions

1.1 Safety suggestion

Regardless of how well electrical equipment is designed, personnel can be exposed to **dangerous electrical shock** when protective covers are removed for maintenance or other activities.

Therefore, it is incumbent in 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 related to electrical shocks (see next 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.

  These capacitors should be discharged trough a suitable resistor before any circuit points are touched.
- Don't take chances. Be fully trained.

  Screen Service Italia equipment should be operated and maintained by fully qualified personnel.
- Do not service alone and do not perform internal adjustments of this unit unless another person capable of rendering first aid and resuscitation is present.
- Some components used in the construction of this equipment contain Beryllium Oxide (BeO).

  This substance is harmless as it is, but becomes highly dangerous if it is ground to powder.

  Special procedures of disposal must be observed in case of failure of these devices.

NOTE: This section is not intended to contain a complete statement of all safety precautions which should be observed by personnel in using this electronic equipment or others.

Screen Service shall not be responsible for injury or damage resulted from improper procedures or from using it by improperly trained or inexperienced personnel.

1.2 General safety recommendations

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

- This product is intended to operate from a power source that will not apply more than 10% of the voltage specified on the rear panel between the supply conductors or between either supply conductor and ground.

  A protective-ground connection by way of the grounding conductor in the power cord is essential for safe operation.

- This equipment is grounded through the grounding conductor of the power cord.

  To avoid electrical shock, plug the power cord into a properly wired socket before connecting to the product input or output terminals.

- Upon loss of the protective-ground connection, all accessible conductive parts (including parts that may appear to be insulating) can render an electric shock.

- To avoid fire hazard, use only the fuse of 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.

1.3 Good practices

In maintaining the equipment covered in this manual, please keep in mind the following, standard good practices:

- At regular intervals, the condition of the equipment and the correct functioning of protective and safety devices shall be checked by a skilled person approved by the appropriate authority for this duty.

  Functional checks shall be carried out on interlocking systems of doors, mechanical interlocks, isolating switches, earthing switches, parallel resistances and protective devices against over-voltages and over-currents.

  The above checks shall not be carried out after the protective and safety devices have operated under fault conditions.

  The safety devices shall not be altered or disconnected except for replacement, nor shall the safety circuit be modified without specific approval of the appropriate authority in each case.

- When connecting any instrument (wattmeter, spectrum analyzer, etc.) to a high frequency output, use the appropriate attenuator or dummy load to protect the final amplifiers and the instrument input.

- When inserting or removing printed circuit boards (PCBs), cable connectors, or fuses, always turn off power to the affected portion of the equipment.

  After power is removed, allow sufficient time for the power supplies to bleed down before reinserting PCBs.

- When troubleshooting, remember that FETs and other metal-oxide semiconductor (MOS) devices may appear defective because of leakage between traces or component leads on the printed circuit board.

  Clean the printed circuit board and recheck the MOS device before assuming it is defective.

- When replacing MOS devices, follow standard practices to avoid damage caused by static charges and soldering.

- When removing components from PCBs (particularly ICs), use care to avoid damaging PCB traces.

1.4 Procedure for establish the absence of voltage

Follow these simple steps for establish the absence of voltage:

- Before starting work on the equipment, it shall be isolated from the mains supply.

  This disconnection shall always be checked by visual inspection.

  Further precautions shall be taken to ensure that the mains supply cannot be restored whilst work is being carried out.

  After the mains supply has been disconnected, all other lines such as control, interlocking and modulation lines shall be disconnected if they carry dangerous voltages.

  Moreover, the antenna or the antenna transmission line shall be disconnected from the antenna terminal device to prevent the introduction of dangerous voltages due to antenna pick-up.

  When disconnection of the antenna or antenna transmission line is not possible, other suitable precautions shall be taken, for example, earthing, when necessary at several places, to esablish absence of voltage.

  These earthing connections shall be very short compared with the wave-lenght.

- Capacitors which are connected to a circuir isolated from its supply shall be discharged and have their terminals permanently short-circuited and the casing earthed during the whole period of the work.

- The electrical charge retained by electrical machinery when stopped may, in certain cases, be sufficient to cause a severe shock.

  This shall be taken into account when making connections to an apparently "dead" machine.

  Therefore all machinery shall be discharged and earthed using an adequately insulated lead for this purpose.

  The discharge operation shall be repeated several times.

- Before any maintenance work is carried out on automatic or remote controlled equipment, the remote swithching circuits shall be made inoperative.

1.4.1 Procedure for determination of the absence of voltage

After the equipment has been isolated according to the standard EN60215, the absence of voltage shall be determined at the work place.

This may be done by the use of voltage indicators, measuring instruments, glow discharge lamps for indicating radio-frequency voltage or other suitable means.

1.5 First aid in case of electrical shock

If someone seems unable to free himself while receiving an electric shock, **turn power off** before rendering aid.

A muscular spasm or unconsciousness can make a victim unable to free himself from the electrical power.

DO NOT TOUCH VICTIM OR HIS CLOTHING BEFORE POWER IS DISCONNECTED OR YOU CAN ALSO BECOME A SHOCK VICTIM

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.

Carefully avoid touching him or his clothing until free of power.

1.5.1 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 the forehead and the other under the chin. Tilt the head back and lift the chin until teeth almost touch. Look and listen for breathing.

Step 3

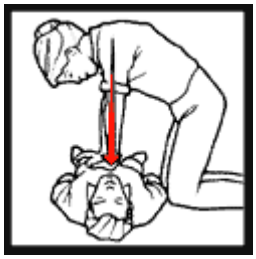
If not breathing normally, pinch the nose and cover the mouth with yours. Give two full breaths. The person's chest will rise if you are giving enough air.

Step 4

Put the fingertips of your hand on the Adam's apple, slide them into the groove next to the windpipe. Feel for a pulse. If you can not 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 chest 15 times.

CONTINUE WITH TWO BREATHS AND 15 PUMPS UNTIL HELP ARRIVES.

1.5.2 Treatment for burns

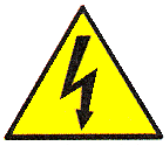
- Continue treat victim for electrical shock.
- Check for points of entry and exit of current.
- Cover burned surface with a clean dressing.
- Remove all clothing from the injured area, but cut around any clothing that adheres to the skin and leave it in place.

  Keep the patient covered, except the injured part, since there is a tendency to chill.
- Splint all fractures.

  (Violent muscle contractions caused by the electricity may result in fractures.)
- Never permit burned surfaces to be in contact with each other, such as: areas between the fingers or toes, the ears and the side of the head, the undersurface of the arm and the chest wall, the folds of the groin, and similar places.
- Transport to a medical facility

1.5.3 Electric safety precautions

All the parts making up the equipment have got danger identification tags (with a yellow background) to highlight the parts dangerous for the operator that has access to the system.



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.

1.5.4 Electrostatic precautions

Before removing or replacing any PCB assembly within the equipment, make sure that all precautions comply with ESD protections (ESD = Electro Static Discharge).

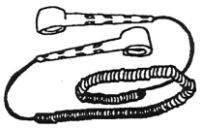
Make sure that electrostatic discharge protections are reset after maintenance and/or measurement operations.

This ATTENTION tag is used for the majority of electronic devices that are sensitive to electrostatic discharges.

If electronic parts have to be touched during installation or repair, please observe the following precautions.

Operators must be equipped with anti-static protection devices such as:

Elastic wrist band. To be fixed on the operator's wrist.



Flexible cord. To be connected to the elastic wrist band and the special plug on the shelf highlighted with the ESD warning label.

1.6 R&TTE directive 1999/5/EC

Table 1-1 Declaration of Conformity with regards to the R&TTE Directive 1999/5/EC

English:	This equipment is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC
Deutsch:	Dieses Gerät entspricht den grundlegenden Anforderungen und den weiteren entsprechenden Vorgaben der Richtlinie 1999/5/EU.
Dansk:	Dette udstyr er i overensstemmelse med de væsentlige krav og andre relevante bestemmelser i Directiv 1999/5/EF.
Español:	Este equipo cumple con los requisitos esenciales asi como con otras disposiciones de la Directiva 1999/5/EC.
'Ελληνας	Αυτός ο εξοπλισμός συμμορφώνεται με τις ουσιώδεις απαιτήσεις και τις λοιπές διατάξεις της Οδηγίας 1999/5/ΕΚ
Français:	Cet appareil est conforme aux exigences essentielles et aux autres dispositions pertinentes de la Directive 1999/5/EC.
Íslenska:	Þessi búnaður samrýmist lögboðnum kröfum og öðrum ákvæðum tilskipunar 1999/5/ESB.
Italiano:	Questo apparato é conforme ai requisiti essenziali ed agli altri principi sanciti dalla Direttiva 1999/5/EC.
Nederlands:	Deze apparatuur voldoet aan de belangrijkste eisen en andere voorzieningen van richtlijn 1999/5/EC.
Norsk:	Dette utstyret er i samsvar med de grunnleggende krav og andre relevante bestemmelser i EU-directiv 1999/5/EC.
Português:	Este equipamento satisfaz os requisitos essenciais e outras provisões da Directiva 1999/5/EC.
Suomalainen:	Tämä laite täyttää direktiivin 1999/5/EY oleelliset vaatimukset ja on siinä asetettujen muidenkin ehtojen mukainen.
Svenska:	Denna utrustning är i överensstämmelse med de väsentliga kraven och andra relevanta bestämmelser i Direktiv 1999/5/EC.

The Declaration of Conformity related to this product can be found at the following URL: www.screen.it/rtte

The following CE mark is affixed to the equipment:

CE 0648 !

The identification number of the Notified Body who certified the product might change.

This equipment is intended to be used in all EU and EFTA countries.

The use of this equipment may be restricted to certain frequencies and requires a license for operation. For more details, contact your customer service representative.

1.7 Waste electrical and electronic equipment (WEEE)

The purpose of the DIRECTIVE 2002/96/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on waste electrical and electronic equipment (WEEE) is, as first priority, the prevention of waste electrical and electronic equipment and, in addition, the reuse, recycling and other forms of recovery of such wastes so as to reduce the disposal of waste.

To do this, remember to collect separately all the electronic material.

Chapter 2
Technical Data

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2 Technical Data

2.1 Product Overview

The SSBT ARK6 has been designed as a brand new model of software defined transmitters which incorporate all the technical and functional capabilities of the previous models of the ARK family (ARK-1, ARK-R, ARK-T, ARK-ATSC, ECHO-2) together with a complete set of new functionalities that bring the transmitter at the forefront of the technology edge.

Key features of the ARK-6 device are:

- Multiple software definable functional modes between DVB-T, DVB-T2, ATSC, ISDB-T, DAB, DTMB, ITU (any analog TV standard) modulator and Echo canceller;
- Modular front-end for input extension: RF DVB-T, DVB-T2, ISDB-T, DTMB, ATSC, A/V front end for analog input on ITU modulator; ETI inputs for DAB modulator; DVB-S2 and DVB-S2 with decoder and descrambler for direct satellite input on all standards;
- Adaptive Linear Compensation, available on all modes but the ITU modulator which implements a manual GUI based linear compensation tool;
- Adaptive Non-Linear Compensation;
- Agile UHF output Up-converter (from 470 MHz up to 806 MHz). The VHF and IF options are also available;
- Remote management via Java based GUI, SNMP interface and light Java-Script web GUI (not available on all modes).

Please refer to the mode description appendix for deeper descriptions of modes features.

2.2 General Technical Data

Table 1 General technical data

Parameter / Control	Admitted Ranges / Values
Power supply	- IEC: 1 - Voltage: 90-264 VAC - Frequency: 50-60 Hz
Inputs	4 ASI, 2 TSoIP channels and 1 RF
Outputs	1 RF, 1 RF Monitor, 2 ASI and 2 TSoIP channels for input bypass
Frequency references synchronization	External or GPS
System clock synchronization	Internal, GPS or NTP client.
Internal frequency reference	Oven Controlled OCXO oscillator (10MHz and 1 PPS)
Output clock	1 PPS and 10 MHz
Test modes	CW, Force Null Packets and PRBS
Management	- Embedded SNMP v1,v2 server - Embedded Web server
GbE Ports	- GbE 1: 10/100/1000 Base T Management port - GbE 2: 10/100/1000 Base T Data port
Redundancy	Input autoswitch algorithm supported. On some modes hitless or seamless switching feature is also available
Security	Authentication for GUI access optional
Configuration	- Automatic loading of preset configuration supported - Automatic retrieving of configuration data from the RF input supported

Parameter / Control	Admitted Ranges / Values
Input interfaces	○ ASI/SSI/SDI ○ Number of inputs: 4 ○ Connector: BNC ○ Zin: 75 Ohm ○ Input voltage: 800mVpp (500 to 1200)
	○ TSoIP ○ Number of channels: 2 ○ Connector: RJ45 ○ Speed: 10/100/1000
	○ GPS ○ Number of inputs: 1 ○ Connector: TNC ○ Zin: 50 Ohm ○ Sensitivity: -185 dBW
	○ 10 MHz ○ Number of inputs: 1 ○ Connector: BNC ○ Zin: 50 Ohm ○ Input voltage: 2 Vpp
	○ 1PPS ○ Number of inputs: 1 ○ Connector: BNC ○ Zin: 50 Ohm ○ Input voltage: TTL (min 1,7 V) ○ Pulse width: 100 us
	○ Adaptive Precorrection ○ Number of inputs: 1 ○ Connector: SMA ○ Zin: 50 Ohm ○ Input level: -19 to +1 dBm

Parameter / Control	Admitted Ranges / Values
Output interfaces	○ ASI Out Monitor ○ Number of outputs: 2 ○ Connector: BNC ○ Zout: 75 Ohm
	○ TSoIP ○ Number of channels: 2 ○ Connector: RJ45 ○ Speed: 10/100/1000
	○ RF ○ Number of outputs: 1 ○ Connector: N Female ○ Frequency: UHF (VHF or IF optional) ○ Zout: 50 Ohm
	○ RF Mon ○ Number of outputs: 1 ○ Connector: SMA ○ Frequency: UHF (VHF or IF optional) ○ Zout: 50 Ohm
	○ 10 MHz ○ Number of outputs: 1 ○ Connector: SMB ○ Zout: 50 Ohm ○ Output: 2 Vpp
	○ 1PPS ○ Number of outputs: 1 ○ Connector: SMB ○ Zout: 50 Ohm ○ Output voltage: TTL (min 2,4 V) ○ Pulse width: 100 us

Parameter / Control	Admitted Ranges / Values
Control Interfaces	○ GbE 1 ○ Number of interfaces: 1 ○ Connector: RJ45 ○ Speed 10/100/1000
	○ RS485 ○ Number of interfaces: 1 ○ Connector: DB9 ○ Type: CAM BUS
	○ OPTO ○ Number of outputs: 4 ○ Connector: SUB-D 15p Female ○ Max current: -5 mA
	○ Relays ○ Number of outputs: 4 ○ Connector: SUB-D 25p Female ○ Max voltage: 125 VAC / 60VDC @ 0,3 A – 30 VDC @ 1A
	○ RS232 ○ Number of interfaces: 1 ○ Connector: DB9 ○ Speed: Up to 230400 bps ○ Data: 8-bit data ○ Parity: No parity bits ○ Flow control: None ○ Stop: 1 stop bit

Note: described features may be enabled only on some of the modes available. Refer to the mode description for deeper description of the inputs used.

2.2.1 RS232 pinout

Usually personal computers use a standard RS 232 DE-9 connector.

Figure 1 DE-9 Male connector

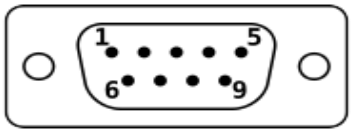

Table 2 RS232 DE-9 pinout

DE-9 Pin	Name	Direction	Description
2	RXD	⇦	Receive Data
3	TXD	⇨	Transmit Data
5	GND	-	System Ground

2.2.2 TLC pinout

ARK6 has a SUB-D 15p Female connector for OPTOs with customized pin assignments.

Figure 2 TLC connector

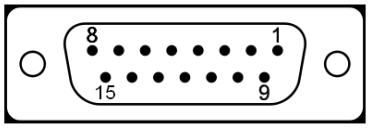

Table 3 TLC pinout

Pin	Signal	Pin	Signal
1	IN_OPTO_0	9	O_GND_0
2	IN_OPTO_1	10	O_GND_1
3	IN_OPTO_2	11	O_GND_2
4	IN_OPTO_3	12	O_GND_3
5	OPTO_GND	13	OPTO_GND
6	VCC_P	14	VCC_P
7	GND	15	GND
8	NC	-	-

2.2.3 TLS pinout

ARK6 has a SUB-D 25p Female connector for Relays with customized pin assignments.

Figure 3 TLS connector

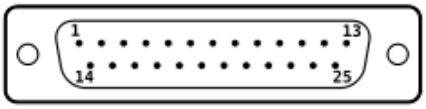

Table 4 TLS pinout

Pin	Signal	Pin	Signal
1	RL_NC0	14	RL0_NC0
2	RL_COM0	15	RL0_COM0
3	RL_NO0	16	RL0_NO0
4	RL_NC1	17	RL1_NC1
5	RL_COM1	18	RL1_COM1
6	RL_NO1	19	RL1_NO1
7	RL_NC2	20	RL2_NC2
8	RL_COM2	21	RL2_COM2
9	RL_NO2	22	RL2_NO2
10	RL_NC3	23	RL3_NC3
11	RL_COM3	24	RL3_COM3
12	RL_NO3	25	RL3_NO3
13	NC	-	-

2.3 Modulation Modes Interface Technical Data

2.3.1 DVB-T2 mode

Table 5 DVB-T2 modulation mode technical data

Parameter / Control	Admitted Ranges / Values
Input interfaces	○ ASI input 1,2,3,4 supported (ASI/SDI inputs on board) ○ Front-end supported (refer to 2.5 Front End Technical Data): ○ DVB-T/T2 front end: UHF/VHF down-converted and DVB-T/T2 professional receiver ○ DVB-S2 front end: satellite DVB-S2 receiver ○ DVB-S2 CAM front end: satellite DVB-S2 input with descrambling and MPEG-2 / H264 decoding ○ TS over IP on GbE data port
Output interfaces values	○ ASI Out Monitor ○ Output voltage: 800 mVpp (500 to 1200 mVpp)
	○ RF ○ Spectrum polarity: Non-inverted (inverted optional) ○ Level: STDx50: 21 to 41 dBm STDx20: 18 to 38 dBm ○ Spectrum outside band: +/- 3,8 MHz: 0 dB +/- 4,25 MHz: < 46 dB +/- 5,25 MHz: < 56 dB ○ Harmonic and spurious: < -50dBm below 1 GHz ○ MER: > 38 dB
	○ RF Mon ○ Level: -40 dBm RF Out

Parameter / Control	Admitted Ranges / Values
Signal Processing	○ Input stream monitoring ○ T2-MI over ASI, IP and RF supported ○ PCR restamping ○ Bit rate adaptation through Null packet insertion ○ PAT and PMT parsing for automatic detection of T2-MI PID ○ User selectable input autoswitch criteria based on primary feed quality (RF, ASI and TSoIP) ○ Linear and Non-Linear Adaptive Precorrections
Supported Modes	○ T2 Base/ T2 Lite supported over T2-MI ○ T2 Version 1.1.1, 1.2.1 ,1.3.1(T2-MI) ○ Carrier Modes: Normal and Extended ○ Guard Interval: 1/4, 19/256, 1/8, 19/128, 1/16, 1/32 and 1/128 ○ PLP Constellation: QPSK, 16-QAM, 64-QAM and 256-QAM ○ L1 post constellations: BPSK, QPSK, 16QAM, 64QAM ○ FEC: Short and Normal ○ IFFT: 1K, 2K, 4K, 8K, 16K and 32K ○ Constellation rotation: Rotated and Normal ○ PLP Code Rate (T2 Base): 1/2, 3/5, 2/3, 3/4, 4/5, 5/6 ○ PLP Code Rate (T2 Lite): 1/3, 2/5, ½, 3/5,2/3, 3/4 ○ Pilot Patterns: From PP1 to PP8 ○ Network modes: MFN and SFN ○ Bandwidth: 8 MHz, 7 MHz, 6 MHz and 5 MHz ○ Time Interleaver: Adjustable ○ T2 SISO,T2-MISO, T2-Lite-SISO, T2-Lite MISO; modes: Supported ○ FEF supported ○ Physical Layer Pipe (PLP): Single and Multiple ○ PAPR Reduction: TR-PAPR

2.3.2 DVB-T mode

Table 6 DVB-T modulation mode technical data

Parameter / Control	Admitted Ranges / Values
Input interfaces	○ ASI input 1,2,3,4 supported (ASI/SDI inputs on board) ○ Front-end supported (refer to 2.5 Front End Technical Data): ○ DVB-T/T2 front end: UHF/VHF down-converted and DVB-T/T2 professional receiver ○ DVB-S2 front end: satellite DVB-S2 receiver ○ DVB-S2 CAM front end: satellite DVB-S2 input with descrambling and MPEG-2 / H264 decoding ○ TS over IP on GbE data port
Output interfaces values	○ ASI Out Monitor ○ Output voltage: 800 mVpp (500 to 1200 mVpp)
	○ RF ○ Spectrum polarity: Non-inverted (inverted optional) ○ Level: STDx50: 21 to 41 dBm STDx20: 18 to 38 dBm ○ Spectrum outside band: +/- 3,8 MHz: 0 dB +/- 4,25 MHz: < 46 dB +/- 5,25 MHz: < 56 dB ○ Harmonic and spurious: < -50dBm below 1 GHz ○ MER: > 38 dB
	○ RF Mon ○ Level: -40 dBm RF Out

Parameter / Control	Admitted Ranges / Values
Signal Processing	○ Input stream monitoring ○ Input over ASI, IP and RF supported ○ PCR restamping ○ Bit rate adaptation through Null packet insertion ○ Seamless input autoswitch (ASI and TSoIP) ○ User selectable input autoswitch criteria based on primary feed quality (RF, ASI and TSoIP) ○ Linear and Non-Linear Adaptive Precorrections
Supported Modes	○ Guard Interval: 1/4, 1/8, 1/16, 1/32 ○ Constellation: QPSK, 16-QAM, 64-QAM ○ FFT: 2K, 4K, 8K ○ Code Rate; 1/2, 2/3, 3/4, 4/5, 5/6, 7/8 ○ Network modes: MFN and SFN ○ Bandwidth: 8 MHz, 7 MHz, and 6 MHz ○ Time Interleaver: Adjustable ○ Hierarchical modes: Supported

2.3.3 ISDB-T mode

Table 7 ISDB-T mode technical data

Parameter / Control	Admitted Ranges / Values
Input interfaces	○ ASI input 1,2,3,4 supported (ASI/SDI inputs on board) ○ Front-end supported (refer to 2.5 Front End Technical Data): ○ ISDBT front end: UHF/VHF down-converted and ISDBT professional receiver ○ DVB-S2 front end: satellite DVB-S2 receiver ○ DVB-S2 CAM front end: satellite DVB-S2 input with descrambling and MPEG-2 / H264 decoding ○ TS over IP on GbE data port
Output interfaces values	○ ASI Out Monitor ○ Output voltage: 800 mVpp (500 to 1200 mVpp)
	○ RF ○ Spectrum polarity: Non-inverted (inverted optional) ○ Level: STDx50: 21 to 41 dBm STDx20: 18 to 38 dBm ○ Spectrum outside band: +/- 3,8 MHz: 0 dB +/- 4,25 MHz: < 46 dB +/- 5,25 MHz: < 56 dB ○ Harmonic and spurious: < -50dBm below 1 GHz ○ MER: > 38 dB
	○ RF Mon ○ Level: -40 dBm RF Out

Parameter / Control	Admitted Ranges / Values
Signal Processing	○ Input stream monitoring ○ Input strean over ASI, IP and RF supported ○ PCR restamping ○ Input autoswitch (ASI and TSoIP) ○ User selectable input autoswitch criteria based on primary feed quality (RF, ASI and TSoIP) ○ Linear and Non-Linear Adaptive Precorrections ○ Crest Factor Reduction ○ Remux Options with Carousel Insertion
Supported Modes	○ Guard Interval: 1/4, 1/8, 1/16, 1/32 ○ Constellation: QPSK, 16-QAM, 64-QAM ○ Mode (FFT carriers): Mode 3 ○ Code Rate; 1/2, 2/3, 3/4, 4/5, 5/6, 7/8 ○ Network modes: MFN and SFN ○ Bandwidth: 6 MHz ○ Time Interleaver: 0, 1, 2, 3, 4 ○ Hierarchical. modes: Up to three layers

2.3.4 ATSC mode

Table 8 ATSC mode technical data

Parameter / Control	Admitted Ranges / Values
Input interfaces	○ ASI input 1,2,3,4 supported (ASI/SDI inputs on board) ○ Front-end supported (refer to 2.5 Front End Technical Data): ○ ATSC front end: UHF/VHF down-converted and ATSC professional receiver ○ DVB-S2 front end: satellite DVB-S2 receiver ○ DVB-S2 CAM front end: satellite DVB-S2 input with descrambling and MPEG-2 / H264 decoding ○ TS over IP on GbE data port
Output interfaces values	○ ASI Out Monitor ○ Output voltage: 800 mVpp (500 to 1200 mVpp)
	○ RF Digital ○ Spectrum polarity: Non-inverted (inverted optional) ○ Harmonic and spurious: < -50dBm below 1 GHz ○ Level: STDx50: 21 to 41 dBm STDx20: 18 to 38 dBm ○ Spectrum outside band: +/- 3,8 MHz: 0 dB +/- 4,25 MHz: < 46 dB +/- 5,25 MHz: < 56 dB ○ MER: > 38 dB

Parameter / Control	Admitted Ranges / Values
	○ RF Analog ○ Spectrum polarity: Non-inverted (inverted optional) ○ Harmonic and spurious: < -50dBm below 1 GHz ○ Level: STDx50: 28 to 48 dBm STDx20: 24 to 44 dBm ○ RF Output Reverberate Loss: ≥ 13 dB ○ Video Modulation Degree: 87.5 % ○ Video Flatness: +/- 1.0 dB
	○ RF Mon ○ Level: -40 dBm RF Out
Signal Processing	○ Input stream monitoring ○ On- The-Fly substation of Major and Minor channel number in the TVCT for user selectable ones ○ PCR restamping ○ Null packets deletion ○ Bit rate adaptation through Null packet insertion ○ M/H mode supported ○ M/H Regenerative mode up to M/H number of groups supported ○ User selectable input autoswitch criteria based on primary feed quality (RF, ASI and TSoIP) ○ Linear and Non-Linear Adaptive Precorrections

Parameter / Control	Admitted Ranges / Values
Supported Modes	○ Carrier Modes: Normal and Extended ○ Guard Interval: 1/4, 1/8, 1/16, 1/32 ○ Constellation: QPSK, 16-QAM, 64-QAM ○ FFT: 2K, 4K, 8K ○ Code Rate; 1/2, 2/3, 3/4, 4/5, 7/8 ○ Network modes: MFN and SFN ○ Bandwidth: 8 MHz, 7 MHz, and 6 MHz ○ Time Interleaver: Adjustable ○ Hierarchical. modes: Supported

2.3.5 ITU mode

Table 9 ITU mode technical data

Parameter / Control	Admitted Ranges / Values
Input interfaces	○ SDI input 1,2,3,4 supported (ASI/SDI inputs on board) ○ Front-end supported (refer to 2.5 Front End Technical Data): ○ A/V front end: analog audio and video inputs ○ DVB-S2 CAM front end: satellite DVB-S2 input with descrambling and MPEG-2 / H264 decoding ○ Data GBe is disabled for this mode
Output interfaces values	○ ASI Out Monitor ○ Not supported
	○ RF Digital ○ Spectrum polarity: Non-inverted (inverted optional) ○ Level: STDx200: 24 to 44 dBm STDx500: 28 to 48 dBm STDx201: STDx501: 40 to 60 dBm ○ RF Output Reverberate Loss: ≥ 13 dB ○ Video Modulation Degree: 87.5 % ○ Video Flatness: +/- 1.0 dB ○ Harmonic and spurious: < -50dBm below 1 GHz
	○ RF Mon ○ Level: -40 dBm RF Out

Parameter / Control	Admitted Ranges / Values
Signal Processing	○ Digital audio channels presence and level monitoring ○ Analog audio sampling rate fixed to 48 KHz ○ Input redundancy provided by an input autoswitch algorithm based on primary feed presence (SDI and CVBS) ○ Selectable Audio Type ○ Selectable Sound System ○ Selectable Emphasis ○ Adjustable Audio Deviation and Carriers Level ○ Adjustable White Level, Synchronism Amplitude and Pedes Levels ○ Group Delay Selection ○ Non-Linear Adaptive Precorrections ○ Linear Manual Precorrections
Supported standards	○ ITU-R BT.470-6 ○ PAL B/G,M,N,DK,I ○ NTSC

2.3.6 DAB mode

Table 10 DAB mode technical data

Parameter / Control	Admitted Ranges / Values
Input interfaces	○ ASI/SDI inputs on board are disabled for this mode ○ Front-end supported (refer to 2.5 Front End Technical Data): ○ ETI front end: ETI ○ Data GbE is enabled for EDI reception
Output interfaces values	○ ASI Out Monitor ○ Not supported
	○ RF Digital ○ Spectrum polarity: Non-inverted (inverted optional) ○ Level: ▪ STDx0: -10dBm to 0 dBm ▪ STDx200: 24 dBm to 44 dBm ▪ STDx500: 28 dBm to 48 dBm ▪ STDx201: 33 dBm to 53 dBm ▪ STDx501: 36 dBm to 56 dBm ○ Agile VHF band channels up-converter. Other bands are available as option.
	○ RF Monitor available on: ▪ SDTx0 ▪ SDTx200 ▪ SDTx500 ▪ SDTx201 ▪ SDTx501 ○ IF monitor available on SDTx0 ▪ Measure if level ▪ Frequency (36MHz)

Parameter / Control	Admitted Ranges / Values
Signal Processing	○ Modulation parameters from input ○ Mode change feature ○ MFN, static and dynamic SFN network modes supported

