

3DG-4T2-4T 3DG-4T2-BP



OPERATING INSTRUCTIONS

1. SAFETY WARNINGS

The product can only be installed by qualified personnel in compliance with local safety laws and regulations. Fracarro Radioindustria is free from all civil and criminal responsibility due to breaches of current legislation derived from the improper use of the product by the installer, user or third parties

The product must be used in full compliance with the instructions given in this manual, in order to protect the operator against all possible injury and the product from being damaged.

Never remove the product cover as there are live parts underneath it

Installation precautions

- The product must not be exposed to water drips and must be installed indoors inside in dry places.
- Damp and condensation drops could damage the product. Consequently always wait for the product to be perfectly dry before use. Handle with care. Knocks could damage the product. Leave plenty of space around the product to ensure sufficient ventilation. High temperatures or overheating could compromise the product functions and life.
- Do not install the product above or close to sources of heat, in dusty atmospheres or when it could be exposed to corrosive substances.
- If the product is installed on the wall, use proper expansion bolts suitable to the fixing support. The wall and the fixing support must be able to bear at least 4 times the equipment weight.
- Attention: to avoid being hurt, the unit must be mounted to the wall/floor according to the installation instructions.
- The "PERMANENTLY INSTALLED EQUIPMENT" needs a sectioning device, easy to access, that must be integrated outside the unit; in the "EQUIPMENT WITH POWER PLUG", the plug must be installed close to the equipment and easily accessible.
- The unit must be connected to the ground electrode of the antenna system, in compliance with the EN 60728-11 standard. The earth screw is indicated with the symbol: .
- It is important to observe the provisions of the EN60728-11 standard and not to connect this screw to the power supply earth line.



Class II symbol



Ground symbol of the antenna system

GENERAL PRECAUTIONS

In case of a malfunction, do not attempt to repair the product because this would invalidate the guarantee.

Only use the feeder supplied with the product. The information given in this manual has been carefully prepared, however Fracarro Radioindustria S.r.l. reserves the right at any time, and without prior notice, to make any Improvements or changes to the product described in the manual. Consult the website of www.fracarro.com for the terms regarding assistance and the guarantee.

2. INTRODUCTION

The 3DGFLEX family is a modular headend equipped with a cabinet (3DG-BOX cod.283156) that can house 6 modules and a Control Unit in order to use and program the centralised unit.

The control unit allows:

- Powering up to 6 modules
- Programming the central unit using the keypad and display on board, or through a Web interface (PC) from a local or remote network.
- Monitoring in real time the state of the central unit and send signals via email (Controller Host).
- Importing or exporting the central unit configuration via USB.

3DG-4T2-4T is a module to house in the 3DGFLEX central unit, that generates two pairs of adjacent Multiplexes modulated according to the DVB-T or DVB-C standards, using the streams received from any RF or USB Input in the same module or any other module in the central unit cabinet (POOL Technology - see Chapter 2.3).

2. PRODUCT DESCRIPTION

Full band modulator: the mux can be modulated on arbitrary frequencies on VHF-S-UHF bands (114 - 858 MHz).

NB: (only 3DG-4T2-4T) the four mux are not totally independent, but linked to pairs (MUX1-MUX 2 and MUX 3-MUX 4), channel (or frequency) parameters, band width and output level: if the output channel of MUX 1 (or MUX 3) is set the output channel of MUX 2 (or MUX 4) will be set automatically to the adjacent channel subsequent to the one set for MUX 1 (or MUX 3). However, if the output channel is set for MUX 2 (or MUX 4) the output channel will be automatically set for MUX 1 (or MUX 3) to the adjacent previous channel. In the same way, by setting a different bandwidth level or output level for MUX 1 (or MUX 3) the same value will be set for MUX 2 (or MUX 4) and vice versa.

