ISO 9001:2000
Cert. N°4500/1

# *User Manual*
# *XBT529 MUX-ISDBT*

*External Document*

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ISO 9001:2000 Cert. N°4500/1

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# Chapter 1
# Safety Instructions

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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**

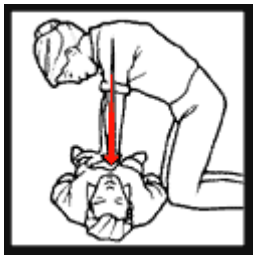
If not breathing normally, pinch the nose and cover the mouth with yours. Give two full breaths. The person's chest will rise if you are giving enough air.

**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).

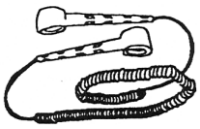
Make sure that electrostatic discharge protections are reset after maintenance and/or measurement operations.

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:

CE0648①

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 XBT529 MUX ISDBT device has been designed as a brand new model of software defined BTS re-multiplexer that incorporates all the technical and functional capabilities requiring before the use of two different devices XBT527 and XBT528 together with a complete set of new functionalities that bring this multiplexer at the forefront of the technology edge.

Main functionalities are:

Main possible application is:

- BTS Remux supporting up to three Layers – including muxing up to 8 logical input for each Layer - and PSI/SI Carousel Insertion

The XBT529 MUX ISDBT project finds its field of application as BTS Multiplexer and Network Adapter in Broadcasted Transport Stream (BTS) based Broadcasting Systems like ISDB-T

#### *2.1.1.1 Features*

The key features of the XBT529 MUX ISDBT are:

- MPEG-2 Transport Stream (TS) inputs (ISO 13818-1 - over ASI (EN-50083/9) and Gigabit Ethernet (PRO-MPEG CoP3 R2)
- Broadcast Transport Stream (BTS) Outputs (ABNT NBR 15601) over ASI (EN-50083/9) and Gigabit Ethernet (PRO-MPEG COP3 R2)
- PSI/SI Table Analyzer
- PCR re-stamping
- LayerA PCR Replacement (only on Logic Input 1)
- Semi-automatic PID Filter and Remapping
- PSI/SI Carousel Editing and Insertion
- IIP Insertion – both MFN and SFN related parameters
- Support for Emergency Broadcasting Warning System (EWBS)
- GPS, external or internal 10MHz/1PPS synchronization
- Optos and Relays Managements
- Alarms with selectable action on GUI/LCD/Events/Relays/SNMP Traps/Output
- Multiple device configuration management (up to 8)
- Remote management via Java GUI and locally by display (partial control).
- Event logs
- SMNP traps support

## 2.2 General Technical Data

**Table 1 General technical data**

| Parameter / Control | Admitted Ranges / Values |
|---|---|
| Power supply | - IEC: 1[1]<br>- Voltage: 80-264 VAC<br>- Frequency: 50-60 Hz |
| Inputs | 8x ASI, 1x GPS, 1x 1PPS, 1x 10MHz, 1x SPI [1], 2x TSoIP channels |
| Outputs | 4x ASI, 1x 1PPS, 1x 10MHz, 1x SPI [1], 1x or 2x TSoIP channels |
| Frequency references synchronization | External or GPS[1] |
| System clock synchronization | Internal, GPS or NTP client.[1] |
| 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<br>- Embedded Web server |
| GbE Ports | - GbE 1: 10/100/1000 Base T Management port / Data port (for product not using GbE2 port)<br>- GbE 2: 10/100/1000 Base T Data port.[1] |
| Redundancy | Input autoswitch algorithm supported. On some modes hitless or seamless switching feature is also available.[1] |
| Security | Authentication for GUI access optional.[1] |
| Configuration | - Automatic loading of preset configuration supported |

[1] This feature could be not available on all products

| Parameter / Control | Admitted Ranges / Values |
|---|---|
| Input interfaces | ○ ASI/SSI/SDI<br>○ Number of inputs: 8<br>○ Connector: BNC<br>○ Zin: 75 Ohm<br>○ Input voltage: 800mVpp (500 to 1200) |
| | ○ TSoIP<br>○ Number of channels: 2<br>○ Connector: RJ45<br>○ Speed: 10/100/1000 |
| | ○ GPS<br>○ Number of inputs: 1<br>○ Connector: TNC<br>○ Zin: 50 Ohm<br>○ Sensitivity: -185 dBW |
| | ○ 10 MHz<br>○ Number of inputs: 1<br>○ Connector: BNC<br>○ Zin: 50 Ohm<br>○ Input voltage: 2 Vpp |
| | ○ 1PPS<br>○ Number of inputs: 1<br>○ Connector: BNC<br>○ Zin: 50 Ohm<br>○ Input voltage: TTL (min 1,7 V)<br>○ Pulse width: 100 us |
| Output interfaces | ○ ASI Out Monitor<br>○ Number of outputs: 4<br>○ Connector: BNC<br>○ Zout: 75 Ohm |

| Parameter / Control | Admitted Ranges / Values |
|---|---|
| | ○ TSoIP<br>○ Number of channels: 2<br>○ Connector: RJ45<br>○ Speed: 10/100/1000 |
| | ○ 10 MHz<br>○ Number of outputs: 1<br>○ Connector: SMB<br>○ Zout: 50 Ohm<br>○ Output: 2 Vpp |
| | ○ 1PPS<br>○ Number of outputs: 1<br>○ Connector: SMB<br>○ Zout: 50 Ohm<br>○ Output voltage: TTL (min 2,4 V)<br>○ Pulse width: 100 us |
| Control Interfaces | ○ GbE 1<br>○ Number of interfaces: 1<br>○ Connector: RJ45<br>○ Speed 10/100/1000 |
| | ○ OPTO<br>○ Number of outputs: 4<br>○ Connector: SUB-D 15p Female<br>○ Max current: -5 mA |
| | ○ Relays<br>○ Number of outputs: 4<br>○ Connector: SUB-D 25p Female<br>○ Max voltage: 125 VAC / 60VDC @ 0,3 A – 30 VDC @ 1A |

| Parameter / Control | Admitted Ranges / Values |
|---|---|
| | ○ RS232<br>○ Number of interfaces: 1<br>○ Connector: DE-9<br>○ Speed: Up to 230400 bps<br>○ Data: 8-bit data<br>○ Parity: No parity bits<br>○ Flow control: None<br>○ Stop: 1 stop bit |

### 2.2.1 RS232 pinout

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

**Figure 1 DE-9 connector**

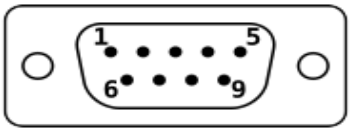


**Table 2 RS232 DE-9 pinout**

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

### 2.2.2 External Interface pinout

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

**Figure 2 Ext. Interface connector**

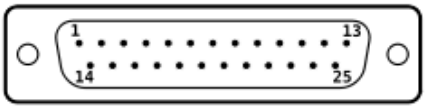


**Table 3 Ext. Interface pinout**

| SUB-D 25p Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | VCC_N (IN_OPTO_0) | 14 | GND_OPTO_0 |
| 2 | VCC_N (IN_OPTO_1) | 15 | GND_OPTO_1 |
| 3 | VCC_N (IN_OPTO_2) | 16 | GND_OPTO_2 |
| 4 | VCC_N (IN_OPTO_3) | 17 | GND_OPTO_3 |
| 5 | RL_NO0 | 18 | RL_NO3 |
| 6 | RL_COM0 | 19 | RL_COM3 |
| 7 | RL_NC0 | 20 | RL_NC3 |
| 8 | N.C. | 21 | N.C. |
| 9 | RL_NO1 | 22 | RL_NO2 |
| 10 | RL_COM1 | 23 | RL_COM2 |
| 11 | RL_NC1 | 24 | RL_NC2 |
| 12 | GND | 25 | 485B |
| 13 | 485A | - | - |

# Chapter 3
# Installation

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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.

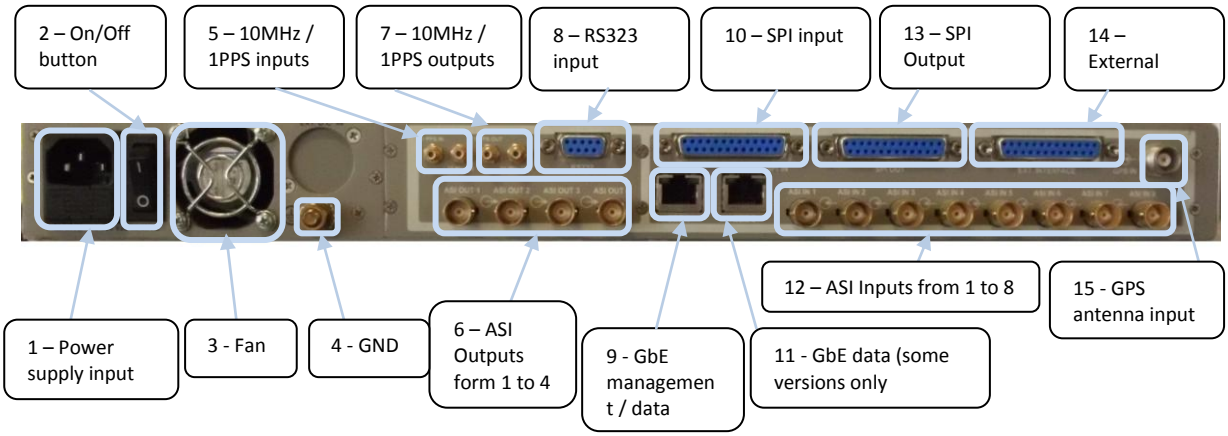
Install the device in an EIA (Standard 310) 19 inch rack as follows:

- 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 TS_MUX version different cable connection must be done.

#### *3.1.3.1 Mounting operation – rear panel connectors*

Hereafter are described the rear panel connections TS_MUX:

**Figure 1 TS_MUX rear panel connectors**



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# 4 User Interface

## 4.1 Overview

The following paragraph describes the Local User Interface with color LCD and 5 buttons available as an option on our devices.

The Local User interface allows the user to display and manage the main functions of the device such as:

- Operative settings;
- Input Statistics;
- Alarms monitoring;
- Modulation settings;
- General device status monitoring.

Local User Interface provides all monitoring of the device and network configuration but not fully operative settings that are available on the remote Java GUI only.

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:

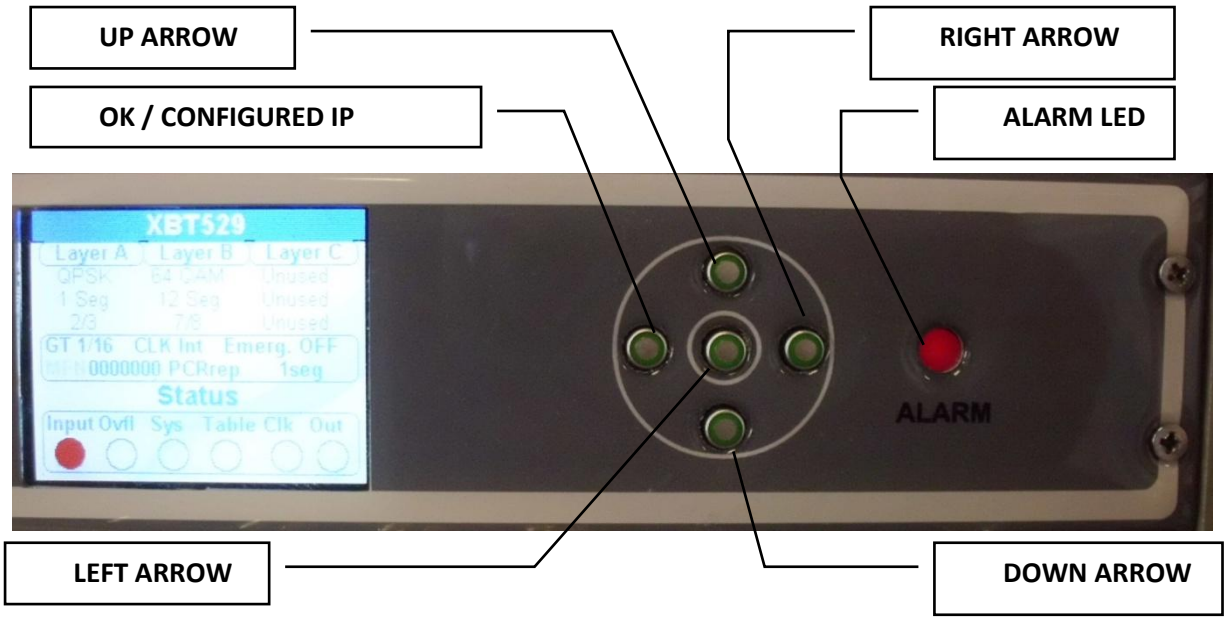
- ***Local User Interface***: access from local control panel and display. Provides a way to set the main device management parameters e.g. IP address, system clock, etc. and to monitor the device status and alarms. It could be composed by a B&W display (old devices) or by a Color display (new devices). 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;

This chapter provides a deep description of all commands and indicators implemented by each interface referred to the common management of TSMUX devices.

## 4.2 Local User Interface – Color display

### 4.2.1 Color Display Local User Interface

The paragraph which follows describe the Color local user interface for **XBT 529 MUX ISDB-T** which is made up by a Color LCD Display, five functional buttons and one **LED.**




Subsequently the Front Panel with Color Display Local User Interface and it is functional buttons are described:

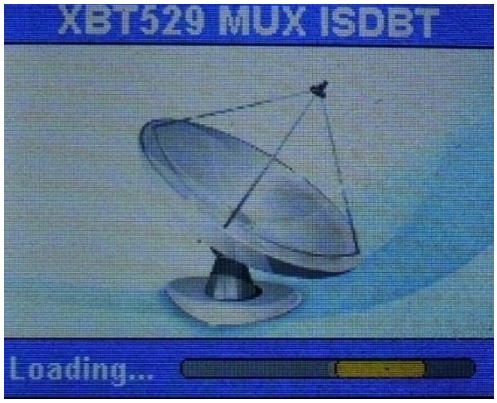
- **OK /CONFIGURED IP ADDRESSES**: push this button to select or to confirm the sub-menu or the value respectively. Push this button while displaying the Idle window than it will appears the list of configured IP addresses.
- **ALARM**: when an alarm occurs the RED LED lights up.
- **UP ARROW**: push this button to scroll up menus or to increase a value.
- **DOWN ARROW**: push this button to scroll down menus or to decrease a value.
- **LEFT ARROW**: push this button to move within a string, to open the Main Menu or to go backwards in the Main Menu.
- **RIGHT ARROW**: push this button to move within a string.

### 4.2.2 Boot and Welcome Message

Turning on the equipment the display will shows as follow:

**Figure 1 Welcome Message 1**

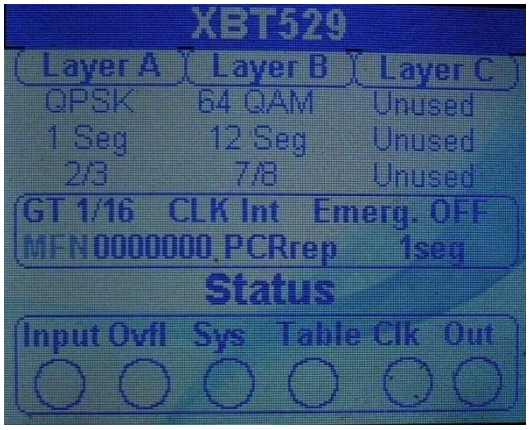
**Figure 2 Welcome Message 2**




When the boot is over the device is ready.