2.3.7 DTMB mode

Table 11 DTMB modulation mode technical data

Parameter / Control	Admitted Ranges / Values
Input interfaces	○ ASI input 1,2,3,4 supported (ASI/SDI inputs on board) ○ Front-end supported (refer to 2.5 Front End Technical Data): ○ DTMB front end: UHF/VHF down-converted and DVBT professional receiver ○ DVB-S2 front end: satellite DVB-S2 receiver ○ DVB-S2 CAM front end: satellite DVB-S2 input with descrambling and MPEG-2 / H264 decoding ○ TS over IP on GbE data port
Output interfaces values	○ ASI Out Monitor ○ Output voltage: 800 mVpp (500 to 1200 mVpp)
	○ RF ○ Spectrum polarity: Non-inverted (inverted optional) ○ Level: STDx50: 21 to 41 dBm STDx20: 18 to 38 dBm ○ Spectrum outside band: +/- 3,8 MHz: 0 dB +/- 4,25 MHz: < 46 dB +/- 5,25 MHz: < 56 dB ○ Harmonic and spurious: < -50dBm below 1 GHz ○ MER: > 38 dB

Parameter / Control	Admitted Ranges / Values
	○ RF Mon ○ Level: -40 dBm RF Out
Signal Processing	○ Input stream monitoring ○ Input over ASI, IP and RF supported ○ PCR restamping ○ Bit rate adaptation through Null packet insertion ○ Seamless input autoswitch (ASI and TSoIP) ○ User selectable input autoswitch criteria based on primary feed quality (RF, ASI and TSoIP) ○ Linear and Non-Linear Adaptive Precorrections
Supported Modes	○ Carrier Modes: Single Carrier and OFDM ○ Guard Interval: 420 Symbols, 595 Symbols, 945 Symbols ○ Constellation: 40-QAM-NR, 4-QAM, 16-QAM, 32-QAM, 64-QAM ○ FFT: 2K, 4K, 8K ○ Code Rate: 0.4 / 0.6 / 0.8 ○ Network modes: MFN, SFN, Test ○ Bandwidth: 8 MHz, 7 MHz, and 6 MHz ○ Time Interleaver: 240 Symbols or 720 Symbols

2.3.8 ECHO mode

Table 12 ECHO canceller repeater mode technical data

Parameter / Control	Admitted Ranges / Values
Input interfaces	○ Front-end supported (refer to 2.5 Front End Technical Data): ○ DVB-T/T2 front end: UHF/VHF down-converted and DVB-T/T2 professional receiver ○ ISDBT front end: UHF/VHF down-converted and ISDBT professional receiver ○ ATSC front end: UHF/VHF down-converted and ATSC professional receiver ○ DTMB front end: UHF/VHF down-converted and DVBT professional receiver
Output interfaces values	○ RF ○ Spectrum polarity: Non-inverted (inverted optional) ○ Level: STDx50: 21 to 41 dBm STDx20: 18 to 38 dBm ○ Spectrum outside band: +/- 3,8 MHz: 0 dB +/- 4,25 MHz: < 46 dB +/- 5,25 MHz: < 56 dB ○ Harmonic and spurious: < -50dBm below 1 GHz ○ MER: > 38 dB
	○ RF Mon ○ Level: -40 dBm RF Out
	○ Linear and Non-Linear Adaptive Precorrections
Signal Processing	○ Feedback signal echo removal ○ Foldback mode dynamically reduces the output signal to contain the echo ○ Instant echo spikes control

2.4 Hardware Versions

2.4.1 0 – 100 – 200 - 500

Table 13 SDT 0 - 100 - 200 - 500

Parameter / Control	Admitted Ranges / Values
Operating temperature	From 0°C to +40°C (+32 °F to +104 °F)
Storage temperature	From -30°C to +70°C (-22 °F to +158 °F)
Range temperature within specs	From +5 °C to +45 °C (41 °F to 113 °F)
Maximum relative humidity	Max 90% RH
EMC	Compliant to EN50022 (emission) and EN55024 (immunity)
Safety	Compliant to EN60950-1
RoHs	Compliant with directive 2002/95/EC
Depth	20.85'' (530 mm)
Width	19" (483 mm)
Height	Composed by 1 Unit 1.75" (44 mm)
Weight	5,5 kg (approx)
Transport and storage	Vibration acc. To IEC Publ. 68
Cooling	Long life fans to assist natural convection

2.4.2 201

Table 14 SDT201 technical data

Parameter / Control	Admitted Ranges / Values
Operating temperature	From 0°C to +40°C (+32 °F to +104 °F)
Storage temperature	From -30°C to +70°C (-22 °F to +158 °F)
Range temperature within specs	From +5 °C to +45 °C (41 °F to 113 °F)
Maximum relative humidity	Max 90% RH
EMC	Compliant to EN50022 (emission) and EN55024 (immunity)
Safety	Compliant to EN60950-1
RoHs	Compliant with directive 2002/95/EC
Depth	20.85‘‘ (530 mm)
Width	19” (483 mm)
Height	Composed by 2 Unit 3.5” (88 mm)
Weight	15 kg (approx)
Transport and storage	Vibration acc. To IEC Publ. 68
Cooling	Long life fans to assist natural convection

2.4.3 ????

Table 15 SDT501UB HE technical data

Parameter / Control	Admitted Ranges / Values
Operating temperature	From 0°C to +40°C (+32 °F to +104 °F)
Storage temperature	From -30°C to +70°C (-22 °F to +158 °F)
Range temperature within specs	From +5 °C to +45 °C (41 °F to 113 °F)
Maximum relative humidity	Max 90% RH
EMC	Compliant to EN50022 (emission) and EN55024 (immunity)
Safety	Compliant to EN60950-1
RoHs	Compliant with directive 2002/95/EC
Depth	20.85'' (530 mm)
Width	19" (483 mm)
Height	Composed by 3 Unit 5.25" (132 mm)
Weight	25 kg (approx)
Transport and storage	Vibration acc. To IEC Publ. 68
Cooling	Long life fans to assist natural convection

2.5 Front End Technical Data

ARK-6 provides several series of modular front-ends that add optional inputs to the devices in order to expand their capabilities.

Not all modes are compatible with all the front ends available, if the device is defined to support a front end board and there is no board connected or if the board is broken, an error message will be shown in this page.

Hereafter a list of the available front ends in a table that shows the compatibility with the available modulation modes:

Table 16 Modulations-frontends compatibility

Mode \ Frontend	DVB-T/T2 RX	ATSC RX	ISDBT RX	A/V	DVB-S2	DVB-S2 CAM	ETI
DVB-T	✓	✗	✗	✗	✓	✓	✗
DVB-T2	✓	✗	✗	✗	✓	✓	✗
ATSC	✗	✓	✗	✗	✓	✓	✗
ISDBT	✗	✗	✓	✗	✓	✓	✗
ITU	✗	✗	✗	✓	✗	✓	✗
DAB	✗	✗	✗	✗	✗	✗	✓
DTMB	✗	✗	✗	✗	✗	✗	✗
ECHO	✓	✓	✓	✗	✗	✗	✗

✓ : this front end is fully working and recommended with this mode

✗ : this front end is not compatible and will not work properly with this modulation although they both may be present on multi-mode devices that uses other modes compatible with the front-end.

A modulation with a not compatible front end can be used anyway but won't use the frontend inputs.

DAB modulator is a special case, using only ETI input it is compatible only with ETI frontend and can be released only with that.

Refer to Appendix AD for a deep explanation of the frontend mounted on your device.

2.5.1 DVB-T/DVB-T2 Front End

Table 17 DVB-T/T2 front end technical data

Parameter / Control	Admitted Ranges / Values
Inputs	- RF o Number of inputs: 1 o Connector: N Female o Frequency: UHF (VHF optional) o Level: -76 dB to -16 dB o Zin: 50 Ohm o Supported standards: DVB-T, DVB-T2

2.5.2 ATSC Front End

Table 18 ATSC front end technical data

Parameter / Control	Admitted Ranges / Values
Inputs	- RF o Number of inputs: 1 o Connector: N Female o Frequency: UHF (VHF optional) o Level: -76 dB to -16 dB o Zin: 50 Ohm o Supported standards: DVB-T, DVB-T2

2.5.3 ISDB-T Front End

Table 19 ISDB-T front end technical data

Parameter / Control	Admitted Ranges / Values
Inputs	- RF o Number of inputs: 1 o Connector: N Female o Frequency: UHF (VHF optional) o Level: -76 dB to -16 dB o Zin: 50 Ohm o Supported standards ISDB-T

2.5.4 DVB-S/S2 Front End

Input DVB-S and DVB-S2 demodulator that conforms to ETSI EN 300 421 and ETSI TR 102 376 respectively

Dual multi standard demodulation:

- Legacy DVBS and DirecTVTM QPSK
- DVBS2 QPSK, 8PSK, 16 and 32 APSK
- Multi-tap equalizer for RF reflection removal
- Wide range carrier frequency tracking loop for offset recovery

Dual multi standard decoding:

- DVBS or DirecTVTM legacy
- DVBS2 FEC and framing
- Up to 190 Mbit/s channel bit rate
- Bit error monitoring

Table 20 DVB-S/S2 front end technical data

Parameter / Control	Admitted Ranges / Values
Inputs	- RF o Number of inputs: 1 o Connector: F Female o Frequency: 950MHz … 2150MHz o Level: -76 dB to -16 dB o Zin: 50 Ohm o Supported standards DVB-S, DVB-S2

2.5.5 A/V Front End

The Audio and Video front-end provides an analog input interface for ITU modulations

Table 21 A/V front end technical data

Parameter / Control	Admitted Ranges / Values
Inputs	- CVBS ○ Number of inputs: 2 ○ Connector: BNC ○ Zin: 75 Ohm ○ Input Voltage: 1 Vpp ○ Supported standards: PAL, NTSC
	- Analog Audio ○ Number of inputs: 2 L/R ○ Connector: XLR (Cannon f) ○ Zin: 600 Ohm balanced ○ Input level: +6 dBm +/- 6 dB ○ Supported standards: EIA RF-297-A

2.5.6 ETI Front End

The ETI front-end provides input compliant with the Ensemble Transport Interface (ETI) standard ETSI ETS 300799.

Table 22 ETI front end technical data

Parameter / Control	Admitted Ranges / Values
Inputs	- ETI ○ Number of inputs: 2 ○ Connector: BNC ○ Zin: 75 Ohm ○ Input Voltage: 1 Vpp ○ Supported standards: ETSI ETS 300799. ETI(NI,G703), ETI(NA,G704)5592 , ETI(NA,G704)5376

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3 Installation

3.1 Installation Procedure.

Use the following specifications to establish criteria for site selection and equipment installation.

3.1.1 Unpacking.

If there is any external damage to the containers, inform the shipping company and request that an agent be present during unpacking.

Carefully unpack the boxes (no special instructions are required) and note any damage.

After all items are unpacked, check the equipment received.

If there are any damages or shortages, notify the carrier and Screen Service spa immediately.

3.1.2 Mounting Specifications.

Use the following criteria for site selection and equipment installation:

- Mount.
    - A floor-standing, open rack or permanent structure with vertical mounting members conforming to EIA Standard 310 is recommended.
- Environment.
    - Refer to Technical Data chapter.
- Clearance.
    - No clearance is required for sides.
    - Access to the rear requires approximately 15 centimeters clearance for making connections.

3.1.3 Mounting Operation.

Install the device in an EIA (Standard 310) 19 inch rack as follows:

- Place the equipment into the rack, align the mounting holes, and secure in place with four rack screws.
- On each cable a label is present; on the rear panel a label is present; you must follow this label for the connections.
- Depending from ARK6-DAB version different cable connection must be done.

3.1.3.1 Mounting operation – front panel connectors

Hereafter are described the front panel connections of SDT200 (1 rack unit) in its different ways.

Figure 1 SDT200 no front end panel connectors

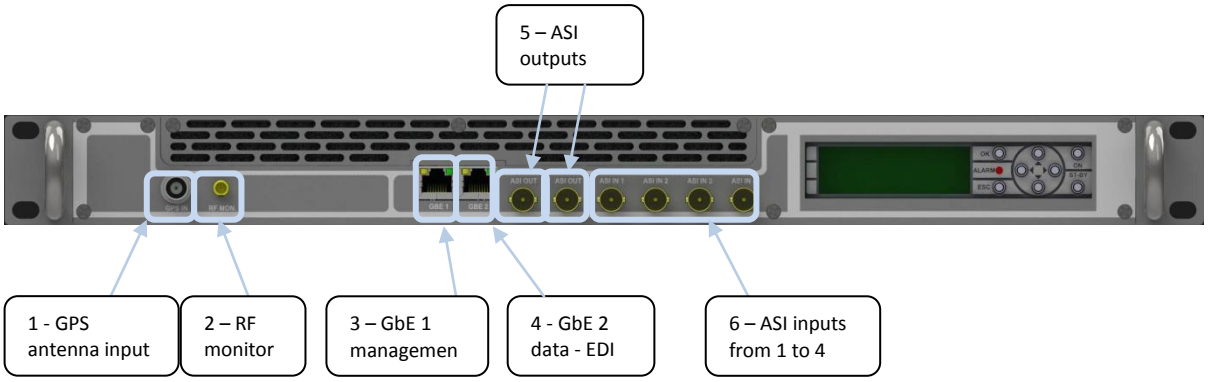


Figure 2 SDT200 Rx front panel connectors

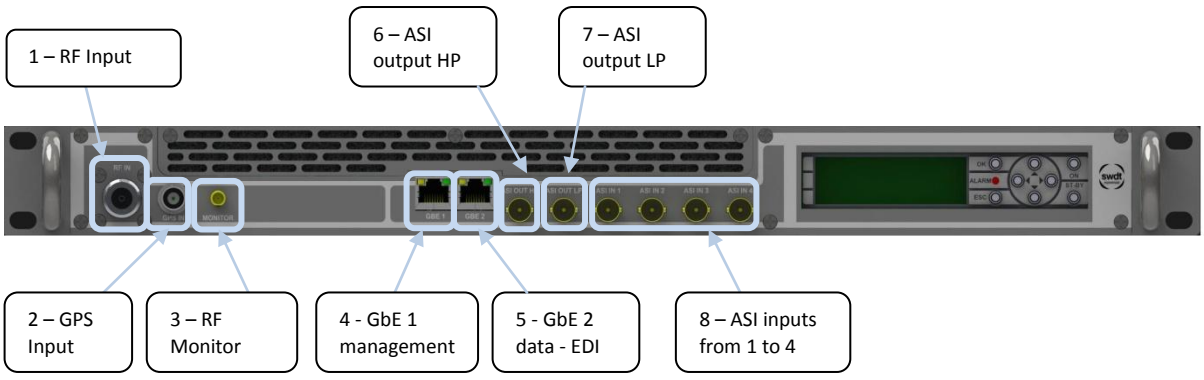


Figure 3 SDT200 A/V front panel connectors

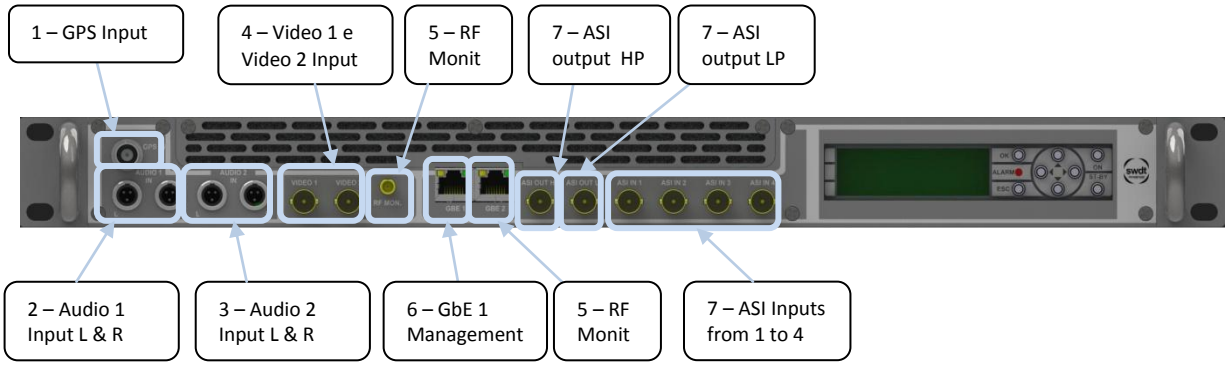


Figure 4 SDT200 DVB-S2 front panel connectors

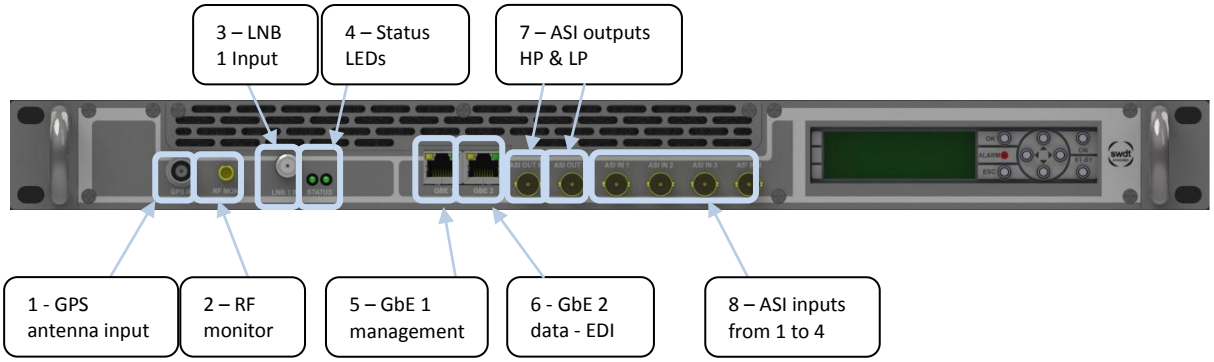
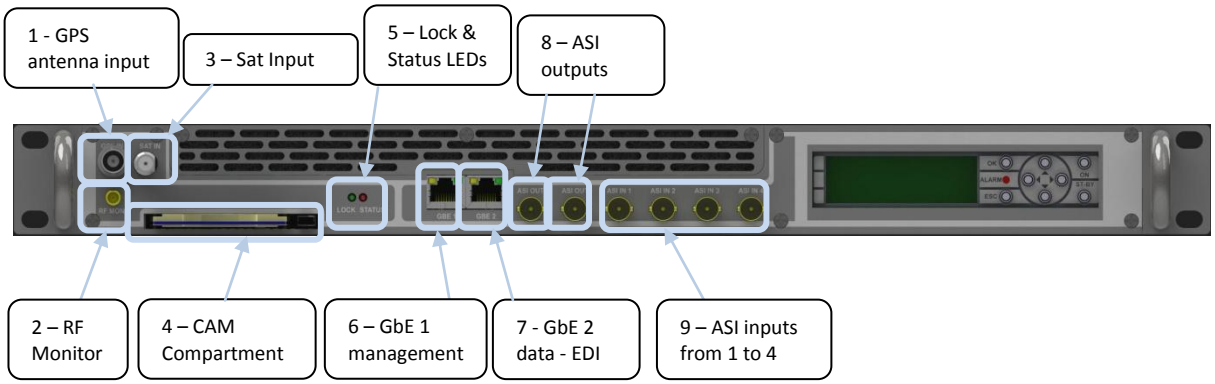


Figure 5 SDT200 DVB-S2 CAM front panel connectors



3.1.3.2 *Mounting operation – rear panel connectors*

Below are shown the rear panel connectors and fans of the SDT200/SDT500 (1rack unit), SDT201 (2rack units) and SDT501UB HE (3rack units).

Figure 6 SDT200 / SDT 500 (1Rack Unit) rear panel connectors

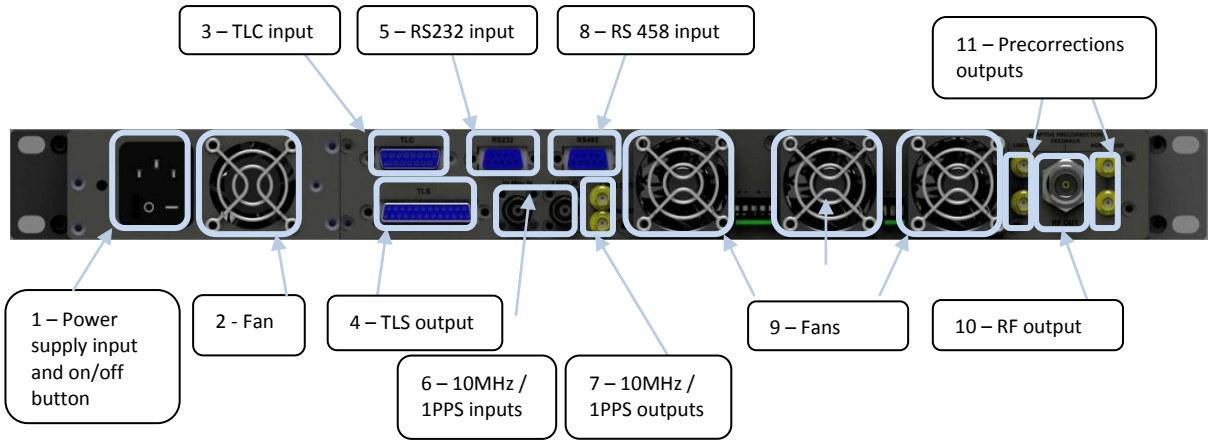


Figure 7 SDT 201 (2 Rack Unit) rear panel connectors

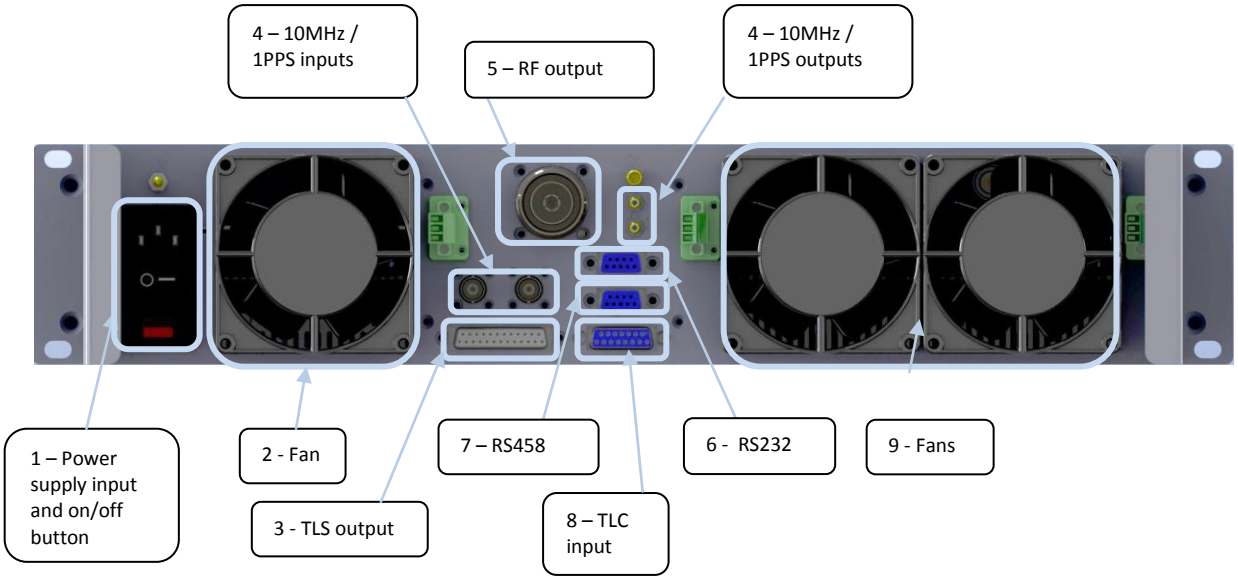
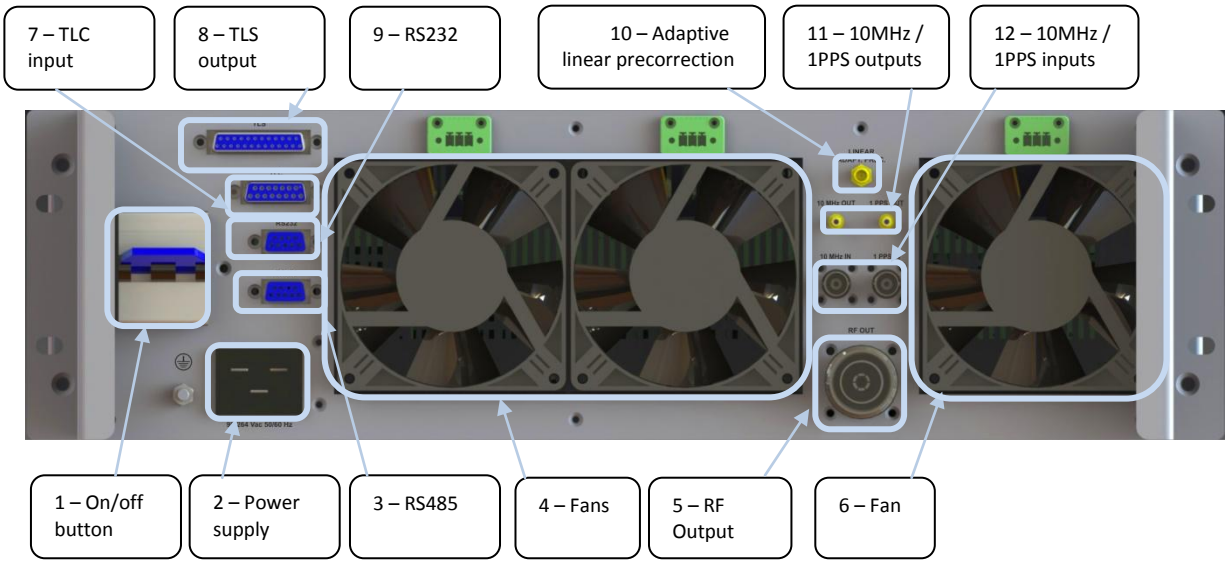


Figure 8 SDT 501 (3 Rack Unit) rear panel connectors



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User Interface

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4 User Interface

Different User Interfaces are provided in order cover any necessity of access, monitoring and setting of the devices.

Each User Interface has its own purpose and scope of action on the device so not all the settings could be available on all the interfaces.

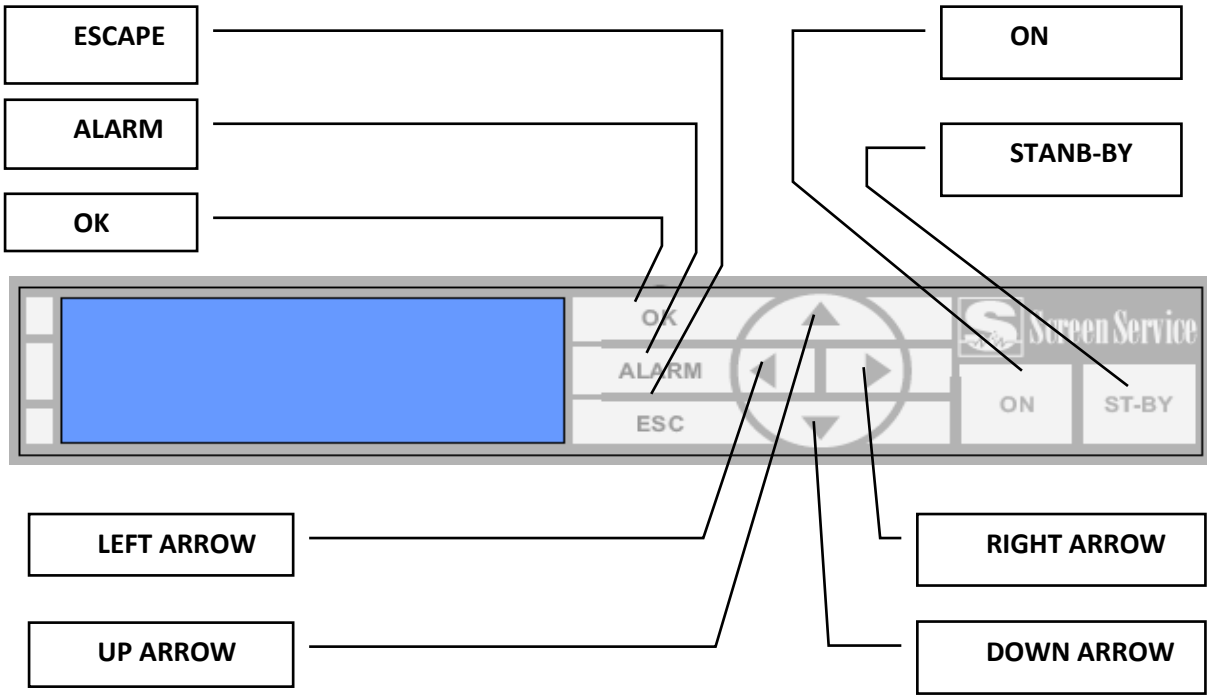
UI available are:

- ***Local User Interface***: access from local control panel and display. Provides a way to set the main device management parameters e.g. IP address, system clock, etc. and to monitor the device status and alarms. It does not provide operative settings;
- ***Java Graphic User Interface***: provides a remote access to the operative settings and monitors of the device. It allows to set-up the device modulation and to make it operative. It allows the management parameters monitoring but not their setting;
- ***JavaScript Web User Interface***: it is a lightweight version of the Java GUI, designed for web browsers connection with limited connection capability and for systems that doesn't support Java (e.g. connection from tablet). It allows all the operative settings provided by Java GUI except some advanced graphic tools (e.g. pre-correction graph tools). JS GUI is not available for all the device definitions and modulation modes;
- ***Simple Network Management System (SNMP) User Interface***: based on SNMP v2 provides a standard interface that can be integrated with bigger systems NMS. It allows all the operative settings provided by Java GUI except some advanced graphic tools (e.g. pre-correction graph tools). MIB libraries are provided with the software of the device and the documentation;

This chapter provides a deep description of all commands and indicators implemented by each interface referred to the common management of ARK 6 devices. The description of parameters related to any specific modulation modes and to front-end boards can be found in the Appendix AC and Appendix AD. References to appendixes are called inside the chapter every time a mode specific section is described.

4.1 Local User Interface

The following paragraphs describe the local user interface for **ARK6**. This user interface is composed of LCD Display, seven buttons and two status LEDs. Here below is depicted the ARK6 Front Panel.