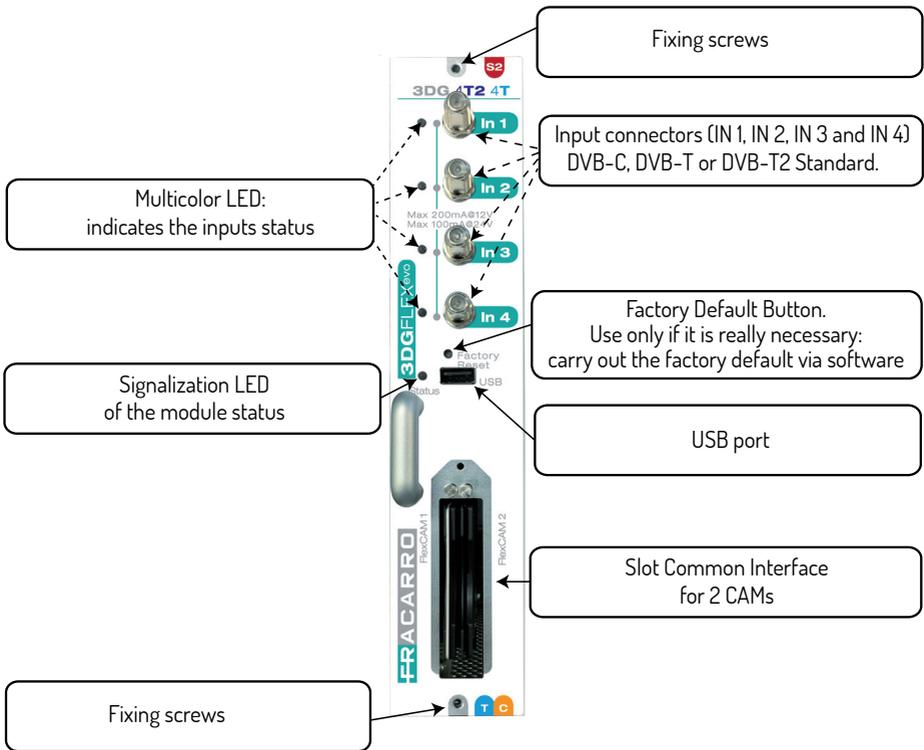
Each module has 4 terrestrial inputs (INPUT 1, INPUT 2, INPUT 3 and INPUT 4) and double slot common interface associated with any of the module inputs connected in the central unit (POOL technology - see chapter 2.3), which allows decrypting programs from the same transport stream.

There is also a USB port to rapidly update the firmware, download and update configuration parameters or to read and modulate videos in .TS files.

It can be programmed in two of the following ways: base programming using the keypad and LCD display on the control unit, or complete programming using the web interface connecting with a local or remote PC connected to the LAN port/network of the control unit. Each 3DG-4T2-4T module can generate, for each 14/18V input, the tone at 22 KHz and the tone-burst DISEqC 1.0 to pilot any multiswitches or LNB, and is equipped with short-circuit protection.

The maximum remote power current for the module is 500mA@14V/18V total.

2.1 Module description



2.2 Led description

LED INPUT STATUS

INPUT LED	INDICATION
off	Input not activated
Orange	Input active, waiting for lock
Green	Input active and locked
Red	Input current overloaded

LED STATUS

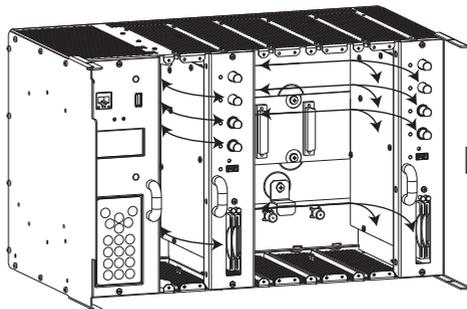
Colour	INDICATION
On turning on/initialising the system	
Orange	Internal boot loader or warning of overflow
Red	Run operating system
Flashing green	Boot phase
Green	System started without error
System started	
Green	Normal
Red	Anomaly alarm
Flashing red	Update or Recovery phase

2.3 POOL Technology

The 3DG-4T2-4T module is part of the evolved 3DGFLEX family. The main innovation is the use of POOL technology. POOL technology enables total communications between all the EVO modules in the 3DGFLEX. Communications are two-way and, in fact, any interactive content can be managed and used on any module. For example: each module can modulate in output any input from any module in the central unit.