### 4.2.3 Idle Menu

**Figure 3 Idle screenshot**



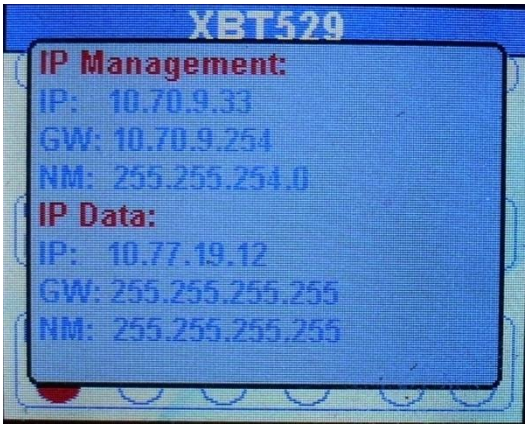
The informations contained in the Idle Menu are described hereafter table:

**Table 1 Color User Interface: Idle**

| Information | Description |
|---|---|
| XBT529 | Device description |
| Layer A, B, C | Modulation Scheme, Coding rate, Number of Segment |
| GT | Guard Time |
| Clk | Clock source |
| Emergency | Emergency Flag (Receiver Startup controlled) |
| SFN/MFN | Network Type |
| | MaxDelay (if Network Mode = SFN) – if present |
| PCR Rep | PCR Replacement ON – if present |
| 1seg | Tx 1 seg active |
| Status | Status of alarm groups |

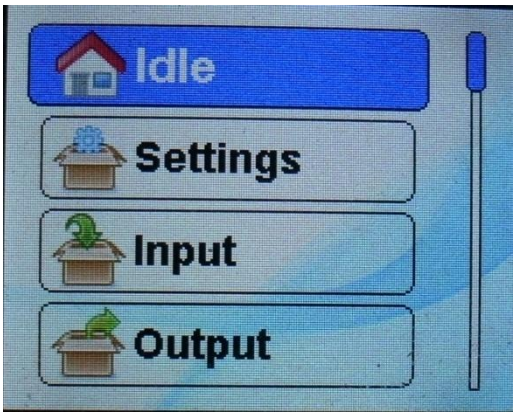
Pressing OK button the Configured IP Addresses will appears, this table allows the user to quickly have a look about the main network information about the device

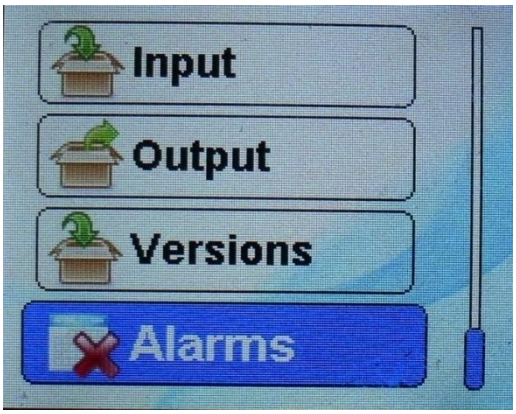
**Figure 4 Configured IP Addresses screenshot**



### 4.2.4 Main Menu

**Figure 5 Main Menu screenshots**




This menu shows five 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 2 Color User Interface: Submenus Descriptions**

| Submenu | Description |
|---|---|
| Idle | Allows the user to show the Idle window |
| Settings | Enter this submenu to view/set the following parameters:<br>• Ethernet Settings<br>• Date & Time<br>• SNMP<br>• Save Configuration<br>• Load Configuration<br>• Restart the device |
| Input | In this window is possible to view/set the parameters of physical and logical inputs |
| Output | This window allows choosing modulation parameters and selecting available outputs. |
| Versions | Show Installer and SW Module versions |

| Submenu | Description |
|---|---|
| Alarms | In this window the user can display the situation about Alarms |

### 4.2.5 Color LCD Alarms

From the Java GUI it is possible to set the lighting of the red alarm LED and/or the displaying of an alarm message on the bottom of the Idle window for each alarm the user desire. Opening the Alarm window on the main menu it is possible to see in detail which are the active/passive alarms. Alarms can have three colours:

1. Green, alarm not active
2. Red, alarm active

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

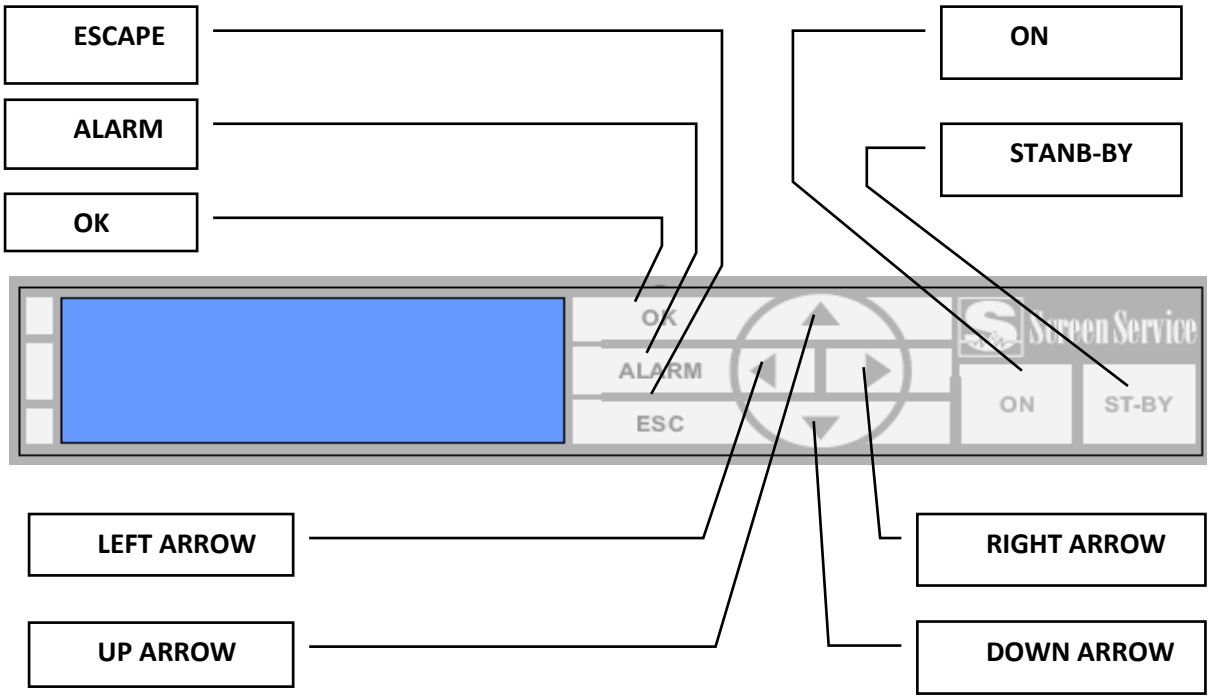
**Table 3 Color Local User Interface: Common Alarms Descriptions List**

| Alarm | Alarm Message |
|---|---|
| GPS Lock | GPS not locked |
| GPS Communication Error | GPS dialog error |
| Signal 10 MHz Lock | 10M not locked |
| Signal 1PPS Lock | 1PPS not detect |
| Input logic 1 Lock | Input logic 1 not locked |
| Input logic 2 Lock | Input logic 2 not locked |
| Input logic 3 Lock | Input logic 3 not locked |
| Input logic 4 Lock | Input logic 4 not locked |
| Input logic 5 Lock | Input logic 5 not locked |
| Input logic 6 Lock | Input logic 6 not locked |
| Input logic 7 Lock | Input logic 7 not locked |
| Input logic 8 Lock | Input logic 8 not locked |
| Input logic 1 Overflow | Input logic 1 ovf |
| Input logic 2 Overflow | Input logic 2 ovf |
| Input logic 3 Overflow | Input logic 3 ovf |
| Input logic 4 Overflow | Input logic 4 ovf |

| Alarm | Alarm Message |
|---|---|
| Input logic 5 Overflow | Input logic 5 ovf |
| Input logic 6 Overflow | Input logic 6 ovf |
| Input logic 7 Overflow | Input logic 7 ovf |
| Input logic 8 Overflow | Input logic 8 ovf |
| Layer A Table Overflow | Lay A Table ovfl |
| Layer C Table Overflow | Lay B Table ovfl |
| Layer C Table Overflow | Lay C Table ovfl |
| ARP Reply Error | ARP error |
| File System Error | FS wrong |
| Bad File in File system | File error |
| FPGA Boot Error | FPGA boot error |

## 4.3 Local User Interface – Black & White display

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

### 4.3.1 Boot and Welcome Message

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

```
Screen Service
MUX-ISDBT
Init System
[                    ]     Wait
```

```
Screen Service
MUX-ISDBT
Boot FPGA
[ ■■■                ]     Wait
```

```
Screen Service
MUX-ISDBT
Start System
[ ■■■ ■■■■           ]     Wait
```

```
Screen Service
MUX-ISDBT
IP    10.77.114.15
                       Readv
```

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. Idle Menu.

### 4.3.2 Idle Menu

```
XBT-529 12345678GgS
MUX-ISDBT          OUT ON
IP: 10.77.114.15
UTC:  14:17:00  04/06/10
```

This menu appears after one minute waiting from the last touch. Information contained in the Idle Menu is described in next table.

**Table 4 Local User Interface: Idle Menu**

| Information | Description |
|---|---|
| XBT529 MUX-ISDBT | Product code |
| 12345678GgS | List of locked inputs (if none -> No lock) |
| IP Address | Device IP address |
| OUT ON / OFF | Status of output |
| UTC | Time and date |

Press ESC to enter the MAIN MENU.

### 4.3.3 Main Menu

```
 Events
>Network setup
 Time & Date setup
▲/▼              OK: Enter
```

This menu shows eight 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 on the OK button.

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

**Table 5 Local User Interface: Main Menu**

| Submenu | Description |
|---|---|
| Network setup | Enter this submenu to set:<br>• GbE1 Board IP address<br>• GbE1 Gateway address<br>• GbE1 Netmask<br>• GbE2 IP address<br>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:<br>• Time<br>• Date<br>• Time Offset<br>Settings in this submenu do not need to be saved in order to be loaded at next device restart. |
| System Status | Enter this submenu to monitor system status and installer version the device is loaded with. This menu provides also information about:<br>• Hardware status;<br>• Layer-specific input statistics;<br>• Tuner statistics;<br>• Output settings and status. |
| Alarms | Alarms, detected and associated to the local interface by the relative mask, are listed in this submenu. |
| Save config | Enter this submenu to save the current configuration (overwriting one of the existing one or generating a new *.sav file). |
| Load config | Enter this submenu to load one of the available configurations. |
| Reset system | Enter this submenu to reset the device. |

### 4.3.4 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 alarms to alarm messages association (refer to Alarms paragraph for further information about alarms and their masks).

**Table 6 Alarms descriptions list**

| *Alarm* | **Alarm Message** |
|---|---|
| GPS Lock | GPS not locked |
| GPS Communication Error | GPS dialog error |
| Signal 10 MHz Lock | 10M not locked |
| Signal 1PPS Lock | 1PPS not detect |
| Input logic 1 Lock | In. logic 1 no lock |
| Input logic 2 Lock | In. logic 2 no lock |
| Input logic 3 Lock | In. logic 3 no lock |
| Input logic 4 Lock | In. logic 4 no lock |
| Input logic 5 Lock | In. logic 5 no lock |
| Input logic 6 Lock | In. logic 6 no lock |
| Input logic 7 Lock | In. logic 7 no lock |
| Input logic 8 Lock | In. logic 8 no lock |
| Input logic 1 Overflow | In. logic 1 ovf |
| Input logic 2 Overflow | In. logic 2 ovf |
| Input logic 3 Overflow | In. logic 3 ovf |
| Input logic 4 Overflow | In. logic 4 ovf |
| Input logic 5 Overflow | In. logic 5 ovf |
| Input logic 6 Overflow | In. logic 6 ovf |
| Input logic 7 Overflow | In. logic 7 ovf |
| Input logic 8 Overflow | In. logic 8 ovf |
| Layer A Table Overflow | Lay A Table ovfl |
| Layer C Table Overflow | Lay B Table ovfl |
| Layer C Table Overflow | Lay C Table ovfl |
| ARP Reply Error | ARP error |
| File System Error | FS wrong |
| Bad File in File system | File error |
| FPGA Boot Error | FPGA boot error |

## 4.4 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. The following paragraphs show the user how this Java GUI is composed.

### 4.4.1 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 6 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 7 System commands bar**

**Operation pages bar** allows switching between the following windows:

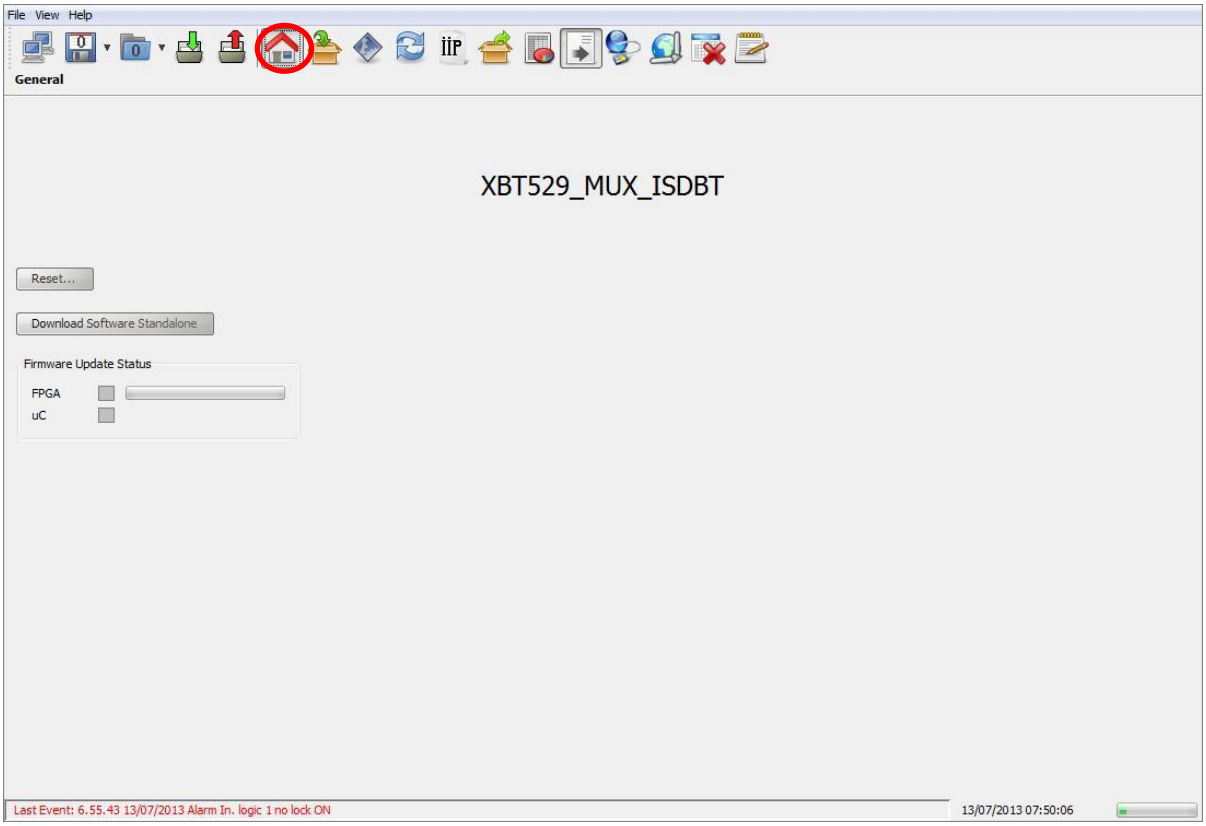
- **Home Page**: shows the firmware updating status, allows to reset the device, to locally download the *.jar file, to Reset the board.
- **Input**: shows ASI, GbE, Logic Inputs, Equalizer Bypass statistics and input select.
- **CAM**: allows the monitoring and setting of all the PIDs mapping/remapping for each logic input.
- **Carousel**: this section allows to see informations about the data carousel of all three layers, the parameters in question are:
  - Partition #;
  - Repetition Rate [ms];
  - Level [packets];
  - Overflow;
- **IIP Packets:** It allows to add the IIP equipment control information loops and to monitor the incoming ones.
- **Output:** this section allow the monitoring and the managing of output parameters such as:
  - Frequency;
  - Modulation;
  - Layer A/B/C;

- **Tables:** this is the window with which the user can monitor data flow: it is possible to see what tables are input and manage them to obtain the desired BTS output
- **FILTER:** allows to semi-automatically configure CAM by assigning services and PSI/SI tables to each layer;
- **Network**: this page allows the management of all the GbE ports parameters;
- **GPS:** this window 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;

### 4.4.2 Home Page

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

**Figure 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:

- **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).

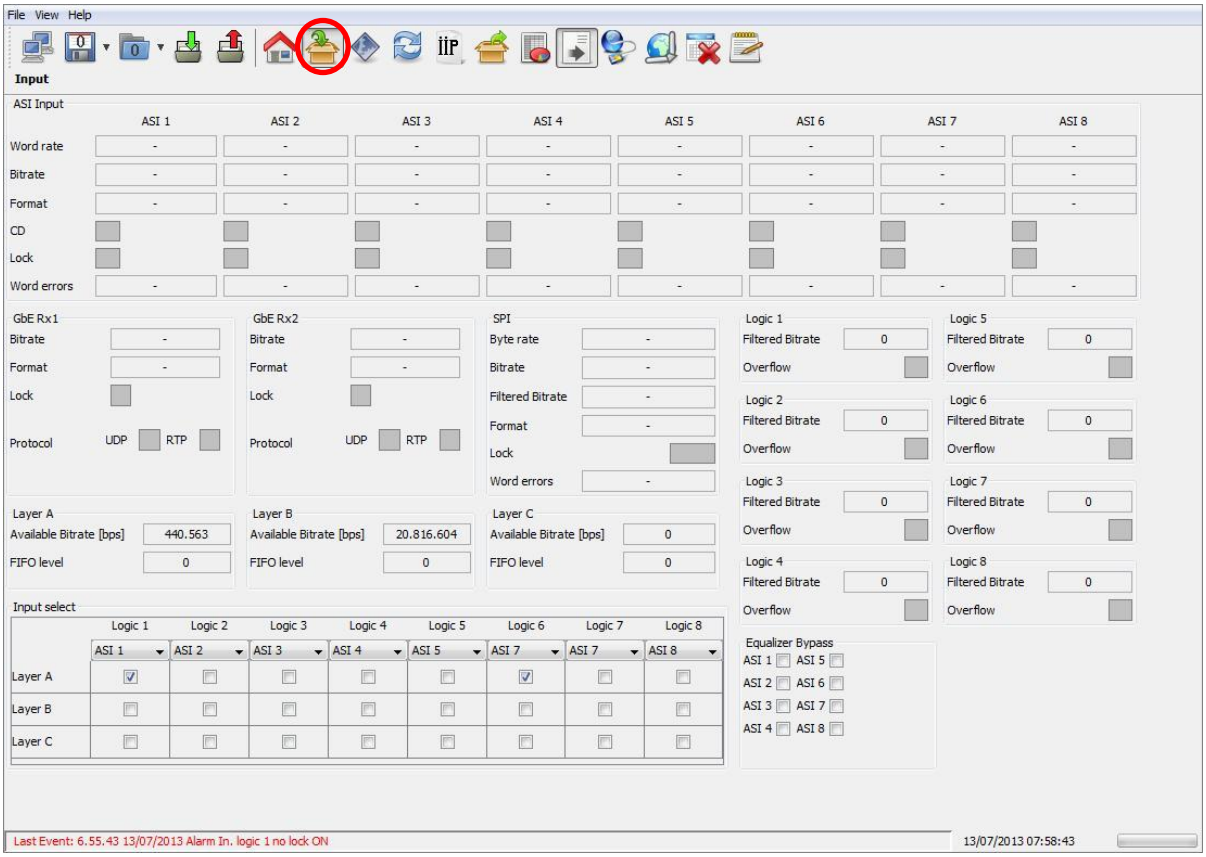
  The progress bars, at the right side of the FPGA and GPS indicators, show the status of firmware loading process into FLASH. The FPGA and GPS indicators remain yellow until the new firmware is loaded. When either FPGA or uC indicators turn into green, the transmitter shall be reset in order to load the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

### 4.4.3 Input

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

**Figure 9 Input page window**




The Input window allows to manage inputs, to monitor Transport Stream input statistics and to monitor the layer-specific capacity on the basis of its configuration.