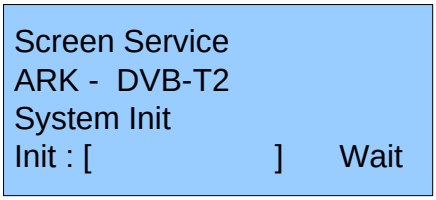


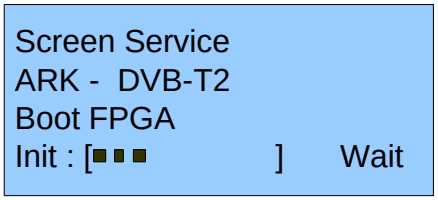
- **STAND-BY**: push this button (lie in wait for two seconds) to put the equipment on STAND-BY mode. The orange led lights up and the written **STAND-BY MODE** appears on the display. The remote Stand-by mode is enforceable only if on JAVA interface this feature is enabled.
- **ON**: push this button (lie in wait for two seconds) to turn on the equipment. The green led lights up and the **MAIN MENU** is displayed.
- **OK**: push this button to select or to confirm the sub-menu or the value respectively. Touching the screen with a finger the green led lights up.
- **ESC**: push this button to quit a submenu and to return to the previous one. Touching the screen with a finger the green led lights up.
- **ALARM**: when an alarm occurs the RED LED lights up.
- **UP ARROW**: push this button to scroll up menus or to increase a value. Touching the screen with a finger the green led lights up.
- **DOWN ARROW**: push this button to scroll down menus or to decrease a value. Touching the screen with a finger the green led lights up.
- **LEFT ARROW**: push this button to move within a string. Touching the screen with a finger the green led lights up.
- **RIGHT ARROW**: push this button to move within a string. Touching the screen with a finger the green led lights up.

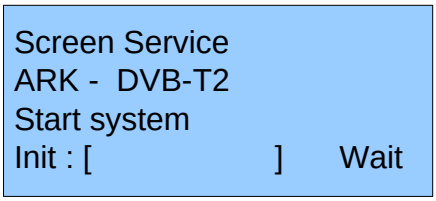
4.1.1 Boot and Welcome Message

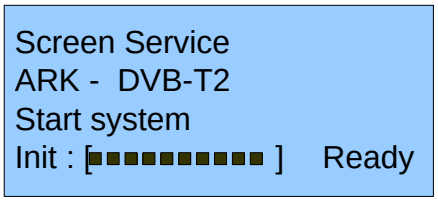
Turning on the equipment, the display shows the progress bar as follow:

The first two rows displayed by the User Interface refer to the actual configuration of software loaded on the device, in the following examples the SW loaded is a DVB-T2 mode, but the behavior is the same for all modes.

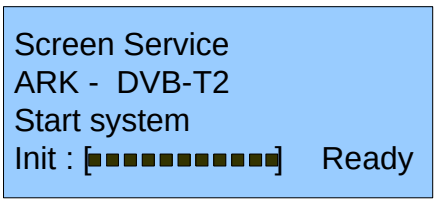


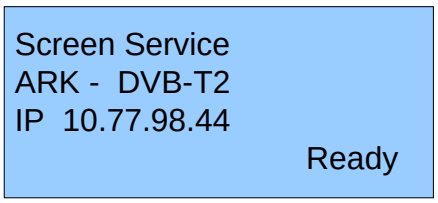






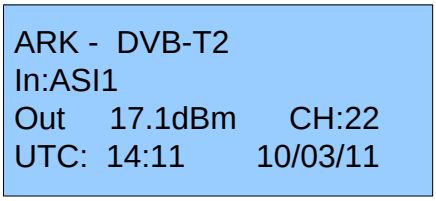
When the boot is over, the device is ready.





Press ESC to enter the main menu, otherwise after one minute waiting the idle status message appears.

4.1.2 Idle Menu



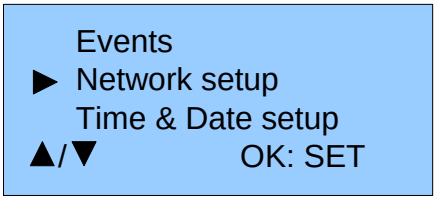
This menu could appears different it depend by the software definition uploaded on the file system. It appears after one minute waiting from the last touch and in this case, for example, the machine is uploaded with a DVB-T2 software definition. Informations contained in this kind of Idle Menu are described in next table.

Table 4-1 Local User Interface: Idle Menu

Information	Description
ARK – DVB-T2	Device description
In	Input signal source
Out	Output power and channel
IP	Management IP address (GBE 1)
UTC	UTC time and date

Press ESC to enter the MAIN MENU.

4.1.3 Main Menu



This menu shows six SUBMENUs. It is possible to view them sliding the menu up and down, with the UP or DOWN ARROWS, and to select one of them by pushing OK button.

Submenus contained in the Main Menu are described in next table.

Table 4-2 Local User Interface: submenus descriptions

Submenu	Description
Network setup	Enter this submenu to set: • GbE1 Board IP address • GbE1 Gateway address • GbE1 Netmask • GbE2 IP address • GbE2 Gateway address • GbE2 Netmask Settings in this submenu do not need to be saved, they will be loaded at next device restart.
Time & Date setup	Enter this submenu to set: • Time • Date Settings in this submenu do not need to be saved in order to be loaded at next device restart.
System Status	This submenu depends by the software definition(s) loaded on the device.
Installer Version	In this section the user can see what is the installer version actually loaded on the device.
Alarms	Alarms, detected and associated to the local interface by the relative mask, are listed in this submenu.
Reset system	Enter this submenu to reset the device.
Events	Enter this submenu to manage and monitor the events list.

4.1.4 LCD Alarms

Through the LCD Alarms mask it is possible to select which alarm has to be notified on LCD display. When an alarm condition occurs the alarm button is lighted and an alarm message is displayed in the Alarms submenu.

The following table lists only the common alarms to alarm messages association (refer to Alarms paragraph for further information about alarms and their masks).

For details about LCD alarms modes refer to specific mode files:

- DVB-T2 Mode Manual ARK6
- DVB-T Mode Manual ARK6
- ISDB-T Mode Manual ARK6
- ITU Mode Manual ARK6
- ATSC Mode Manual ARK6
- DAB Mode Manual ARK6
- DTMB Mode Manual ARK6

Table 4-3 Alarms descriptions list

Alarm	Alarm Message
Temperature Absolute High	Temp. High
Temperature Alarm (-3dB)	Temp. High (-3dB)
Temperature Warning	Temp.High Warning
Fans Speed Low	Fans Speed Low
Alim Dialog Err	Alim Dialog Err
FE Dialog Err	FE Dialog Err
Meas Dialog Err	Meas Dialog Err
GPS Dialog Err	GPS Dialog Err
GPS Not Locked	GPS Not Locked
120MHz Not Locked	120M Not Locked
960MHz Not Locked	960M Not Locked
Input PLL Not Locked	In PLL Not Locked
Output PLL Not Locked	Out PLL Not Locked
10MHz Not Locked	10M Not Locked
1PPS Not Locked	1PPS Not Locked
FPGA Boot Error	FPGA Boot Err
Forward Power High	FWD Power High
Forward Power Low Warning	FWD Low Warning

Alarm	Alarm Message
Forward Power Low Alarm	FWD Pwr Low
Reflex Power High	Reflex Power High
File System Error	FS Err
Bad File In File System	File Error
PS Voltage Out Of Range	PS1V Out Of Range
PS Current Out Of Range	PS1I Out Of Range
CPU Fan Error	CPU Fan Error
Test Mode	Test Mode
Interlock shut off (only 501 versions)	Interlock shut off
NTP Server Alarm	NTP Server Alarm

4.2 Java Graphic User Interface

The Java Graphic User Interface, stored in the board File System, is downloaded to the local PC every time the user connects to the board with a Web Browser. A proper Java Virtual Machine is needed; refer to the software installation chapter for a description on how to download and install the proper JVM.

4.2.1 Device protection options

ARK-6 can provide up to two levels of authentication in order to prevent unauthorized access to user GUI and/or unauthorized changing of device operational parameters.

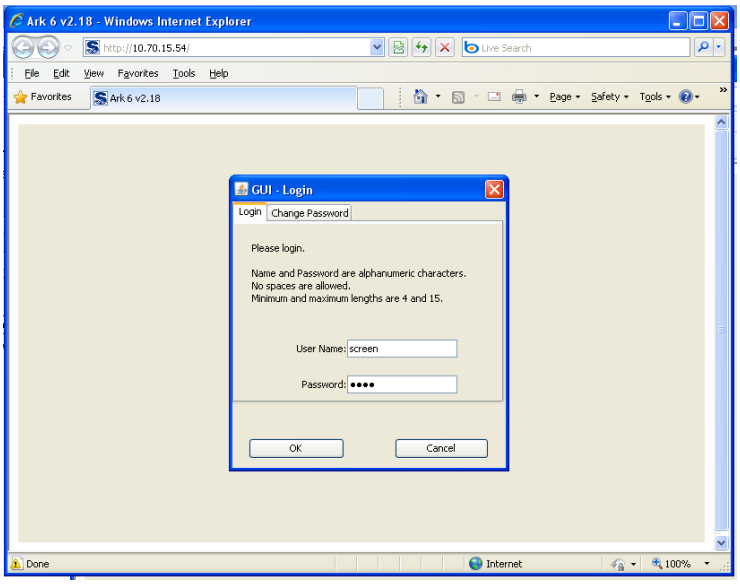
These levels of security can be each or both enabled as factory option.

4.2.1.1 Java GUI authentication

In order to prevent unauthorized users from accessing ARK6 devices via Java Graphic User Interface, an authentication mechanism can be enabled by means of a factory setting. The name/password credentials provide control only over who can open the GUI, and requires that all users know a single name/password to access it.

If the authentication mechanism is set for the GUI access, operators will be prompted to enter User Name and Password before they can have read/write access. The following figure shows the window that appears as soon as an operator tries to access the Java GUI.

Figure 4-1 GUI - Login



Enter your User Name and Password and then click “OK” in order to log in.

The default factory login credentials are:

User name: “**screen**”	Password: “**0000**”

Use the Change Password tab to change your credentials. You'll be asked to insert the old username and password before the new in order to prevent unauthorized changing of the credentials.

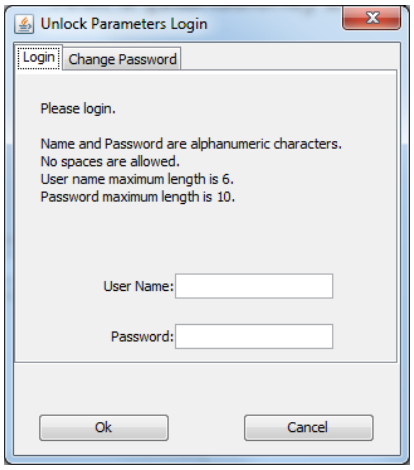
4.2.1.2 *Parameters set locking*

This option provides a locking of all the device settings. When the option is enabled a lock icon is shown in the java GUI.

Figure 4-2 Device settings lock

Click on the lock icon to enable the parameters setting or to change the credentials. A form is opened for login operation.

Figure 4-3 Unlock parameters login form



Enter your User Name and Password and then click "OK" in order to log in.

The default factory login credentials are:

User name: "**screen"**	Password: "**0000"**

Use the Change Password tab to change your credentials. You'll be asked to insert the old username and password before the new in order to prevent unauthorized changing of the credentials.

The credentials used for parameters locking **are not the same** used for the GUI access. They are stored in different memory locations and can be changed with different user and password.

4.2.2 Java Menu Bar

The following figure shows the menu bar of the Java Graphic User Interface. It allows the switching between control pages that will be described in detail in next chapters.

Figure 4-4 Java menu bar

The following controls are provided:

System commands bar allows enabling of the following commands:

- **Connect:** releases/acquires the connection to the device.
- **Save:** saves the device configuration.
- **Load:** loads the last saved configuration.

Figure 4-5 System commands bar

Operation pages bar allows switching between the following windows:

- **Home Page**: shows the firmware updating status, allows to reset the device, to locally download the *.jar file, to enable the Stand-by mode and to switch between operative modes.
- **Input**: shows ASI, GbE and Tuner input statistics.
- **Front-end**: allows the monitoring and setting of all the parameters related to the front-end board. This section is optional and is not visible on devices which are not defined to support a front-end board.
- **Modulation settings**: allows to monitor and to set the related modulation specific parameters. Different buttons could be visible in this section depending on the modulation modes loaded on the device. Hereafter a list of the possible modulations, refer to the appendix AC for an explanation of each modulation interface.
    - DVB-T,
    - DVB-T2,
    - ATSC,
    - ISDBT
    - ITU
    - DAB
    - DTMB
- **Adaptive Linear Precorrection:** allows managing the adaptive linear compensation.

- **Adaptive Non Linear Precorrection:** allows to manage the adaptive non linear compensation.

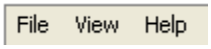
Outputs: allows to set clock and output parameters and to monitor the hardware status.

- **Network:** allows to monitor the Network settings of both GbE port 1 and GbE port 2 and to set in/out Ethernet channels parameters.
- **GPS:** shows received GPS statistics and provides commands to manage the Holdover functionality.
- **Alarms:** provides a grid where to set LCD, Graphic User Interface, Events, Relays, Traps, Input Switch and RF Off alarm masks.
- **Events:** shows the board events log and allows the manual setting of date and time.

Figure 4-6 Operation pages bar

System menu allows the access to the same commands and windows as System commands and Operation pages bars do, plus management options, help and version information (refer to System menu paragraph).

Figure 4-7 System menu

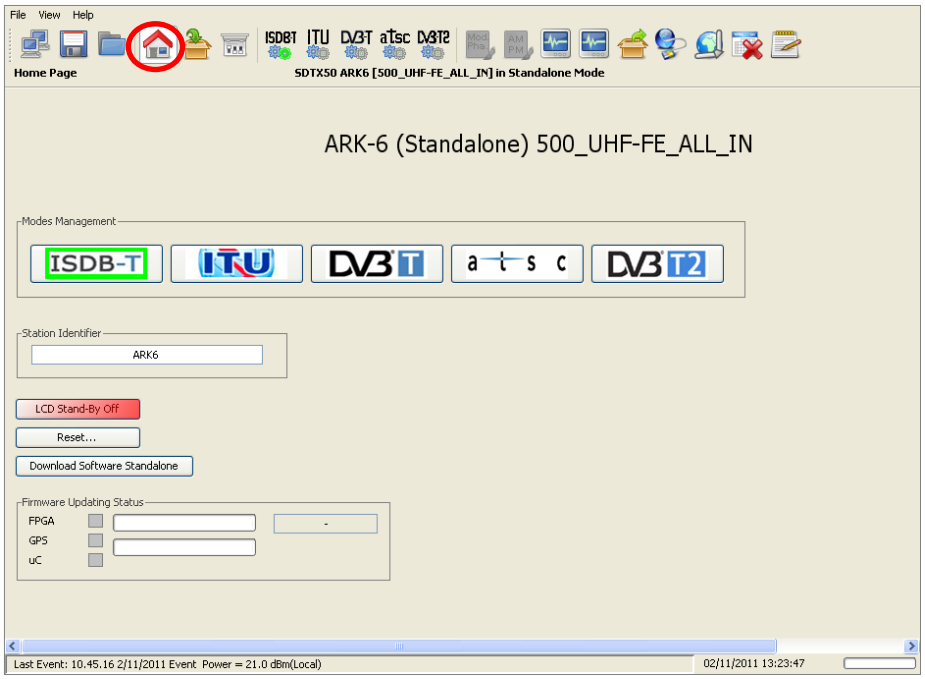


A brief description of all the provided information and controls follows in the next paragraphs.

4.2.3 Home Page

Click on Home Page button, highlighted in the next figure, to access the Home Page.

Figure 4-8 Home Page window



The Home Page provides a general description of the equipment, the firmware updating status and a subset of commands here below described:

- **Modes Management**: shows the list of all the available modes, identified by their transmission standard, and allows to switch between them. Click on a button to activate the related modulation.

  The possible modes are:

- DVB-T
- DVB-T2
- ISTDB-T
- ITU
- ATSC
- DAB
- DTMB

Each device can be software defined to support one or more modes. Modes available at the same time on a device depends also on hardware configurations like the front end mounted.

DAB mode is always incompatible with other modes as long as it uses a specific ETI front end for inputs and dedicated canalization.

- **Station Identifier**: shows and sets the station name.

- **LCD Standby**: enables the LCD Stand-by button.
- **Reset**: resets the equipment.
- **Download Software Standalone**: performs a local download of the *.jar file (refer to Download Software Standaloneparagraph).
- **Firmware Updating Status:** the three indicators turn into:
    - Yellow during FPGA, uC and GPS updating;
    - Green when the updating process is finished (FPGA and uC);
    - Grey when new code has been loaded (after next system reset).

  The progress bars, at the right side of the FPGA and GPS indicators, show the status of firmware loading process into FLASH. The FPGA and GPS indicators remain yellow until the new firmware is loaded. When either FPGA or uC indicators turn into green, the transmitter shall be reset in order to load the new software. **After a GPS update, the status LED turns into grey and the transmitter shall be reset in order to load the new sofware.**

In the Home Page is also specified the installer configuration the device has been loaded with.

4.2.4 Input

Click on Input button, highlighted in the next figure, to monitor the input statistics window.

Figure 4-9 Input page window

The Input window allows to monitor input data statistics and to enable the cable equalizer bypass of inputs.

The inputs windows changes depending on the Modes.

- DVB-T2: shows input TS statistics;
- DVB-T: shows input TS statistics;
- ISDB-T: shows input TS statistics;
- ITU: shows input SDI statistics;
- ATSC: shows input TS statistics;
- DAB: shows ETI and EDI data streams input statistics;
- DTMB: shows input TS statistics;

Refer to Appendix AC for a deep explanation of the input statistics for the modes defined on your device.

4.2.5 Front End

Click on Front End button, highlighted in the next figure, to access the front end window.

Figure 4-10 Frontend page window

The front end page is available only when the device is defined to enable a front end board and shows different controls according to the type of board connected.

Not all modes are compatible with all the front ends available, if the device is defined to support a front end board and there is no board connected or if the board is broken, an error message will be shown in this page.

Hereafter a list of the available front ends in a table that shows the compatibility with the available modulation modes:

Table 4-4 Modulations-frontends compatibility

Mode \ Frontend	DVB-T/T2 RX	ATSC RX	ISDBT RX	A/V	DVB-S2	DVB-S2 CAM	ETI
DVB-T	✓			✗	✓	✓	✗
DVB-T2	✓			✗	✓	✓	✗
ATSC		✓		✗	✓	✓	✗
ISDBT			✓	✗	✓	✓	✗
ITU	✗	✗	✗	✓	✗	✓	✗
DAB	✗	✗	✗	✗	✗	✗	✓
DTMB	✗	✗	✗	✗	✗	✗	✗
ECHO	✓	✓	✓	✗	✗	✗	✗

✓ : this front end is fully working and recommended with this mode

✗ : this front end is not compatible will not work properly with this mode

A modulation with a not compatible front end can be used anyway but won't use the frontend inputs.

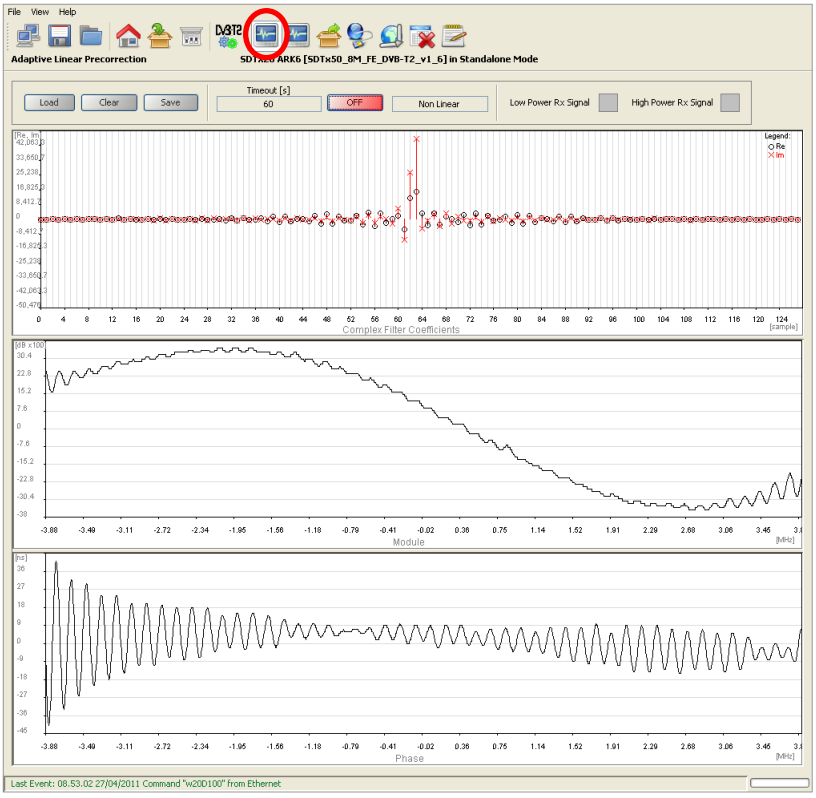
DAB modulator is a special case, using only ETI input it is compatible only with ETI frontend and can be released only with that. ETI front-end is not considered an external option but it is bound to the device DAB feature, for this reason its own settings and indicators are not shown in a dedicated tuner/front-end page in the GUI but are shown in the default input page.

Refer to Appendix AD for a deep explanation of the frontend mounted on your device.

4.2.6 Adaptive Linear Precorrection

Click on Linear Adaptive Precorrection button, highlighted in the next figure, to access the filter window.

Figure 4-11 Adaptive Linear Precorrection



This window provides commands and indicators for adaptive filter management and monitor.

The Filter window is organized as follows:

- Management panel.
- Complex filter coefficients graph.
- Module graph.
- Phase graph.

In order to enable the adaptive linear precorrection, click on the ON/OFF button.

4.2.6.1 Adaptive Filter

The Adaptive Filter provides the ARK6 with an effective adaptive linear compensation.

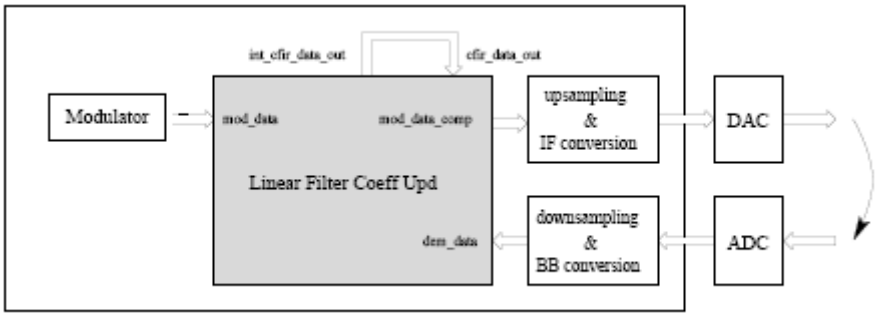
The developed system is responsible for pre-emptively compensating the modulated signal in order to make unimportant the contribution of the system transmission section. The signal passes through the transmission section and re-enters the system as to determine the distortion and the compensating adaptive filter.

The system is composed of two main blocks: a Power Calculation block and a 128-tap Complex FIR. The modulated signal, with IQ format and sampled at fc frequency, enters both blocks:

Power Calculation block is responsible for estimating the mean power level that will be restored at both transmitting and receiving sides;

128-tap Complex FIR is responsible for linearly pre-correcting the modulated signal. Filter coefficients are obtained by estimating the channel between the signal before the transmission section and the signal reentering the system, after the channel distortion and the A/D conversion.

Figure 4-12 Adaptive Filter



4.2.6.2 *Adaptive Linear Precorrection: Management panel*

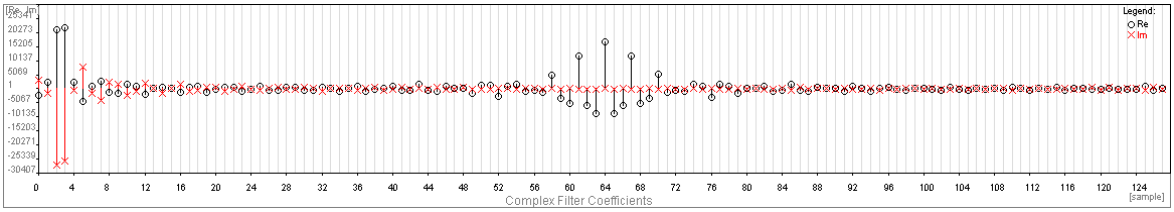
Table 4-5 Adaptive Linear Precorrection: Management panel

Box	Parameter / Control	Description	Admitted Ranges / Values
General	Load	Loads filter coefficients from the respective FPGA registers.	
General	Clear	Loads flat curve coefficients.	
General	Timeout [s]	Once enabled, the adaptive linear compensation has a timeout. When the timeout is expired, the precorrection is stopped. In order to continue updating coefficients, click on ON/OFF button.	Fixed to 60 seconds
General	Save	Saves the current adaptive filter coefficients.	
General	ON/OFF	Enables the adaptive linear compensation.	• ON(Green):Enabled • OFF(Red): Disabled
General	Status	Shows the type of adaptive compensation currently used, if any.	• None • Linear • Non Linear
General	Low Power Rx Signal	Indicates that the signal that re-enters the system has a low power. When this flag is on, the automatic update of the filter coefficients is stopped.	• Red: Alarm On • Grey: Alarm Off
General	High Power Rx Signal	Indicates that the signal that re-enters the system has a high power. When this flag is on, the automatic update of the filter coefficients is stopped.	• Red: Alarm On • Grey: Alarm Off

4.2.6.3 Complex Filter coefficients graph

The Complex Filter coefficients graph shows the current coefficients values. The circles indicate the real part of coefficients; the red crosses indicate the imaginary one.

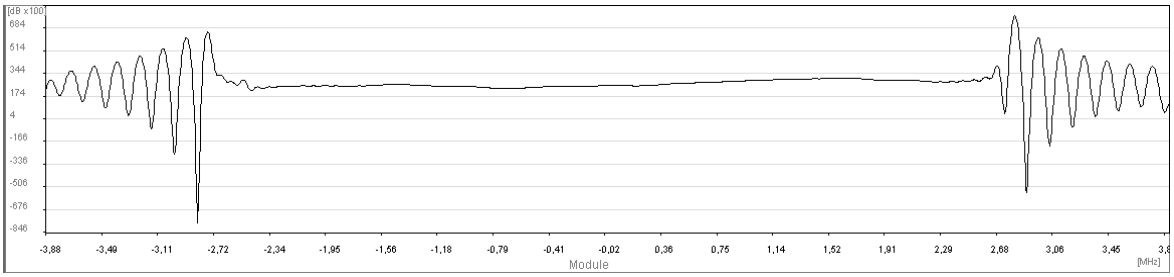
Figure 4-13 Filter window: complex filter coefficients graph



4.2.6.4 Module graph

The Module graph shows the actual output signal module according to the complex filer coefficients applied.

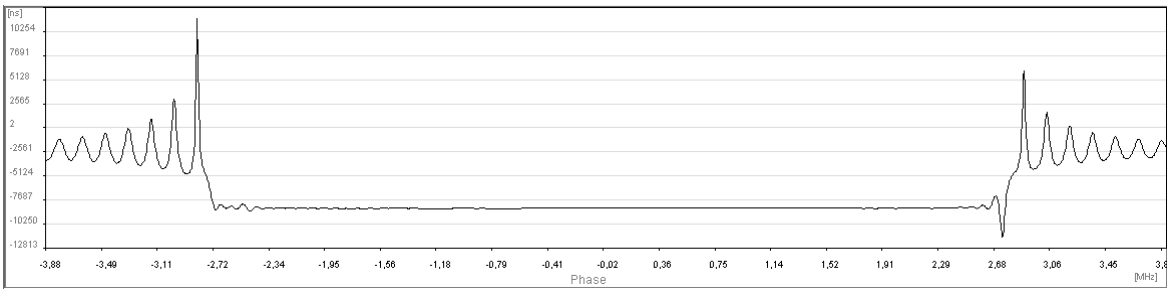
Figure 4-14 Filter window: module graph



4.2.6.5 Phase graph

The Phase graph shows the actual output signal phase according to the complex filer coefficients applied.

Figure 4-15 Filter window: phase graph



4.2.7 Adaptive Non-Linear Precorrection

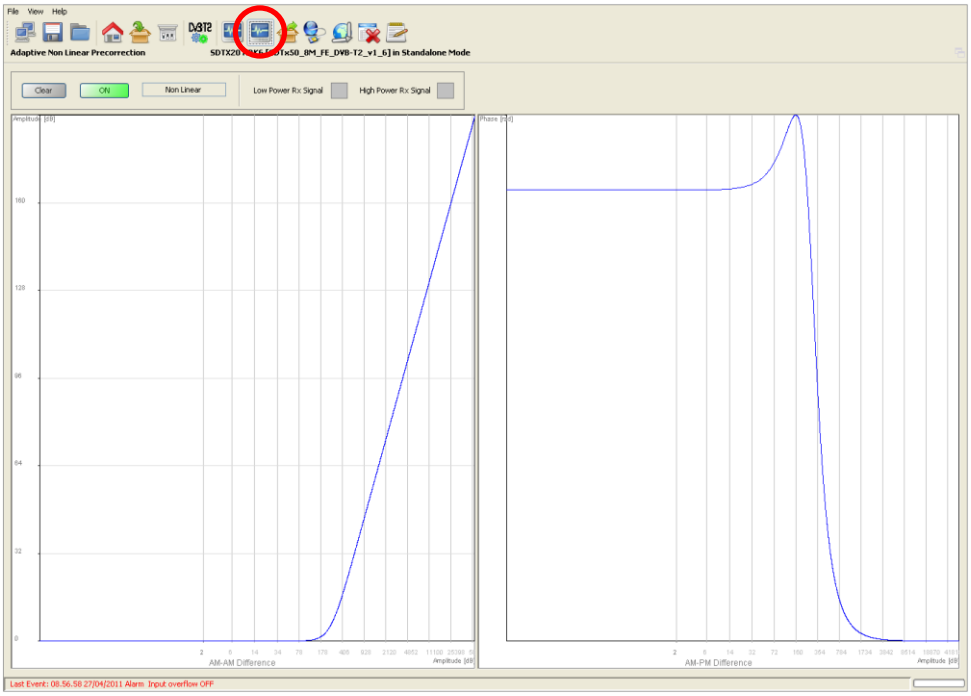
The Non Linear Adaptive Filter provides the ARK6 with an effective **adaptive non linear compensation**.

The developed system is responsible for pre-emptively compensating the signal in order to make unimportant the contribution of the intermodulation products due to the power amplifiers.

The signal passes through the power amplifiers and re-enters the system as to determine the distortion and the compensating adaptive filter.

In order to enable the adaptive non linear precorrection, click on the ON/OFF button.