The CAM can decrypt any program received from any module in the central unit.

This technology enables noteworthy savings in the module resources (e.g. no input with the same frequency) and greater flexibility (the output mux can be composed from any content received in the central unit).



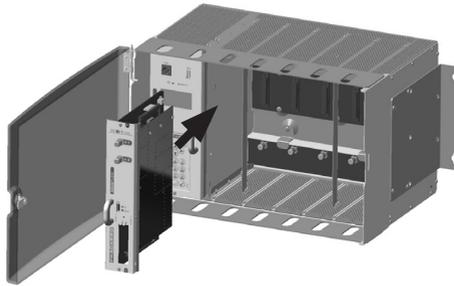
3. INSTALLATION OF THE PRODUCT

3.1 PACKAGE CONTENTS

The packaging contains the following items:

- 3DG-4T2-4T or 3DG-4T2-BP module
- Safety warnings and product installation instructions.
- Accessory bag (3 M3x6 screws - 2 for fixing the module + 1 for the CAM cover) + CAM cover

3.2 MOUNTING THE MODULE



To avoid any injury, the product must be installed in a basket in accordance with the assembly instructions.

3.3 INSERTING AND REMOVING THE CAM MODULES

Proceed as shown in the figure:



CAM insertion



To remove the CAM press the corresponding pin

4. INSTRUCTIONS FOR USE

1. Insert the module in the central unit (which must be turned off).
2. Turn on the central unit and wait for initialisation (the Fracarro logo appears on the display).
3. Connect the antennal cables to the respective inputs.
4. To access the menu, press “√”, type in the user code (default 1234) and confirm by pressing “√”; the central unit will perform a scan to find the connected modules. Begin programming using the PC or keypad and integrated display in the control unit.
5. Check the output signal using a field meter.
6. Connect the distribution cable to the central unit output connector.

If required, the module can be reset to the factory default settings (see the control unit instructions).

ATTENTION: In this case the default language is English.

5. PROGRAMMING INSTRUCTION

Note: the control unit time out is 5 minutes, after this time lapse since the last change the CU resets the module configuration to the last save.

5.1 BASIC PROGRAMMING FROM THE CENTRAL UNIT

The 3DG-4T2-4T module can be programmed using the keypad on the central control unit. to access the programming menu, press “√” and type in the user code (default 1234).

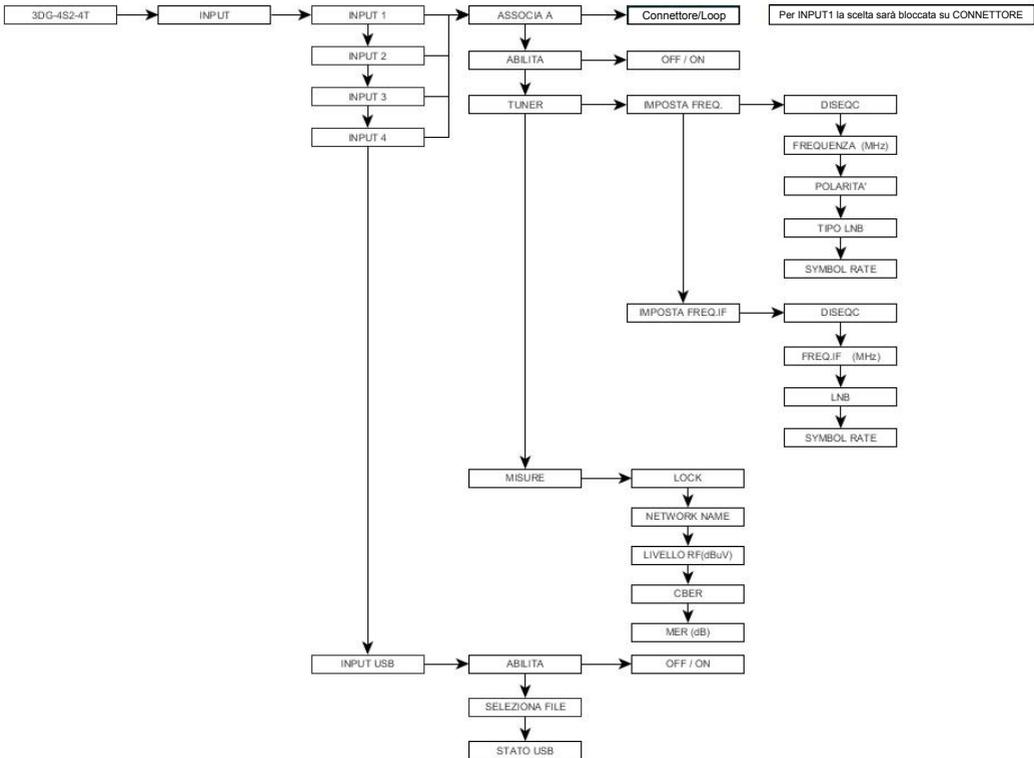
To change the menu language on the 3DG-4T2-4T access the main LANGUAGE menu of the control unit, select the required language and press √.