Hereafter table 4 describes all parameters that the user can find in this page.

**Table 7 Input parameters description**

| Box | Parameter / Control | Description | Admitted Ranges / Values |
|---|---|---|---|
| Input select | Logic 1..8 | It allows to assign Physical Input to Logical Input<br>Note: the same physical input can be assigned to multiple Logical Inputs. | • ASI 1..8<br>• SPI<br>• GbE Rx1..2 |
| Input select - Logic 1..8 | LayerA/B/C | It allows to assign Logical Input to Transmission Layer | Tick/Not tick (once at time) |
| ASI Input - ASI1..8 | Word rate | Input byte rate. | |
| ASI Input - ASI 1..8 | Bitrate | Input bitrate. | |
| ASI Input - ASI 1.8 | Format | Format of received TS Packets. | • 188 Bytes<br>• 204 Bytes |
| ASI Input - ASI 1..8 | CD | Carrier detect. | • Green: Detected<br>• Grey: Not detected |
| ASI Input - ASI 1..8 | Lock | The actual synchronization of the Transport Stream. It depends on the number of correct sync bytes necessary for the device to synchronize and on the number of destroyed sync bytes witch the device cannot cope with.<br>Five consecutive correct sync bytes are sufficient for sync acquisition, and two or more consecutive corrupted sync bytes indicate sync loss (Ref. to ETSI TR 101 290) | • Green: Locked<br>• Grey: Not locked |
| ASI Input – ASI 1..8 | Word Errors | Input error rate: word errors per second. | |
| GbE Channel 1,2 | Bitrate | Bitrate of TS from Ethernet input. | |
| GbE Channel 1,2 | Format | Format of received TS Packets. | • 188 Bytes<br>• 204 Bytes |
| GbE Channel 1,2 | Lock | TS lock status. The input Transport Stream is unlocked when more than two consecutive Sync Byte are missed then five consecutive Sync Bytes must occur to regain the lock (Ref. to ETSI TR 101 290) | • Green: Locked<br>• Grey: Not locked |

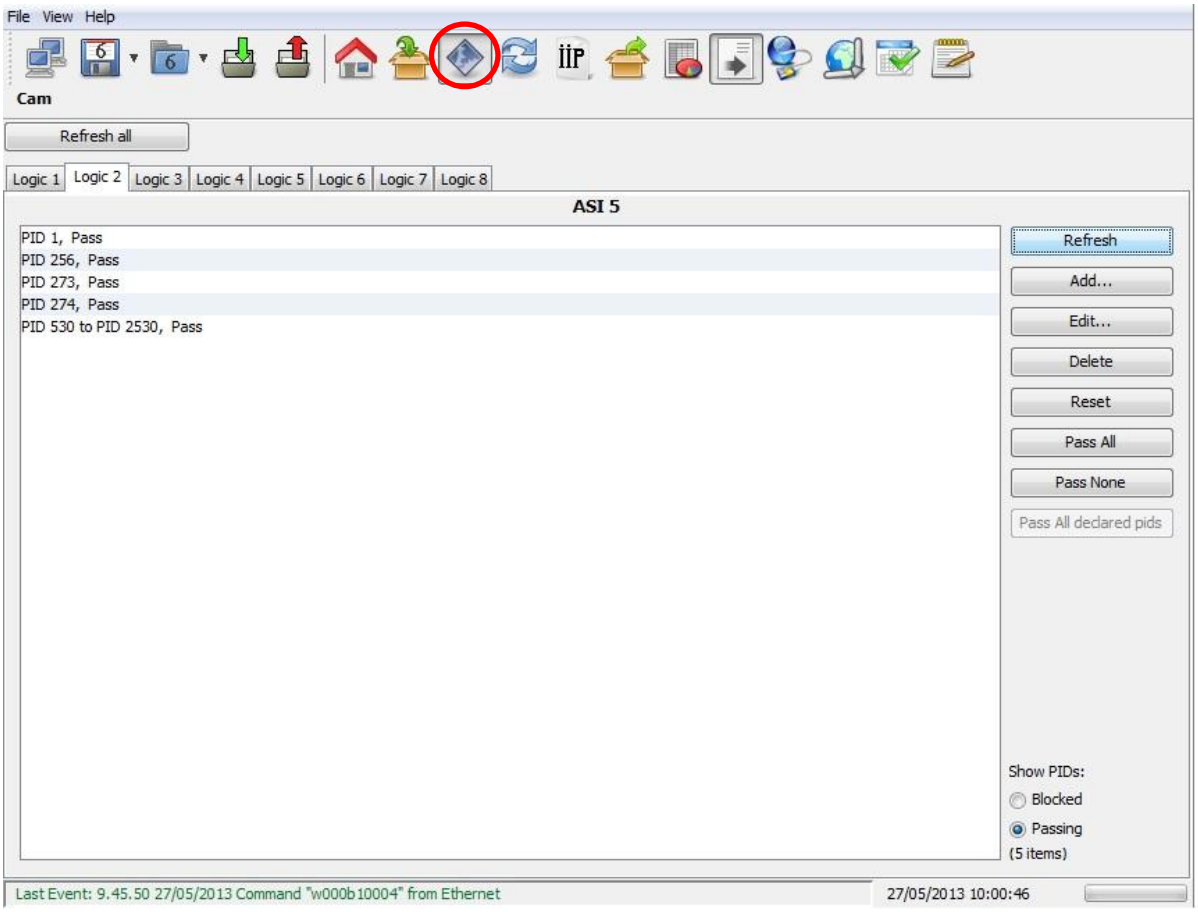
| Box | Parameter / Control | Description | Admitted Ranges / Values |
|---|---|---|---|
| GbE Channel 1,2 | Protocol | Ethernet input packets protocol. | • UDP<br>• RTP |
| SPI | Byte rate | Input byte rate. | |
| SPI | Bitrate | Input bit rate. | • |
| SPI | Format | Format of received TS Packets. | • 188 Bytes<br>• 204 Bytes |
| SPI | Lock | TS lock status. The input Transport Stream is unlocked when more than two consecutive Sync Byte are missed then five consecutive Sync Bytes must occur to regain the lock (Ref. to ETSI TR 101 290) | • Green: Locked<br>• Grey: Not locked |
| SPI | Word errors | | • Normally 0 |
| Layer A/B/C | Available Bitrate [bps] | Indicates the data rate available depending on the layer-specific parameters. | |
| Layer A/B/C | FIFO Level | FIFO level indicator Debugging indicator. | 0... |
| Logic 1..8 | Filtered Bitrate | Input data rate actually processed. | • Zero when the PID filter block is in “Pass None” mode or when the selected input is not locked.<br>• Equal to the total bit-rate, when the PID filter block is in “Pass All” mode.<br>• Less than total bit-rate, when the PID Filter block is blocking some PIDs. |
| Logic 1..8 | Overflow | TS input overflow indicator. This alarm condition occurs when the input bit-rate exceeds the Layer capability (Ref. to ABNT NBR 15601). | • Red: Alarm On<br>• Grey: Alarm Off |

| Box | Parameter / Control | Description | Admitted Ranges / Values |
|---|---|---|---|
| Equalizer Bypass | ASI 1..2 | Enables/disables the bypassing of cable equalizers at ASI inputs. | • Checked: Cable equalizer is bypassed<br>• Not checked: Cable equalizer is used |

### 4.4.4 Cam

Click on Cam button, highlighted in the next figure, to access the CAM (PID Filter) window.

**Figure 10 Cam**




XBT529 MUX ISDBT provides commands and monitoring that allows the manual filtering of each single PID contained in each logical input for a versatile re-multiplexing of one or more inputs.

Notes:

- The default setting of the PID filters is “Pass none” on all inputs.
- Each filter is related to logical input, the association between physical and logical input must be performed in the input sub-window and it is described in the previous paragraph.
- The filtering list is manually set and independent from the PIDs actually present in the input TS: the filter let pass or blocks packets with the selected PID if any, the system doesn’t know if those packets are present or not. The user shall be aware of PIDs actually present in the input TS and their meaning.
- PIDs values are expressed in decimal form.
- There is no consistency check when a PID is remapped, so the user shall take care to avoid settings that could generate overlapping PIDs in the output.
- PIDs of SI/PSI tables that are added by the multiplexer must be manually blocked – if present on input - to avoid overlap in the output.

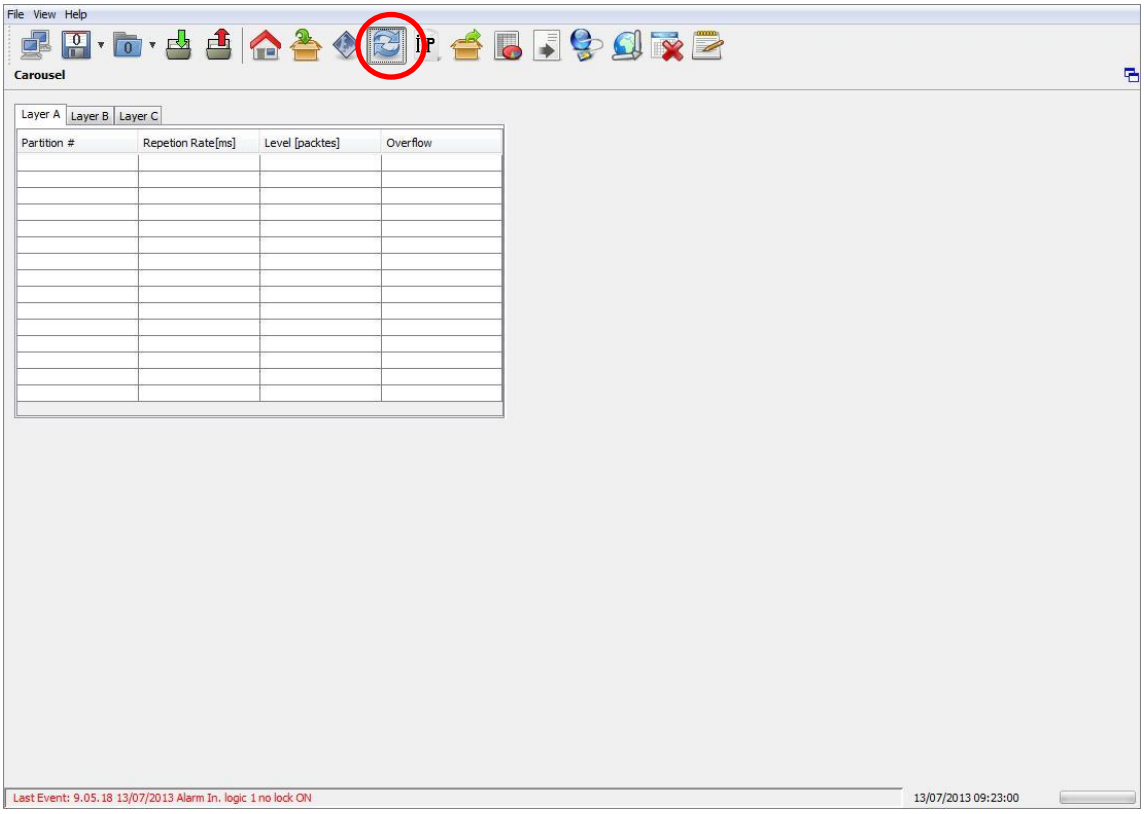
**Table 8 Cam window parameters**

| Box | Parameter / Control | Description | Admitted Ranges / Values |
|---|---|---|---|
| Logic 1..8 | Refresh | Click on Refresh button to refresh the list of blocked/passing PIDs. | |
| Logic 1..8 | Add | Select a PID through a left mouse click and then click on Add button to block and/or remap it. | |
| Logic 1..8 | Edit | Select a PID through a left mouse click and then click on Edit button to edit the CAM settings. | |
| Logic 1..8 | Delete | Select a PID through a left mouse click and then click on Delete button to delete one PID from active list (Block/Passing) and add it to the other one. | |
| Logic 1..8 | Reset | Click on the Reset button to reset the remapped PIDs table. | |
| Logic 1..8 | Pass All | Click on the Pass All button to pass all the PIDs. | |
| Logic 1..8 | Pass None | Click on the Pass None button to block all PIDs. | |
| Logic 1..8 | Blocked | Shows the list of the blocked PIDs. | • Ticked: Selected<br>• Unticked: Not selected |
| Logic 1..8 | Passing | Shows the list of the passing PIDs. | |
| Logic 1..8 | Pass All Declared PIDs | Click on the Pass All Declared PIDs button to make pass PAT, PMTs, all the referenced PIDs and all analyzed PSI/SI Tables of the selected input | |

### 4.4.5 Carousel

Click on Carousel button, highlighted in the next figure, to access the SI/SPI carousel information window.

**Figure 11 Carousel section**



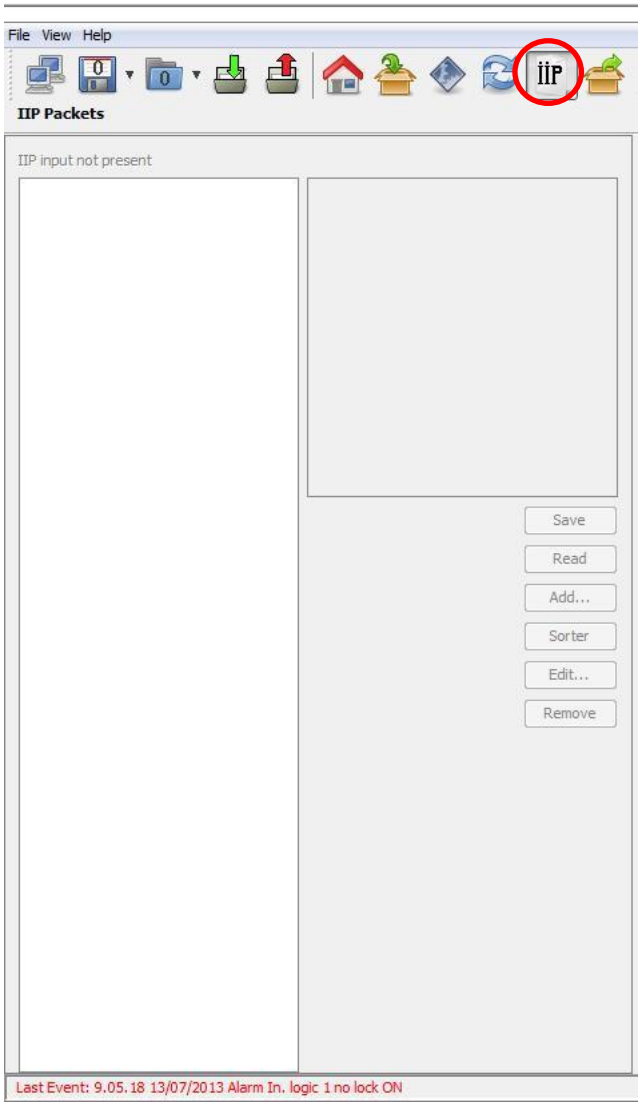

The SI/PSI Carousel window provides information about SI/PSI memory partitions status for each Layer (Refer to Appendix B or further information).

It shows repetition rate of each partition, number of packets per partition and overflow status.

### 4.4.6 IIP

Click on IIP button, highlighted in the next figure, to access the IIP Packets window.

**Figure 12 IIP packets window**




The IIP Packets window allows to manage the equipment control information to insert in the output IIP.

Hereafter in table 6 are described all the parameters which the user can find in this page.