Figure 4-16 Adaptive Non Linear Precorrection



4.2.7.1 *Adaptive Non Linear Precorrection: Management panel*

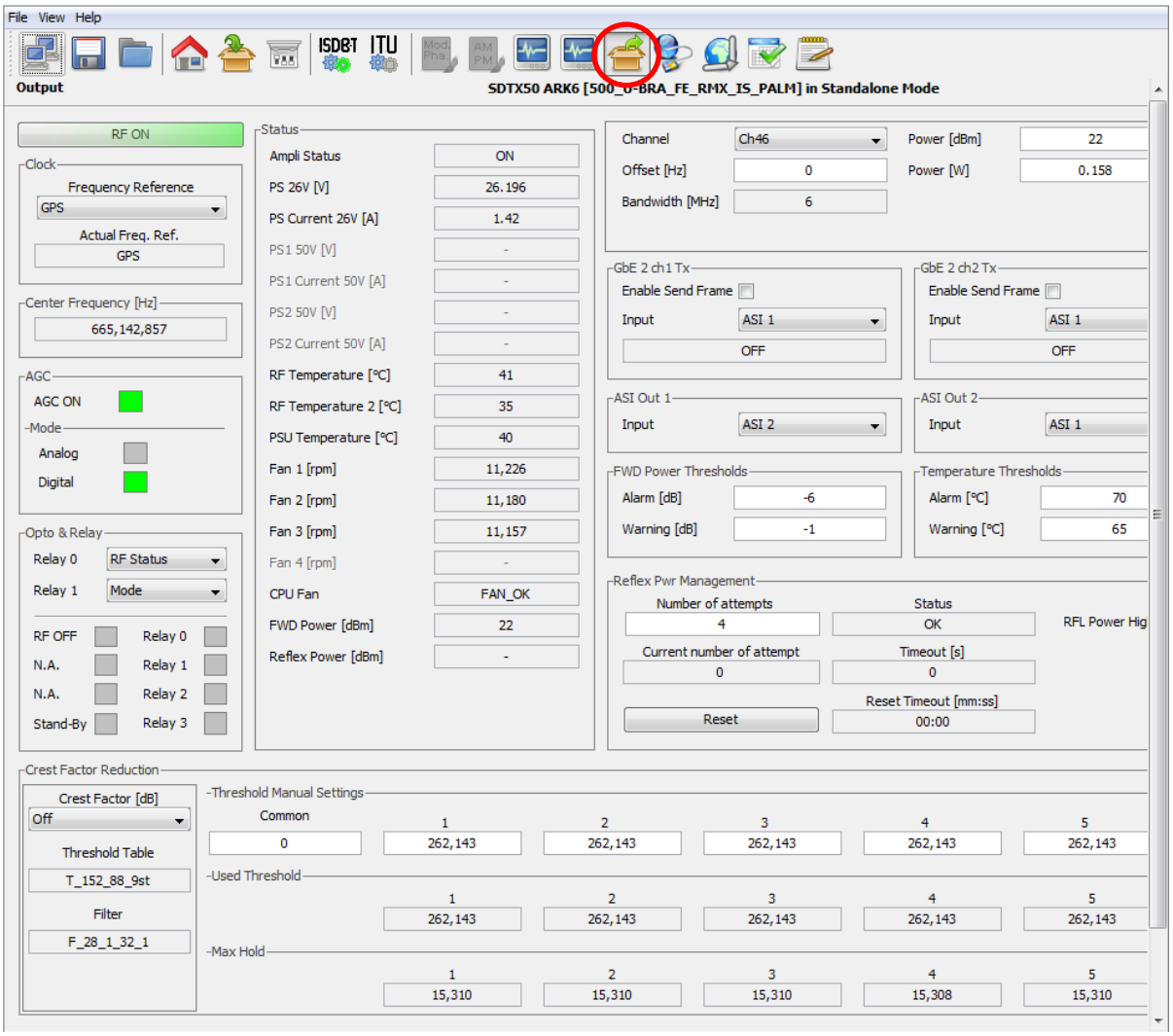
Table 4-6 Adaptive Non Linear Precorrection: Management panel

Box	Parameter / Control	Description	Admitted Ranges / Values
General	Clear	Resets the filter coefficients to zero.	
General	ON/OFF	Enables the adaptive non linear compensation.	• ON(Green):Enabled • OFF(Red): Disabled
General	Status	Shows the type of adaptive compensation currently used, if any.	• None • Linear • Non Linear
General	Low Power Rx Signal	Indicates that the signal that re-enters the system has a low power. When this flag is on, the automatic update of the filter coefficients is stopped.	• Red: Alarm On • Grey: Alarm Off
General	High Power Rx Signal	Indicates that the signal that re-enters the system has a high power. When this flag is on, the automatic update of the filter coefficients is stopped.	• Red: Alarm On • Grey: Alarm Off

4.2.8 Output

Click on Output button, highlighted in the next figure, to access the output window.

Figure 4-17 Output window



Use the Output window to change Ethernet, RF and ASI outputs settings, and to monitor all available hardware indicators.

In this section are described the common parts of the Output window

The Crest Factor Reduction section is described in ISDB-T Mode Manual ARK6

Table 4-7 Output window

Box	Parameter / Control	Description	Admitted Ranges / Values
General	RF ON / OFF	Output RF signal enabling. The possible output RF signal status are the following: • ON; • RF OFF: automatic switch off of the output signal (refer to Amplifier status); • OFF: manual switch off of the output signal.	• Green: ON • Green: RF OFF • Red: OFF
Clock	Frequency reference	Frequency reference source selector. This command will select the reference source used to lock the internal clocks (10 MHz and 1 PPS). When set to internal the 10 MHz clock and 1 PPS generator runs unlocked. When set to external or GPS the 10 MHz clock is locked to the source selected and the 1 PPS counter reset is triggered by the source 1 PPS. Note: External 10 MHz, 1PPS and GPS shall be connected and locked when the External and GPS are selected as frequency references. If the Network Mode is SFN and the Frequency Reference is set to Internal, the frequency reference is automatically forced to GPS and the event “Freq Ref Forced: GPS” is generated Use the Actual Freq. Ref.indicator in order to check the used reference source.	• External • Internal • GPS
Clock	Actual Freq. Ref.	Frequency reference source actually used.	• External • Internal • GPS
Centre Frequency[Hz]		Shows the output centre frequency expressed in Hz.	
AGC	AGC ON	AGC status.	• Green: ON • Grey: OFF

Box	Parameter / Control	Description	Admitted Ranges / Values
Status	PS1 26V / 42V	First PSU voltage indicator (values are expressed in V). It depends on the hardware type of the device: • 26V for SDTx 20 and SDTx 50; • 42V for SDTx 201 and SDTx 501.	
Status	PS1 Current 26V / 42V [A]	First PSU current indicator (values are expressed in A) It depends on the hardware type of the device: • 26V for SDTx 20 and SDTx 50; • 42V for SDTx 201 and SDTx 501.	
Status	PS1 24V	First PSU 24V indicator (values are expressed in V). Only in SDTX 201 and SDTX 501 version.	
Status	PS2 42V	Second PSU voltage indicator (values are expressed in V). Only in SDTX 501 version.	
Status	PS2 Current 42V [A]	Second PSU current indicator (values are expressed in A) Only in SDTX 501 version.	
Status	PS2 24V	Second PSU 24V indicator (values are expressed in V). Only in SDTX 501 version.	
Status	Amplifier status	Current amplifier status indicator: • ON: the amplifier has been manually set to on and no alarms or settings switched it off • OFF: when an alarm of over current, over voltage or over power occurs on the second Power Supply, the Amplifier is restarted a specific number of times, if the alarm is still on, the Amplifier is automatically switched off. Single Power Supply models do not support this status • Restart: the amplifier has been automatically restarted due to	• ON • OFF • Restart • Stand-by OFF • Init

Box	Parameter / Control	Description	Admitted Ranges / Values
		an alarm for over current, over voltage or forward power exceeding the upper limit on the second Power Supply. Single Power Supply models do not support this status • Stand-by OFF: the equipment has been put on Standby mode and the amplifier has been automatically muted • Init: at every amplifier initialization the amp is automatically switched off. • Alarm OFF: an alarm switched off the amplifier • RF OFF: amplifier manually set to off • Opto OFF: output RF is switched off by an optocoupler • Change mode: the amplifier is automatically switched off during the mode switch (e.g. T1 / T2) • Missing file OFF: the amplifier is automatically switched off because of the lack of *.cdef and *.def files (additional files will be included in future releases). • Loading New Config: the amplifier is automatically switched off during the loading of new T2 configuration parameters, • Reflex Pwr High retry: the output RF stage has been restart because of the reflex power that has gone over the maximum threshold. • Reflex Pwr Alarm: the maximum number of attempts to restore the system after a Reflex Power High warning has been reached, the equipment is in Reflex Power High alarm and the Amplifier has been automatically switched off. • Test Mode: the amplifier is in ON state, but the transmitter is modulating a test signal instead of the selected input. • Start New Firmware: during the loading of a new fw the output RF is OFF. • Restart Mode: a system error occurs and the FPGA fw boot is forced. During this operations the amplifier is turned OFF.	• Alarm OFF • RF OFF • Opto OFF • Change mode • Missing file OFF • Loading New Config • Reflex Pwr High Retry • Reflex Pwr High Alarm • Test Mode • Start New Fw • Restart Mode
Status	RF Temperature [°C]	Case temperature indicator (values are expressed in °C).	
Status	RF Temperature 2 [°C]	2nd Case temperature indicator (values are expressed in °C). Only in SDTX 200 version.	

Box	Parameter / Control	Description	Admitted Ranges / Values
Status	PSU Temperature	PSU temperature indicator (values are expressed in °C).	
Status	Fan 1	Fan 1 speed indicator (values are expressed in rpm). Used in SDTX20, SDTX50 and SDTX201	
Status	Fan 2	Fan 2 speed indicator (values are expressed in rpm). Used in SDTX20, SDTX50 SDTX201, and SDTX501	
Status	Fan 3	Fan 3 speed indicator (values are expressed in rpm). Used in SDTX201, and SDTX501	
Status	Fan 4	Fan 4 speed indicator (values are expressed in rpm). Used in SDTX201, and SDTX501	
Status	CPU Fan	Shows the status of the CPU fan. There are two types of errors: • Fan fault: fan speed equal to zero; • No Fan: the CPU fan is not connected.	• FAN_OK • FAN_FAULT • NO_FAN
Status	FWD Power [dBm]	Output forward power indicator (values are expressed in dBm).	
Status	Reflex Power [dBm]	Output reflex power indicator (values are expressed in dBm).	
Opto & Relay	Relay 0	Selector of Relay 0 mode.	• Alarm: indicator of an alarm condition • Idle: RFU • RF Status: indicator output RF signal status (on/off)

Box	Parameter / Control	Description	Admitted Ranges / Values
Opto & Relay	Relay 1	Selector of Relay 1 mode.	• Alarm: indicator of an alarm condition • Mode: indicator of operating mode
Opto & Relay	Relay 0…3	Relays status indicators.	• Green: Alarm on/RFU/RF Off • Grey: Alarm off/RFU/RF On
Opto&Relay	RF OFF	RF Off Opto status indicators. Opto 0 is a output RF manual on/off switch: • Closed (0): RF off • Opened (1): RF on (default value)	• Green: Closed (0) • Grey: Opened (1)
Opto&Relay	N.A.	**NOT AVAILABLE** Switch mode Opto status indicators. When the Switch mode is set to Opto: • Closed (0): Switch to mode B • Opened (1): Switch to mode A	• Green: Closed (0) • Grey: Opened (1)
Opto&Relay	N.A.	**NOT AVAILABLE** Retry of amplifier alarms status indicators.(only in SDTX 201 version);	• Green: Closed (0) • Grey: Opened (1)
Opto&Relay	Stand-By	Stand-by enabling Opto status indicators (in version SDTX 20/50/201): • Closed (0): stand-by on • Opened (1): stand-by off Interlock Opto status indicators (only in SDTX 501 version): • Closed (0): Interlock off • Opened (1): Interlock on	Stand-by enabling Opto status indicators • Green: Closed (0) • Grey: Opened (1) Interlock Opto status indicators • Green: Closed (0) • Red: Opened (1)

Box	Parameter / Control	Description	Admitted Ranges / Values
General	Channel	Output channel.	Channel ranges are device's definition dependant.
General	Offset [Hz]	Output frequency offset (expressed in Hz).	• Min: -200 kHz • Max: +200 kHz
General	Power [dBm]	Output power (expressed in dBm).	Output power ranges are device's definition dependant.
General	Power [W]	Output power (expressed in W).	
FWD Power Thresholds	Warning [dB]	Forward power warning threshold expressed in dB.	• Min: -16 dB • Max: 0 dB
FWD Power Thresholds	Alarm [dB]	Forward power alarm threshold expressed in dB.	
Temperature Thresholds	Warning [°C]	Temperature warning threshold expressed in °C.	• Min: 50 °C • Max: 74 °C
Temperature Thresholds	Alarm [°C]	Temperature alarm threshold expressed in °C.	
GbE 2 ch1/2 Tx	Enable send frame	Ethernet channel 1 transmission enabling.	• Checked: Enabled • Not checked: Disabled

Box	Parameter / Control	Description	Admitted Ranges / Values
GbE 2 ch1/2 Tx	Input	It selects which TS input shall be re-transmitted on RTP output channel 1. This selection is totally independent from the selection of the TS input to the modulator.	• ASI 1 • ASI 2 • ASI 3 • ASI 4 • Tuner • GbE 2 ch1 • GbE 2 ch2 • Remux (only for ISDB-T Mode)
GbE ch1/2 Out	Status	Ethernet transmission on channel 1/2 status indicator.	• Resolving IP Adr. • IP not found • No entry • Transmitting data • Transmitting data multicast • No TS input • ON • OFF

Box	Parameter / Control	Description	Admitted Ranges / Values
ASI Out 1/2	Input	Select which Transport Stream shall be re-proposed on ASI OUT 1/2 output. This selection is totally independent from the selection of the TS input of the modulator.	• ASI 1 • ASI 2 • ASI 3 • ASI 4 • Tuner • GbE 2 ch1 • GbE 2 ch2 • Remux (only for ISDB-T Mode)

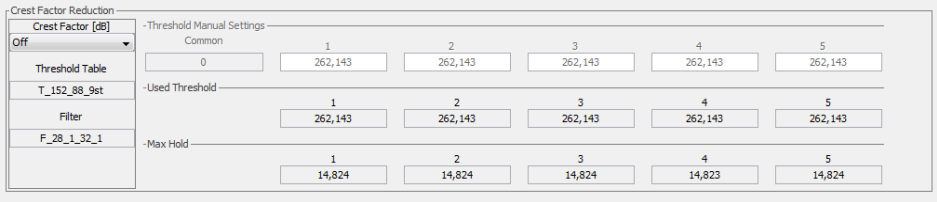
4.2.8.1 *Crest Factor Management*

Crest factor management section allows disciplining the Peak to average ratio or Crest Factor of the output signal.

Threshold manual settings are for debugging purposes only and shall be ignored.

The Crest Factor section allows selecting the enabling of the crest factor reduction and the amount of crest factor allowed.

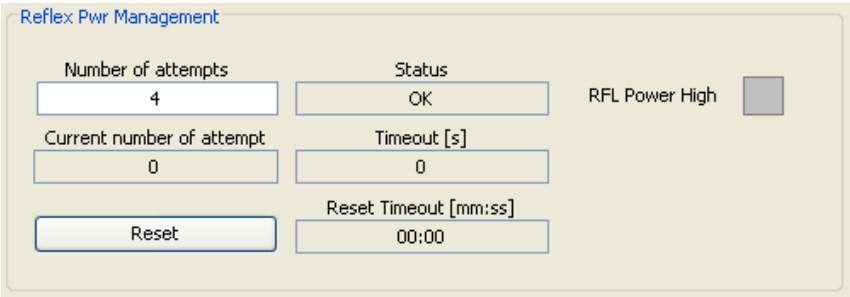
Figure 4-18 Crest factor Management



4.2.8.2 *Reflex Power Management*

The ARK6 is provided with a reflex power control logic that prevents the amplifier stage from being permanently damaged.

Figure 4-19 Reflex Pwr Management



If the output reflex power goes over its alarm threshold, the amplifier stage is automatically shut down and the system reacts to this situation on the basis of the user selectable “Number of attempts”.

In the case that the user sets a “Number of attempts” equal to zero, the red “RFL Power High” LED is turned on, the “Status” indicator shows “Alarm” and the amplifier stage is shut down by a “Reflex Pwr High Alarm”.

In the case that the user sets N as “Number of attempts”, where N is different from zero, a self test is conducted to determine if the system can be successfully restored. The red “RFL Power High” LED is turned on, the “Status” indicator shows “Warning” and the amplifier stage is restarted N times. The delay between two consecutive attempts is fixed to 10 seconds. At every RF ON/OFF the “Ampli status” indicator will show “Reflex Pwr High Retry”. When the maximum number of attempts is reached, the “Status” indicator shows “Alarm” and the amplifier stage is shut down by a “Reflex Pwr High Alarm”.

When the “Reflex Pwr High Alarm” is on the amplifier stage is permanently shut down. Once the operator has carried out the necessary checks, the amplifier shall be manually reset through the button “Reset”.

If the RFL power control mechanism is in warning state and the RFL power level doesn't go over the alarm threshold for 30 minutes, the amplifier stage is automatically reset.

The events associated to the reflex power control logic are the following:

I. "RFL Power Warning": the reflex power level is higher than the specification and the "Number of attempts" is different from zero.

II. "RFL Power OK": RFL power goes under the alarm threshold.

III. "RFL Power Alarm": RFL power goes over the alarm threshold for N times, where N is the number of attempts specified in the Output page of the Java GUI.

IV. "RFL RF OFF": The output RF has been switched off because of either a RFL Power Warning (for every attempt to restore the system) or a RFL Power Alarm.

V. "RFL RF ON "*N":* The output RF has been switched on after attempt number "*N*".

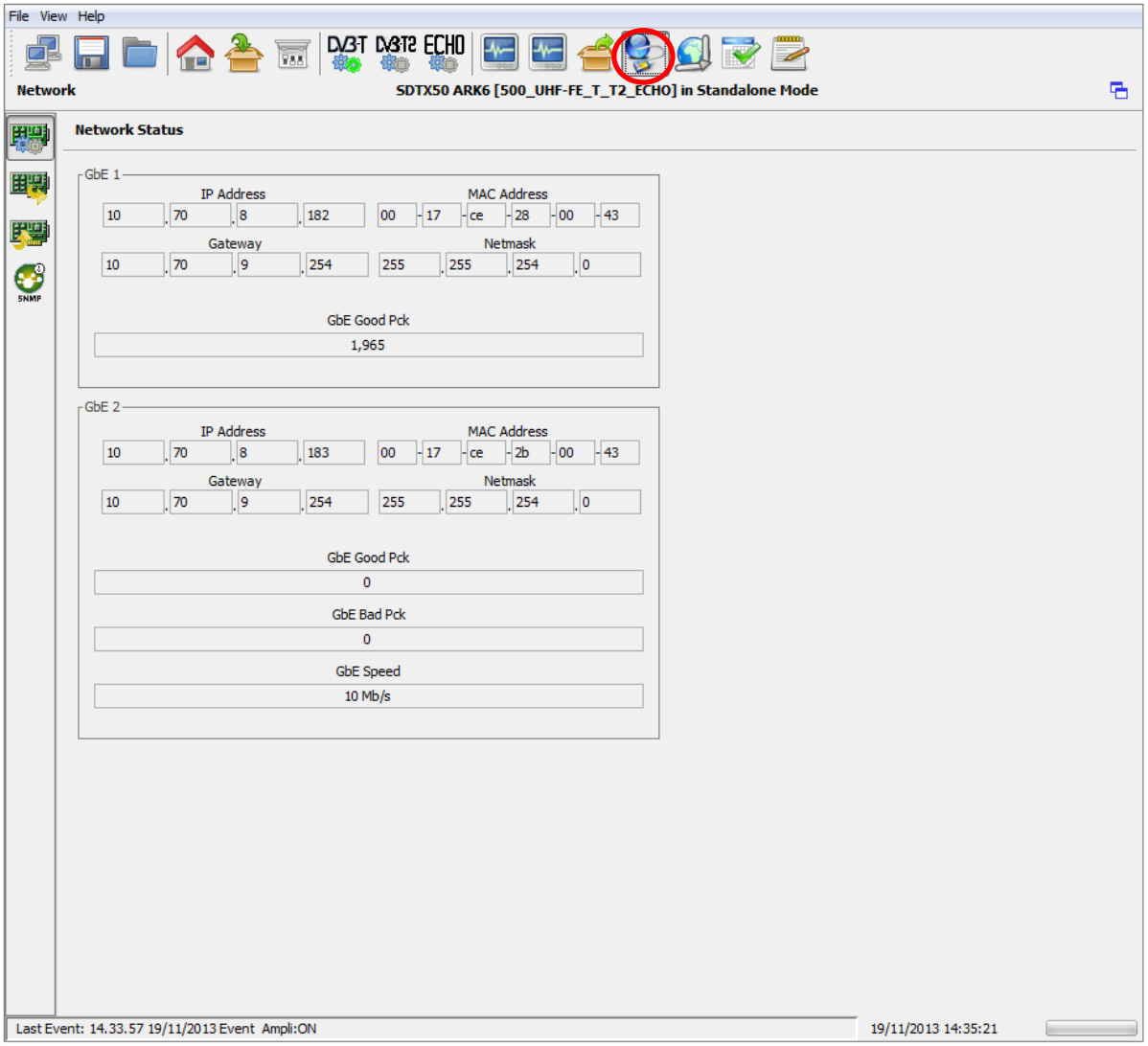
Table 4-8 Output window: Reflex Pwr Management

Box	Parameter / Control	Description	Admitted Ranges / Values
Reflex Pwr Management	Number of attempts	The number of attempts to restore the system after RFL power has gone over the alarm threshold.	• Min: 0 • Max: 255
Reflex Pwr Management	Current number of attempt	The current number attempt to restore the system.	• Min: 0 • Max: "*Number of attempts*"
Reflex Pwr Management	Status	It shows the current status of the Reflex Power.	• OK • Warning • Alarm
Reflex Pwr Management	RFL Power High	It shows if RFL power goes over the alarm threshold.	• Red: RFL power over the alarm threshold • Grey: RFL power under the alarm threshold
Reflex Pwr Management	Timeout [s]	The timeout between two consecutive attempts.	Fixed to 10 seconds
Reflex Pwr Management	Reset	This button resets the amplifier stage when it is switched off due to a Reflex Power High alarm.	
Reflex Pwr Management	Reset Timeout [s]	If the RFL power control mechanism is in warning state and the RFL power level doesn't go over the alarm threshold for 30 minutes, the amplifier stage is automatically reset.	Fixed to 30 minutes

4.2.9 Network

Click on Network button, highlighted in the next figure, to access the Network management window.

Figure 4-20 Network window



This page is divided in subpages to provide monitoring and control over network configuration, TS over IP transmission and reception and SNMP parameters.

TS over IP is not available for ECHO repeater and ITU modulator modes. When the device is working in these modes the sub-pages can be accessed but all the controls and indicators are disabled.

Note: The Clock Recovery Function, used in MFN transmissions of received streams on Ethernet channels 1 and/or 2, is based on the timestamps of incoming packets. UDP packets do not contain these timestamps information therefore it is not allowed using GbE inputs with UDP protocol in MFN transmission mode.

4.2.9.1 Network status

This sub page allows the monitoring of the parameters set for both the Gigabith Ethernet physical ports available.

All the parameters can only be read on java GUI, use the local display interface to change IP address, Gateway address and subnet mask in order to connect the device to your network.

MAC address is factory imposed and cannot be changed.

Figure 4-21 Network status page

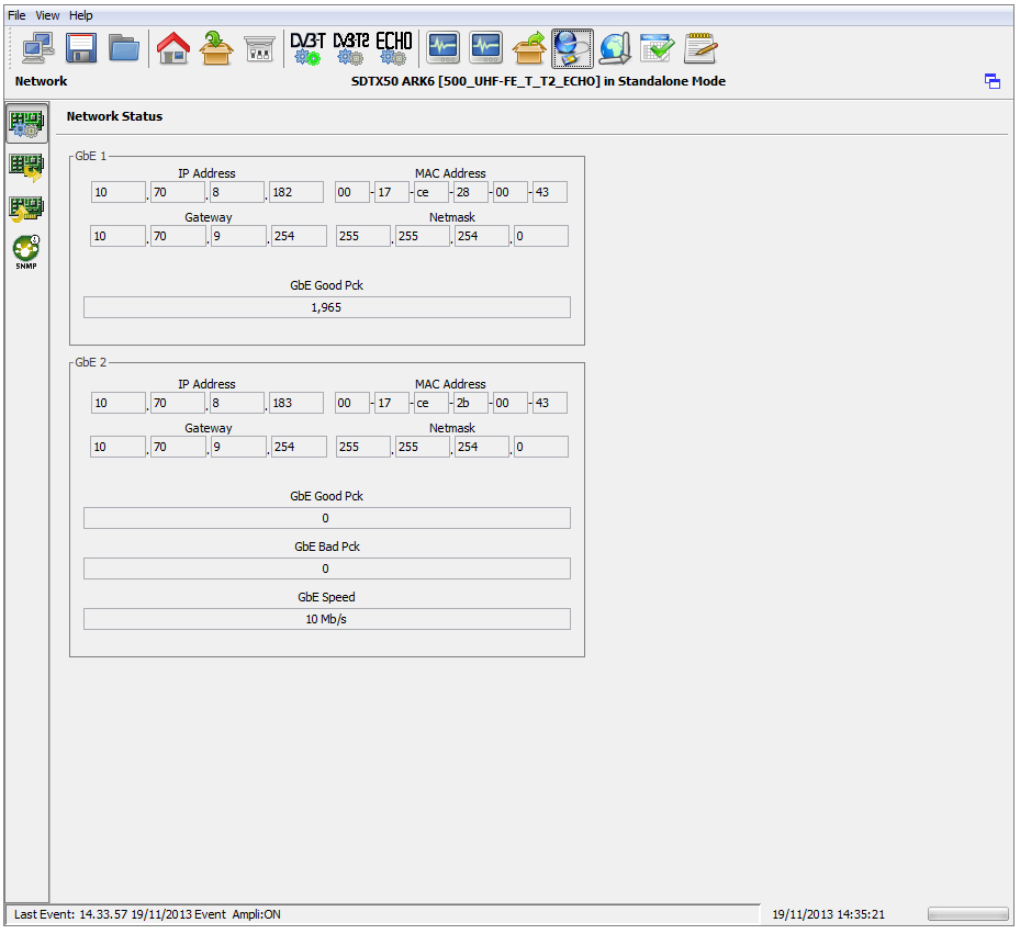


Table 4-9 Network status page

Box	Parameter / Control	Description	Admitted Ranges / Values
GbE 1	IP address	Management GBe port IP address.	
GbE 1	MAC address	Management GBe port MAC address.	
GbE 1	Gateway	Management GBe port Gateway address.	
GbE 1	Netmask	Management GBe port Netmask.	
GbE 1	GbE Good Pck	Total amount of frames delivered to the higher-level protocol for management port.	
GbE 2	IP address	Data TX/RX port IP address.	
GbE 2	MAC address	Data TX/RX port MAC address.	
GbE 2	Gateway	Data TX/RX port Gateway address.	
GbE 2	Netmask	Data TX/RX port Netmask.	
GbE 2	GbE Good Pck	Total amount of frames delivered to the higher-level protocol of the data transfer port.	
GbE 2	GbE Speed	Ethernet connection speed of the data TX/RX port. No duplex information is provided.	• 10 Mbit/s • 100 Mbit/s • 1 Gbit/s
GbE 2	GbE Bad Pck	The number of packets received on the data TX/RX port that contained errors .	

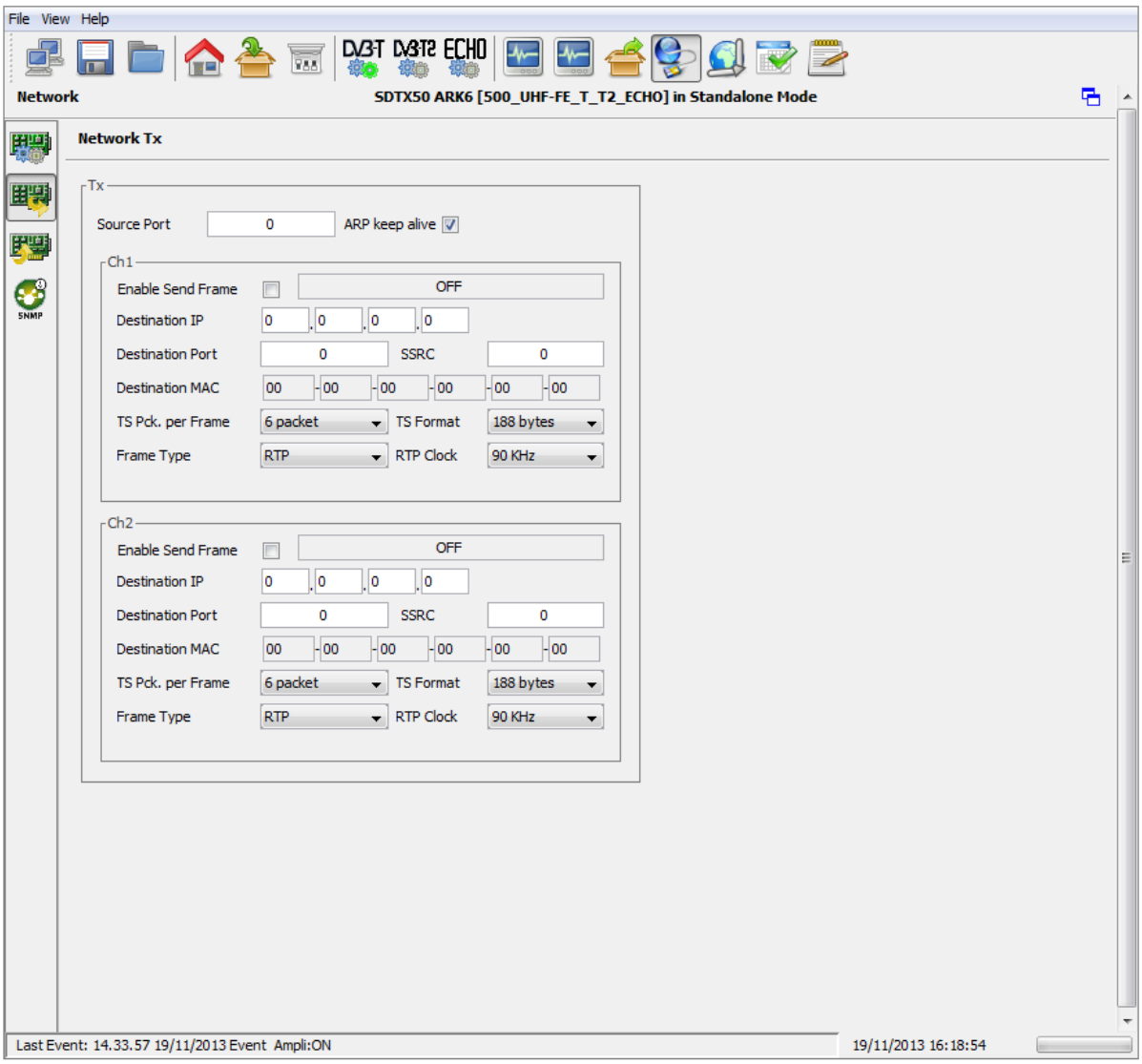
4.2.9.2 Network Tx

This sub page allows the setting of the parameters used by the TS over IP transmission feature.