For all the programming activities and to interpret the programming menus in the following flowchart, refer to the key given below:

Keyboard	Keyboard and Key function
 or 	It confirms an entered value or enters the menu/submenu
 or 	It erases an entered value or leave the menu
   	They are used to navigate the various menu items
 	They modify the parameters
 	They enter values
	It saved the changes

5.1.1 INPUT MENU: Allows selecting one of the 5 available inputs to be programmed (see the Flowchart)

INPUT FLOWCHART



- INPUT 1, INPUT 2, INPUT 3, INPUT 4

- **LINK TO:** select the source from where the DTT signal comes from. There are two options:
 - **CONNECTOR:** enables the selected tuner
 - **LOOP:** enables a physical passthrough of the signal from the previous tuner. On INPUT 1 this option is not allowed since the signal must come from the connector.

NOTE: using the LOOP option, it is possible to passthrough the signal through multiple tuners. For example, when setting LOOP on INPUT 2, INPUT 3 and INPUT 4, they will all receive the signal coming from INPUT 1, therefore it will only be necessary to set the transponder frequencies.

Remember that if selecting the LOOP option on an input results in reception anomalies (DTT transponder with unstable signal), there could be reception problems on all the INPUTS connected in LOOP, in this case, it is recommended to improve the input signal or decrease the risk of signal loss by deactivating the LOOP option and take the DTT signal to all the required inputs by activating the CONNECTOR option.

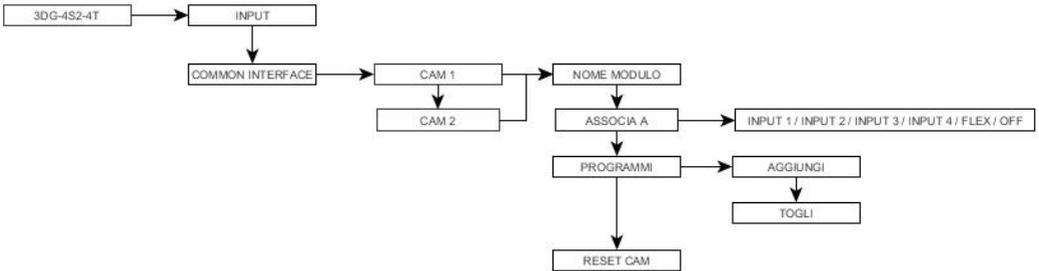
- **ENABLE:** enable the tuner of the selected input; If set to **OFF** the receiver is turned off.
- **POWER SUPPLY:** enable the remote power supply of the selected tuner (12V or 24V).
- **STANDARD:** set the receiver signal standard (DVB-T or DVB-C). Depending on the selection option, the TUNER DVB-T or TUNER DVB-C menu will be available.