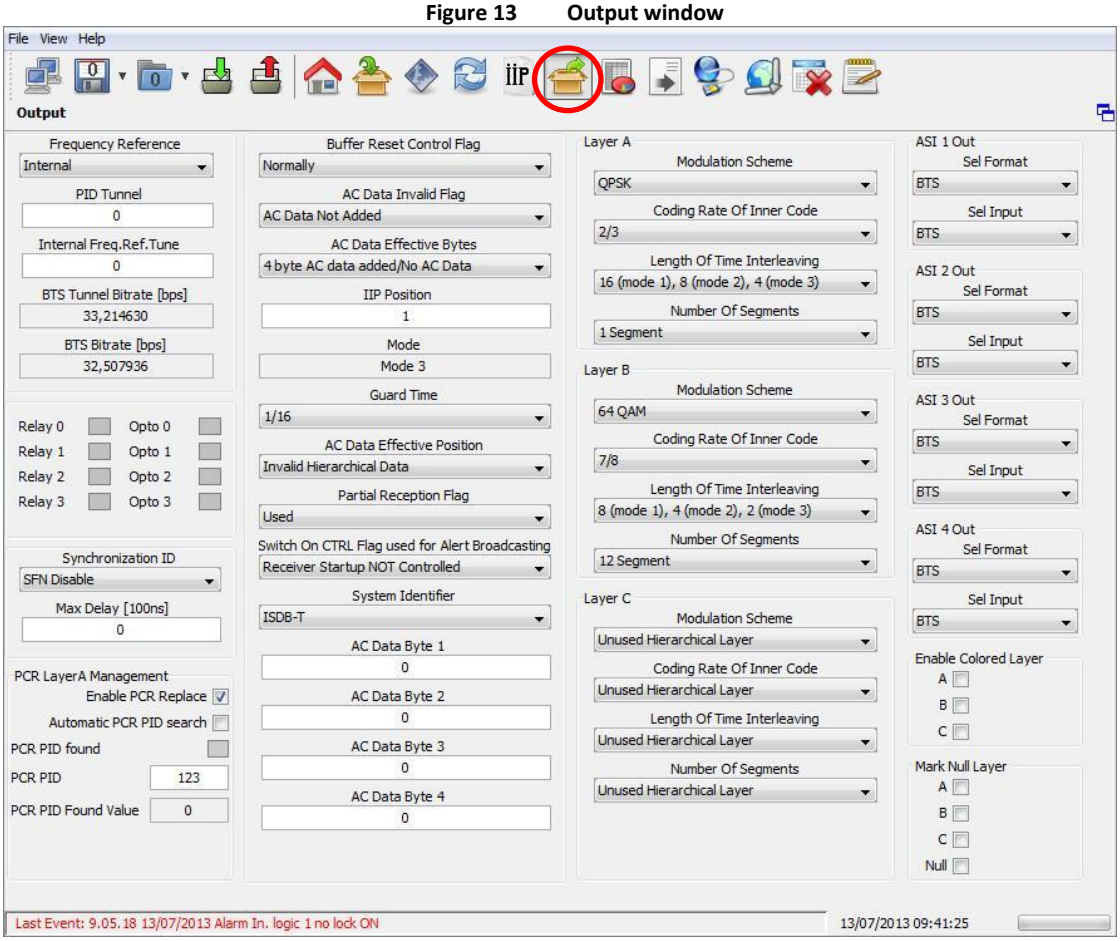
**Table 9 IIP packets parameters description**

| Button | Description |
|---|---|
| Save | Used to save the actual IIP equipment control information configuration in the file *.iip of the file system.<br>After reset or SFN enable the board loads the file *.iip and provides the IIP with the relative equipment control information configuration.<br><br>Note: to guarantee the last SFN equipment loops set after a SFN disable, the file *.iip should be saved during the precedent SFN enable. |
| Read | Used to show the list of the equipment control information loops actually used.<br>Select an item of the list to view the relative parameters configuration. |
| Add | Refer to Add an IIP Equipment ID paragraph. |
| Sorter | Used to sort the IIP Equipment IDs so that the lowest IDs are at the top of the list. |
| Edit | Refer to chapter Edit an IIP Equipment ID paragraph. |
| Remove | Used to remove the selected equipment control information loop from the IIP. |

## 4.4.7 Output

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

**Figure 13 Output window**



Use the Output window to select ASI outputs type, output BTS source, BTS tunnel PID, change and monitor IIP and TMCC modulation parameters, to monitor and set the frequency reference and to monitor output bitrate, optocouplers and relays status. The following table shows all the output parameters, their own description and the values that they can take.

| Box | Parameter / Control | Description | Admitted Ranges / Values |
|---|---|---|---|
| | Frequency Reference | Frequency Reference source selector. | • External<br>• Internal<br>• GPS |
| | PID Tunnel | BTS Tunnel output PID setting. | • Min: 0<br>• Max: 8191 |
| | Internal Freq. Ref. Tune | Internal frequency reference fine tuning setting. Allows the fine tuning of VCO, internal clock oscillator, with 60 Hz steps. | • Min: 0<br>• Max: 255 |
| | BTS Tunnel Bitrate [bps] | BTS Tunnel output bitrate monitor expressed in bit per second. The value must be fixed. | • 33.214.630 |
| | BTS Bitrate [bps] | BTS output bitrate monitor expressed in bit per second. The value must be fixed. | • 32.507.937 |
| | Relay 0/1/2/3 | Relays status monitor. | • Grey: Relay off<br>• Green: Relay on |
| | Opto 0/1/2/3 | TBD<br>Opto status monitor. | • Green: Closed (0)<br>• Grey: Opened (1) |
| | Synchronization ID | SFN enabling. Only with SFN enable the maximum delay value is written in the IIP. | • SFN Enable<br>• SFN Disable |
| | Max Delay [100ns] | Maximum delay setting in 100ns per unit. Time difference between delivery output to broadcasting station at studio and broadcasting wave emission from transmission antenna of each broadcasting station in SFN network. | • Min: 0<br>• Max: < 1second |
| PCR Layer A Management | Enable PCR Replace | Enables the PCR replacement. | • Ticked: Enabled<br>• Unticked: Disabled |
| PCR Layer A Management | Automatic PCR PID search | Enables the automatic searching of the PCR PID. | • Ticked: Enabled<br>• Unticked: Disabled |
| PCR Layer A Management | PCR PID found | Indicates whether the PCR PID has been found. | • Green: Detected<br>• Grey: Not detected |

| Box | Parameter / Control | Description | Admitted Ranges / Values |
|---|---|---|---|
| PCR Layer A Management | PCR PID | PCR PID setting. | • Min: 0<br>• Max: 8191 |
| PCR Layer A Management | PCR PID Found Value | Detected PCR PID. | • -<br>• Min: 0<br>• Max: 8191 |
| | Buffer Reset Control Flag | Buffer reset control flag enable. | • Normally<br>• Buffer reset |
| | AC Data Invalid Flag | AC data adding enable. | • AC Data Added<br>• AC Data Not Added |
| | AC Data Effective Bytes | TMCC AC data bytes quantity parameter selector. | • 1 byte AC data added<br>• 2 byte AC data added<br>• 3 byte AC data added<br>• 4 byte AC data added/NO AC Data |
| | IIP Position | IIP position setting. It's used to set IIP position from the start of the frame.<br>Point the mouse on the java IIP position field to read the admitted values range.<br>The admitted values range depending on the Multiplex Frame length.<br>Value 1 means that the IIP is the last packet in frame.<br>If the actual IIP position is next to the max admitted value, keep attention when guard time changes: the IIP position could be out of the new range (because of the new Multiplex Frame length set). | • Min: 1<br>• Max:<br>GT: 1/32 -> 4224<br>GT: 1/16 -> 4352<br>GT: 1/8 -> 4608<br>GT: 1/4 -> 5120 |
| | Mode | Mode parameter monitor. Must be fixed to mode 3. | • Mode 3 |
| | Guard Time | Guard time parameter selector. | • 1/32<br>• 1/16<br>• 1/8<br>• 1/4 |
| | AC Data Effective Position | AC data position parameter selector. | • Invalid Hierarchical Data<br>• Dummy Data |
| | Partial Reception Flag | Partial reception flag enable. | • Not Used<br>• Used |
| | Switch On CTRL Flag used for Alert Broadcasting | Broadcasting alert control flag enable. | • Receiver Startup NOT Controlled<br>• Receiver Startup Controlled |

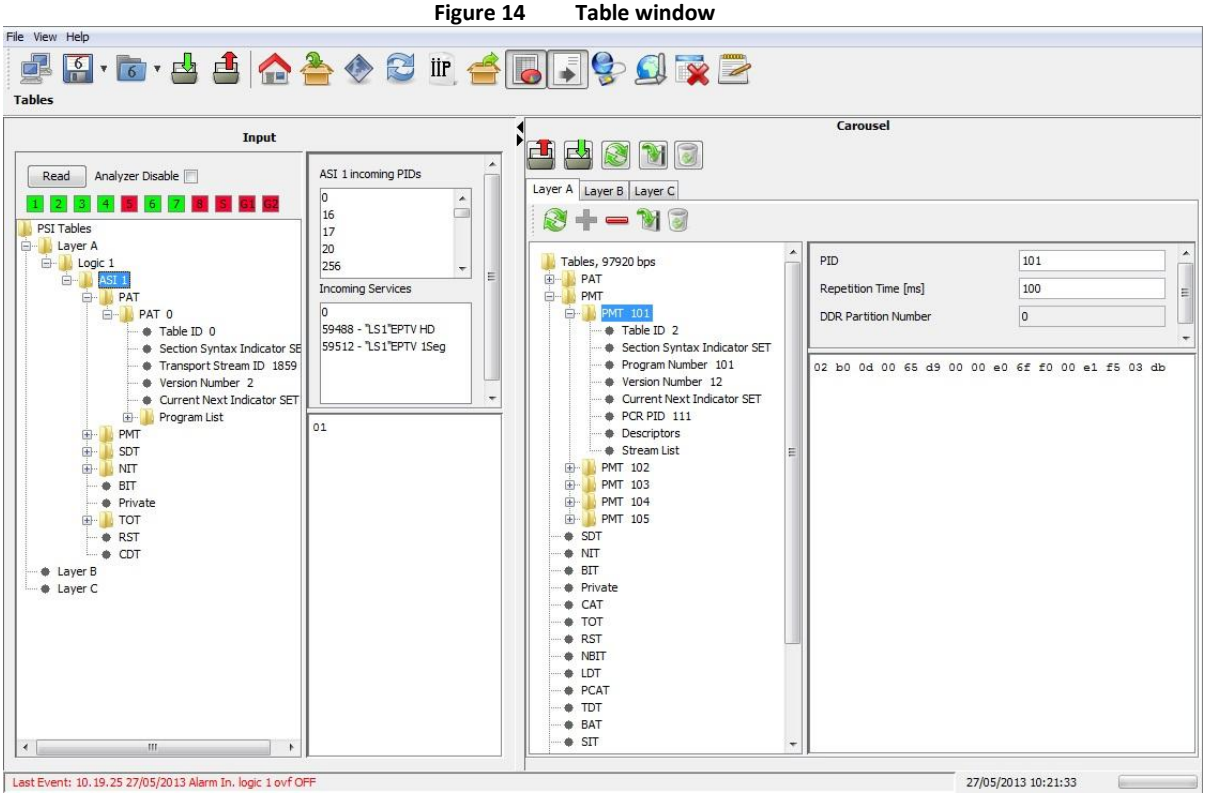
| Box | Parameter / Control | Description | Admitted Ranges / Values |
|---|---|---|---|
| | System Identifier | System identifier parameter selector. | • ISDB-T<br>• ISDBT-Tsb |
| | AC Data Byte 1 | AC Data byte 1 value setting. It's used when AC data are added as data in the TMCC (dummy data). | • Min: 0<br>• Max: 255 |
| | AC Data Byte 2 | AC Data byte 2 value setting. It's used when AC data are added as data in the TMCC (dummy data). | • Min: 0<br>• Max: 255 |
| | AC Data Byte 3 | AC Data byte 3 value setting. It's used when AC data are added as data in the TMCC (dummy data). | • Min: 0<br>• Max: 255 |
| | AC Data Byte 4 | AC Data byte 4 value setting. It's used when AC data are added as data in the TMCC (dummy data). | • Min: 0<br>• Max: 255 |
| Layer A/B/C | Modulation Scheme | Modulation scheme selector. | • QPSK<br>• 16 QAM<br>• 64 QAM<br>• Unused Hierarchical Layer |
| Layer A/B/C | Coding Rate of Inner Code | Coding rate of inner code selector. | • 1/2<br>• 2/3<br>• 3/4<br>• 5/6<br>• 7/8<br>• Unused Hierarchical Layer |
| Layer A/B/C | Length Of Time Interleaving | Length of time interleaving selector. | • 0 (mode 1), 0 (mode 2), 0 (mode 3)<br>• 4 (mode 1), 2 (mode 2), 1 (mode 3)<br>• 8 (mode 1), 4 (mode 2), 2 (mode 3)<br>• 16 (mode 1), 8 (mode 2), 4 (mode 3)<br>• Unused Hierarchical Layer |

| Box | Parameter / Control | Description | Admitted Ranges / Values |
|---|---|---|---|
| Layer A/B/C | Number of Segments | Number of segments selector. | • 1 Segment<br>• 2 Segment<br>• 3 Segment<br>• 4 Segment<br>• 5 Segment<br>• 6 Segment<br>• 7 Segment<br>• 8 Segment<br>• 9 Segment<br>• 10 Segment<br>• 11 Segment<br>• 12 Segment<br>• 13 Segment<br>• Unused Hierarchical Layer |
| ASI1/2/3/4 Out | Sel Format | BTS format selector. | • BTS<br>• BTS Tunnel |
| ASI1/2/3/4 Out | Sel Input | Selects which stream shall be re-proposed on the ASI outputs. | • BTS<br>• ASI 1<br>• ASI 2<br>…<br>• ASI 8<br>• SPI<br>• GbE Rx1<br>• GbE Rx2<br>• Null |

### 4.4.8 Tables

Click on the Tables icon, highlighted in the figure below, to access the Tables window.

**Figure 14 Table window**




The Tables window allows to analyze SI/PSI tables of each input associated to a specific Layer and to create, manage and store actual and new tables. Tables can also be dragged and dropped from the Input section to the Carousel one.

The Tables window is divided into two sections:

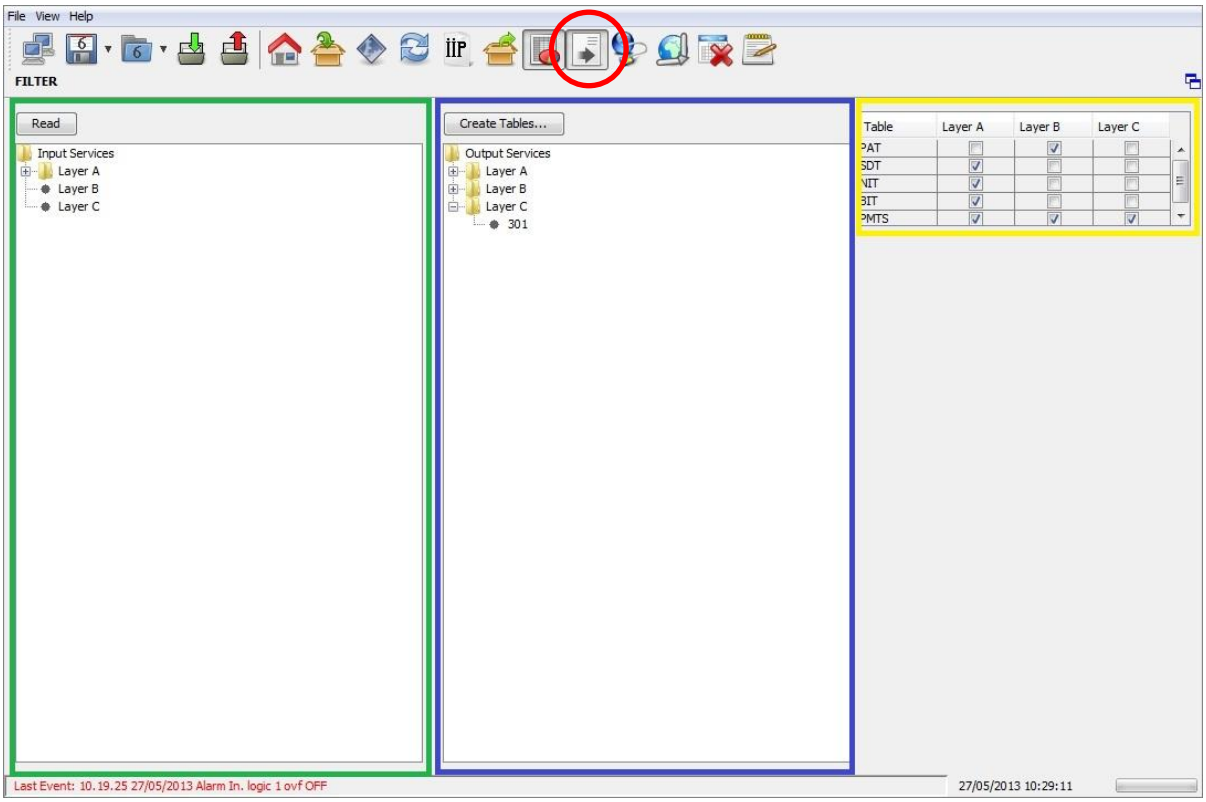
- **Input:** allows analyzing the SI/PSI tables of each logical input TS.
- **Carousel:** allows creating, modifying and storing the actual and new SI/PSI tables to the Carousel memory.