ARK6 devices have the capability to send one selected input (refer to 4.2.8 Output) through one of the two available sockets opened on the data transmission Ethernet port GBe2.

Unicast or multicast destination IP address can be selected along with detination UDP port used. UDP and RTP protocol are supported.

Figure 4-22 Network tx page



The network transmission feature is not available for analog modulator (ITU) and echo canceller modes.

Table 4-10 Network TX page

Box	Parameter / Control	Description	Admitted Ranges / Values
TX	Source Port	Source Port of the transmitter IP packets	• Min: 0 • Max: 65,535
TX	ARP keep alive	When the transmission is performed in the same network and involves Ethernet switches devices, it could be useful to enable this feature in order to send periodic ARP request to keep refreshed the MAC address memory of the in between Ethernet devices. This feature is recommended disabled when the transmission is performed over microwaves links or mono-directional links because it stops the transmission if the ARP response is not received after a timeout.	• Unchecked: disabled • Checked: enabled
TX – Ch 1 / Ch2	Enable send frame	Channel 1 Ethernet transmission enabling.	• Not checked: disabled • Checked: enabled
TX – Ch 1 / Ch2	Transmission status	Show the status of the output Ethernet transmission	• Resolving IP Addr. • IP not found • No entry • Transmitting data • Transmitting data multicast • ON OFF
TX – Ch 1 / Ch2	Destination IP	Channel 1 Ethernet transmission destination IP address. Unicast or multicast addresses can both be used. The device will automatically manage the destination MAC address definition.	• Four fields ranges from 0 to 255 • Addresses from 224.0.0.0 to 239.255.255.255 are used for multicast transmission

Box	Parameter / Control	Description	Admitted Ranges / Values
TX – Ch 1 / Ch2	Destination Port	Port used for RTP/UDP data transmission	• Min: 0 • Max: 65,535
TX – Ch 1 / Ch2	SSRC	SSRC identifier of the RTP transmission on channel 1	
TX – Ch 1 / Ch2	Destination MAC	Destination MAC address.	• Automatically set based on destination IP address. If the IP address is out of the network the gateway MAC address will be set.
TX – Ch 1 / Ch2	TS Pck per Frame	Number of packets per frame.	• Min: 1 • Max: 7
TX – Ch 1 / Ch2	Frame type	Transmission protocol selector.	• RTP • UDP
TX – Ch 1 / Ch2	TS Format	Transmission format.	• 188 Bytes • 204 Bytes
TX – Ch 1 / Ch2	RTP Clock	RTP packets clock reference.	• 90 kHz • 27 MHz

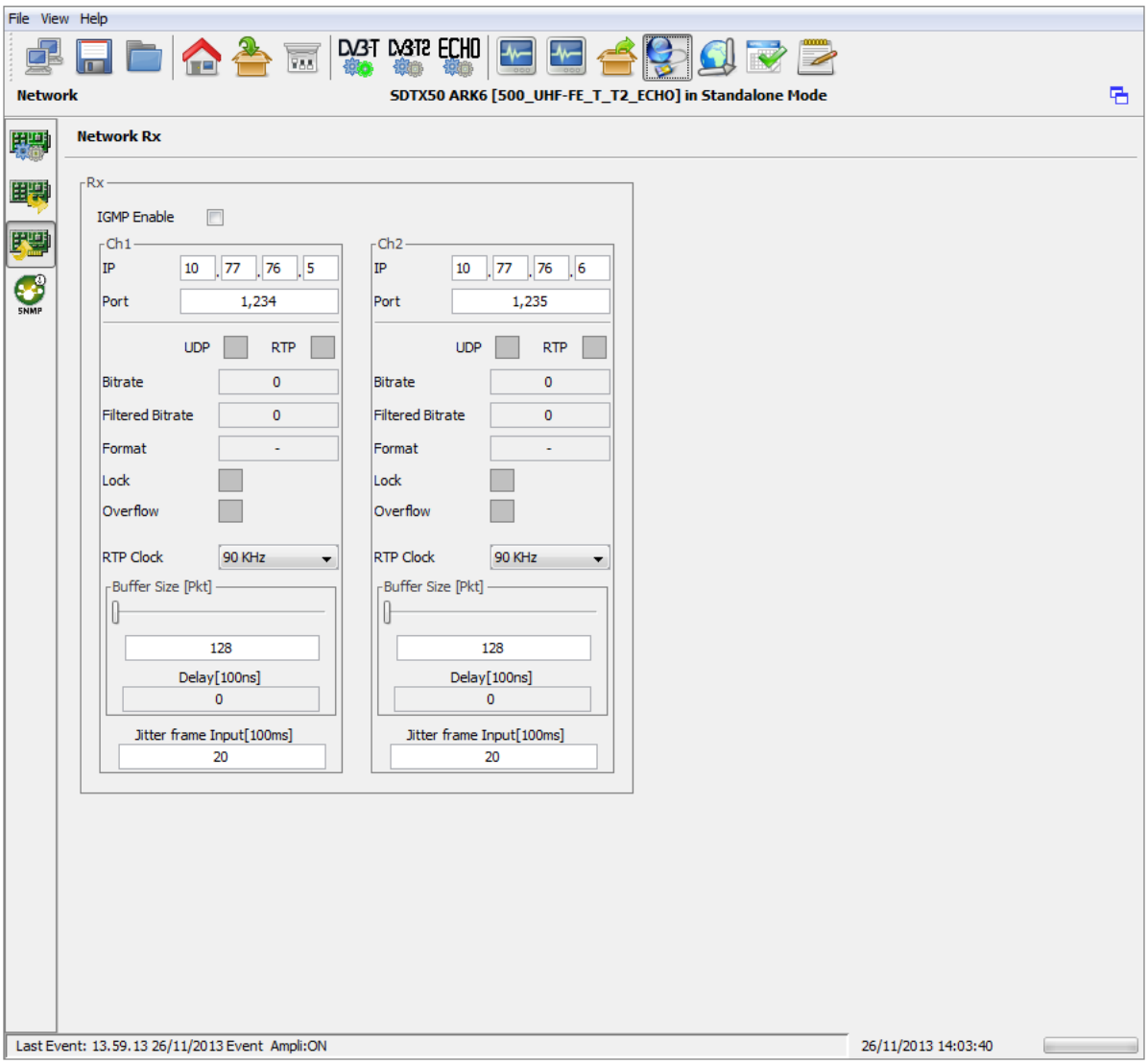
4.2.9.3 *Network RX page*

This sub page allows the setting of the parameters used by the TS over IP receiver feature.

ARK6 devices have the capability to receive two different TS from two available sockets opened on the data Ethernet port GBe2.

Unicast or multicast IP address can be used along with receive UDP port. UDP and RTP protocol are supported. For out of network multicast data flow the IGMP v2 routing protocol can be used.

Figure 4-23 Network rx page



The network transmission feature is not available for analog modulator (ITU) and echo canceller modes.

Table 4-11 Network RX page

Box	Parameter / Control	Description	Admitted Ranges / Values
RX	IGMP Enable	Enable the IGMP protocol for the reception of out of network multicast streams. This control can be enabled when multicast IP addresses are used in the IP address fields of ch1 and ch2. Every time one of the rx IP addresses is changed the IGMP is automatically disabled and must be enabled again.	• Unchecked: disabled • Checked: enabled
RX Ch1 / RX Ch2	IP	The IP address used to receive the TS over IP stream. This address doesn't have to be the same as the physical address of the Gbe 2 data port but need to be on the same network if it is a unicast address. ARK6 device can manage only unicast or multicast addresses at the same time, this means that if a multicast addres was set on one channel the other is set automatically with a multicast address too (not necessary the same).	• Four fields ranges from 0 to 255 • Addresses from 224.0.0.0 to 239.255.255.255 are used for multicast transmission
RX Ch1 / RX Ch2	Port	Receiving port for UDP/RTP data stream. The different ports can be set on two different channels with the same IP address in order to identify different sockets.	• Min : 0 • Max : 65,535

RX Ch1 / RX Ch2	Protocol	Ethernet input packets protocol is automatically detected after input UDP packet data analysis. UDP and RTP protocols are supported.	• UDP/RTP:
			  ○ Green: Detected
			  ○ Grey: Not detected

RX Ch1 / RX Ch2	Bitrate	Shows the actual bitrate of the TS extracted from the received IP data stream	
RX Ch1 / RX Ch2	Filtered bitrate	Bit-rate actually used by the modulator.	• Zero when the input is not selected • Equal to the total bit-rate, when Delete Null Packets disabled • Less than total bit-rate, when Delete Null Packets enabled

Box	Parameter / Control	Description	Admitted Ranges / Values
RX Ch1 / RX Ch2	Format	Received transmission format.	• 188 Bytes • 204 Bytes
RX Ch1 / RX Ch2	Lock	Ethernet input lock status indicator. The input Transport Stream is locked when no more than two consecutive Sync Byte are missed.	• Green: Lock • Grey: Not locked
RX Ch1 / RX Ch2	Overflow	Input GbE overflow alarm status. This alarm condition occurs when the input bit-rate exceeds the capability of the modulation (Ref. to ETSI EN 302 755).	• Red: Alarm on • Grey: Alarm off
GbE 2 ch1/2 Rx	RTP Clock	RTP packets source clock reference. While 90 kHz is the default of the SMPTE standard on some environment 27 MHz clock with higher precision but less resilient to jitter are used.	• 90 kHz • 27 MHz
GbE 2 ch1/2 Rx/Buffer Size	Pkt	GbE Rx buffer depth. This control sets the dimension, expressed as IP packets of the input buffer. A higher buffer increase the performances in term of jitter resiliency and data reception but also rises the delay of transmission of the device. Longer buffer are recommended on fixed delay environment (e.g. SFN transmission) when the transmitter already got a fixed delay to wait that is higher than the delay applied by this buffer.	• 128..2046 (settable by value insertion or using the sliding cursor)
GbE 2 ch1/2 Rx/Buffer Size	Delay [100ns]	Buffer Inserted delay. Shows the delay expressed as 10MHz clock counts (100ns) applied by this buffer. The delay is automatically calculated and depends on the buffer length and on the input bitrate.	
	Jitter Frame Input [100ms]	Timeout used to declare loss of GbE Input.	• 1..100 x100ms

4.2.9.4 *Network SNMP page*

This sub page allows the setting of parameters for the SNMP interface communication.

This page allows the setting of SNMP communities used to protect the SNMP communication, the IP addresses used to send the Trap messages and the version of SNMP used.

Up to three different IP addresses can be set for trap messages, refer to 4.2.11 Alarms for the description of the association between alarms and traps.

Figure 4-24 Network SNMP page

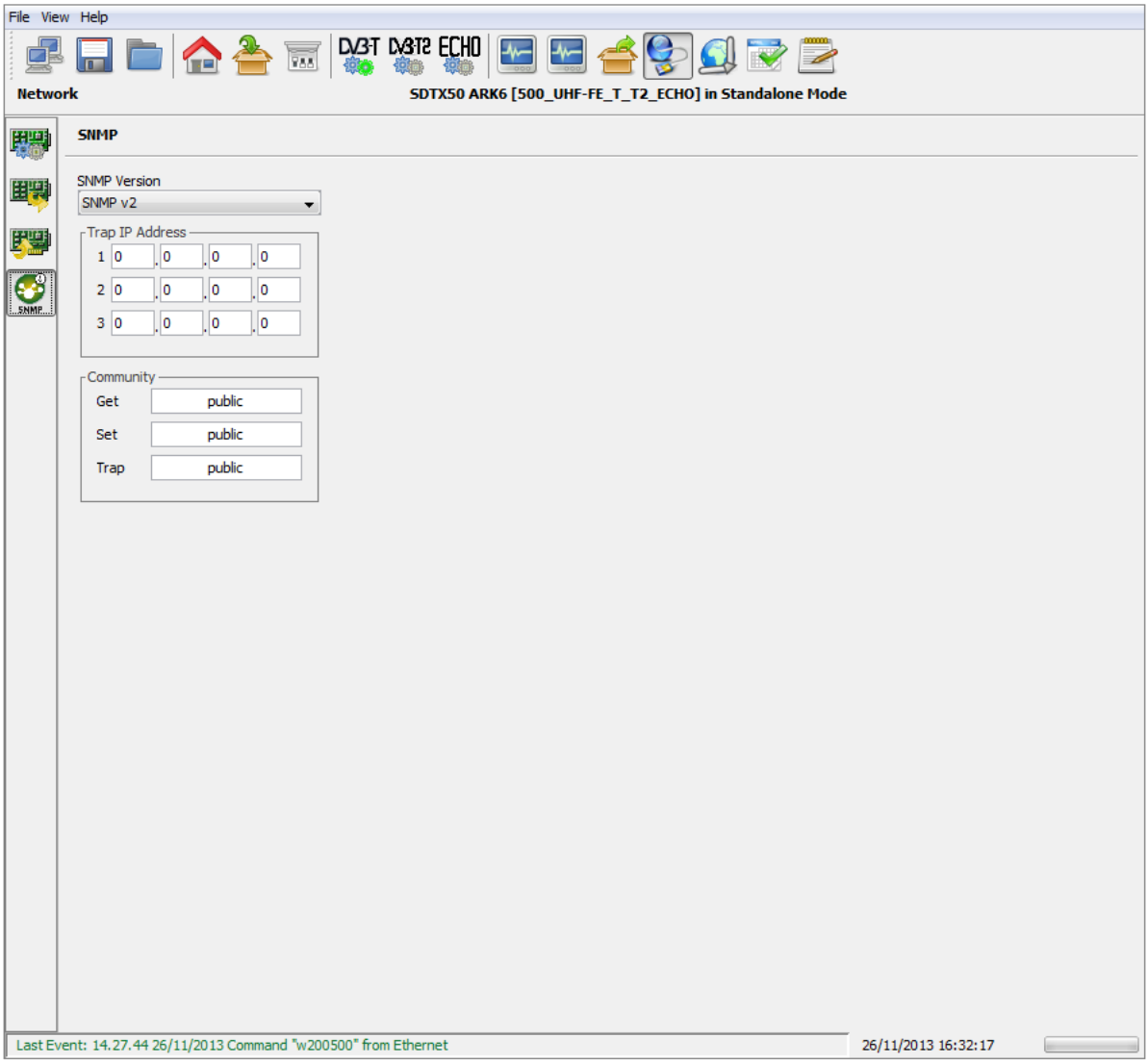


Table 4-12 Network SNMP page

Box	Parameter / Control	Description	Admitted Ranges / Values
Community	Get	Read community setting.	• Any string between 1 and 15 characters
Community	Set	Set community setting.	• Any string between 1 and 15 characters
Community	Trap	Trap community setting.	• Any string between 1 and 15 characters
SNMP	SNMP version	Set the SNMP protocol version used. Not all monitoring features could be available when the older v1 version is used so using the v2 version is recommended.	• SNMP v1 • SNMP v2

4.2.10 GPS - clock

Click on GPS button, highlighted in the next figure, to access the GPS received statistics window and the system clock reference selection.

Figure 4-25 GPS – clock window

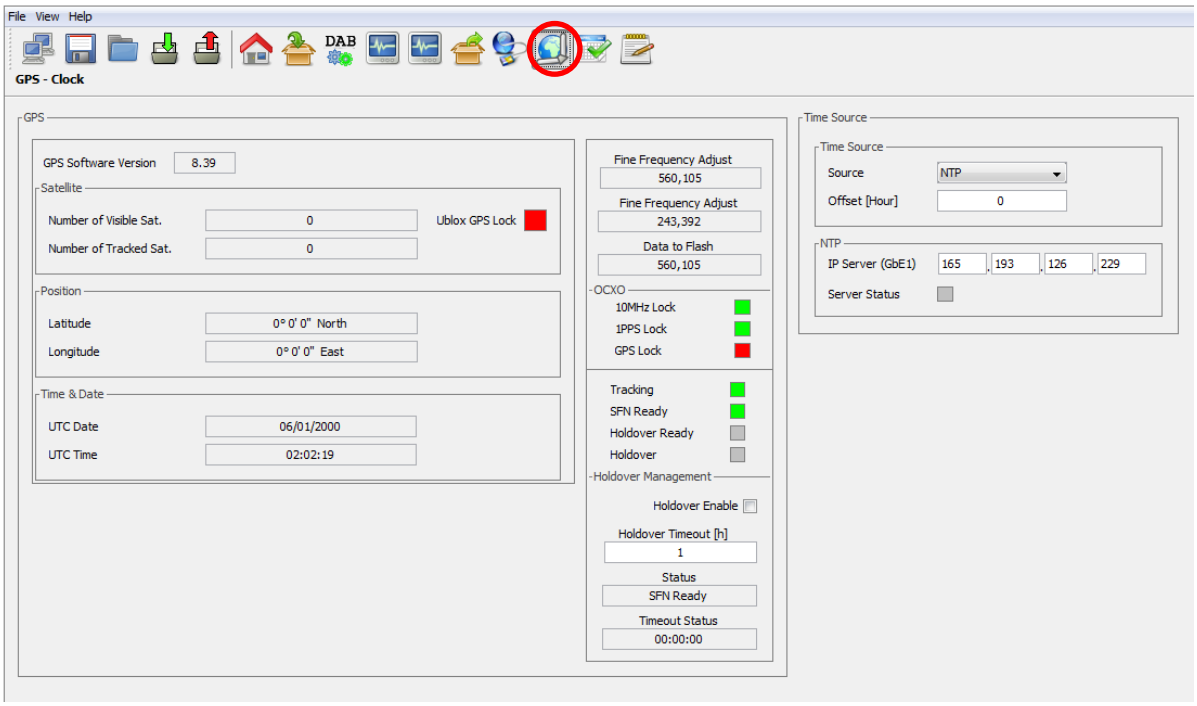


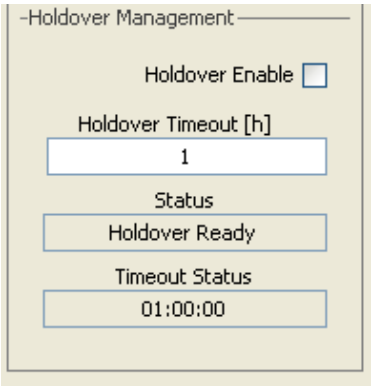
Table 4-13 GPS window

Box	Parameter / Control	Description	Admitted Ranges / Values
General	GPS Software Version	The firmware version of the GPS module.	
Satellite	#Number of Visible sat	Number of visible GPS satellites indicator.	
Satellite	#Number of Tracked sat	Number of tracked GPS satellites indicator.	
Satellite	Ublox GPS Lock	Ublox GPS Lock status. This LED shows the GPS lock status derived from live data provided by the GPS receiver through a proprietary protocol.	• Green: GPS Locked • Red: GPS Not Locked
Position	Latitude (°)	Site latitude expressed in degrees.	
Position	Longitude (°)	Site longitude expressed in degrees.	
Date & Time	UTC Time	Current time indicator. Each GPS satellite has an atomic clock and continually transmits messages containing the current time and date at the start of the message sent by the GPS itself.	
Date & Time	UTC Date	Current date indicator. Each GPS satellite has an atomic clock and continually transmits messages containing the current time and date at the start of the message send by the GPS itself.	
Date & Time	Hour Offset	Time Offset used for Device Time and TOT/TDT time-related inforamtion	-12..+12

4.2.10.1 Holdover Management

The ARK6 includes a holdover function provided by a higher grade Oven-Controlled Crystal Oscillator.

Figure 4-26 Holdover Management



The ARK6 is equipped with an internal OCXO for improved phase noise and stability. The system is provided with internal 10MHz and 1PPS signals which are disciplined to the GPS time signal or to the 10MHz and 1PPS external references. The stability of internal frequency and phase is assured by the highly stable OCXO. If the satellites signal, from the GPS receiver, or the external reference sources are completely lost, the Holdover mode enables the unit to keep working with internal 10MHz and 1PPS for the duration of the Holdover Timeout, with very low drift over time. If the timeout period elapses prior to regain the lock of the selected clock reference source and the Holdover function is enabled, the alarm “Holdover” is raised.

Depending on the conditions, the Holdover function can work in one of the following state:

1. *Holdover OFF*
    a. Condition 1: the clock reference is changed and the OCXO is not locked yet.
    b. Condition 2: the input clock reference is not present.
    c. Associated event: “Holdover OFF”-
2. *SFN Ready*
    a. Condition: the OCXO is locked to the selected frequency reference and the system is waiting for the OCXO stabilization.
    b. Associated event: “Holdover SFN Ready”.
3. *Holdover Ready*
    a. Condition 1: the OCXO is stable and the Holdover function is now available.
    b. Condition 2: the system quit the Holdover mode because the OCXO regain the lock to the selected clock reference.
    c. Associated event: “Holdover Ready”.

4. *Holdover ON*
    a. Condition: if the OCXO is no more locked to the selected frequency reference and the Holdover function is enabled and available, the equipment enters into holdover mode.
    b. Associated event: “Holdover ON”.
5. *Holdover TMO Expired*
    a. Condition: the Holdover state is “Holdover ON” (the function is enabled) and the Holdover timeout period elapses prior to regain the lock of the selected clock reference source.
    b. Associated event: “Holdover TMO Expired”.

Table 4-14 GPS window: Holdover Management

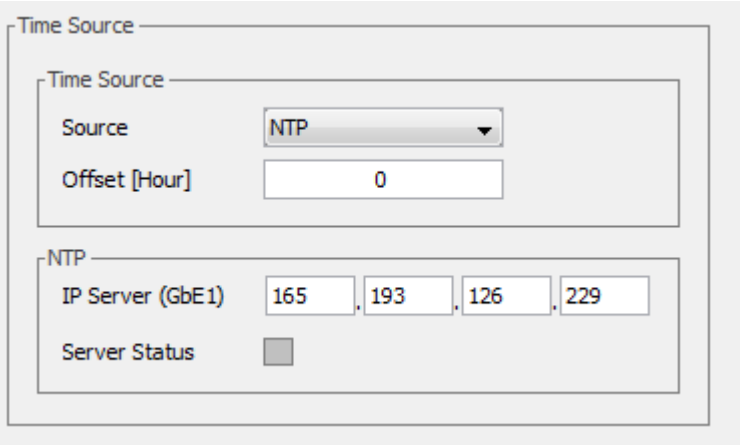
Box	Parameter / Control	Description	Admitted Ranges / Values
General	Fine Frequency Adjust	Internal frequency reference fine tuning setting. It is possible to increase and decrease the frequency offset of the OCXO with reference to the 10MHz clock by 1/21 Hz steps using the Fine Frequency Adjust. This field is accessible only if the Frequency Reference selector is set to Internal	• Min: 0 • Max: 1,048,575
General	Data to Flash	The saved DAC value during the stabilization process of the OCXO. It represents the last saved frequency offset of the OCXO, expressed in 1/21 Hz steps, with respect to the selected frequency reference source. Using External or GPS as frequency reference, the last saved Data to Flash value will be: • retained after a software reset; • reinitialized to zero after a hardware reset (unit powered down and powered back up). Using Internal as frequency reference, the last saved Data to Flash value will be overwritten with the Fine Frequency Adjust value after: 1. a software reset; 2. an hardware reset; 3. setting to Internal the frequency reference.	• Min: 0 • Max: 1,048,575
OCXO	10MHz Lock	Shows the lock status of the OCXO to the external 10MHz reference.	• Red: Not Locked • Green: Locked
OCXO	1PPS lock	Shows the lock status of the OCXO to the external 1PPS reference.	• Red: Not Locked • Green: Locked
OCXO	GPS Lock	OCXO locked to the external GPS reference.	• Green: Locked • Grey: Not Locked

Box	Parameter / Control	Description	Admitted Ranges / Values
OCXO	Tracking	It shows whenever the OCXO is not locked to the selected frequency reference or not.	• Green: Locked • Grey: Not Locked
OCXO	SFN Ready	It shows whenever the OCXO is locked to the selected frequency reference and the system is waiting for the OCXO stabilization or not.	• Green: SFN Ready • Grey: SFN Not Ready
OCXO	Holdover Ready	It shows whenever the Holdover function is available or not.	• Green: Holdover Ready • Grey: Holdover Not Ready
OCXO	Holdover	It notifies that the equipment entered into Holdover mode	• Green: Holdover On • Grey: Holdover Off
Holdover Management	Holdover Enable	Enables the Holdover mechanism.	• Checked: Enabled • Not checked: Disabled
Holdover Management	Holdover Timeout [h]	Sets the timeout of the Holdover in hour.	• Min: 0 h • Max: 24 h
Holdover Management	Status	The status of the Holdover mechanism.	• OFF • SFN Ready • Ready • ON • Expired
Holdover Management	Timeout Status	The countdown of the Holdover timeout.	• Min:00:00:00 • Max: “Holdover Timeout [s]”

4.2.10.2 *Time source management*

The time source section allows the management of the source used as reference for system clock setting.

Figure 4-27 Time Source management



The system clock can be manually set by the user or locked to one of the available external references:

- GPS: time and date are read from NMEA message from the GPS signal if locked.
- NTP: time and date are read from the connection to a NTP server.

When the reference is external the control management system periodically compares the system clock with the reference and updates it if an offset larger than 1 second occurs. A system clock update event is also logged.

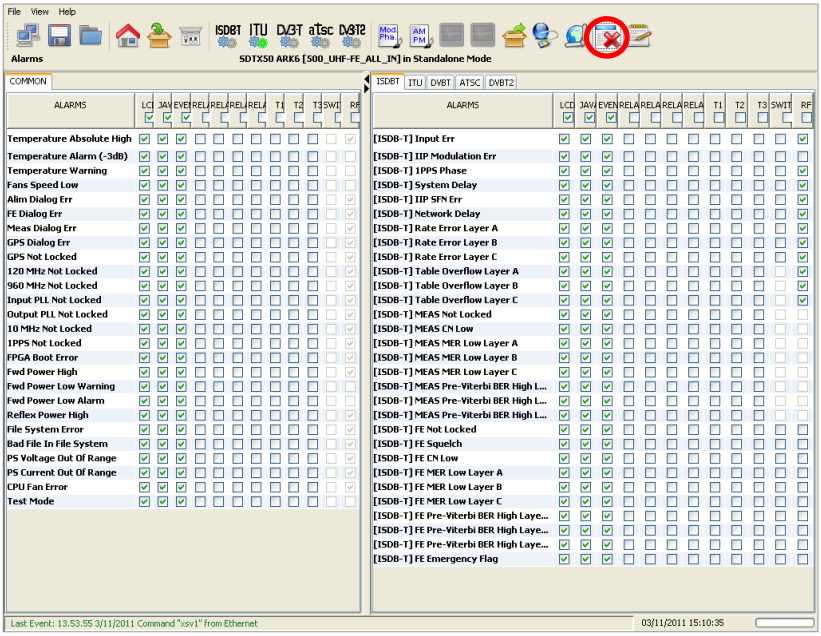
Table 4-15 Time Source parameters

Box	Parameter / Control	Description	Admitted Ranges / Values
Time source	Source	Select the reference used to synchronize the system clock. When an external source is used the system clock is updated whenever the source is present and valid and there is difference between the values of the system clock and the reference.	• Internal: no external synchronization, the clock is manually set by the user; • GPS: system clock is aligned with the clock get by GPS message; • NTP: system clock is aligned with the data get by a NTP server.
Time source	Offset	Set a clock offset. GPS and NTP time are UTC time aligned. User can set an offset in order to align the system clock to the right time zone.	• Ranges from -12 to +12 [hour]
NTP	IP Server (GbE1)	IP address of the remote NTP server. Insert a valid IP address of an active NTP server in order to open a connection for clock update. The management IP port (GbE1) is used for this connection.	• 0.0.0.0 to 255.255.255.255 a valid NTP server must answer to the connection.
NTP	Server Status	Shows the status of the NTP connection to the server.	• OFF: no valid NTP connection available. Server IP address is not right. • ON: server connection correctly established.

4.2.11 Alarms

Click on Alarms button, highlighted in the next figure, to access the alarms management window.

Figure 4-28 Alarms window



The Alarms window allows the setting of alarm masks and the monitoring of alarms status. Use alarm masks to select how and which alarm have to be notified.

Masks are organized in columns. The twelve columns represent twelve destinations of each alarm notification:

- **GUI:** the selected alarms status is notified on the Java alarm page icon.
- **LCD:** the selected alarms status is notified on LCD display lighting the alarm button and listing the alarms in the Alarms menu.
- **Event:** the selected alarms status generate an alarm event that will be logged in the event memory (refer to Events paragraph).
- **RELAY0…3:** the selected alarms switch on the corresponding relay.
- **T1…T3:** the selected alarms generate the corresponding trap messages (refer to Network paragraph to set destination IP addresses).
- **RF:** the selected alarms switch off the output RF signal. The RF mask is almost entirely fixed in order to avoid board damages or malfunctioning.
- **SWITCH:** the selected alarms trigger the automatic input switching, if enabled.

In the Alarms window, when an alarm condition occurs, the relative alarm is red highlighted. The Total check boxes enable all alarms-to-masks associations.

Alarms are divided in two different classes: common and mode-specific alarms.

Common alarms are dependent on hardware or on how the operating system has been designed. Common alarms are shared by all the operational modes.

Mode-specific alarms are dependent on the implemented functionalities and standards. Mode-specific alarms can be easily recognized thanks to the addition of the mode prefix enclosed in squared brackets.
Refer to Appendix AC for a deep explanation of the alarms related to the modes defined on the device.