- **TUNER DVB-T:** set the receiver parameters for the DVB-T standard. It is possible to receive a transponder by frequency or by channel.
 - **SET BY FREQ.:** set a transponder by frequency (in MHz)
 - **CH. BANDWIDTH:** set the signal bandwidth in MHz upon the selected frequency (6, 7, 8 MHz);
 - **FREQUENCY (MHz):** set the transponder frequency that you wish to receive
 - **SEL. BY CHANNEL:** set the input channel number
 - **COUNTRY:** select the country channel table to apply for channels lookup (Europe, France, UK, Australia)
 - **CHANNEL IN:** set the channel number to be received
 - **OFFSET:** set an optional frequency correction offset in MHz
 - **HI/LO PRIORITY:** set the channel priority (High, Low).
 - **DVB-T2 PROFILE:** set the DVB-T2 standard profile to be used to demodulate the input signal (base o Lite)
 - **MULTI PLP ID:** select the multi PLP ID (Physical Layer Pipes) to be used to receive a DVB-T2 signal
 - **MODE:** set the PLP ID mode (Automatic or Manual)
 - **VALUE:** on manual PLP ID, it is possible to set a specific PLP ID to receive
 - **TUNER DVB-C:** set the receiver parameters for the DVB-C standard. It is possible to receive a transponder by frequency or by channel.
 - **SET BY FREQ.:** set a transponder by frequency (in MHz)
 - **FREQUENCY (MHz):** set the transponder frequency that you wish to receive
 - **SEL. BY CHANNEL:** set the input channel number
 - **COUNTRY:** select the country channel table to apply for channels lookup (Europe, France, UK, Australia)
 - **CHANNEL IN:** set the channel number to be received
 - **OFFSET:** set an optional frequency correction offset in MHz
 - **MEASURES:** display the information regarding the signal received from the selected input
 - **LOCK:** checks if the receiver has LOCKED the signal
 - **NETWORK NAME:** displays the transponder name
 - **RF LEVEL (dBµV):** displays the RF input signal level
 - **CBER:** displays the BER (quality) of the input signal
 - **MER (dB):** displays the input signal MER
 - **DVB info:** display addition information regarding the DVB modulation, such as the standard used, hierarchy, code rate, etc.
- **INPUT USB:** to manage the USB input as source for an audio/video signal in transport stream.
- **ENABLE:** allows activating the reading of audio/video files in an external USB drive.
 - **SELECT FILE:** select which file to use among those stored in the external USB drive.
 - **USB STATUS:** shows the status of the selected file.

NOTE: 3DG-4T2-4T recognises and produces audio/video files only in .TS format, with an average band no greater than 15 Mbps; any other audio/video format must be converted into the correct .TS format by using software tools that can be found in the web.

5.1.2 COMMON FACE MENU: sets the parameters for the inserted CAMs.

COMMON INTERFACE FLOWCHART



CAM 1 / CAM 2: Select the CAM to be configured.