| Box | Parameter / Control | Description | Admitted Ranges / Values |
|---|---|---|---|
| Input | Read | Reads the SI/PSI tables from each logical input TS and allows the analysis of tables and descriptors. | |
| Input | Analyzer Disable | Disable SI/PSI tables analyzer functionality | • Tick: disabled<br>• Not tick: enabled |
| Input | G1, G2 | A LED indicating the actual presence of the Gigabit Ethernet Channel 1. | • Green: Present<br>• Red: Not present |
| Input | S | A LED indicating the actual presence of the Satellite feed. | • Green: Present<br>• Red: Not present |
| Input | 1…8 | A LED indicating the actual presence of the ASI 2 input. | • Green: Present<br>• Red: Not present |
| Input | SI/PSI input tree | Shows in a tree fashion the hierarchy of input SI/PSI data. Each table is shown as an expandable tree node to allow a precise representation of data fields. | |
| Input | Input data viewer | Divided in two sub-windows. One that provides a visualization of the decoded data field selected along with its own value. The other provides a visualization of the data field selected still encoded in the hexadecimal values format as it is transmitted in the table. | |
| Input | <Physical Input> incoming PIDs | Shows the declared incoming PIDs when in the tree a physical input node is selected | |
| Input | Incoming Services | Shows the declared incoming services from PAT program list and SDT service | |
| Carousel/Layer A..C | Reload/Read carousel content | Allows transferring the carousel memory of the device to the local SI/PSI tree.<br>Note: this command will restore the local SI/PSI tree with the data contained in the carousel memory, all the modifications from the last “Write local” command will be lost. | |
| Carousel/Layer A..C | Add an item to selected object | Allows adding an instance of a selected SI/PSI table inside a previously created tree. It also allows adding an instance of a descriptor inside a selected table previously created.<br>This operation is performed only on the local tree, the carousel will not be modified until a write command is performed. | |

| Box | Parameter / Control | Description | Admitted Ranges / Values |
|---|---|---|---|
| Carousel/Layer A..C | Remove the selected object | Allows removing an instance of a selected table from a local SI/PSI tree. It also allows deleting an instance of a descriptor from a selected table. This operation is performed only on the local tree, the carousel will not be modified until a write command is performed | |
| Carousel/Layer A..C | Commit tables | Allows transferring the current local SI/PSI tree to the carousel memory of the device.<br>Note: all operations done to the local SI/PSI tree are not applied to the actual output TS until this command is done and a closing of the Java GUI will result in local data losing. | |
| Carousel/Layer A..C | Clear tables | This command resets the Carousel dedicated memory on the device and updates the Carousel tree sub-section. Performing this command without saving the SI/PSI carousel will result in SI/PSI data loosing. | |
| Carousel/Layer A..C | SI/PSI carousel tree | Shows in a tree fashion the hierarchy of input SI/PSI data. Each table is shown as an expandable tree node to allow a precise representation of data fields. | |
| Carousel/Layer A..C | Carousel data viewer | Divided in two sub-windows. One that allows visualization of the decoded data field selected and to modify its value. The other provides a visualization of the data field selected still encoded in the hexadecimal values format as it is transmitted in the table. | |
| Carousel | Export table file | Exports the SI/PSI table carousel. | |
| Carousel | Import tables file | Imports the SI/PSI table carousel. | |
| Carousel | Reload/Read tables carousel of all layers | Allows transferring the carousel memory of the device to the local SI/PSI tree for all layers<br>Note: this command will restore the local SI/PSI tree with the data contained in the carousel memory, all the modifications from the last “Write local” command will be lost. | |
| Carousel | Commit tables of all layers | Allows transferring the current local SI/PSI tree for all layers to the carousel memory of the device.<br>Note: all operations done to the local SI/PSI tree are not applied to the actual output TS until this command is done and a closing of the Java GUI will result in local data losing. | |
| Carousel | Clear tables of all layers | This command resets the Carousel dedicated memory on the device and updates the Carousel tree sub-section for all layers. Performing this command without saving the SI/PSI carousel will result in SI/PSI data loosing. | |

### 4.4.9 Service Filter

**Figure 15 Service Filter window**




This window allows the Semi-automatic creation of PSI/SI Tables by assigning services from Input Analyzed TS to Output Layers and to define to which Layers assign the PSI/SI created tables.

This panel is composed by threes boxes:

Input services (green border): this presents, in a tree structure similar to one used in Table Analyzer panel, the list of services for each availble Input

Output Services (blue border): this presents, in a tree structure similar to one used in Table Analyzer panel, the list of services assigned to each Ouput Layer

Table/Layer Assignement (yellow border): this box is used to define to which Layer each ISDB-T mandatory PSI/SI tables is assigned.

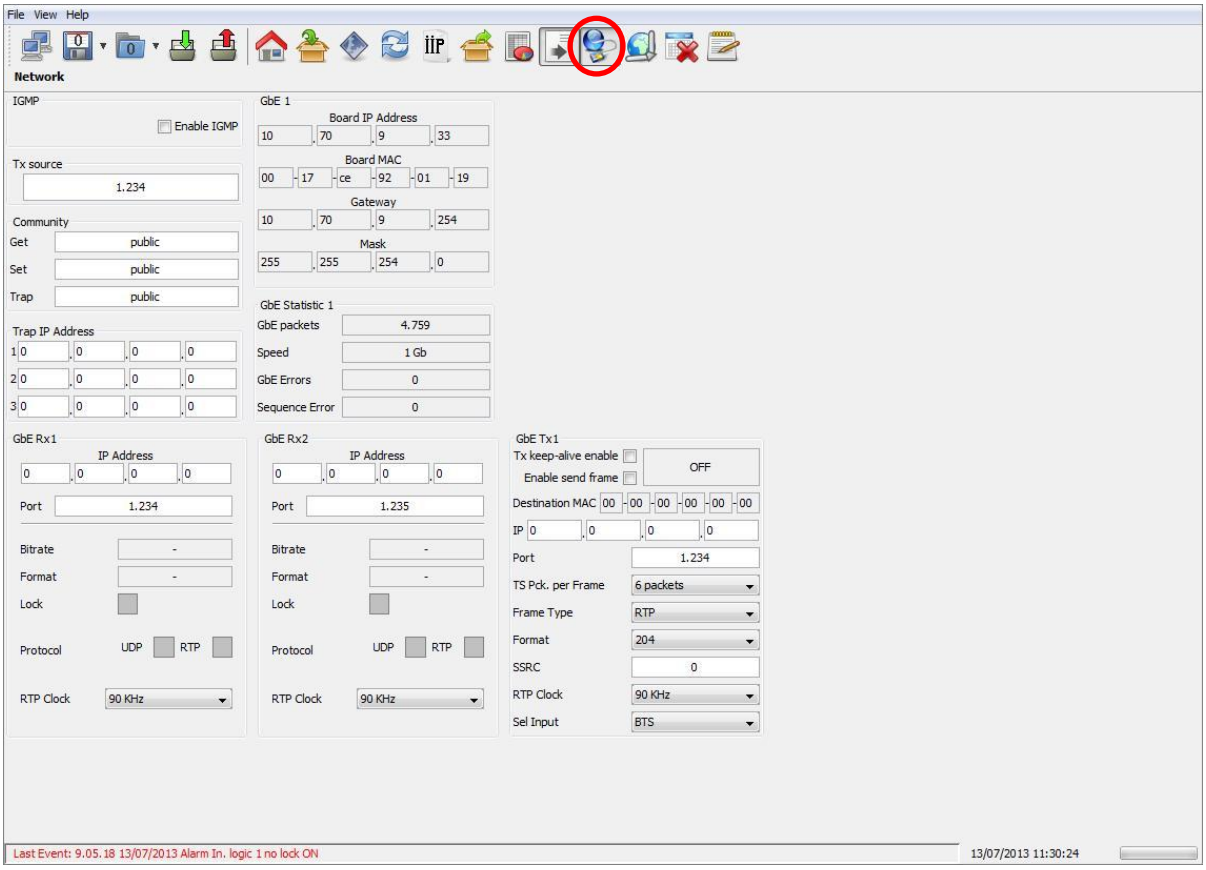
Top assign a servide to a Layer, drag and drop from Input list to an Output Layer.

After all services need for componing the outut are assigned to an output Layer, adn all the desired Table ae assigned to proper Layer, press the button 'Creates Tables' and it will apper

### 4.4.10 Network

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

**Figure 16 Network window**




This window allows the Network management on both PRO-MPEG COP 3 RX and TX sides. It also allows the monitoring of the board IP and MAC addresses.

The following table describe all network parameters which the user can find on this page.

**Table 10 Network window parameters**

| Box | Parameter / Control | Description | Admitted Ranges / Values |
|---|---|---|---|
| Tx source | Tx Source Port | Board transmitting port. | • Min: 0<br>• Max: 65.535 |
| IGMP | Enable IGMP | Enables the IGMP protocol. | • Ticked: Enabled<br>• Unticked: Disabled |
| Community | Get | Get Community name | |
| Community | Set | Set Community name | |
| Community | Trap | Trap Community name | |
| Trap IP address | 1,2,3 | Trap 1…3 destination IP address. | |
| GbE 1 | Board IP Address | Board GbE 1 IP address. | |
| GbE 1 | Board MAC | Board GbE 1 MAC address. | |
| GbE 1 | Gateway | Board GbE 1 Gateway address. | |
| GbE 1 | Mask | Board GbE 1 Netmask. | |
| GbE Rx 1/2 | IP Address | GbE2 channel 1 receiving IP address setting. | 32 bit address.<br>Min unicast: 1.0.0.0<br>Max unicast: 223.255.255.255<br>Min multicast: 224.0.0.0<br>Max multicast: 239.255.255.255<br>It can't be the same of the management board IP address. |
| GbE Rx 1/2 | Port | GbE2 channel 1 receiving port setting. | • Min: 0<br>• Max: 65.535 |
| GbE Rx 1/2 | Bitrate | Bit-rate of TS from Ethernet input. | |
| GbE Rx 1/2 | Format | Received transmission format. | • 188 Bytes<br>• 204 Bytes |
| GbE Rx 1/2 | Lock | Ethernet input lock status indicator. The input Transport Stream is locked when no more than two consecutive Sync Byte are missed. | • Green: Lock<br>• Grey: Not locked |

| Box | Parameter / Control | Description | Admitted Ranges / Values |
|---|---|---|---|
| GbE Rx 1/2 | Protocol | Ethernet input packets protocol. | • UDP/RTP:<br>○ Green: Detected<br>○ Grey: Not detected |
| GbE Rx 1/2 | RTP Clock | RTP packets source clock reference. | • 90 kHz<br>• 27 MHz |
| GbE Statistic 1 | GbE Packets | Total amount of good frames received on GbE 1. | |
| GbE Statistic 1 | Speed | GbE 1 Ethernet speed. | • 10 Mbit/s<br>• 100 Mbit//s<br>• 1 Gbit/s |
| GbE Statistic 1 | GbE Errors | Total amount of bad frames received on GbE 1. | |
| GbE Statistic 1 | Sequence Errors | Total amount of sequence errors received on GbE 1. | |
| GbE Tx1 | Enable send frame | GbE 2 channel 1 Ethernet transmission enabling. | • Ticked: Enabled<br>• Unticked: Disabled |
| GbE Tx1 | Tx keep alive enable | Enable ARP request repetition during Transmission. | • Ticked: after Unicast Tx is started, ARP request is periodically sent to check RX IP is still available. If there is a first miss 4 additional retry are made, and only after them the Tx is stopped, while keeping checking is IP becomes later available.<br>• Unticked: after Unicast Tx is started, NO additional ARP request is sent. |
| GbE Output | Status | GbE Tx1Ethernet transmission status indicator. | • OFF<br>• Resolving IP address<br>• Transmitting data Unicast<br>• No entry available<br>• Transmitting data Multicast<br>• IP not found |
| GbE Output | Destination MAC | GbE Tx1 destination MAC address. | |

| Box | Parameter / Control | Description | Admitted Ranges / Values |
|---|---|---|---|
| GbE Tx1 | IP | GbE Tx1 Ethernet transmission IP address. | |
| GbE Tx1 | Port | GbE Tx1 port used for RTP/UDP data transmission | • Min: 0<br>• Max: 65,535 |
| GbE Output | SSRC | GbE Tx1 SSRC identifier of the RTP transmission on channel ½. | 0…4294967295 |
| GbE Output | Frame type | GbE Tx1 transmission protocol selector. | • RTP<br>• UDP |
| GbE Output | TS Pck per Frame | Number of packets per frame. | • Min: 1<br>• Max: 7 |
| GbE Output | RTP Clock | RTP packets clock reference. | • 90 kHz<br>• 27 MHz |
| RTP Out | Sel Input | Selects which stream shall be re-proposed on the GbE channel 1 output. | • BTS<br>• ASI 1<br>• ASI 2<br>…<br>• ASI 8<br>• SPI<br>• GbE Rx1<br>• GbE Rx2<br>• Null |

### 4.4.11 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 17 GPS window**

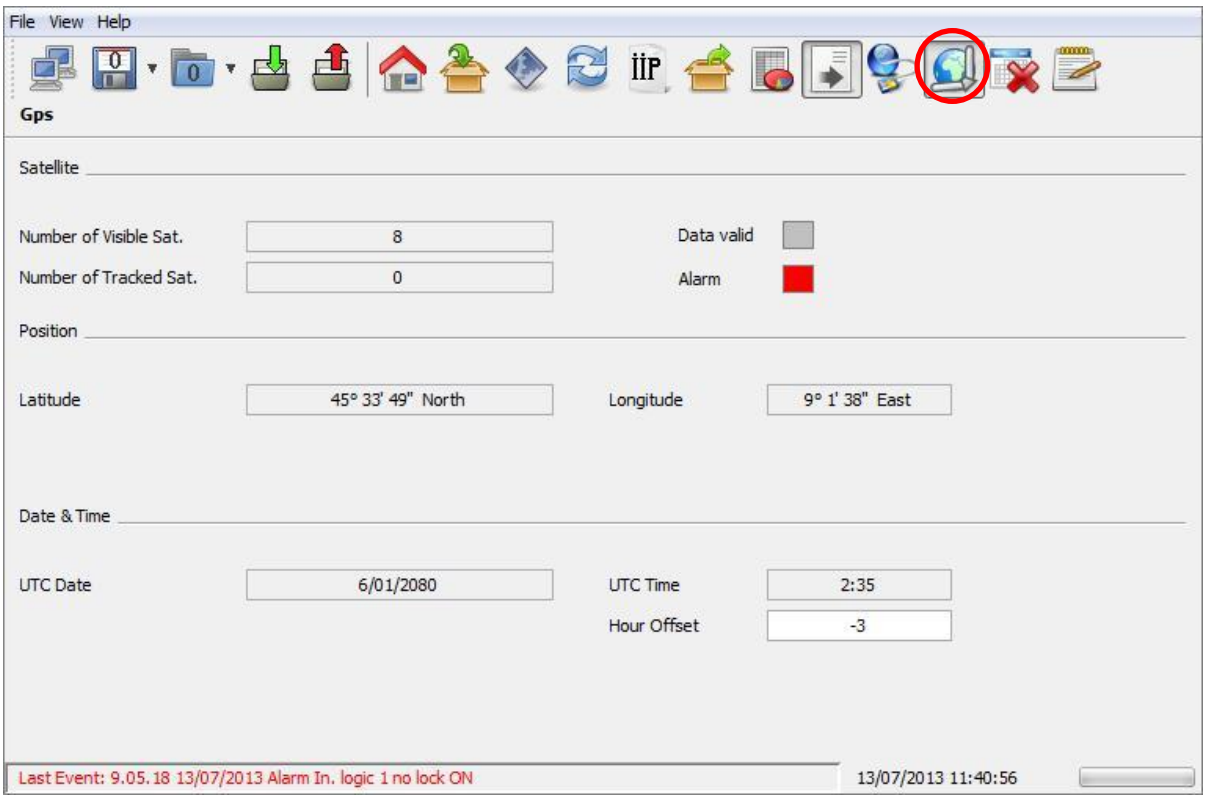



Table 8, in the following page, contains a description of all parameters which the user can find in GPS window.