Table 4-16 Alarms common window

Alarm	Description and limitations	Troubleshooting	RF mask (1)
Temperature Absolute High	Case temperature over 75°C, the maximum endurable limit.	• Check alarm and warning thresholds • Lower the output power to decrease internal temperature • Check the device airflow • Check fans	1
Temperature Alarm (-3dB)	Temperature level goes over the alarm threshold. The output power is consequently lowered by 3 dB (always within the admitted power range).		0
Temperature Warning	Temperature level goes over the warning threshold.		0
Fans Speed Low	One of the fans speed is under the minimum speed level (1,000 rpm).	• Check fans connections • Verify that fans are not damaged; in this case substitute them. The substitution can be performed during device normal operations	0
Alim Dialog Err	Communication errors between the main board and the power supply board.	• Hardware fault	1
FE Dialog Err	Communication errors between the main board and the Front-End board.	• Hardware fault	1
Meas Dialog Err	Communication errors between the main board and the Measure board.	• Hardware fault	1
GPS Not Locked	GPS signal is not locked by either the OCXO or the GPS receiver. The monitoring of this alarm is disabled when GPS is not used as clock reference or when the GPS Communication Error is raised.	• Check cable and GPS antenna connections • Hardware fault	1

Alarm	Description and limitations	Troubleshooting	RF mask (1)
GPS Dialog Err	Communication errors between main board and GPS board. The monitoring of this alarm is disabled when GPS is not used as clock reference.	• Hardware fault	1
120MHz Not Locked	120 MHz is not locked. The monitoring of this alarm is disabled when the Signal 10 MHz Not Locked alarm is raised or when GPS is used as clock reference and GPS alarm (GPS Not Locked, GPS Dialog Err) is raised.	• In SFN configuration, when selected TS input or MIP are not detected, 120 MHz oscillator can lose the lock • Hardware fault	1
960MHz Not Locked	960 MHz is not locked.	• Hardware fault	1
Input PLL Not Locked	Input PLL not locked alarm	• Hardware fault	1
Output PLL Not Locked	Output PLL not locked alarm	• Hardware fault	1
Bad File In File System	One or more of the following files are not present in the File System:	• Check files list	1

Alarm	Description and limitations		Troubleshooting	RF mask (1)
	*.cfg *.drlin *.ochf *.fpga6 *.snmp *.htm	*.jar *.def *.pwr2 *.sav *.cdef2 *.gpsf	• Reload the file system	

10MHz Not Locked	10 MHz is not locked.		• If the frequency reference is Internal: OCXO fault
			• If the frequency reference is External:
			  ○ OCXO fault
			  ○ Lack of external 10 MHz
			  ○ Hardware fault
			• If the frequency reference is GPS:
			  ○ Check GPS alarms
			  ○ OCXO fault
			  ○ Hardware fault
				1

Alarm	Description and limitations	Troubleshooting	RF mask (1)

1PPS Not Locked	1PPS is not locked to the selected frequency reference.	• If the frequency reference is Internal: OCXO fault
		• If the frequency reference is External:
		  ○ OCXO fault
		  ○ Lack of external 1PPS
		  ○ Hardware fault
		• If the frequency reference is GPS:
		  ○ Check GPS alarms
		  ○ OCXO fault
		  ○ Hardware fault
			1

FPGA Boot alarm	FPGA boot has not been successfully completed.	• Restart the machine • Reload the file system	1
Forward Power High	FWD power goes over the maximum endurable limit.	• Hardware fault	1
Forward Power Low Warning	FWD power level goes over the warning threshold.	• Check alarm and warning thresholds • At every amplifier initialization the FWD power alarm and warning are temporary on • Amplifier is not properly working, hardware fault	0
Forward Power Low Alarm	FWD power level goes over the alarm threshold.		0
Reflex Power High	RFL power goes over the set power -9 dB.	• Check the RF output for disconnection or wrong impendence adaptation	0
File System Error	File System loading error.	• File system partition damage	1

Alarm	Description and limitations	Troubleshooting	RF mask (1)
PS Voltage Out Of Range	Power Supply voltage out of range	• Hardware fault	1
PS Current Out Of Range	Power Supply current out of range	• Hardware fault	1
CPU Fan Error	CPU fan speed equal to zero or CPU fan not connected.	• Check fan connection	1
Test Mode	The equipment is generating a test signal.	• Disable the test signal	0
Interlock shut off	Interlock not correctly connected/driven by Opto	• Check Interlock connection / driving	0
NTP server alarm	NTP server not available	• Check server IP address and network settings	0

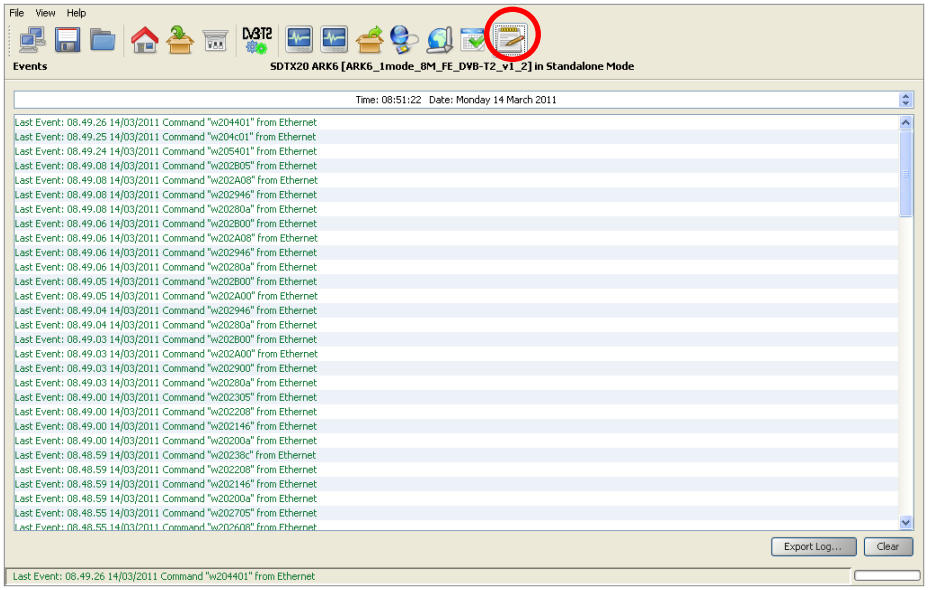
Notes to the table:

(1) 0/1 stands for disabled/enabled and is fixed, X stands for not fixed.

4.2.12 Events

Click on Events button, highlighted in the next figure, to access the events windows.

Figure 4-29 Events window



Open the Events window to slide the events list.

Events are reported with the following information:

- **Time:** event detection time.
- **Date:** event detection date.
- **Type:** type of event:

  - **Alarm;**
  - **Command;**
  - **Event;**
  - **System Init.**
  - **Description:** event description:
    - if the event type is **Alarm**: which alarm generated the event followed by "**ON**" or "**OFF**";
    - if the event type is **Command**: the low level code and command source;
    - if the event type is **Event**: event description;
    - if the event type is **System Init**: system initialization, followed by the alarm in case of error.

Each event type is characterized by a different colour, the following list explain the mean of each colour:

- **Red: alarm** (refer to alarms list in Alarms paragraph and to Alarms list table);
- **Green: command** (See *ARK6_SW_Reference manual_v1_0.doc* for further information);
- **Blue: system Init** (refer to System Initialization Event paragraph);
- **Black**:
  - **Event** (refer to Events list table);
  - **TASK_ERR** (refer to Task Error Event paragraph);
  - **SYS_ERR** (refer to System Error Event paragraph).

Use the following buttons, sited on the right side of the window, to manage the Events list:

- **Clear:** resets the events list.
- **Get History:** gets all the stored events from the last board reset (max 512 events).

Table 4-17 Common Events descriptions list

Description-Event	Event Description
RF OFF enabled from OPTO	RF output switched off through OPTO 0.
RF OFF dis. from OPTO	RF output switched on through OPTO 0.
Stand-by ON from OPTO	Stand-by mode enabled through OPTO 3.
Stand-by ON from LCD	Stand-by mode enabled through LCD button or OPTO 3.
Stand-by ON CPU Fan Err	Stand-by mode enabled because of a CPU Fan error.
Stand-by OFF	Stand-by mode disabled through LCD button.
Power = *xx.x* dBm (Local)	New output power setting. *xx.x*: output power expressed in dBm.
Update file *.*xxxx*	New file loading. *xxxx*: file extension.
P5K open: *xx.xx.xx.xx*	Connection to port 5000 open. *xx.xx.xx.xx:* host IP address.
P5K closed	Connection to port 5000 closed.
File system busy	File system already in use while trying to employ it (e.g. change mode during a file loading).
Mode = (*mode*)	Manual change mode. *mode*: • "OFF", • "ISDBT", • "ITU", • "DVB-T", • "ATSC", • "DVB-T2", • "ECHO", • "Rep. Analog", • "Rep. Digital".
UTC Time set from GPS	Time and date set by GPS. As soon as the GPS lock is regained, once lost, and if the current time and date are different from the GPS ones, the UTC time is set by GPS.

Description-Event	Event Description
PS Restart *N*	This event is reported when one of the following alarms is raised: • Up converter Osc. Unlock • PS 26V out range • PS Current out of range • Absolute Power Limiter The fourth time one of the preceding alarms is raised the amplifier is restarted (from 1 up to 4 times). *N:* number of amplifier restarting. Only in SDTX 200 version.
PS OFF	After the fourth time the amplifier has been restarted, if an alarm condition causing a PS Restart event occurs, PS OFF event is reported and the amplifier is turned off When this event is reported amplifier can be turned on only by OPTO 2 (only in SDTX 200 version).
Restart Amp. from OPTO	This event is reported when the retry command is given by the Retry Alarm OPTO (OPTO 2).
PS ON	This event is reported at every amplifier restarting
Events List cleared	This event is reported when the events list is cleared.
Updating *string* fw...	This event is reported when the update of the FPGA firmware starts. String values: • "ISDBT", • "ITU", • "DVB-T", • "ATSC", • "DVB-T2", • "ECHO", • "Rep. Analog", • "Rep. Digital".
FPGA firmware err *xx*	This event is reported when an error occurs during the update of the FPGA firmware. *xx:* error code: • 0x10, 0x20, 0x01, 0x02, 0x03: programming error; • 0x11: firmware not found in FS (for the current mode); • 0x22: FPGA file opening error; • 0x33: FPGA file reading error; • 0x44: erasing FLASH memory block error.
FPGA firmware OK	New FPGA firmware successfully loaded.
Saving config…	Saving configuration task started (after the command “s” given by RS232 or GbE commands).
Save config Finished	Saving configuration task correctly ended.
Save config error: *xx*	An error occurs during saving configuration. *xx:* error code: • 0x80: File system busy; • 0x01: New *.sav file opening error; • 0x02: uC header writing error; • 0x03: uC data writing error; • 0x04: FPGA header writing error; • 0x05: FPGA data writing error; • 0x07: File date writing error; • 0x08: Old *.sav file deleting error • 0x09: New file naming error (deleting of “*”); • 0x0A: File date writing error it can’t be found into the FS • 0x10: file already opened.
Pwr adjusted to *xx.x* dBm	New output power setting due to a set value exceeding the mode specific power range. *xx.x*: output power expressed in dBm.

Description-Event	Event Description
In. AUTO switch to *string*	When Input Select Mode is set on Autoswitch and the selected input is not locked the device switch to the next available locked input (refer to Task Error Event paragraph) and this event is generated. *string:* • ASI1 • ASI2 • ASI3 • ASI4 • Tuner • RxCh1 • RxCh2
Forced A = *mode*	If the device is in Mode A and the selected working mode is disabled by default (as established in the MODE_DIS field of the *.def file), the next available working mode is forced. *mode*: • "ISDBT", • "ITU", • "DVB-T", • "ATSC", • "DVB-T2", • "ECHO", • "Rep. Analog", • "Rep. Digital".
Forced Ch In A= *string*	Channel input.
Forced ChOut A= *string*	Channel output.
Forced reset for IIC err	An IIC error forced the board reset.
=>*string* err *status*	It notifies witch file generated the Bad file in File System alarm. *string*: file extension *status*: ON or OFF
ERR on delete file '*string*'	After a FS file update the old file is renamed and then deleted. This event is reported when the deletion of the old file during the system initialization does not succeed. *string*: file extension.
Delete file '*string*'	FS file deleted. *string*: file extension.
Init FS date	This event is reported once time and date table of the File System is initialized for the first time.
Error init FS date *xx*	An error occurs during FS initialization. *xx*: error code: • 0x01: EEPROM data reading error; • 0x02: EEPROM data writing error; • 0x03: CRC error in time and date table.
Error on delete *.*string*	FS file deleting error. *string*: file extension.
S1/S2 changed, P1 loading	Automatic update of P1 symbol. This event is reported at every system initialization and, in T2-MI mode, when S1 and S2 fields of incoming T2-MI pkts change.
Saving drlin …	Saving linear coefficients task started (after the command "p2" given by RS232 or GbE commands).
Saving drlin Finished	Saving linear coefficients task correctly ended.

Description-Event	Event Description
Save drlin err: *xx*	An error occurs during saving linear precorrection coefficients. *xx:* error code: • 0x80: File system busy; • 0x01: New *.drlin file opening error; • 0x02: number of coefficients information writing error; • 0x03: linear coefficients writing error; • 0x07: File date writing error; • 0x08: Old *.drlin file deleting error • 0x09: New file naming error (deleting of "*"); • 0x10: file already opened; • 0x0A: File date writing error it can't be found into the FS.
IIC Error	IIC bus error
RFL Power Warning	RFL power goes over the alarm threshold for the first time and the "Number of attempts" is different from zero.
RFL Power OK	RFL power goes under the alarm threshold.
RFL Power Alarm	RFL power goes over the alarm threshold for N times, where N is the number of attempts specified in the Output page of the Java GUI.
RFL RF ON "*N*"	When RFL power goes over the alarm threshold the system switch off and on the output RF signal for a maximum number of times. N is the current number of attempt.
Freq Ref Forced: GPS	If the Network mode is SFN but the clock reference is set to Internal, the frequency reference is automatically forced to GPS and this event is generated.
Freq Ref set to *string*	Event generated at every new Frequency Reference selection. *string:* the clock reference • External • Internal • GPS
Holdover OFF	Condition 1: the clock reference is changed and the OCXO is not locked yet. Condition 2: the input clock reference is not present.
Holdover SFN Ready	The OCXO is locked to the selected frequency reference and the system is waiting for the OCXO stabilization.
Holdover Ready	Condition 1: the OCXO is stable and the Holdover function is now available. Condition 2: the system quit the Holdover mode because the OCXO regain the lock to the selected clock reference.
Holdover ON	If the OCXO is no more locked to the selected frequency reference and the Holdover function is enabled and available, the equipment enters in holdover mode.
Holdover TMO Expired	Condition: the Holdover state is "ON" (the function is enabled) and the Holdover timeout period elapses prior to regain the lock of the selected clock reference source.
Fan *N* Speed *string*	It notifies which fan caused the Fans Speed Low alarm. *string*: • Low; • OK
Updating GPS fw…	This event is reported when the update of the GPS firmware starts.
GPS firmware err *xx*	This event is reported when an error occurs during the update of the GPS firmware. *xx:* error code: • 0x80: File system busy; • 0x01: firmware not found in FS (for the current mode); • 0x02: GPS file opening error; • 0x03: GPS file reading error; • 0x06:GPS fw transferring into buffer error.
GPS firmware OK	New GPS firmware successfully loaded.

Description-Event	Event Description
Updating GPS fw (NILL)…	When an error occurs during the update of the GPS firmware, the system reloads the Nill firmware prior to attempt another update.
Event Ampli:*string*	This event is reported when there is asignificative change in Ampli status, *string* is the new Ampli status New MODE ON RF OFF Alarm OFF

The following table lists the descriptions of all the common alarm type events (refer to Alarms paragraph for further information about alarms).

Refer to Appendix AC for a deep explanation of the input statistics for the modes defined in the device.

Table 4-18 Common Alarms descriptions list

Alarm	Description-Alarm
Temperature Absolute High	Temp. High
Temperature Alarm (-3dB)	Temp. High -3dB
Temperature Warning	Temp. High Warning
Fans Speed Low	Fans Speed Low
Alim Dialog Err	Alim Dialog Err
FE Dialog Err	FE Dialog Err
Meas Dialog Err	Meas Dialog Err
GPS Dialog Err	GPS Dialog Err
GPS Not Locked	GPS Not Locked
120MHz Not Locked	120MHz Not Locked
960MHz Not Locked	960MHz Not Locked
Input PLL Not Locked	Input PLL Not Locked
Output PLL Not Locked	Out PLL Not Locked
10MHz Not Locked	10MHz Not Locked
1PPS Not Locked	1PPS Not Locked
FPGA Boot Error	FPGA Boot Err
Forward Power High	FWD Power High
Forward Power Low Warning	FWD Pwr Low Warning
Forward Power Low Alarm	FWD Pwr Low
Reflex Power High	Reflex Power High
File System Error	File System Err
Bad File In File System	File Err
PS Voltage Out Of Range	PS1 V Out Of Range

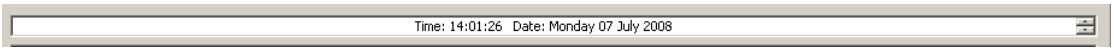
Alarm	Description-Alarm
PS Current Out Of Range	PS1 I Out Of Range
CPU Fan Error	CPU Fan Error
Test Mode	Test Mode
FE S2 Not Locked	Front End RF Not locked
FE S2 S/N Low	Front End S/N Below SNR Ratio
FE S2 BER High	Front End BER
FE S2 Global Alarm	Front End Global Alarm (collect all FrontEnd alarms)
Interlock shut off	Interlock not correctly connected/driven by Opto
NTP Server Alarm	NTP Server not available

NB: FE S2 Alarms are considered Common Alarms

4.2.12.1 Date and Time Setting

The upper part of the event window shows the actual time and date and allows the manual setting of those parameters.

Time and date setting



Click to each part of the date and time to change the parameter and then increase or decrease its value with the up/down arrows.

Note: When the onboard GPS receiver is locked and GPS frequency reference is enabled, the date and time information are received by GPS satellite and updated every thirty seconds.

The board incorporates a rechargeable battery to maintain the time when there isn't a power supply. The battery supplies the clock for two or three days, after that the time shall be reset either by char interface, or LCD display, or Java interface or selecting the GPS as frequency reference.

4.2.12.2 Task Error Event

The watchdog performs a periodic (every 20 seconds) polling of tasks and triggers a system reset if one or more tasks do not answer, restarting the Code loader (See Codeloader_Operations_Note_v1.1.doc for further information) and generating a TSK ERR event as follows:

TSK ERR 00000028, 0000003c

The blue underlined 32-bits word is the enabling status of the alarms mask. The red underlined 32-bits word indicates the status of tasks (1 if the task has been successfully performed, otherwise 0) as specified in the following table:

Table 4-19 Task error event specific data

TASK	Description	Bit
WD_FAN_TASK	This task controls fans speed on the basis of the board temperature.	0
WD_UPCV_TASK	This task controls the Up-converter status.	1
WD_GPS_TASK	This task controls the GPS status.	2
WD_STATUS_TASK	This task gathers quite all the board information in order to perform the following operations: • It updates all variables of the system; • It manages alarms; • It manages the RF status (e.g. on, off…); • It manages the mode switch; • It manages the ARP resolution in DVB mode.	3
WD_TCP_IP_TASK	This task implements the TCP-IP protocol stack.	4
WD_TIMER_TICK_TASK	This task generates the clock for the TCP-IP task.	5
WD_STV0362_TASK	This task gathers information from both the HP and LP tuners and configures them.	6
WD_ARK6AL_TASK	This task gathers information from: • Get ADC value • Get Amplifier Voltage and current measure • Calculate FWD power level • Output AGC • Calculate Reflex power • Get temperature • Get opto & relay status • Disable alim status	7

The default tasks mask at the board startup is set to 0x0000007D (please note that the up-converter task is initially skipped). Once the presence of the up-converter is assured, the up-converter task bit is automatically enabled and the mask is set to 0x0000007F. Tasks execution is stopped during de-fragmentation operations and FPGA boots.

4.2.12.3 System Error Event

For critical and fatal errors, the system calls the system error function and the SYS_ERR event is reported.

The error codes are described below:

- 0x00: Out of memory. Memory pool size is too small.

- 0x01: Invalid memory block release. Buffer data has been written out of boundaries of the allocated memory block.
- 0x02: Link pointer corrupted. Buffer data has been written out of boundaries of the allocated memory block.
- 0x03: No free UDP Sockets. The system has run out of UDP Sockets.
- 0x04: No free TCP Sockets. The system has run out of TCP Sockets.
- 0x05: TCP socket is in an undefined state. System memory has been accidentally overwritten.

4.2.12.4 System Initialization Event

At every system initialization the event System Init is generated.

This event is followed by 25 bytes specifying type and specific code of errors occurred during system initialization.

Each byte refers to an error as described in the following table:

Table 4-20 Init system event specific data

Description	Errors code	Byte
FS_ERR File System error.	• 0x00: File System ok. • 0x01: FS partition error (invalid FS).	1°
INFO_ERR *.cfg file error.	• 0x00: File ok. • 0x01: File not found or File open error. • 0x02…0x03: Invalid file (syntax errors).	2°
DEF_ERR *.def file error.	• 0x00: File ok. • 0x01: File open error. • 0x02: File not found.	3°
LCD_ERR LCD error.	• 0x00: LCD ok. • 0x01: LCD not found.	4°
PLL_960M_ERR 960 MHz PLL error.	• 0x00: PLL locked. • 0x01: PLL not locked	5°
BOOT_ERR FPGA boot error.	• 0x00: FPGA boot ok. • 0x01: FPGA NILL boot error • 0x02: FPGA file version error • 0x03: FPGA code error.	6°
LOAD_CFG_ERR *.sav file error.	• 0x00: File ok. • 0x01: File open error. • 0x02…0x05: Invalid file (syntax errors).	7°
SNMP_ERR SNMP file error.	• 0x00: SNMP file ok. • 0x01: SNMP file not found. • 0x02: File open error. • 0x03: UDP socket initialization error. • 0x04: Port 161 open error.	8°

Description	Errors code	Byte
CALIB_ERR *.pwr file error.	• 0x00: File ok. • 0x01: Current AGC mode file not found. • 0x02: Current AGC mode file open error. • 0x03…0x12: Invalid current AGC mode file (syntax error). • 0x20: Other AGC mode file not found • 0x21: Other AGC mode file open error. • 0x22…0x26: Invalid other AGC mode file (syntax error). Please note that the AGC mode may be analog or digital. Actual AGC mode is displayed in Java output window.	9°
PREC_ERR	• 0x00: File ok.	10°
LINEAR_ERR	• 0x00: File ok. • 0x01: File not found. • 0x02: File open error. • 0x03…0x06: Invalid file (syntax errors).	11°
DOWNCV_ERR Downconverter PLL not locked error.	• 0x00: PLL locked. • 0x01: PLL not locked • 0x10: PLL disabled.	12°
UPCV_ERR Upconverter error.	• 0x00: Upconverter ready.	13°
CH_FILT_ERR *.chf7 or *.chf8 file error.	• 0x00: File ok. • 0x01: File not found. • 0x02: File open error. • 0x03…0x06: Invalid file (syntax errors). Please note that checked file is the one which refers to the current signal bandwidth: *.chf7 refers to VHF bandwidth, *.chf8 refers to UHF bandwidth.	14°

Description	Errors code	Byte
CH_DEF_ERR *.cdef file error.	• 0x00: File ok. • 0x01: File not found. • 0x02: File open error. • 0x03: syntax error or lack of input number of channels. • 0x13: syntax error or lack of output number of channels. • 0x04: input channels memory allocation error. • 0x14: output channels memory allocation error. • 0x05: when the automatic indexing of channels listed in *.cdef file is disabled, it notifies syntax errors or lack of input channels definition lines. • 0x15: when the automatic indexing of channels listed in *.cdef file is disabled, it notifies syntax errors or lack of output channels definition lines. • 0x06: when the automatic indexing of channels listed in *.cdef file is enabled, it notifies syntax errors or lack of input channels definition lines. • 0x16: when the automatic indexing of channels listed in *.cdef file is enabled, it notifies syntax errors or lack of output channels definition lines.	15°

4.2.13 System menu

Figure 4-30 Menu bar

The menu bar allows the access to three menus:

- **File:** allows to import/export the configuration file, to load and save the board configuration and to download the screenshots of the Java GUI;
- **View:** allows to navigate windows and to configure java update time and events alert massages;
- **Help:** allows to access information such as board name, board IP address, serial numbers of HW components, File System content, an abstract of the User Manual and system characteristics.

4.2.13.1 File Menu

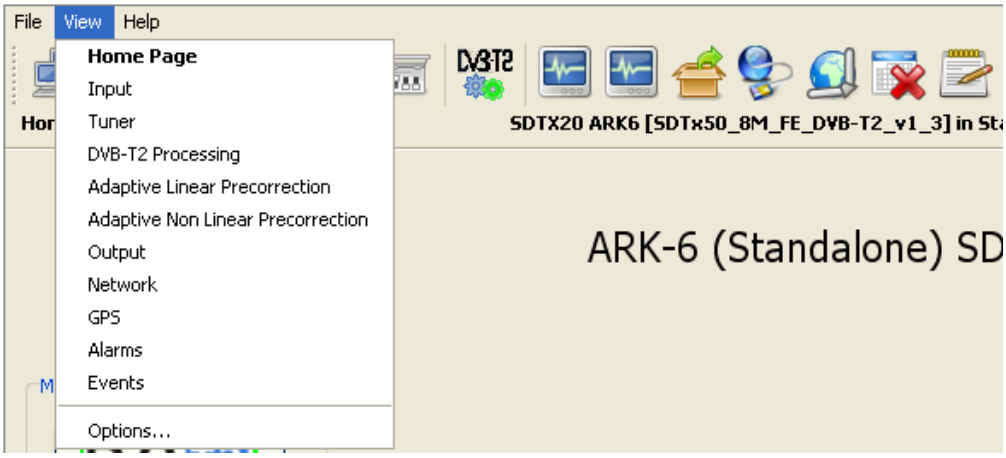
Figure 4-31 File menu

The File menu is structured as follows:

- **Save:** saves the current device configuration.
- **Load:** loads the last saved configuration.
- **Export Config:** exports last saved configuration of the device (the *.sav file).
- **Import Config:** imports a new configuration file (the *.sav file).
- **Capture screenshots:** downloads a screenshot for each one of the selected windows.

4.2.13.2 View Menu

Figure 4-32 View menu



The View menu allows accessing the following windows:

- **Home Page**
- **Input**
- **Tuner**
- **Adaptive Linear Precorrection**
- **Adaptive Non Linear Precorrection**
- **Output**
- **Network**.
- **GPS**.
- **Alarms**
- **Events:** Events window.
- **Options...:** Options window.

4.1.1.1 Options window

The Options window has two tabs:

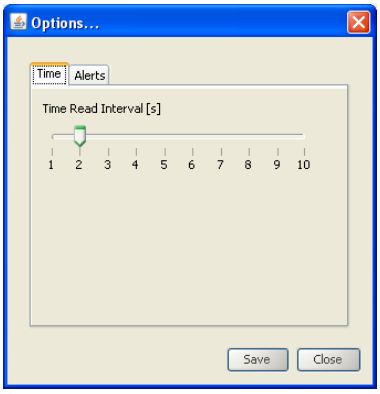
- **Time:** Time Read Interval [s];
- **Alerts:** the selection of events to display.

Click on the *Save* button to save Java options; a new *.properties file will be created.

The device is not loaded with a factory default *.properties file, but it is created and then stored in System File once properties are saved for the first time.

4.1.1.1.1 Time

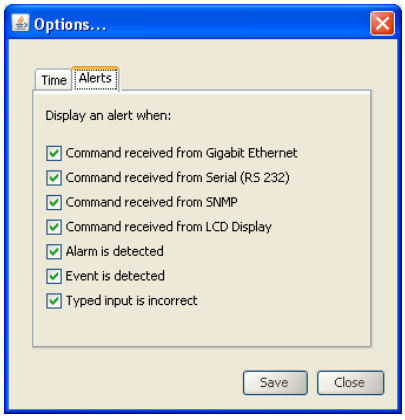
Figure 4-33 Time window



This control allows changing the device-to-management PC java update time. The default value is 2 seconds. Click on Close button to quit this window.

4.1.1.1.2 Alerts

Figure 4-34 Alerts window

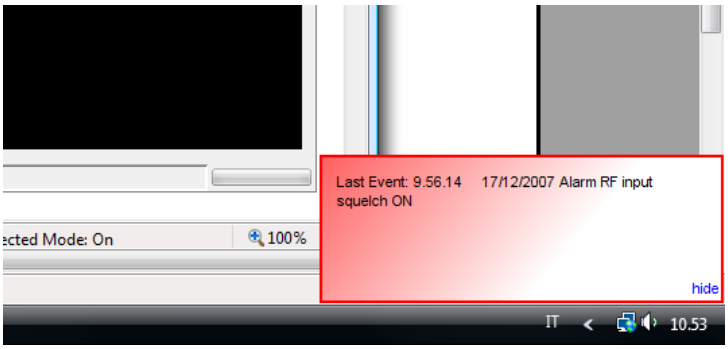


Alerts tab allows selecting which types of events will be notified through Alert boxes. Alerts appear on the right side of the monitor.

The selection is performed among the following types of event:

- Commands (blue boxes):
  - Gigabit Ethernet commands;
  - RS232 commands;
- SNMP commands;
- LCD Display commands.
- Alarms (red boxes);
- Events (green messages):
  - Board events.
- Typing error (yellow messages):
  - Typed setting is incorrect.

Figure 4-35 Message alarm



Click on hide button to close alerts popup windows.

Alerts can be disabled through the hide button located on the right side of the box.

The hide button, once clicked, disables all boxes belonging to the same class.