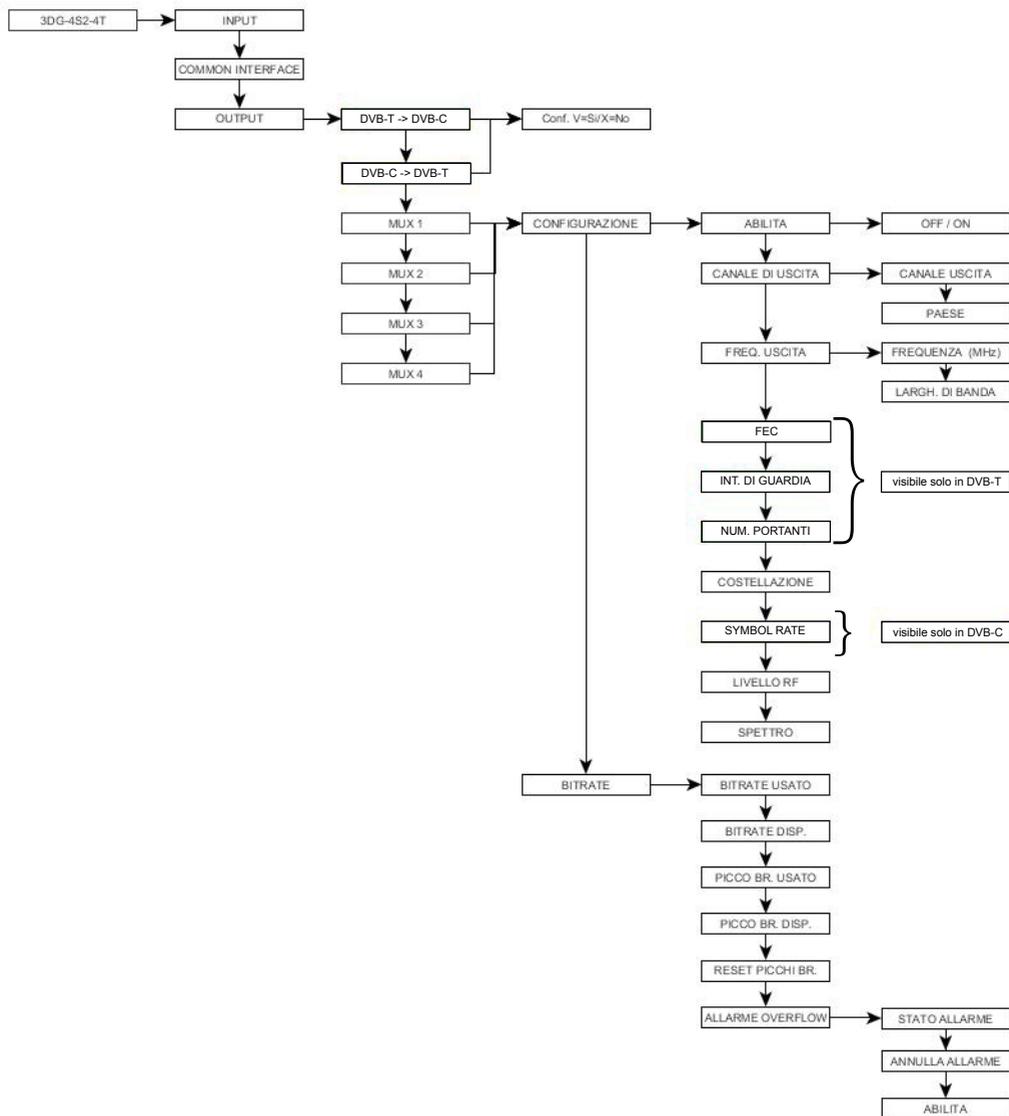
- **MODULE NAME:** checks the common interface module name inserted in the relative slot.
- **LINK TO:** link the selected CAM to one of the 4 available INPUTS or set its working mode in FLEX (see the paragraph below).
- **PROGRAMS:** to add or remove the programs to be decrypted.
- **RESET CAM:** to reset the selected CAM.

- **FLEX CAM MODE:** the FLEX mode allows not linking the selected CAM to a specific input, but to create a personalised list of programs to decrypt using programs coming from any input from any module in the 3DGFLEX (POOL technology, see paragraph 2.3).

By setting "FLEX" in the "LINK TO" menu, in "PROGRAMS" a list is given of all the programs coming from the 4 INPUTS or from the inputs of the other modules installed in the cabinet, and then the required programs can be decrypted independently from the input the program comes from.