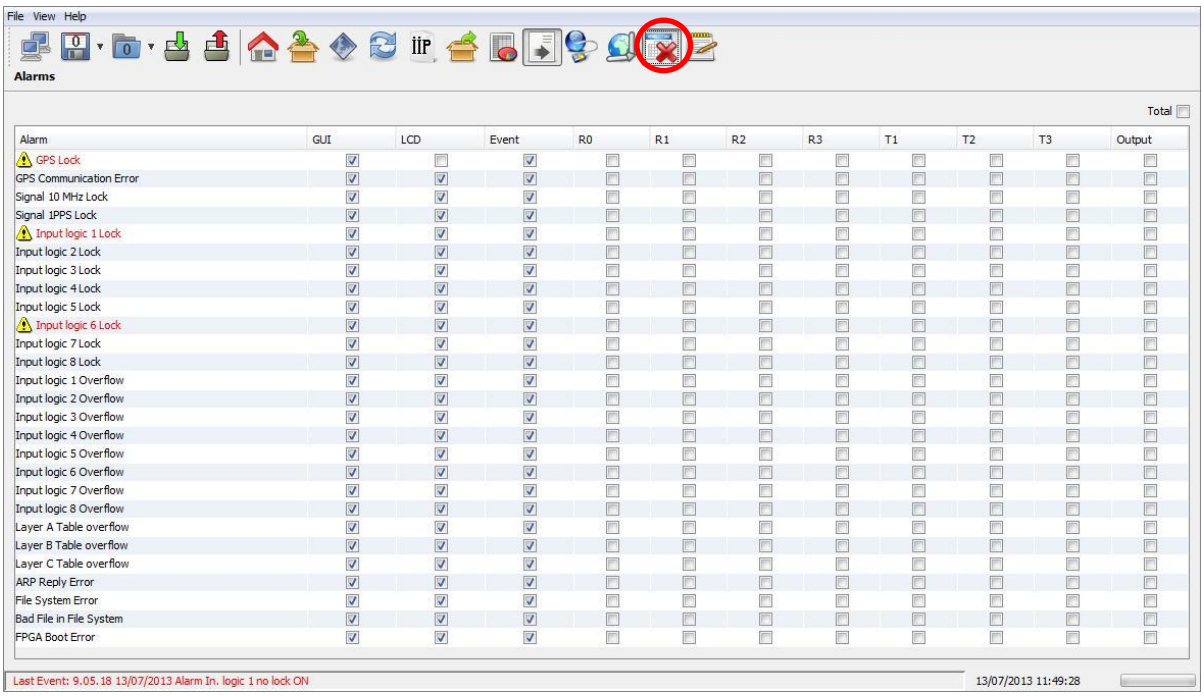
**Table 11 GPS window parameters**

| Box | Parameter / Control | Description | Admitted Ranges / Values |
|---|---|---|---|
| Satellite | Number of Visible Sat | Number of visible GPS satellites indicator. | |
| Satellite | Number of Tracked Sat | Number of tracked GPS satellites indicator. | |
| Satellite | Data valid | GPS alarm status indicator. This alarm is the logic OR of the GPS alarms: GPS Communication Error and GPS Lock (refer to Alarms paragraph). | • Red: Alarm on<br>• Grey: Alarm off |
| Satellite | Alarm | Valid satellite signal receiving status indicator. | • Green: Valid<br>• Grey: Not valid |
| Position | Latitude (°) | Site latitude expressed in degrees. | |
| Position | Longitude (°) | Site longitude expressed in degrees. | |
| Date & Time | UTC Time | Current time indicator.<br>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.<br>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 | Hour offset setting.<br>To consider the time difference between the GPS time and the regional local time, it's possible to calculate the device current time by adding to GPS time a fixed hour offset. If the device transmit timing info (TOT or TDT Tables) this offset will be also accounted to update them. | • Min: -12<br>• Max: 12 |

### 4.4.12 Alarms

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

**Figure 18 Alarm window**




The Alarm 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).
- **Output:** the selected alarms mute the ASI output.

In the Alarms window, when an alarm condition occurs, the relative alarm is red highlighted.

The Total check box enables all alarms-to-masks associations.

Hereafter table 9 shows a description of all parameters the user can find in alarm window

**Table 12 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<br>• Lower the output power to decrease internal temperature<br>• Check the device airflow<br>• Check fans | 1 |
| Temperature Alarm (-3dB) | Temperature level goes over the alarm threshold.<br>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<br>• 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.<br>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<br>• Hardware fault | 1 |

| Alarm | Description and limitations | Troubleshooting | RF mask (1) |
|---|---|---|---|
| GPS Dialog Err | Communication errors between main board and GPS board.<br>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.<br>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<br>• 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<br>*.drlin<br>*.ochf<br>*.fpga6<br>*.snmp<br>*.htm | *.jar<br>*.def<br>*.pwr2<br>*.sav<br>*.cdef2<br>*.gpsf | • Reload the file system | |
| 10MHz Not Locked | 10 MHz is not locked. | | • If the frequency reference is Internal: OCXO fault<br>• If the frequency reference is External:<br>  ○ OCXO fault<br>  ○ Lack of external 10 MHz<br>  ○ Hardware fault<br>• If the frequency reference is GPS:<br>  ○ Check GPS alarms<br>  ○ OCXO fault<br>  ○ 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<br>• If the frequency reference is External:<br>  ○ OCXO fault<br>  ○ Lack of external 1PPS<br>  ○ Hardware fault<br>• If the frequency reference is GPS:<br>  ○ Check GPS alarms<br>  ○ OCXO fault<br>  ○ Hardware fault | 1 |
| FPGA Boot alarm | FPGA boot has not been successfully completed. | • Restart the machine<br>• 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<br>• At every amplifier initialization the FWD power alarm and warning are temporary on<br>• 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:

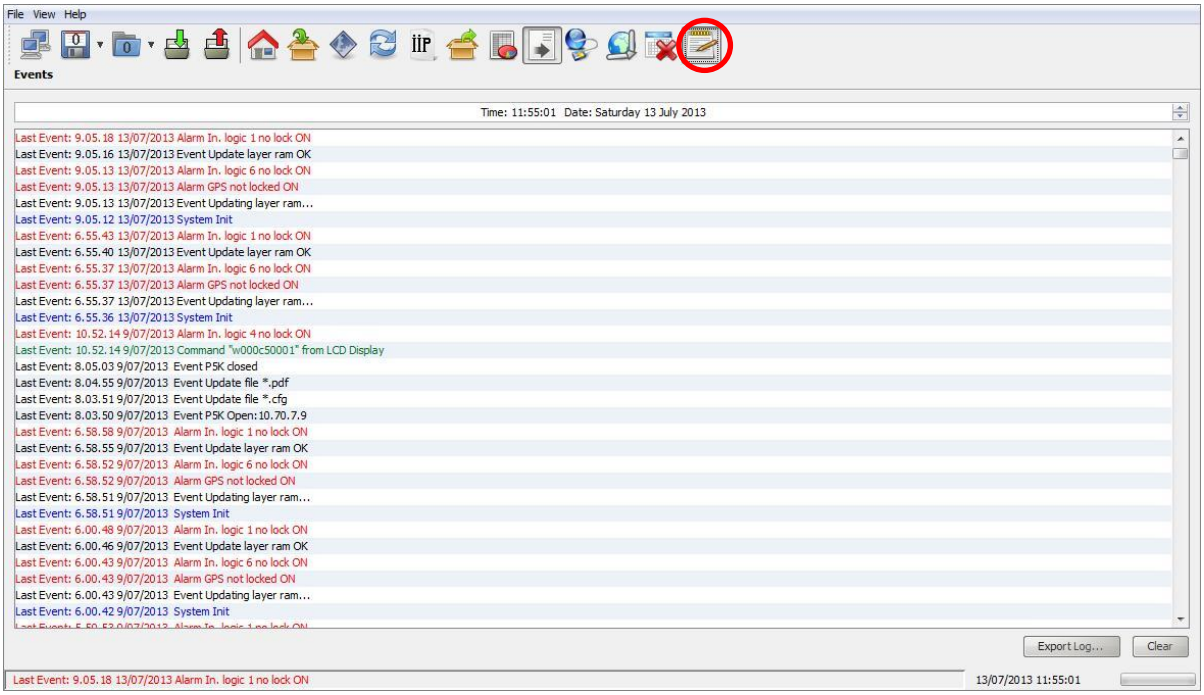
(1) 0/1 stands for disabled/enabled and is fixed, X stands for not fixed.

(2) C/T2 stands for Common/T2-Specific alarm. 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.

### 4.4.13 Events

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

**Figure 19 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 Initialization 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 13 Events description list**

| *Event* | Description |
|---|---|
| Update file *.*xxxx* | New file loading.<br>*xxxx*: file extension. |
| P5K open: *xx.xx.xx.xx* | Connection to port 5000 open.<br>*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). |
| 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. |
| Events List cleared | This event is reported when the events list is cleared. |
| Updating FPGA firmware | This event is reported when the update of the FPGA firmware starts. |
| FPGA firmware err *xx* | This event is reported when an error occurs during the update of the FPGA firmware.<br>*xx*: error code:<br>• 0x10, 0x20, 0x01, 0x02, 0x03: programming error;<br>• 0x11: firmware not found in FS (for the current mode);<br>• 0x22: FPGA file opening error;<br>• 0x33: FPGA file reading error;<br>• 0x44: erasing FLASH memory block error. |
| FPGA firmware OK | New FPGA firmware successfully loaded. |
| Saving config *X*… | Saving configuration task started (after the command “s” given by RS232 or GbE commands).<br>*X*: configuration number. |
| Save config *X* Finished | Saving configuration task correctly ended.<br>*X*: configuration number. |
| Forced reset for IIC err | An IIC error forced the board reset. |
| 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.<br>*string*: file extension. |
| Delete file ‘*string*‘ | FS file deleted.<br>*string*: file extension. |
| Init FS date | This event is reported when time and date table of the File System is initialized for the first time. |

| *Event* | Description |
|---|---|
| Error init FS date *xx* | An error occurs during FS initialization.<br>*xx*: error code:<br>• 0x01: EEPROM data reading error;<br>• 0x02: EEPROM data writing error;<br>• 0x03: CRC error in time and date table. |
| Error on delete *.*string* | FS file deleting error.<br>*string*: file extension. |
| Save config *X* error: xx | An error occurs while saving the configuration.<br>*X*: configuration number.<br>xx: error code:<br>• 0x80: File system busy;<br>• 0x01: New *.sav file opening error;<br>• 0x02: uC header writing error;<br>• 0x03: uC data writing error;<br>• 0x04: FPGA header writing error;<br>• 0x05: FPGA data writing error;<br>• 0x07: File date writing error;<br>• 0x08: Old *.sav file deleting error<br>• 0x09: New file naming error (deleting of "*");<br>• 0x0A: File date writing error it can't be found into the FS<br>• 0x10: file already opened. |
| Saving PSI tables… | Saving PSI tables task started |
| Save PSI tables err: *xx* | An error occurs while saving PSI tables.<br>*xx:* error code:<br>• 0x80: File system busy;<br>• 0x10: Files already opened;<br>• 0x01: New *.psi file opening error;<br>• 0x02: Header writing error (Layer A);<br>• 0x03: DDR reading error (Layer A);<br>• 0x04: Data writing error (Layer A);<br>• 0x05: Header writing error (Layer B);<br>• 0x06: DDR reading error (Layer B);<br>• 0x07: Data writing error (Layer B);<br>• 0x08: Header writing error (Layer C);<br>• 0x09: DDR reading error (Layer C);<br>• 0x0A: Data writing error (Layer C);<br>• 0x0C: Old *.psi file deleting error;<br>• 0x0D: New file naming error (deleting of "*"). |
| Save PSI tables ok | Task correctly ended. |
| Saving IIP tables… | Saving IIP tables task started |
| Save IIP tables err: *xx* | An error occurs while saving IIP tables.<br>*xx:* error code:<br>• 0x80: File system busy;<br>• 0x10: Files already opened;<br>• 0x01: New *.iip file opening error;<br>• 0x02: Header writing error;<br>• 0x03: DDR reading error;<br>• 0x04: Data writing error;<br>• 0x0C: Old *.psi file deleting error;<br>• 0x0D: New file naming error (deleting of "*"). |
| Save IIP tables ok | Task correctly ended. |
| Updating layer ram... | This event is reported when the update of the layer RAM starts. |

| *Event* | Description |
|---|---|
| Update layer ram err: *xx* | An error occurs while updating the layer RAM.<br>*xx:* error code:<br>• 0x01: The total number of segments is different from 13 (Layer A + Layer B + Layer C).<br>• 0x02: the Mode is either <1 or >3.<br>• 0x03: Layer A used (Numseg > 0) but its Modulation Scheme or Coding Rate not defined<br>• 0x04: Layer A used (Numseg > 0) but its Modulation Scheme or Coding Rate not defined<br>• 0x05: Layer A used (Numseg > 0) but its Modulation Scheme or Coding Rate not defined |
| Update layer ram OK | Task correctly ended. |

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

**Figure 20 Alarms descriptions list**

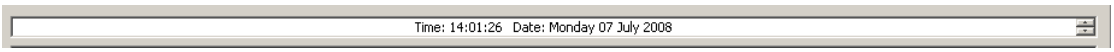
| *Alarm* | Description-Alarm |
|---|---|
| GPS Lock | GPS not locked |
| GPS Communication Error | GPS dialog err |
| Signal 10 MHz Lock | 10MHz not locked |
| Signal 1PPS Lock | 1PPS not detected |
| Stat Lock | RF input not locked |
| Sat S/N low | RF S/N level low |
| Sat RF Input low | RF input level low |
| Sat Ber/Per | RF BER/PER min lev |
| BB frame err | RF BB-Frame Error |
| Input 1 Layer A input Lock | In1 LayA unlocked |
| Input 2 Layer A input Lock | In2 LayA unlocked |
| Input 1 Layer B input Lock | In1 LayB unlocked |
| Input 2 Layer B input Lock | In2 LayB unlocked |
| Input 1 Layer C input Lock | In1 LayC unlocked |
| Input 2 Layer C input Lock | In2 LayC unlocked |
| Input 1 Layer A input overflow | Input 1 LayA ovfl |
| Input 2 Layer A input overflow | Input 2 LayA ovfl |
| Input 1 Layer B overflow | Input 1 LayB ovfl |
| Input 2 Layer B overflow | Input 2 LayB ovfl |
| Input 1 Layer C overflow | Input 1 LayC ovfl |
| Input 2 Layer C overflow | Input 2 LayC ovfl |

| Alarm | Description-Alarm |
|---|---|
| Layer A Table Overflow | Lay A Table ovfl |
| Layer B Table Overflow | Lay B Table ovfl |
| Layer C Table Overflow | Lay C Table ovfl |
| IIP not valid | IIP not valid |
| ARP Reply Error | ARP replay |
| File System Error | File system wrong |
| Bad File in File system | File error |
| FPGA Boot Error | FPGA boot error |

#### 4.4.13.1 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.

**Figure 21 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. 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.

#### 4.4.13.2 System Error Event

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

#### 4.4.13.3 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:

**Figure 22 Task error event specific data**

| TASK | Description | Bit |
|---|---|---|
| WD_GPS_TASK | This task controls the GPS status. | 0 |
| WD_STATUS_TASK | This task gathers quite all the board information in order to perform the following operations:<br>• It updates all variables of the system;<br>• It manages alarms;<br>• It manages the ARP resolution | 1 |
| WD_TCP_IP_TASK | This task implements the TCP-IP protocol stack. | 2 |
| WD_TIMER_TICK_TASK | This task generates the clock for the TCP-IP task. | 3 |
| WD_TUNER_TASK | This task manages DVB-S tuner. | 4 |

The default mask at the board initialization is set to 0x0000000F. Once the presence of tuner is assured, the tuner task bit is automatically enabled and tasks mask is set to 0x0000001F. The polling of tasks is stopped during de-fragmentation operations.

#### 4.4.13.4 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:

**Figure 23 Init system specific data**

| *Byte* | Description | Errors code |
|---|---|---|
| 1° | FS_ERR<br>File System error. | • 0x00: File System ok.<br>• 0x01: FS partition error (invalid FS). |
| 2° | INFO_ERR<br>*.cfg file error. | • 0x00: File ok.<br>• 0x01: File not found.<br>• 0x02…0x03: Invalid file (syntax errors). |
| 3° | DEF_ERR<br>*.def file error. | • 0x00: File ok.<br>• 0x01: *.def file opening error<br>• 0x02: File not found. |
| 4° | LCD_ERR<br>LCD error. | • 0x00: LCD ok.<br>• 0x01: LCD not found. |
| 5° | BOOT_ERR<br>FPGA boot error. | • 0x00: FPGA boot ok.<br>• 0x01: NILL FPGA boot error.<br>• 0x02: *.fpga1 file version<br>• 0x03: FPGA code error. |
| 6° | LOAD_CFG_ERR<br>*.sav file error. | • 0x00: File ok.<br>• 0x02…0x07: Invalid file (syntax errors).<br>• 0x10: File not found. |
| 7° | SNMP_ERR<br>SNMP file error. | • 0x00: SNMP file ok.<br>• 0x01: SNMP file not found.<br>• 0x02: File open error.<br>• 0x03: UDP socket initialization error.<br>• 0x04: Port 161 open error. |

| *Byte* | Description | Errors code |
|---|---|---|
| 8° | TUNER_ERR<br>Tuner error | • 0x00: Tuner ok.<br>• 0x01: Tuner type error.<br>• 0x02: Tuner not handled.<br>• 0x03: Invalid register.<br>• 0x04: Invalid field.<br>• 0x05: Invalid field size.<br>• 0x06: no acknowledgment from Tuner.<br>• 0x07: Too many Tuner registers accessed in burst mode. |
| 9° | PSI_ERR<br>*.psi file loading error | • 0xA0: FS Busy<br>• 0x30: *.psi file not found<br>• 0x21: File open error<br>• 0x22...0x23: File parsing error (Layer A)<br>• 0x24: DDR writing error (Layer A)<br>• 0x25...0x26: File parsing error (Layer B)<br>• 0x27: DDR writing error (Layer B)<br>• 0x28...0x29: File parsing error (Layer C)<br>• 0x2A: DDR writing error (Layer C) |
| 10° | IIP_ERR<br>*.iip file loading error | • 0x80: FS Busy<br>• 0x10: *.iip file not found<br>• 0x01: File open error<br>• 0x02...0x03: File parsing error<br>• 0x04: DDR writing error |

### 4.4.14 System menu

The menu bar allows the access to three menus:

- **File:** allows to import/export the configuration file and to load and save the device configuration.
- **View:** allows to manage sections windows showing, java update time and events alert massages
- **Help:** informs about board name, file system and operator managing system characteristics,

**Figure 24 Menu bar**

#### *4.4.14.1 File Menu*

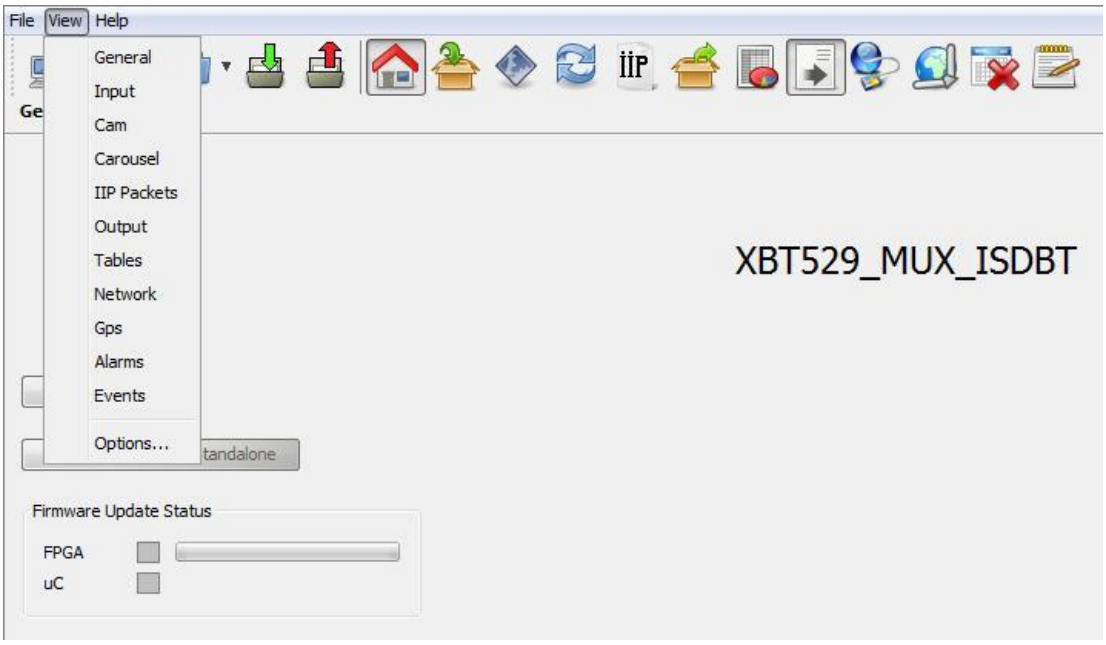
**Figure 25 File menu**

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).