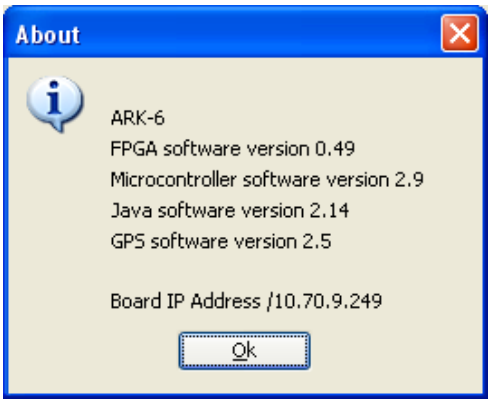
4.2.13.3 Help Menu

Figure 4-36 Help menu

The Help menu allows selecting one of the following options:

- **Contents:** Help file download (.pdf) with an abstract of the User Manual.
- **About:** shows the board name and the management IP address. It also provides uC, FPGA, Java and GPS software versions. Click on OK button to close the window.

Figure 4-37 About window



- **Info:** shows serial numbers of HW components, File System content and the managed system characteristics. Click on OK button to close Info window.

Figure 4-38 Info window: Serial Numbers

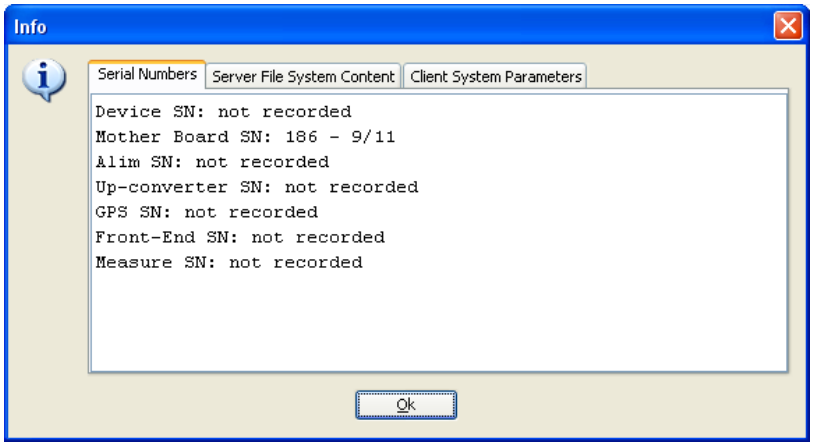


Figure 4-39 Info window: Server File System Content

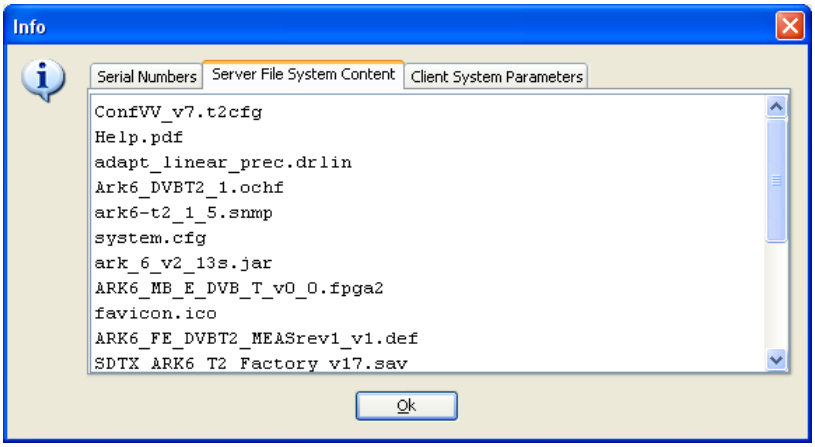
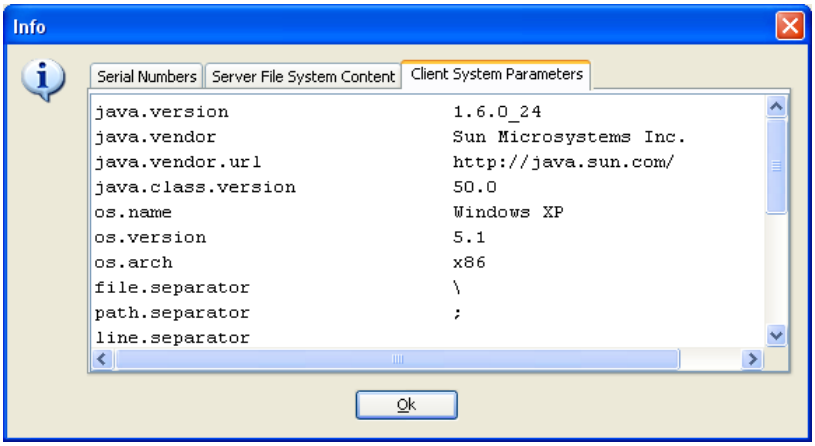


Figure 4-40 Info window: Client System Parameters



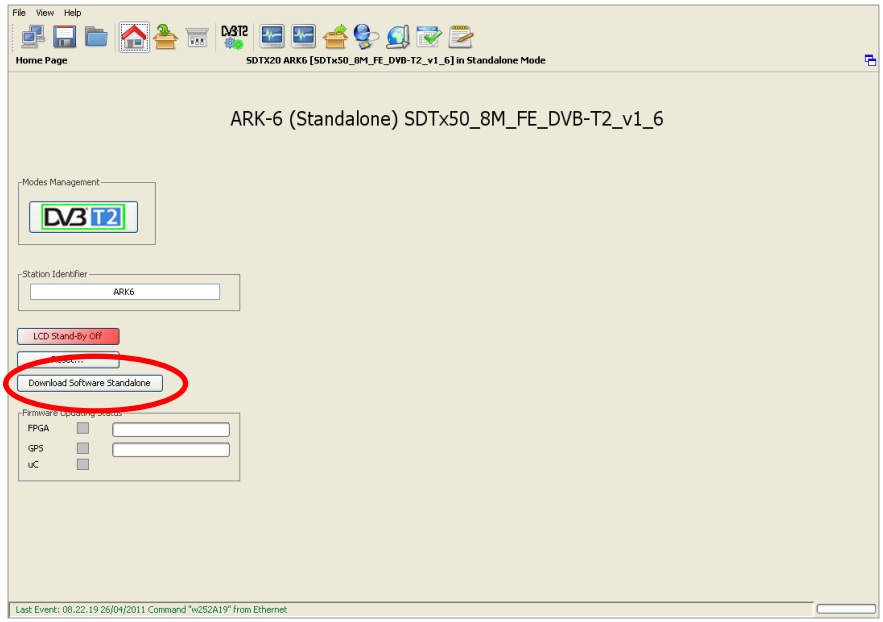
4.2.14 Download Software Standalone

The Download Software Standalone button allows the downloading of standalone Java application (executable *.jar file) based on java applet.

If your browser is Internet Explorer, it may block the site from downloading files to your computer. If you want to enable the file downloading, follow the instructions listed below:

- Open Internet Explorer;
- Click on the Tools button and then click on Internet Options;
- Click on the Security tab and then click on Custom level button;
- To turn off the Information bar for file downloads, scroll to the Downloads section of the list, and then, under Automatic prompting for file downloads, click on Enable;
- Click on OK, click Yes in order to confirm that you want to make the change, and then click OK again.

Figure 4-41 Download Software Standalone



4.3 SNMP – Simple Network Management Protocol

The SNMP model assumes the existence of managers and agents. A manager is a software module in a management system responsible for managing the device. An agent is a software module in a managed device responsible for maintaining local management information and delivering that information to a manager via SNMP. A management information exchange can be initiated by the manager (via polling) or by the agent (via trap).

Interaction between a user of board management and the board management software takes place across a user interface. Such an interface is needed to provide users with a monitoring and controlling tool in order to allow some parameters to be viewed or set locally.

The operations that are supported in SNMP network management are the alteration and inspection of variables. Specifically, three general-purpose operations may be performed on scalar objects:

- Get: a management station retrieves a scalar object value from a managed station.
- Set: a management station updates a scalar object value in a managed station.
- Trap: a managed station sends an unsolicited scalar object value to a management station.

Management information accessible via SNMP is maintained in a management information base (MIB) at each manager and agent node.

On manager side, ARK6 management system has been tested with MG-SOFT as MIB Browser; besides compatibility with any other MIB browser is assured.

Compatibility tested and assured with SNMP version 1 and v2c.

4.3.1 SNMP Protocol Preferences

Go to SNMP Protocol Preferences. The following parameters should be set in order to correctly configure the SNMP Manager:

SNMP protocol version: SNMPv1 or SNMPv2c;

Read Community: the same of the one set in the Get field of Java interface, community section;

Set Community: the same of the one set in the Set field of Java interface, community section;

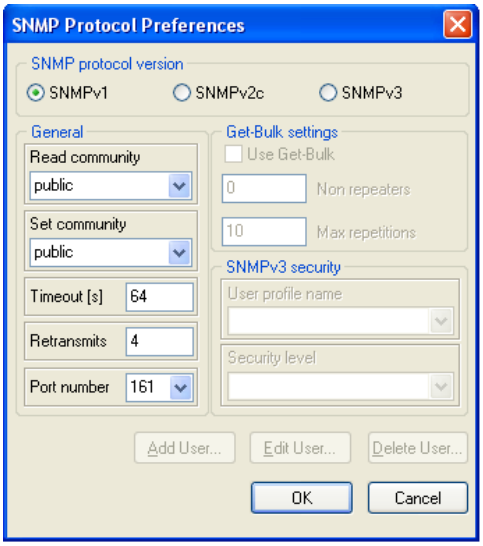
Timeout [s]: user defined;

Retransmits: user defined;

Port number: 161.

Next figure illustrates how to configure SNMP Protocol Preferences using MG_SOFT MIB Browser as an example.

Figure 4-42 SNMP Protocol Preferences

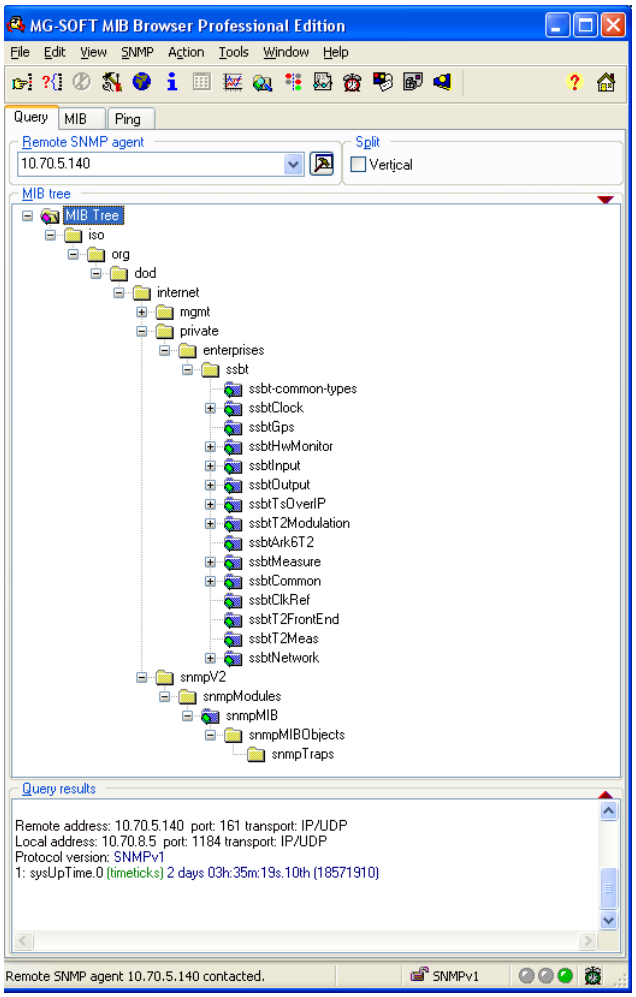


4.3.2 Monitoring

All status and setup information can be queried via SNMP. To get the setup and status information you need a management system (or a special MIB browser).

Each mode has a specific tree. Next figure, referring to MG-SOFT MIB Browser as an example, is a broad view of the ARK6-T2 tree structure.

Figure 4-43 ARK6-T2 Tree Structure



4.3.3 List of MIBs organization

SSBT SNMP v2 code is composed on several different libraries in order to provide maximum flexibility and re-usability of the code between SSBT products and projects.

One single MIB, composed by each useful MIB for the product purchased, can be required as an option.

ARK6 MIBs can be placed in few families:

Common ARK6 MIB, which are used by any ARK6 device, independent on the power and transmission modes loaded on the device:

- ssbtArk6: the MIB module for the objects common to all ARK6 modes.
- ssbtClkRef: the MIB module to set the frequency reference.
- ssbtClock: the MIB module for clock management.
- ssbtGps: the MIB module to monitor the collection of live data from the GPS receiver.
- ssbtHwMonitor: The MIB module for HW monitor.
- ssbtInput: the MIB module to monitor and manage inputs.
- ssbtOutput: the MIB module to monitor and manage outputs.
- ssbtMeasure: the MIB module to manage and monitor ARK6 Measure board.
- ssbtNetwork: the MIB module for network monitoring.
- ssbtTimeSourceNTP: the MIB module for NTP server connection.
- ssbtCommon: the MIB module housing SSBT common objects.
- ssbtTsOverIP: the MIB module to manage input and output GbE channels.
- ssbt-common-types: the MIB module housing SSBT Textual Conventions.

Specific modes and options MIB, which are used in dependence on the modulation modes and other options loaded on the device:

- ssbtATSC: the MIB module for ATSC modulation parameters.
- ssbtATSCFe: the MIB module for ATSC front-end parameters.
- ssbtATSCMeasure: the MIB module for ATSC measure board parameters.
- ssbtT2: the MIB module for DVB-T2 modulation parameters.
- ssbtT2Fe: the MIB module for DVB-T 2 front-end parameters.
- ssbtT2Measure: the MIB module for DVB-T2 measure board parameters.
- ssbtT: the MIB module for DVB-T modulation parameters.
- ssbtTFe: the MIB module for DVB-T front-end parameters.
- ssbtTMeasure: the MIB module for DVB-T measure board parameters.
- ssbtISDBT: the MIB module for ISDBT modulation parameters.
- ssbtISDBTFe: the MIB module for ISDBT front-end parameters.

- ssbtISDBTMeasure: the MIB module for ISDBT measure board parameters.
- ssbtITU: the MIB module for ITU 470 (PAL, NTSC) modulation parameters.
- ssbtITUFe: the MIB module for ITU 470 (PAL, NTSC) front-end parameters.
- ssbtITUMeasure: the MIB module for ITU 470 (PAL, NTSC) measure board parameters.

4.3.4 ARK6 common OIDs description

The following paragraph shows a decription of the parameters of the common MIBs used by the ARK 6 devices. Specific modes MIBs are described in modes specific appendixes.

Table 4-21 SNMP description

OID	Name	R/W	Description	MIB
1	iso			
1.3	org			
1.3.6	dod			
1.3.6.1	internet			
1.3.6.1.2	mgmt			
1.3.6.1.2.1	mib-2			
1.3.6.1.2.1.1	system			
1.3.6.1.2.1.1.1	sysDescr	R	A textual description of the entity. This value includes the full name and version identification of the system"	
1.3.6.1.2.1.1.2	sysObjectID	R		
1.3.6.1.2.1.1.3	sysUpTimeInstance	R		
1.3.6.1.2.1.1.4	sysContact	R		
1.3.6.1.2.1.1.5	sysName	R	Identification name of the equipment managed	
1.3.6.1.2.1.1.6	sysLocation	R		
1.3.6.1.2.1.1.7	sysServices	R		

OID	Name	R/W	Description	MIB
1.3.6.1.4	private			
1.3.6.1.4.1	enterprise			
1.3.6.1.4.1.21678	ssbt			ssbt
1.3.6.1.4.1.21678.303	ssbtClock			ssbtClock
1.3.6.1.4.1.21678.303.1	reference			ssbtClock
1.3.6.1.4.1.21678.303.1.1	refClock	RW	Frequency reference selector	ssbtClock
1.3.6.1.4.1.21678.303.2	gps			gps
1.3.6.1.4.1.21678.303.2.1	satellites			gps
1.3.6.1.4.1.21678.303.2.1.1	satVisible	R	Number of visible satellites.	gps
1.3.6.1.4.1.21678.303.2.1.2	satTracked	R	Number of locked satellite.	gps
1.3.6.1.4.1.21678.303.2.2	position			gps
1.3.6.1.4.1.21678.303.2.2.1	positionLatitude	R	Latitude position [°]	gps
1.3.6.1.4.1.21678.303.2.2.2	positionLongitude	R	Longitude position [°]	gps
1.3.6.1.4.1.21678.303.2.3	utc			gps
1.3.6.1.4.1.21678.303.2.3.1	utcDate	R	UTC date and time as specified in SNMPv2-TC	gps
1.3.6.1.4.1.21678.303.2.4	gpsLockStatus			ssbtArk6
1.3.6.1.4.1.21678.303.2.4.1	glsGps	R	GPS lock status derived from live data provided by the GPS receiver	ssbtArk6

OID	Name	R/W	Description	MIB
1.3.6.1.4.1.21678.303.3	ocxo			ssbtArk6
1.3.6.1.4.1.21678.303.3.1	fineFreqAdjust	RW	Enables the Holdover mechanism	ssbtArk6
1.3.6.1.4.1.21678.303.3.2	dataToFlash	R	Sets the timeout of the Holdover in hour	ssbtArk6
1.3.6.1.4.1.21678.303.3.3	ocxoLockStatus			ssbtArk6
1.3.6.1.4.1.21678.303.3.3.1	olsGps	R	OCXO locked to the external GPS reference	ssbtArk6
1.3.6.1.4.1.21678.303.3.3.2	ols10Mhz	R	OCXO locked to the external 10 MHz reference	ssbtArk6
1.3.6.1.4.1.21678.303.3.3.3	ols1Pps	R	OCXO locked to the external 1PPS reference	ssbtArk6
1.3.6.1.4.1.21678.303.4	holdover			ssbtArk6
1.3.6.1.4.1.21678.303.4.1	hEnable	RW	Enables the Holdover mechanism	ssbtArk6
1.3.6.1.4.1.21678.303.4.2	hTimeout	RW	Sets the timeout of the Holdover in hour	ssbtArk6
1.3.6.1.4.1.21678.303.4.3	hStatus	R	The status of the Holdover mechanism	ssbtArk6
1.3.6.1.4.1.21678.303.4.4	hTmoStatus	R	The countdown of the Holdover timeout expressed in seconds	ssbtArk6
1.3.6.1.4.1.21678.306	ssbtHwMonitor			ssbtHwMonitor
1.3.6.1.4.1.21678.306.1	reflexPower	R	Reflex power [dBm x 10]	ssbtHwMonitor
1.3.6.1.4.1.21678.306.2	amplifierStatus	R	Amplifier status	ssbtHwMonitor
1.3.6.1.4.1.21678.306.3	powerSupplies			ssbtHwMonitor
1.3.6.1.4.1.21678.306.3.1	psNumber	R	The number of power supplies present on this system	ssbtHwMonitor

OID	Name	R/W	Description	MIB
1.3.6.1.4.1.21678.306.3.2	psTable	NA		ssbtHwMonitor
1.3.6.1.4.1.21678.306.3.2.1	psEntry			ssbtHwMonitor
1.3.6.1.4.1.21678.306.3.2.1.1	psIndex	R		ssbtHwMonitor
1.3.6.1.4.1.21678.306.3.2.1.2	psDescr	R	Power supply description	ssbtHwMonitor
1.3.6.1.4.1.21678.306.3.2.1.3	psVMeasUnit	R	Voltage unit of measurement	ssbtHwMonitor
1.3.6.1.4.1.21678.306.3.2.1.4	psVoltage	R	Voltage indicator	ssbtHwMonitor
1.3.6.1.4.1.21678.306.3.2.1.5	psCMeasUnit	R	Current unit of measurement	ssbtHwMonitor
1.3.6.1.4.1.21678.306.3.2.1.6	psCurrent	R	Current indicator	ssbtHwMonitor
1.3.6.1.4.1.21678.306.3.3	psRestart	W	Restarts the amplifier	ssbtHwMonitor
1.3.6.1.4.1.21678.306.5	fans			ssbtHwMonitor
1.3.6.1.4.1.21678.306.5.1	fansNumber	R	The number of fans present on this system	ssbtHwMonitor
1.3.6.1.4.1.21678.306.5.2	fansTable	NA		ssbtHwMonitor
1.3.6.1.4.1.21678.306.5.2.1	fansEntry			ssbtHwMonitor
1.3.6.1.4.1.21678.306.5.2.1.1	fansIndex	R		ssbtHwMonitor
1.3.6.1.4.1.21678.306.5.2.1.2	fansDescr	R	Fan description	ssbtHwMonitor
1.3.6.1.4.1.21678.306.5.2.1.3	fansMeasUnit	R	Fan speed unit of measurement	ssbtHwMonitor
1.3.6.1.4.1.21678.306.5.2.1.4	fansSpeed	R	Fan speed	ssbtHwMonitor

OID	Name	R/W	Description	MIB
1.3.6.1.4.1.21678.306.6	temperatures			ssbtHwMonitor
1.3.6.1.4.1.21678.306.6.1	tempNumber	R	The number of temperature sensors present on this system	ssbtHwMonitor
1.3.6.1.4.1.21678.306.6.2	tempTable	NA		ssbtHwMonitor
1.3.6.1.4.1.21678.306.6.2.1	tempEntry			ssbtHwMonitor
1.3.6.1.4.1.21678.306.6.2.1.1	tempIndex	R		ssbtHwMonitor
1.3.6.1.4.1.21678.306.6.2.1.2	tempDescr	R	Temperature indicator description	ssbtHwMonitor
1.3.6.1.4.1.21678.306.6.2.1.3	tempMeasUnit	R	Temperature unit of measurement	ssbtHwMonitor
1.3.6.1.4.1.21678.306.6.2.1.4	tempLevel	R	Temperature indicator	ssbtHwMonitor
1.3.6.1.4.1.21678.306.7	relays			ssbtHwMonitor
1.3.6.1.4.1.21678.306.7.1	rlNumber	R	The number of relays present on this system	ssbtHwMonitor
1.3.6.1.4.1.21678.306.7.2	rlTable	NA		ssbtHwMonitor
1.3.6.1.4.1.21678.306.7.2.1	rlEntry			ssbtHwMonitor
1.3.6.1.4.1.21678.306.7.2.1.1	rlIndex	R		ssbtHwMonitor
1.3.6.1.4.1.21678.306.7.2.1.2	rlDescr	R	Relay description	ssbtHwMonitor
1.3.6.1.4.1.21678.306.7.2.1.3	rlStatus	R	Relay status	ssbtHwMonitor
1.3.6.1.4.1.21678.306.8	optocouplers			ssbtHwMonitor
1.3.6.1.4.1.21678.306.8.1	optNumber	R	The number of optocouplers present on this system	ssbtHwMonitor

OID	Name	R/W	Description	MIB
1.3.6.1.4.1.21678.306.8.2	optTable	NA		ssbtHwMonitor
1.3.6.1.4.1.21678.306.8.2.1	optEntry			ssbtHwMonitor
1.3.6.1.4.1.21678.306.8.2.1.1	optIndex	R		ssbtHwMonitor
1.3.6.1.4.1.21678.306.8.2.1.2	optDescr	R	Optocoupler description	ssbtHwMonitor
1.3.6.1.4.1.21678.306.8.2.1.3	optStatus	R	Optocoupler status	ssbtHwMonitor
1.3.6.1.4.1.21678.306.9	cpuFan			ssbtArk6
1.3.6.1.4.1.21678.306.9.1	cfNoFan	R	CPU Fan missing alarm status	ssbtArk6
1.3.6.1.4.1.21678.306.9.2	cfFanFault	R	CPU ventilation blocked alarm status	ssbtArk6
1.3.6.1.4.1.21678.307	ssbtInput			ssbtInput
1.3.6.1.4.1.21678.307.1	inputSettings			ssbtInput
1.3.6.1.4.1.21678.307.1.7	isAInputAutoswitch			ssbtInput
1.3.6.1.4.1.21678.307.1.7.1	isaiaEnable	RW	Enables the use of Input Autoswitch finite-state machine	ssbtInput
1.3.6.1.4.1.21678.307.1.7.2	isaiaState	R	Current state of the finite-state machine	ssbtInput
1.3.6.1.4.1.21678.307.1.7.3	isaiaActualInput	R	Shows the currently used input	ssbtInput
1.3.6.1.4.1.21678.307.1.7.4	isaiaPrimaryToSecondaryCounter	R	Primary to secondary input switch countdown expressed in seconds	ssbtInput
1.3.6.1.4.1.21678.307.1.7.5	isaiaSecondaryToSecondaryCounter	R	Secondary to secondary input switch countdown expressed in seconds	ssbtInput
1.3.6.1.4.1.21678.307.1.7.6	isaiaSecondaryToPrimaryCounter	R	Secondary to primary input switch countdown expressed in seconds	ssbtInput

OID	Name	R/W	Description	MIB
1.3.6.1.4.1.21678.307.2	inputStatistics			ssbtInput
1.3.6.1.4.1.21678.307.2.1	isNumber	R	Number of inputs	ssbtInput
1.3.6.1.4.1.21678.307.2.2	isTable	NA		ssbtInput
1.3.6.1.4.1.21678.307.2.2.1	isEntry			ssbtInput
1.3.6.1.4.1.21678.307.2.2.1.1	isIndex	R		ssbtInput
1.3.6.1.4.1.21678.307.2.2.1.2	isDescr	R	Input descriptor	ssbtInput
1.3.6.1.4.1.21678.307.2.2.1.3	isType	R	Input type	ssbtInput
1.3.6.1.4.1.21678.307.2.2.1.4	isWordRate	R	Input word rate	ssbtInput
1.3.6.1.4.1.21678.307.2.2.1.5	isBitRate	R	Iinput bitrate	ssbtInput
1.3.6.1.4.1.21678.307.2.2.1.6	isFiltered	R	Filtered bitrate	ssbtInput
1.3.6.1.4.1.21678.307.2.2.1.7	isOverflow	R	Overflow	ssbtInput
1.3.6.1.4.1.21678.307.2.2.1.8	isLock	R	Lock status	ssbtInput
1.3.6.1.4.1.21678.307.2.2.1.9	isPckFormat	R	Packet format	ssbtInput
1.3.6.1.4.1.21678.307.2.2.1.10	isCarrierDetect	R	Carrier detect indicator	ssbtInput
1.3.6.1.4.1.21678.307.2.2.1.11	isErrors	R	Wrong bytes received	ssbtInput
1.3.6.1.4.1.21678.307.2.2.1.12	isBypassEnable	RW	Cable equalizer bypass enable	ssbtInput
1.3.6.1.4.1.21678.310	ssbtOutput			ssbtOutput

OID	Name	R/W	Description	MIB
1.3.6.1.4.1.21678.310.1	outputSettings			ssbtOutput
1.3.6.1.4.1.21678.310.1.1	osOutputManagement			ssbtOutput
1.3.6.1.4.1.21678.310.1.1.3	osomOutPower	RW	Output power	ssbtOutput
1.3.6.1.4.1.21678.310.1.1.4	osomRflManagement			ssbtArk6
1.3.6.1.4.1.21678.310.1.1.4.1	osomrmNumberAttempts	RW	Number of attempts to restore the system after a Reflex Power warning	ssbtArk6
1.3.6.1.4.1.21678.310.1.1.4.2	osomrmStatus	R	Reflex Power status	ssbtArk6
1.3.6.1.4.1.21678.310.1.1.4.3	osomrmRflHigh	R	Shows if the Reflex Power High goes over the alarm threshold	ssbtArk6
1.3.6.1.4.1.21678.310.1.1.4.4	osomrmCurrNumAttempt	R	Shows the current number of attemp to restore the system after a Reflex Power warning	ssbtArk6
1.3.6.1.4.1.21678.310.1.1.4.5	osomrmAttemptTimeout	R	Shows the coutdown expressed in seconds between two attemps	ssbtArk6
1.3.6.1.4.1.21678.310.1.1.4.6	osomrmReset	W	Resets the output amplifier stage once the device is in Reflex Power Alarm	ssbtArk6
1.3.6.1.4.1.21678.310.1.1.4.7	osomrmResetTimeout	R	Shows the coutdown expressed in seconds to come back from Warning to Ok state	ssbtArk6
1.3.6.1.4.1.21678.310.2	rf			ssbtOutput
1.3.6.1.4.1.21678.310.2.1	rfEnable	RW	RF output enable 0: disabled 1: enabled	ssbtOutput
1.3.6.1.4.1.21678.310.2.2	rfStatus	R	RF output status 0: off 1: on	ssbtOutput
1.3.6.1.4.1.21678.310.3	testSignals			ssbtOutput
1.3.6.1.4.1.21678.310.3.1	tsNumber	R	Number of available test signals.	ssbtOutput

OID	Name	R/W	Description	MIB
1.3.6.1.4.1.21678.310.3.2	tsTable	NA		ssbtOutput
1.3.6.1.4.1.21678.310.3.2.1	tsEntry			ssbtOutput
1.3.6.1.4.1.21678.310.3.2.1.1	tsIndex	R		ssbtOutput
1.3.6.1.4.1.21678.310.3.2.1.2	tsDescr	R	Test signal description.	ssbtOutput
1.3.6.1.4.1.21678.310.3.2.1.3	tsEnable	RW	Test signal enable 0: disabled 1: enabled.	ssbtOutput
1.3.6.1.4.1.21678.310.4	outputMonitor			ssbtOutput
1.3.6.1.4.1.21678.310.4.1	omFwdPower	R	Forward power [dBm x 10] indicator	ssbtOutput
1.3.6.1.4.1.21678.310.4.2	omAgcMode	R	AGC mode status 0: analog 1: digital	ssbtOutput
1.3.6.1.4.1.21678.310.4.3	omAgcOn	R	Auto AGC status 0: off 1: on	ssbtOutput
1.3.6.1.4.1.21678.310.5	standBy			ssbtOutput
1.3.6.1.4.1.21678.310.5.1	sbEnable	RW	LCD stand-by button enable	ssbtOutput
1.3.6.1.4.1.21678.310.5.2	sbStatus	R	Current device mode	ssbtOutput
1.3.6.1.4.1.21678.311	ssbtTsOverIP			ssbtOutput
1.3.6.1.4.1.21678.311.1	inputChannels			ssbtOutput
1.3.6.1.4.1.21678.311.1.1	icIgmpEnable	RW	IGMP enable	ssbtOutput
1.3.6.1.4.1.21678.311.1.2	icNumber	R	Number of input Ethernet channels.	ssbtOutput
1.3.6.1.4.1.21678.311.1.3	icTable	NA		ssbtOutput

OID	Name	R/W	Description	MIB
1.3.6.1.4.1.21678.311.1.3.1	icEntry			ssbtOutput
1.3.6.1.4.1.21678.311.1.3.1.1	icIndex	R		ssbtOutput
1.3.6.1.4.1.21678.311.1.3.1.2	icDescr	R	Description of input channel	ssbtOutput
1.3.6.1.4.1.21678.311.1.3.1.3	icLocalIpAddr	RW	IP address	ssbtOutput
1.3.6.1.4.1.21678.311.1.3.1.4	icLocalPort	RW	Port	ssbtOutput
1.3.6.1.4.1.21678.311.1.3.1.5	icSourceClkReference	RW	Source clock reference selector	ssbtOutput
1.3.6.1.4.1.21678.311.2	outputChannels			ssbtOutput
1.3.6.1.4.1.21678.311.2.1	ocPort	RW	UDP port	ssbtOutput
1.3.6.1.4.1.21678.311.2.2	ocNumber	R	Number of output Ethernet channels.	ssbtOutput
1.3.6.1.4.1.21678.311.2.3	ocTable	NA		ssbtOutput
1.3.6.1.4.1.21678.311.2.3.1	ocEntry			ssbtOutput
1.3.6.1.4.1.21678.311.2.3.1.1	ocIndex	R		ssbtOutput
1.3.6.1.4.1.21678.311.2.3.1.2	ocDescr	R	Description of output channel	ssbtOutput
1.3.6.1.4.1.21678.311.2.3.1.3	ocStatus	R	Tansmission state	ssbtOutput
1.3.6.1.4.1.21678.311.2.3.1.4	ocDestIpAddr	RW	Destination IP address	ssbtOutput
1.3.6.1.4.1.21678.311.2.3.1.5	ocDestPhysAddr	R	Destination MAC address	ssbtOutput
1.3.6.1.4.1.21678.311.2.3.1.6	ocDestPort	RW	Destination port	ssbtOutput

OID	Name	R/W	Description	MIB
1.3.6.1.4.1.21678.311.2.3.1.7	ocInputSelector	RW	Input selector	ssbtOutput
1.3.6.1.4.1.21678.311.2.3.1.8	ocProtocol	RW	Transmission protocol	ssbtOutput
1.3.6.1.4.1.21678.311.2.3.1.9	ocPckFormat	RW	Packet format	ssbtOutput
1.3.6.1.4.1.21678.311.2.3.1.10	ocPckPerFrame	RW	Number of TS packets per frame (when the packet format is 204, the maximum number of packets per frame is 6)	ssbtOutput
1.3.6.1.4.1.21678.311.2.3.1.11	ocSsrc	RW	SSRC identifier	ssbtOutput
1.3.6.1.4.1.21678.311.2.3.1.12	ocSourceClkReference	RW	Source clock reference selector	ssbtOutput
1.3.6.1.4.1.21678.311.2.3.1.13	ocEnable	RW	Transmission enable	ssbtOutput
1.3.6.1.4.1.21678.315	ssbtMeasure			ssbtMeasure
1.3.6.1.4.1.21678.315.4	atscMeasure			ssbtMeasure
1.3.6.1.4.1.21678.315.4.1	amStatistics			ssbtMeasure
1.3.6.1.4.1.21678.315.4.1.1	amsFrequencyOffset	R	Output carrier offset	ssbtMeasure
1.3.6.1.4.1.21678.315.4.1.2	amsDemodStatus	R	VSB demodulation status	ssbtMeasure
1.3.6.1.4.1.21678.315.4.1.3	amsEqStatus	R	Equalizer status	ssbtMeasure
1.3.6.1.4.1.21678.315.4.1.4	amsDemLock	R	Demodulator lock status	ssbtMeasure
1.3.6.1.4.1.21678.315.4.1.5	amsAgcLock	R	Digital AGC lock status	ssbtMeasure
1.3.6.1.4.1.21678.315.4.1.6	amsFrameLock	R	Frame lock status	ssbtMeasure
1.3.6.1.4.1.21678.315.4.1.7	amsCarrierFreqLoopLock	R	Carrier frequency loop lock status	ssbtMeasure

OID	Name	R/W	Description	MIB
1.3.6.1.4.1.21678.315.4.1.8	amsTimingFreqLoopLock	R	Timing frequency loop lock status	ssbtMeasure
1.3.6.1.4.1.21678.315.4.1.9	amsSnr	R	Signal to Noise Ratio [dB]	ssbtMeasure
1.3.6.1.4.1.21678.315.4.1.10	amsSer	R	Segment Error Rate	ssbtMeasure
1.3.6.1.4.1.21678.315.4.1.11	amsBer	R	Bit Error Rate	ssbtMeasure
1.3.6.1.4.1.21678.317	ssbtCommon			ssbtCommon
1.3.6.1.4.1.21678.317.1	info			ssbtCommon
1.3.6.1.4.1.21678.317.1.1	infoName	RW	The station identifier	ssbtCommon
1.3.6.1.4.1.21678.317.1.2	infoManufacturer	R	Manufacturer name	ssbtCommon
1.3.6.1.4.1.21678.317.1.3	infoVersion			ssbtCommon
1.3.6.1.4.1.21678.317.1.3.1	versionNumber	R	Number of software versions	ssbtCommon
1.3.6.1.4.1.21678.317.1.3.2	versionTable	NA		ssbtCommon
1.3.6.1.4.1.21678.317.1.3.2.1	versionEntry			ssbtCommon
1.3.6.1.4.1.21678.317.1.3.2.1.1	versionIndex	R	Software version index	ssbtCommon
1.3.6.1.4.1.21678.317.1.3.2.1.2	versionDescr	R	Software description	ssbtCommon
1.3.6.1.4.1.21678.317.1.3.2.1.3	versionVersion	R	Software version	ssbtCommon
1.3.6.1.4.1.21678.317.1.4	infoHw			ssbtCommon
1.3.6.1.4.1.21678.317.1.4.1	hwNumber	R	Number of devices	ssbtCommon

OID	Name	R/W	Description	MIB
1.3.6.1.4.1.21678.317.1.4.2	hwTable	NA		ssbtCommon
1.3.6.1.4.1.21678.317.1.4.2.1	hwEntry			ssbtCommon
1.3.6.1.4.1.21678.317.1.4.2.1.1	hwIndex	R	Device index	ssbtCommon
1.3.6.1.4.1.21678.317.1.4.2.1.2	hwDescr	R	Device description	ssbtCommon
1.3.6.1.4.1.21678.317.1.4.2.1.3	hwSerialNumber	R	Serial number	ssbtCommon
1.3.6.1.4.1.21678.317.1.4.2.1.4	hwUniqueId	R	Unique device ID	ssbtCommon
1.3.6.1.4.1.21678.317.2	settings			ssbtCommon
1.3.6.1.4.1.21678.317.2.1	sDate	RW	Device date and time as specified in SNMPv2-TC	ssbtCommon
1.3.6.1.4.1.21678.317.2.2	sSystem			ssbtCommon
1.3.6.1.4.1.21678.317.2.2.1	ssLoadConfig	W	Load configuration	ssbtCommon
1.3.6.1.4.1.21678.317.2.2.2	ssSaveConfig	W	Save configuration	ssbtCommon
1.3.6.1.4.1.21678.317.2.2.3	ssReset	W	Reset board	ssbtCommon
1.3.6.1.4.1.21678.317.3	events			ssbtCommon
1.3.6.1.4.1.21678.317.3.1	evNumber	R	The total number of alarms	ssbtCommon
1.3.6.1.4.1.21678.317.3.2	evOverwritten	R	The events list has been overwritten. Obsolete events began to be overwritten."	ssbtCommon
1.3.6.1.4.1.21678.317.3.3	evPageSel	RW	Events page selector	ssbtCommon
1.3.6.1.4.1.21678.317.3.4	evTable	NA	Events table	ssbtCommon

OID	Name	R/W	Description	MIB
1.3.6.1.4.1.21678.317.3.4.1	evEntry			ssbtCommon
1.3.6.1.4.1.21678.317.3.4.1.1	evIndex	R	Event index	ssbtCommon
1.3.6.1.4.1.21678.317.3.4.1.2	evNum	R	Event number.	ssbtCommon
1.3.6.1.4.1.21678.317.3.4.1.3	evDate	R	Event date and time as specified in SNMPv2-TC	ssbtCommon
1.3.6.1.4.1.21678.317.3.4.1.4	evCode	R	Event code	ssbtCommon
1.3.6.1.4.1.21678.317.3.4.1.5	evDescr	R	Event description	ssbtCommon
1.3.6.1.4.1.21678.317.4	alarms			ssbtCommon
1.3.6.1.4.1.21678.317.4.1	alNumber	R	The total number of alarms	ssbtCommon
1.3.6.1.4.1.21678.317.4.2	alSeverityStatus	R	Maximum severity	ssbtCommon
1.3.6.1.4.1.21678.317.4.3	alThresholds			ssbtCommon
1.3.6.1.4.1.21678.317.4.3.1	altNumber	R	Number of alarm thresholds	ssbtCommon
1.3.6.1.4.1.21678.317.4.3.2	altTable	NA	Alarm thresholds table	ssbtCommon
1.3.6.1.4.1.21678.317.4.3.2.1	altEntry			ssbtCommon
1.3.6.1.4.1.21678.317.4.3.2.1.1	altIndex	R	Threshold index	ssbtCommon
1.3.6.1.4.1.21678.317.4.3.2.1.2	altDescr	R	Threshold description	ssbtCommon
1.3.6.1.4.1.21678.317.4.3.2.1.3	altAlarmCode	R	Code of the alarm this threshold is referred to	ssbtCommon
1.3.6.1.4.1.21678.317.4.3.2.1.4	altMeasUnit	R	Temperature unit of measurement	ssbtCommon

OID	Name	R/W	Description	MIB
1.3.6.1.4.1.21678.317.4.3.2.1.5	altSetting	RW	Threshold setting	ssbtCommon
1.3.6.1.4.1.21678.317.4.4	alTable	NA	Alarms table. This table contains all alarms that can be managed by screen service devices"	ssbtCommon
1.3.6.1.4.1.21678.317.4.4.1	alEntry			ssbtCommon
1.3.6.1.4.1.21678.317.4.4.1.1	alIndex	R	Alarm index	ssbtCommon
1.3.6.1.4.1.21678.317.4.4.1.2	alStatus	R	Alarm status	ssbtCommon
1.3.6.1.4.1.21678.317.4.4.1.3	alCode	R	Alarm code	ssbtCommon
1.3.6.1.4.1.21678.317.4.4.1.4	alDescr	R	Alarm description	ssbtCommon
1.3.6.1.4.1.21678.317.4.4.1.5	alSeverity	R	Severity associated to the alarm	ssbtCommon
1.3.6.1.4.1.21678.317.4.4.1.6	alTrapManager1	RW	Enables trap messages to be sent to the manager with IP address 1"	ssbtCommon
1.3.6.1.4.1.21678.317.4.4.1.7	alTrapManager2	RW	Enables trap messages to be sent to the manager with IP address 2"	ssbtCommon
1.3.6.1.4.1.21678.317.4.4.1.8	alTrapManager3	RW	Enables trap messages to be sent to the manager with IP address 3"	ssbtCommon
1.3.6.1.4.1.21678.317.4.4.1.9	alR0Enable	RW	Enables relay 0 to be switched on/off depending on the status of this alarm"	ssbtCommon
1.3.6.1.4.1.21678.317.4.4.1.10	alR1Enable	RW	Enables relay 1 to be switched on/off depending on the status of this alarm"	ssbtCommon
1.3.6.1.4.1.21678.317.4.4.1.11	alR2Enable	RW	Enables relay 2 to be switched on/off depending on the status of this alarm"	ssbtCommon
1.3.6.1.4.1.21678.317.4.4.1.12	alR3Enable	RW	Enables relay 3 to be switched on/off depending on the status of this alarm"	ssbtCommon

OID	Name	R/W	Description	MIB
1.3.6.1.4.1.21678.317.4.4.1.13	alFrontPanelEnable	RW	Enables this alarm to be notified on LCD display	ssbtCommon
1.3.6.1.4.1.21678.317.4.4.1.14	alJavaEnable	RW	Enables this alarm to be notified on the Java alarm page icon"	ssbtCommon
1.3.6.1.4.1.21678.317.4.4.1.15	alEventEnable	RW	Enables this alarm to be notified through an event	ssbtCommon
1.3.6.1.4.1.21678.317.4.4.1.16	alRfOffEnable	RW	Enables this alarm to switch off the output RF signal	ssbtCommon
1.3.6.1.4.1.21678.317.4.4.1.17	alAutoSwitchEnable	RW	Enables this alarm to trigger the automatic input switching	ssbtCommon
1.3.6.1.4.1.21678.317.5	snmp			ssbtCommon
1.3.6.1.4.1.21678.317.5.1	managerTrapNumber	R	Number of manager Trap IP addresses	ssbtCommon
1.3.6.1.4.1.21678.317.5.2	managerTrapTable	NA	Manager Trap IP addresses table	ssbtCommon
1.3.6.1.4.1.21678.317.5.2.1	managerTrapEntry			ssbtCommon
1.3.6.1.4.1.21678.317.5.2.1.1	managerTrapIndex	R	SNMP Manager index	ssbtCommon
1.3.6.1.4.1.21678.317.5.2.1.2	managerTrapIp	RW	SNMP Manager IP listening address	ssbtCommon
1.3.6.1.4.1.21678.317.5.3	traps		"Traps section"	ssbtCommon
1.3.6.1.4.1.21678.317.5.3.1	alarmTraps1		Traps definition for Trap Manager 1. An alarmTrap1 trap signifies that the sending protocol entity recognizes that some state transitions occurred in the alarms table."	ssbtCommon
1.3.6.1.4.1.21678.317.5.3.2	alarmTraps2		Traps definition for Trap Manager 2. An alarmTrap2 trap signifies that the sending protocol entity recognizes that some state transitions occurred in the alarms table."	ssbtCommon

OID	Name	R/W	Description	MIB
1.3.6.1.4.1.21678.317.5.3.3	alarmTraps3		Traps definition for Trap Manager 3. An alarmTrap3 trap signifies that the sending protocol entity recognizes that some state transitions occurred in the alarms table."	ssbtCommon
1.3.6.1.4.1.21678.317.6	mode			ssbtCommon
1.3.6.1.4.1.21678.317.6.1	transmissionMode	RW	The transmission mode of the device	ssbtCommon
1.3.6.1.4.1.21678.317.6.2	modesManagement			ssbtCommon
1.3.6.1.4.1.21678.317.6.2.1	mmNumber	R	Number of available modes	ssbtCommon
1.3.6.1.4.1.21678.317.6.2.2	mmTable	NA	Modes management table	ssbtCommon
1.3.6.1.4.1.21678.317.6.2.2.1	mmEntry			ssbtCommon
1.3.6.1.4.1.21678.317.6.2.2.1.1	mmIndex	R	Mode index	ssbtCommon
1.3.6.1.4.1.21678.317.6.2.2.1.2	mmType	R	Mode type	ssbtCommon
1.3.6.1.4.1.21678.317.6.2.2.1.3	mmStatus	R	Mode status	ssbtCommon
1.3.6.1.4.1.21678.321	ssbtNetwork			ssbtNetwork
1.3.6.1.4.1.21678.321.1	netInterfaces			ssbtNetwork
1.3.6.1.4.1.21678.321.1.1	nifNumber	R	The number of network interfaces	ssbtNetwork
1.3.6.1.4.1.21678.321.1.2	nifTable	NA		ssbtNetwork
1.3.6.1.4.1.21678.321.1.2.1	nifEntry			ssbtNetwork
1.3.6.1.4.1.21678.321.1.2.1.1	nifIndex	R		ssbtNetwork

OID	Name	R/W	Description	MIB
1.3.6.1.4.1.21678.321.1.2.1.2	nifDescr	R	Interface description	ssbtNetwork
1.3.6.1.4.1.21678.321.1.2.1.3	nifType	R	The type of interface	ssbtNetwork
1.3.6.1.4.1.21678.321.1.2.1.4	nifIpAddr	R	The IP address of this entry	ssbtNetwork
1.3.6.1.4.1.21678.321.1.2.1.5	nifPhysAddr	R	The physical address of this entry	ssbtNetwork
1.3.6.1.4.1.21678.321.1.2.1.6	nifNetMask	R	The subnet mask associated with the IP address of this entry	ssbtNetwork
1.3.6.1.4.1.21678.321.1.2.1.7	nifGateway	R	The gateway IP address of this entry	ssbtNetwork
1.3.6.1.4.1.21678.321.1.2.1.8	nifSpeed	R	The current bandwidth of this interface	ssbtNetwork
1.3.6.1.4.1.21678.321.1.2.1.9	nifInPkts	R	The number of packets delivered to higher-level protocol	ssbtNetwork
1.3.6.1.4.1.21678.321.1.2.1.10	nifInErr	R	The number of inbound packets that contained errors	ssbtNetwork

4.3.5 Events Monitoring

In MIB *ssbtCommon* the *events* node allows the monitoring of events.

evNumber object specifies the total number of events stored in memory.

evOverwritten object notifies if the events list exceeded the memory limit. If this object returns "1", obsolete events have begun to be overwritten.

evPageSel object selects which page has to be monitored through the events table. Each page is composed by 16 events.

The total number of entries of the *evTable* is fixed to 16. Each entry in the table is defined as follows:

```
EvEntry ::= SEQUENCE {
        evIndex INTEGER,
        evNum INTEGER,
        evDate DateAndTime,
        evCode EvType,
        evDescr DisplayString
        }
```

evIndex is the index of the specific entry.

evNum object specifies the numerical order of the specific entry.

evDate object provides the date and time of the event generation as specified in SNMv2-TC.

evCode object provides the Type of the specific entry (ref. to Events chapter for further information).

evDescr object provides the Description of the specific entry (ref. to Events chapter for further information).

4.3.6 Configuring alarm masks and alarm thresholds

In *ssbtCommon* MIB the *alarms* node allows the monitoring of alarms status, the setting of alarm masks and thresholds.

4.3.6.1 Alarms Table

The *alTable* table is used to monitor alarms status and to set alarm masks. *alNumber* object specifies the total number of entries in the alarms table. *alSeverityStatus* specifies the maximum severity of currently raised alarms. Each entry in the table is defined as follows:

```
AlEntry ::= SEQUENCE {
        alIndex INTEGER,
        alStatus OnOff,
        alCode INTEGER,
        alDescr DisplayString,
        alSeverity Severity,
        alTrapManager1 EnDis,
        alTrapManager2 EnDis,
        alTrapManager3 EnDis,
        alR1Enable EnDis,
        alR2Enable EnDis,
        alR3Enable EnDis,
        alR4Enable EnDis,
        alFrontPanelEnable EnDis,
        alJavaEnable EnDis,
        alEventEnable EnDis,
        alRfOffEnable EnDis,
        alAutoSwitchEnable EnDis
        }
```

alIndex is the index of the specific entry.

alStatus object shows the alarm status (on/off).

alCode object univocally identifies the alarm (refer to Alarms Code and Description table).

alDescr object provides a textual description of the specific entry (refer to Alarms Code and Description table for the complete list of alarms descriptions).

alSeverity defines the severity associated to the alarm.

alTrapManager1 object allows to *e*nable trap messages, associated to the entry, to be sent to the manager with IP address 1

alTrapManager2 object allows to *e*nable trap messages, associated to the entry, to be sent to the manager with IP address 2

alTrapManager3 object allows to *e*nable trap messages, associated to the entry, to be sent to the manager with IP address 3

alR0Enable, alR1Enable, alR2Enable, alR3Enable objects enable relay 0, 1, 2, 3 respectively, to be switched on/off depending on the status of this entry.

alFrontPanelEnable object enables the alarm to be notified on LCD display lighting the alarm button and listing the alarms in the Alarms menu.

alJavaEnable enables the alarm to be notified on the Java alarm page icon.

alEventEnable enables the alarm to be notified through an event.

alRfOffEnable enables the entry to switch off the RF output.

alAutoSwitchEnable enables the entry to trigger the automatic input switching.

Alarms are divided in two different classes: common alarms and mode-specific alarms. Common alarms are those which are HW dependant or are dependent on how the operating system has been designed. Common alarms are shared by all the operational modes. Mode-specific alarms are those which depend on the implemented functionalities and standards. Mode-specific alarms can be easily recognized thanks to the addition of the mode prefix enclosed in squared brackets.

The alarms table lists only common alarms. Indexes of alarms may change from one operational mode to another, but alarm codes do not. Alarm codes of common alarms are the same whatever the working mode. Alarm codes of mode-specific alarms uniquely identify the specific alarm and are not shared by operational modes.

For details about alarms modes refer to specific mode files:

- DVB-T2 Mode Manual ARK6
- DVB-T Mode Manual ARK6
- ISDB-T Mode Manual ARK6
- ITU Mode Manual ARK6
- ATSC Mode Manual ARK6

Table 4-22 Alarms Code and Description

alDescr	Alarm Description	Alarm Code
Temp. High	Temperature High Alarm	0
Temp. High -3dB	Temperature Level -3db	1
Temp. High Warning	Temperature High Warning	2
Fans Speed Low	Fans Speed Low	3

alDescr	Alarm Description	Alarm Code
Alim Dialog Err	Alim Dialog Err	4
FE Dialog Err	FE Dialog Err	5
Meas Dialog Err	Meas Dialog Err	6
GPS Dialog Err	GPS Dialog Err	7
GPS Not Locked	GPS Not Locked	8
120MHz Not Locked	120MHz Not Locked	9
960MHz Not Locked	960MHz Not Locked	10
Input PLL Not Locked	Input PLL Not Locked	11
Out PLL Not Locked	Output PLL Not Locked	12
10MHz Not Locked	10MHz Not Locked	13
1PPS Not Locked	1 PPS Not Locked	14
FPGA Boot Err	FPGA Boot Error	15
FWD Power High	Forward Power High	16
FWD Pwr Low Warning	Forward Power Low Warning	17
FWD Pwr Low	Forward Power Low Alarm	18
Reflex Power High	Reflex Power High	19
File System Err	File System Error	20
File Err	Bad File In File System	21
PS1 V Out Of Range	PS Voltage Out Of Range	22
PS1 I Out Of Range	PS Current Out Of Range	23
CPU Fan Err	CPU Fan Error	24
Test Mode	Test Mode	25
FE S2 Not Locked	Front End DVB-S2 Not locked	26
FE S2 S/N low	Front End DVB-S2 Signal-to Noise Ratio Low	27
FE S2 BER High	Front End DVB-S2 Bit Error Rate High	28
FE S2 Global Alarm	Front End DVB-S2 Global Alarm	29
Interlock shut off	Interlock Alarm (only fro 501 device)	30
NTP Server Alarm	NTP Server Alarm	31

4.3.6.2 Thresholds Table

The *alThresholds* subtree is used to set alarms thresholds. *altNumber* object specifies the total number of entries in the alarm thresholds table. Each entry in the table is defined as follows:

```
AltEntry ::= SEQUENCE {
        altIndex INTEGER,
        altDescr DisplayString,
        altAlarmCode INTEGER,
        altMeasUnit MeasureType,
        altSetting INTEGER
        }
```

altIndex is the index of the specific entry.

altDescr object provides a textual description of the specific entry (refer to Alarm Thresholds Description table for the complete list of thresholds descriptions).

altAlarmCode object univocally identifies the alarm this threshold refers to (refer to Alarms Code and Description table).

altMeasUnit object specifies the unit of measurement of the entry.

altSetting object is used to set the threshold.

The thresholds table lists both common and mode-specific alarm thresholds. Indexes of thresholds may change from one operational mode to another, but alarm codes of the alarms they refer to do not. Alarm codes of common alarms are the same whatever the working mode. Alarm codes of mode-specific alarms uniquely identify the specific alarm and are not shared by operational modes.

Table 4-23 Alarm Thresholds Description

altDescr	Threshold Description	Alarm Code
Temp. High -3dB	Temperature warning threshold expressed in °C.	1
Temp. High Warning	Temperature alarm threshold expressed in °C.	2
FWD Pwr Low Warning	Forward power warning threshold expressed in dB.	17
FWD Pwr Low	Forward power alarm threshold expressed in dB.	18
FE Squelch	FE Squelch alarm threshold expressed in dB.	1315
FE Pre LDPC BER	FE Pre LDPC BER alarm threshold expressed in dB*1e7.	1316
FE SNR Low	FE Signal to Noise alarm threshold expressed in dB*1e3.	1317
FE MER Low	FE MER alarm threshold expressed in dB*1e3.	1318
FE S.Quality Low	FE Signal Quality alarm threshold.	1319

altDescr	Threshold Description	Alarm Code
Meas Pre LDPC BER	Measure Pre LDPC BER alarm threshold expressed in dB*1e7.	1321
Meas SNR Low	Measure Signal to Noise alarm threshold expressed in dB*1e3.	1322
Meas MER Low	Measure MER alarm threshold expressed in dB*1e3.	1323
Meas S.Quality Low	Measure Signal Quality alarm threshold.	1324
FE LDPC Mean Err	FE LDPC Mean Error alarm threshold	1330
MEAS LDPC Mean Err	Measure LDPC Mean Error alarm threshold	1331

4.3.7 Traps

While a management station can poll, at fixed time interval, all the agents it knows for some key information, each agent is responsible for notifying the management station of any alarm condition. These events are communicated in SNMP messages known as *traps*.

The following parameters shall be set in order to correctly configure traps:

- SNMP Agent Port: 162.
- SNMP Agent Transport protocol: IP/UDP.

ARK6 devices transmit alarm-specific traps. For every Trap Manager there is a different trap definition:

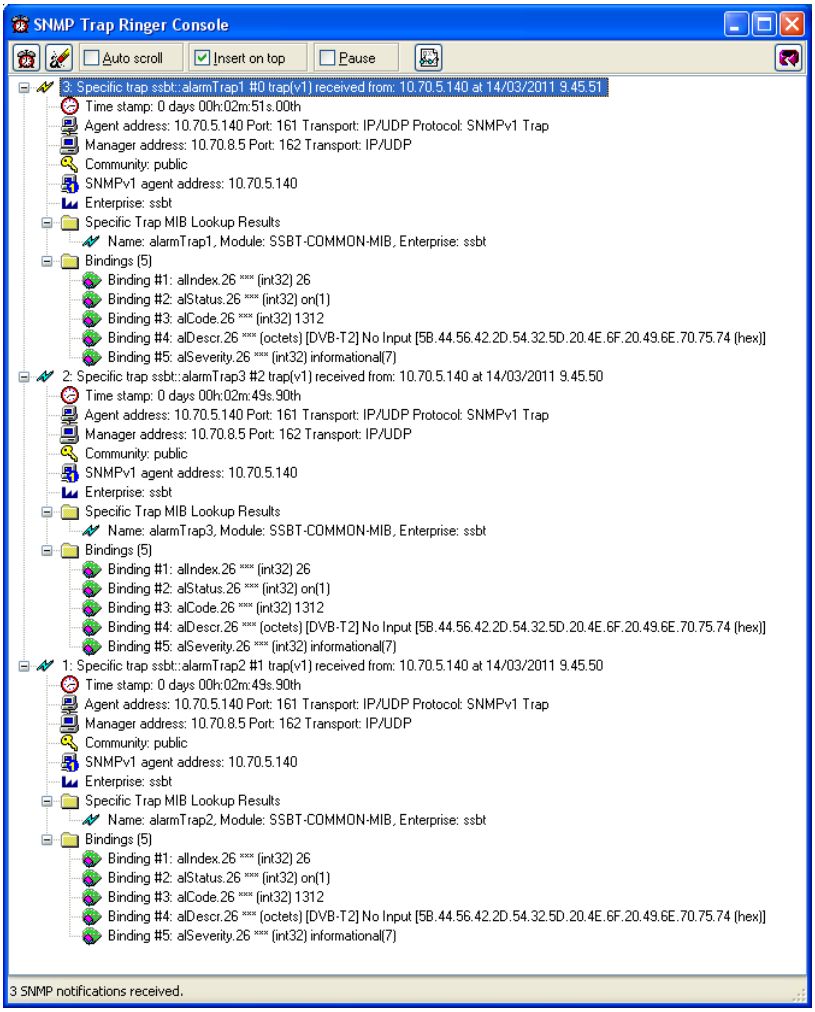
```
alarmTrap1 TRAP-TYPE
        ENTERPRISE  ssbt
        VARIABLES   { alIndex, alStatus, alCode, alDescr, alSeverity}
        DESCRIPTION
        "Traps definition for Trap Manager 1"
        ::= 0

alarmTrap2 TRAP-TYPE
        ENTERPRISE  ssbt
        VARIABLES   { alIndex, alStatus, alCode, alDescr, alSeverity}
        DESCRIPTION
        "Traps definition for Trap Manager 2"
        ::= 1

alarmTrap3 TRAP-TYPE
        ENTERPRISE  ssbt
        VARIABLES   { alIndex, alStatus, alCode, alDescr, alSeverity}
        DESCRIPTION
        "Traps definition for Trap Manager 3"
        ::= 2
```

VARIABLES clause defines the ordered sequence of MIB objects, belonging to the specific entry of the *alTable,* which are contained within every instance of the trap type. Each variable is placed, in order, inside the variable-bindings field of the SNMP Trap Message as shown in the following figure (refer to Alarms Table paragraph for further information about alIndex, alStatus, alCode, alDesc, alSeverity objects).

Figure 4-44 SNMP Trap Messages



4.3.7.1 Configuring traps

Use Java (refer to Network and Alarms paragraphs for further information) or SNMP user interfaces to configure traps.

The configuration of traps is performed through the setting of three different alarm masks, by means of *alTrapManager1, alTrapManager2, alTrapManager3* objects in the *alTable* (refer to Alarms Table paragraph), and through the setting of the destination IP Address of the receiving management stations, by means of the *managerTrapTable* in the *snmp* subtree in *ssbtCommon* MIB.

managerTrapNumber object specifies the total number of entries in the trap manager address table.

Each entry of the *managerTrapTable* is defined as follows:

```
ManagerTrapEntry ::= SEQUENCE {
        managerTrapIndex INTEGER,
        managerTrapIp IpAddress
        }
```

managerTrapIndex is the SNMP manager index.

managerTrapIp object allows the setting of the SNMP manager IP listening address. There are up to 3 different manager IP addresses that can be configured, one for each *alTrapManager* mask.

The Community shown in trap messages can be set from Java interface in the Community box within the Network window (refer to Network paragraph).

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Maintenance & Troubleshooting

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5 Maintenance & Troubleshooting

5.1 Maintenance

No particular maintenance is required.

5.2 Troubleshooting

No particular troubleshooting paths have been reported up to date.