### 4.4.14.2 View Menu

**Figure 26 View menu**




The View menu allows accessing the following windows:

- **General:** General window.
- **Input:** Input window.
- **Cam:** PID manager window.
- **Carousel:** SI/PSI memory partitions status window.
- **IIP Packets:** IIP packets monitoring and managing window.
- **Output:** Output window.
- **Tables:** SI/PSI tables management window.
- **Network:** Network window.
- **GPS:** GPS window.
- **Alarms:** Alarms window.
- **Events:** Events window.
- **Options...:** Options window.

#### 4.1.1.1 Options sub-menu

The Option sub-menu allows two controls type:

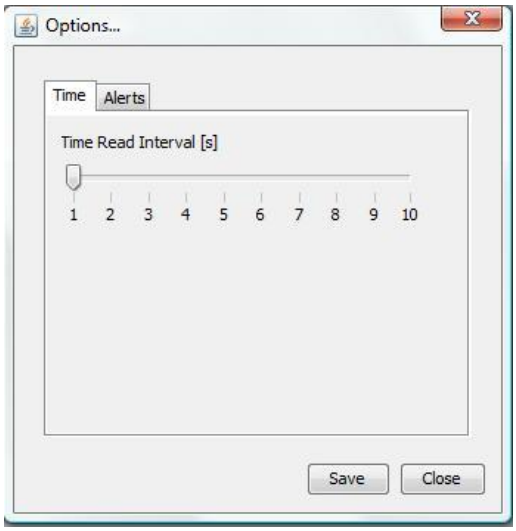
- **Time:** Time Read Interval [s];
- **Alerts:** the selection of events to display.

Click on the Save button to save Java options; a *.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 the properties have been saved.

##### 4.1.1.1.1 Time

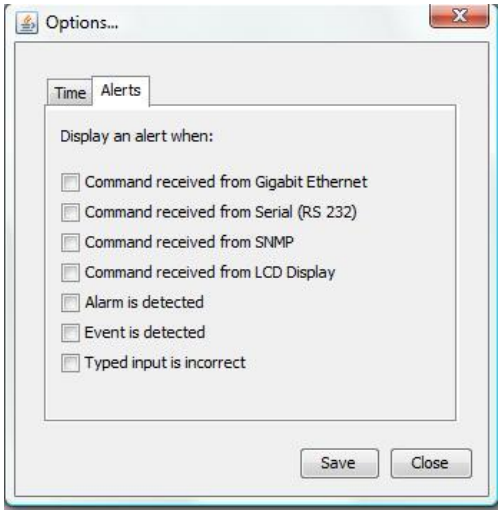
**Figure 27 Time Option window**




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

##### 4.1.1.1.2 Alerts

**Figure 28 Alert Option window**

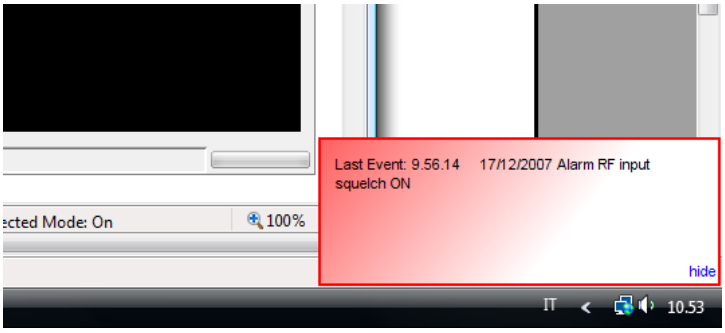


Alerts tab allows selecting which types of events will be notified through Alert boxes. Alerts appear on the right side of the monitor.

The selection is performed among the following types of event:

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

**Figure 29 Alert Message**




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.

#### 4.4.14.3 Help Menu

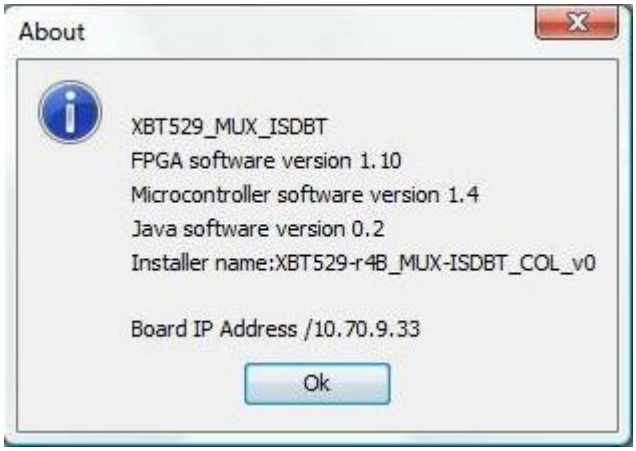
The Help menu allows the enabling of the following commands:

- **Contents:** Help with an abstract of the User Manual.

**Figure 30 Help Menu**

- **About:** shows the equipment 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 31 About window**




- **Info:** shows File System content and the Client System Parameters. Click on OK button to close Info window.

**Figure 32 Server File System Content window**

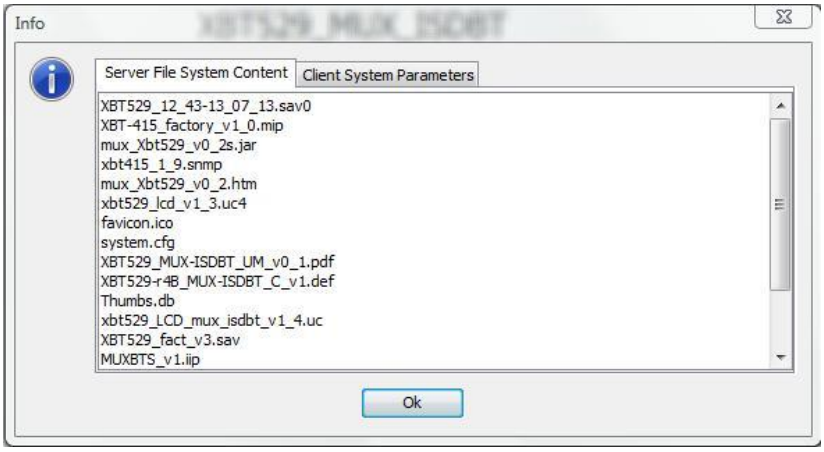
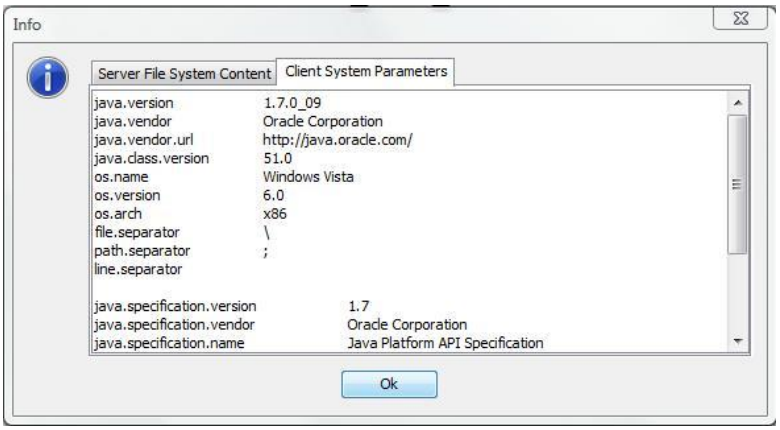


**Figure 33 Client System Parameters**



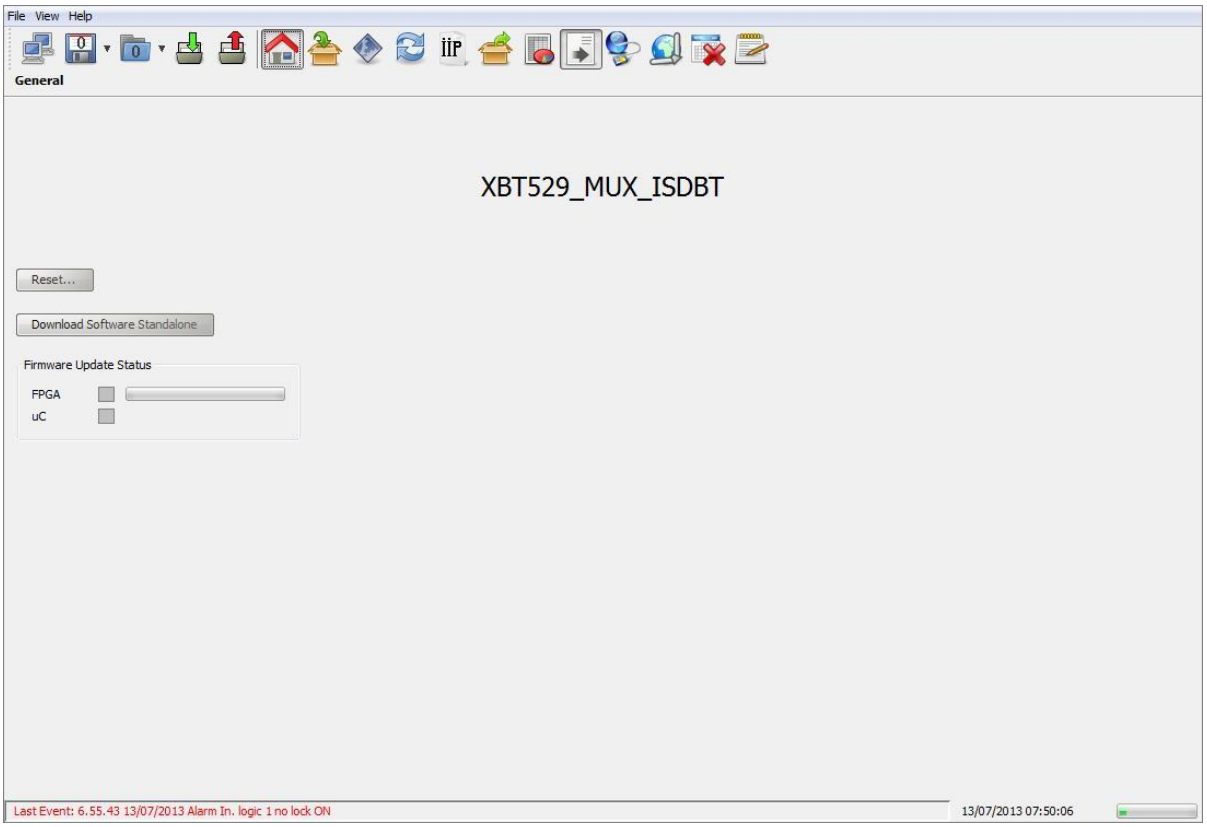
### 4.4.15 Download Software Standalone

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 34 Download Software Standalone**



## 4.5 SNMP – Simple Network Management Protocol

**Only SNMP Traps are currently supported.**

### 4.5.1 SNMP 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 35 SNMP Trap Messages**

### 4.5.2 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).

# Chapter 5
# Maintenance & Troubleshooting

*External Document*

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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.

# *Appendix A*
# *Software Upgrade*

*External Document*

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# Appendix A. Software Upgrade

The following operations are essential to run an update safety without loss of information on your device.

## A.1 Ethernet cable connection

Make sure the Ethernet cables are properly connected: check the ethernet data activity by the LED blinking.

Connect the PC will be used for upgrade operation to the same network of the machine and check that all devices are responding using the ping command.

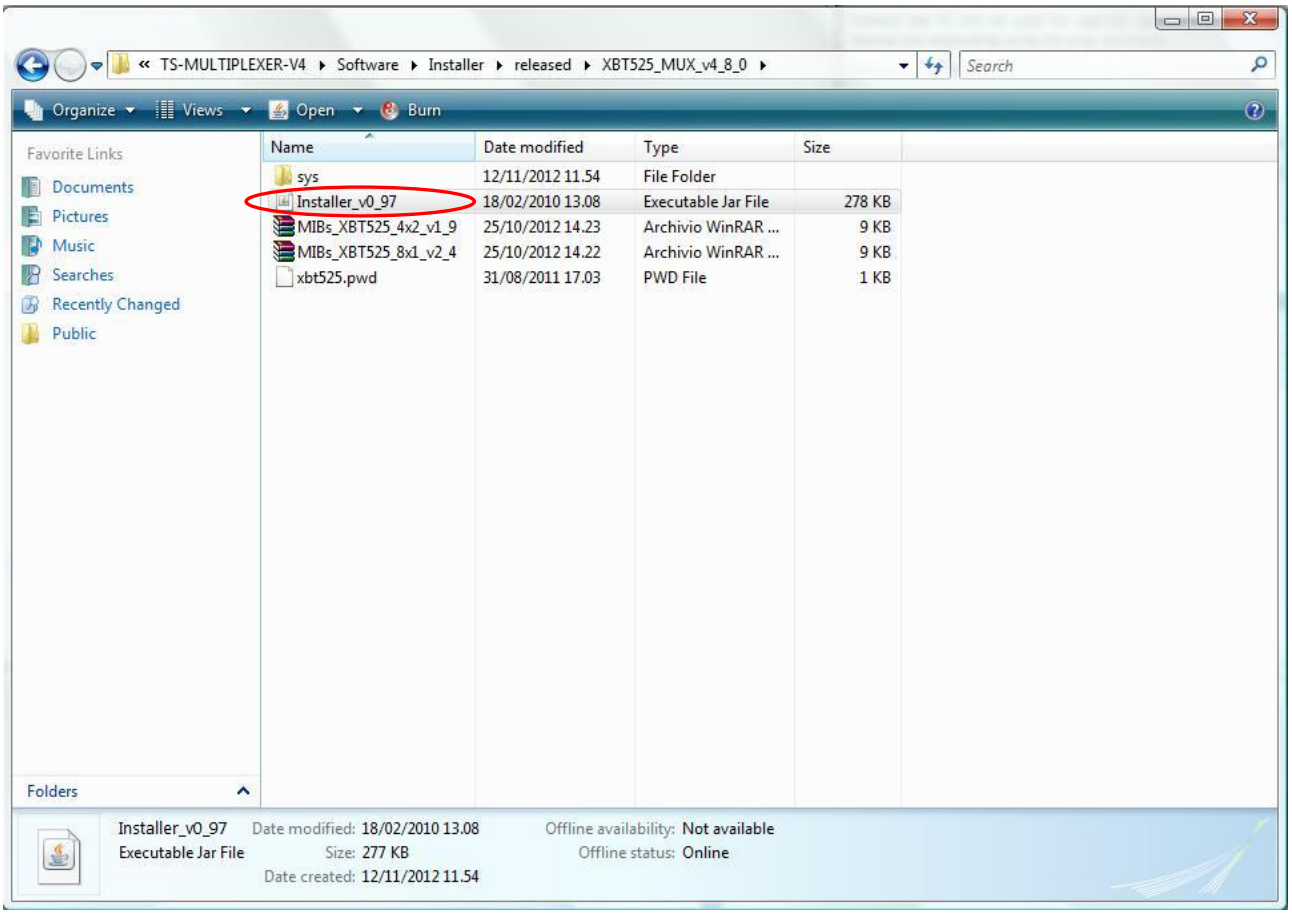
Software installation:

## A.2 How to update

1. Launch the installer by double-click on the file "InstallerXML_v0_97.jar".

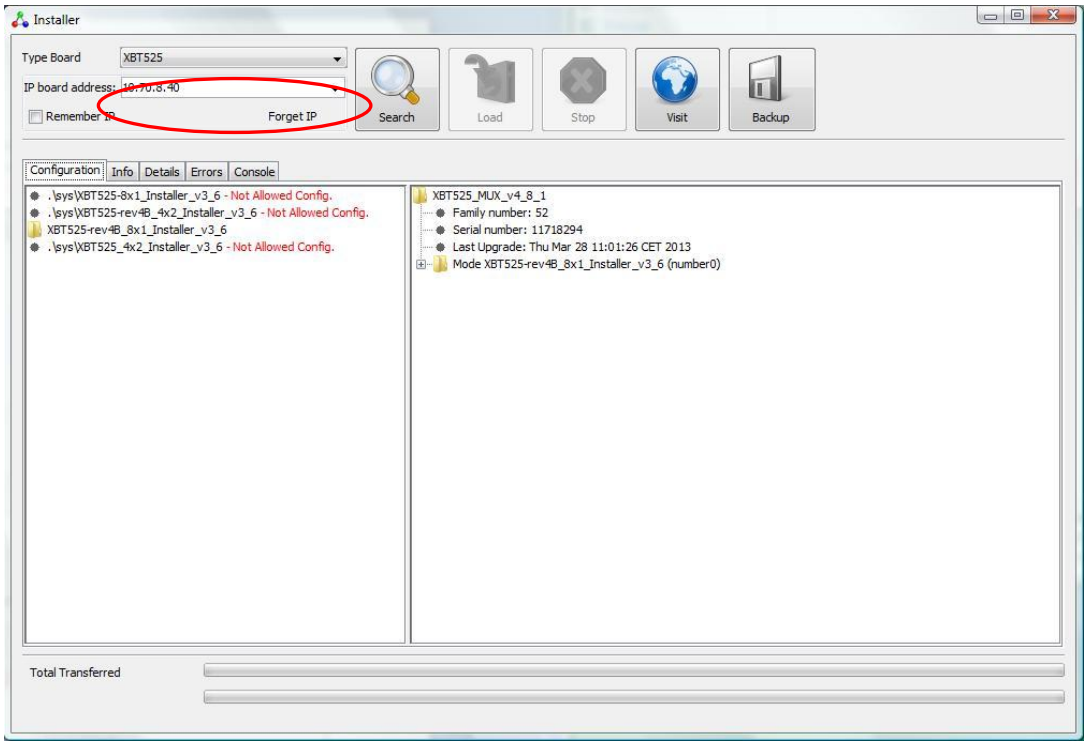
   If the file is opened as a data archive WinRAR, select the file with the right mouse button and open it manually with the Java platform.

**Appendix Figure A-1 Java Installer – Java installer**



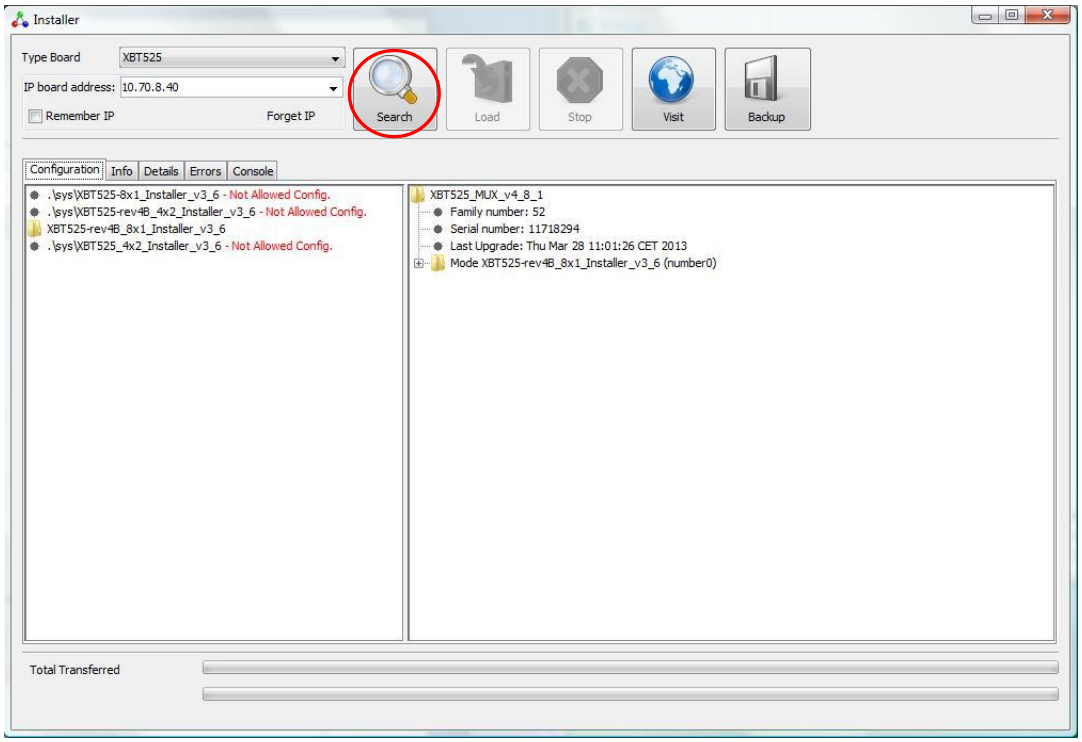
2. Insert the TS_MUX IP address into the numeric field.

**Appendix Figure A-2 Java Installer – IP address insertion**



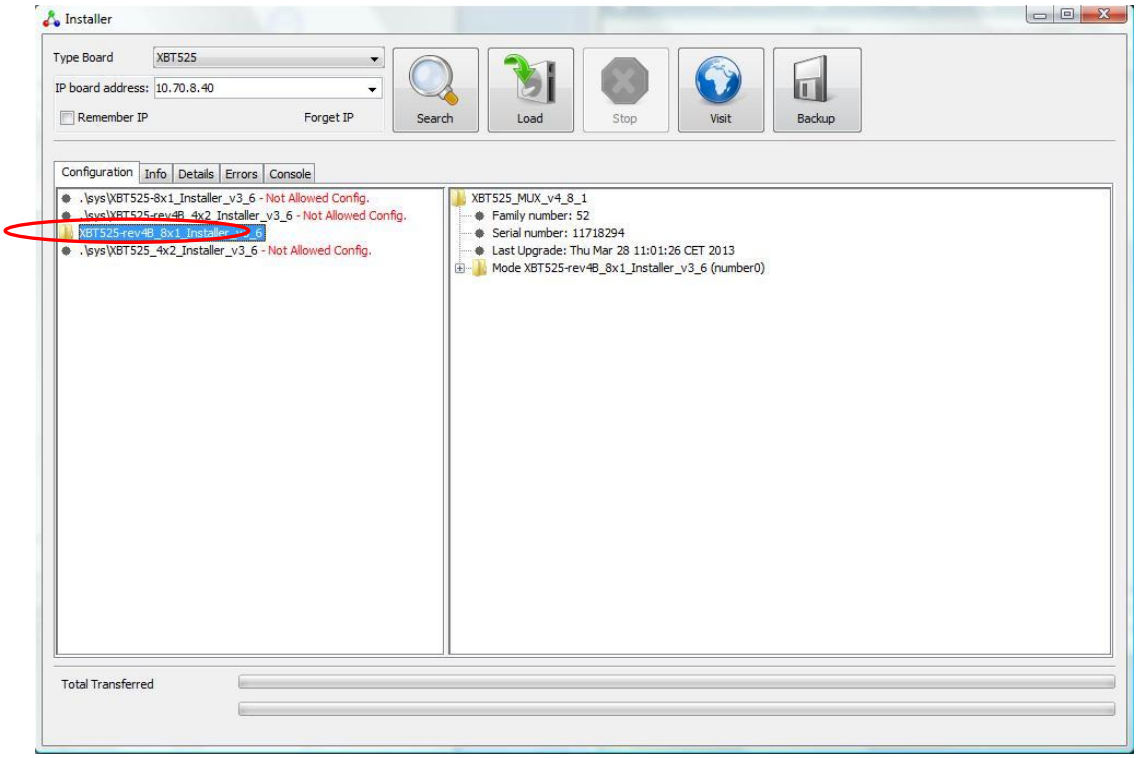

3. Click the Search button.

**Appendix Figure A-3 Java Installer – Search button**



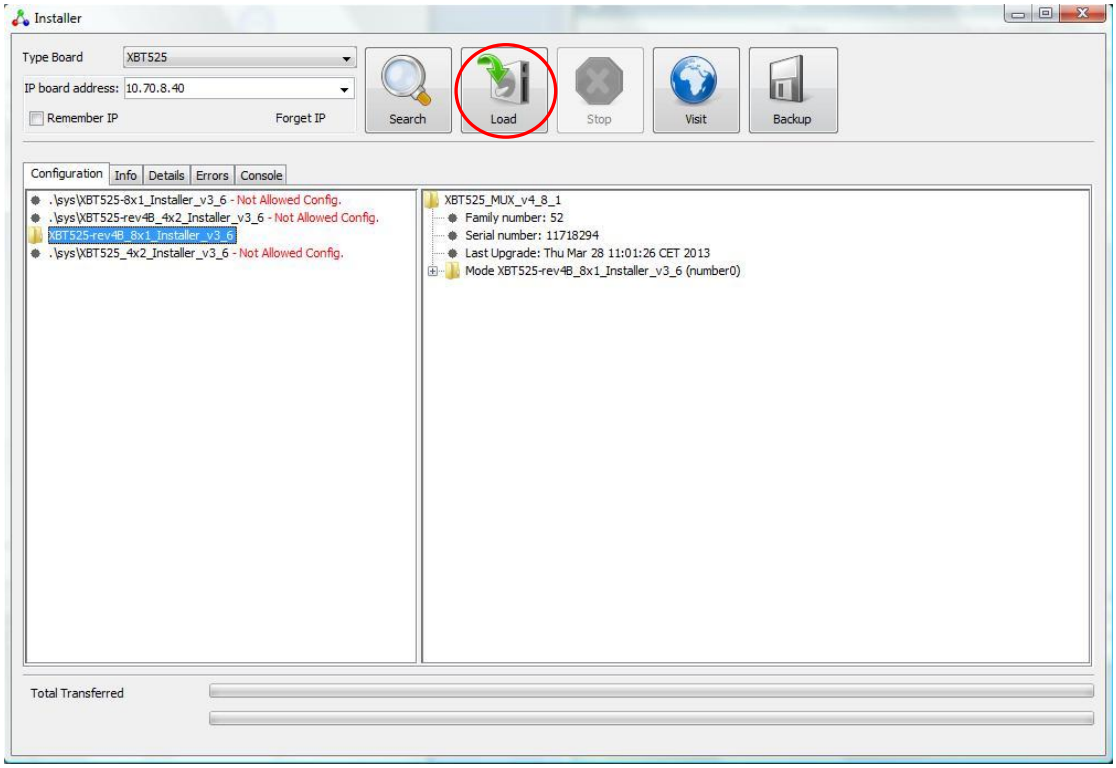
4. Select the device version you want to load.

**Appendix Figure A-4 Java Installer – Software version selection**



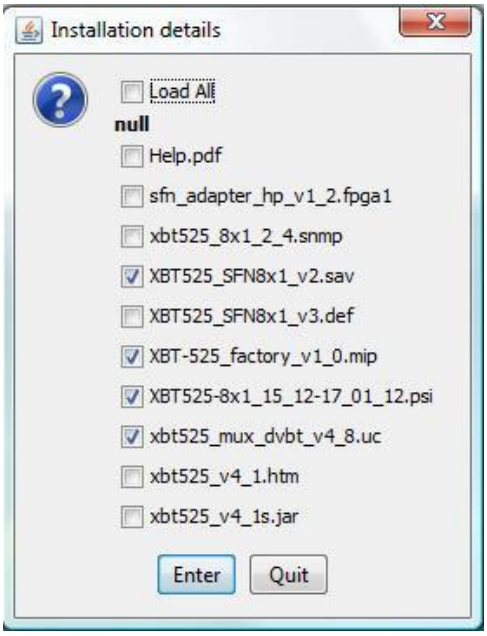

5. Click on the Load button.

**Appendix Figure A-5 Java Installer – Load button**



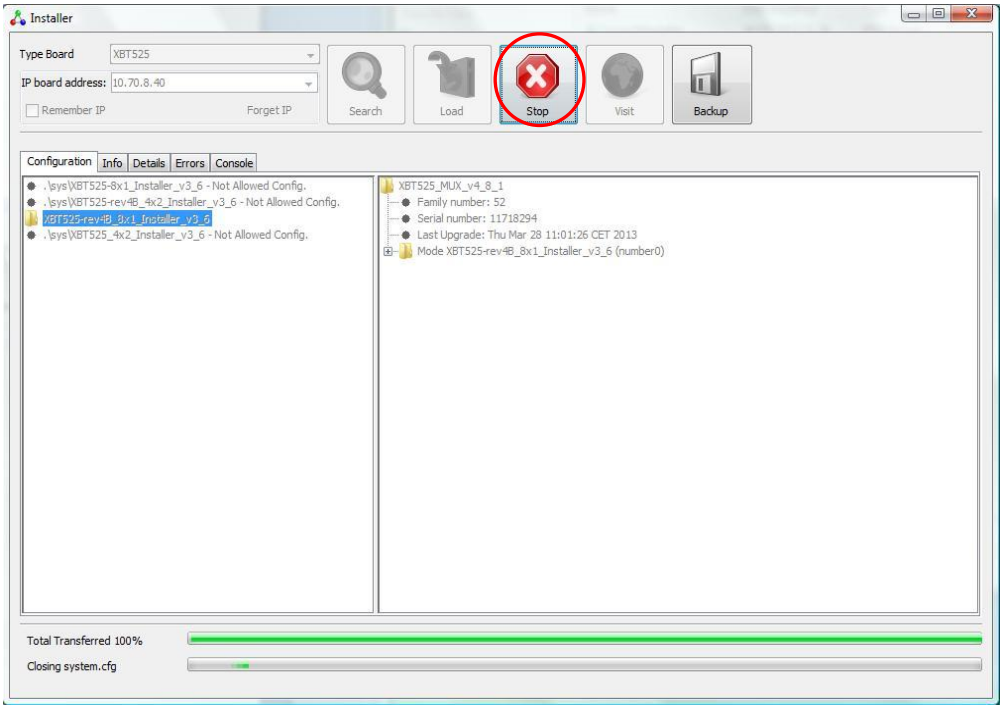
If you want to update only some software versions, click on the check boxes corresponding to the software version you want to load, otherwise click on the check box corresponding to the Load All option. Click on the "OK" button to start the loading.

**Appendix Figure A-6 Java Installer – Files upgrade selection**



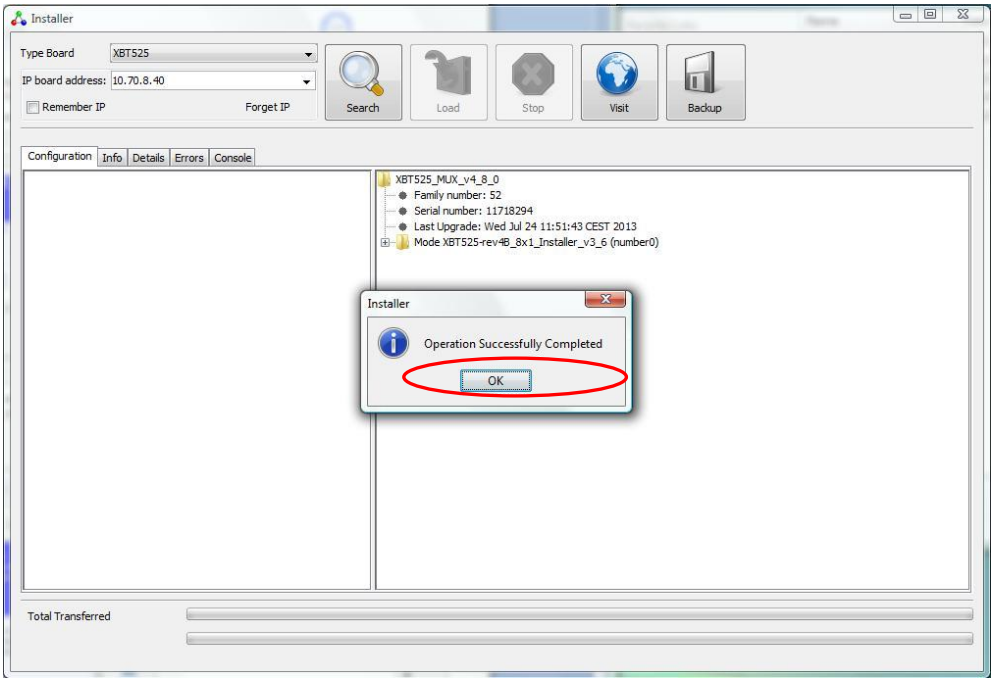

6. Once started the loading, the "Stop" button lights up. Click on this button to interrupt the programming.

**Appendix Figure A-7 Java Installer – Stop button**



7. When the loading is complete, the pop-up window “Operation Successfully Completed” appears. Click on the “OK” button.

**Appendix Figure A-8 Java Installer – Operation Successfully Completed**




8. To save a copy of the file system click on “Backup” button. A pop-up window “Salva” appears. Specify the saving path, then click on “Save” button.

**Appendix Figure A-9 Java Installer – Backup and Save button**