5.1.3 OUTPUT MENU: (only for DG-4T-4T) to configure the output signal from the 3DG 4T2 4T module.

OUTPUT FLOWCHART

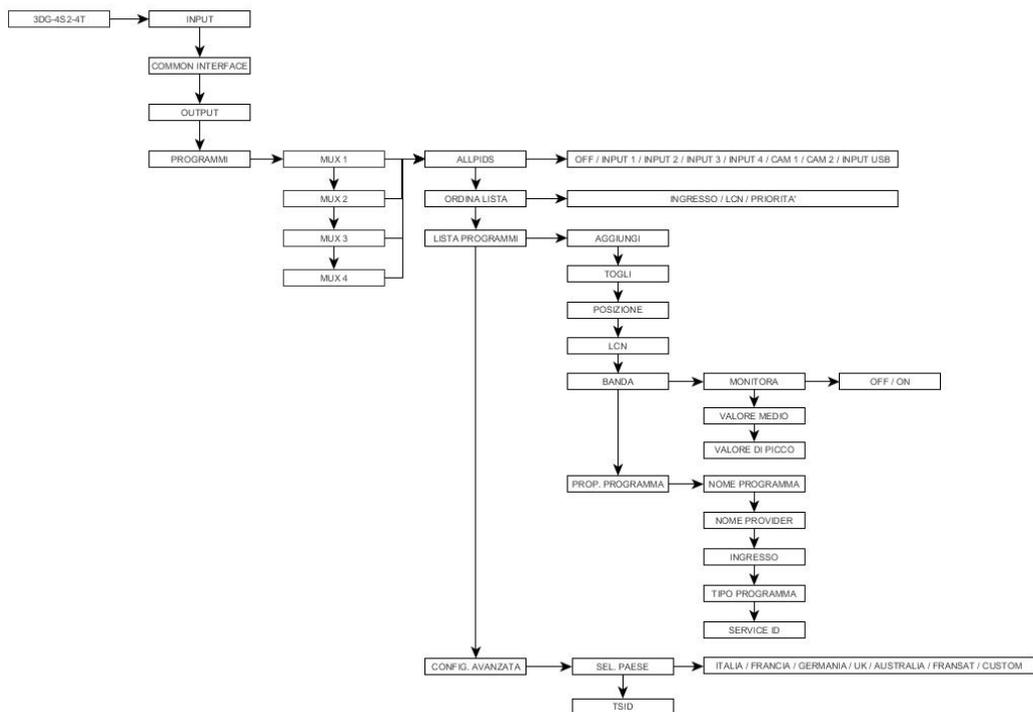


-DVB-T->DVB-C, DVB-C->DVB-T: the output signal standard can be selected from DVB-T and DVB-C, and depending on the standard that is set certain specific MUX parameters output can be viewed and changed. For example: by pressing \checkmark in DVB-C -> DVB-T and, when requested, confirm by pressing the \checkmark key again, the output standard changes from DVB-C as currently set, to DVB-T, thus enabling to check and change just the parameters related to it.

- **MUX 1, MUX 2, MUX 3, MUX 4:** select which output MUX to configure by setting the various submenus.
- **CONFIGURATION:** sets all the output MUX parameters.
 - **ENABLE:** enables the selected MUX; by setting the parameter OFF, the MUX is turned off
 - **OUTPUT CHANNEL:**
 - **OUTPUT CHANNEL:** set the output channel where the MUX will be modulated; this parameter automatically changes the value of the adjacent MUX channel in the same pair.
 - **COUNTRY:** select the country for the channelling standard.
- **OUTPUT FREQ.:**
 - **FREQUENCY (MHZ):** set the output frequency where the MUX will be modulated; this parameter automatically changes the value of the adjacent MUX frequency in the same pair.
 - **BANDWIDTH:** select the bandwidth from the available ones (7 MHz, 8 MHz, 6MHz); this parameter automatically changes the bandwidth value of the adjacent MUX in the same pair.
 - **FEC:** set the FEC (Forward Error Connection) parameter from the available ones (1/2, 2/3, 3/4, 5/6, 7/8) [only DVB-T]
 - **GUARD INTERVAL:** set the guard interval from the available ones (1/4, 1/8, 1/16, 1/32) [only DVB-T]
 - **CARRIER NUMBER:** set the carrier number between 2K and 8K [only DVB-T]
 - **CONSTELLATION:** set the constellation used to module the carriers from among QPSK, 16QAM and 64QAM [in DVB-T] or 16QAM, 32QAM, 64QAM, 128QAM and 256QAM [in DVB-C]
 - **RF LEVEL:** regulate the output level in dBuV, at steps of 1 dBuV; this parameter automatically changes the level value of the adjacent MUX in the same pair.
 - **SPECTRUM:** set the spectrum (NORMAL or INVERTED) according to the reception instrument, that can only work in one of the following two ways; normally NORMAL is set.
- **BITRATE:** shows the measures of the bitrate in the multiplex of output programs.
 - **BITRATE USED:** indicates the bitrate used. This parameter refers to the total measure of all the programs added to the output program list.
 - **BITRATE AVAILABLE:** indicates the available bitrate. This parameter refers to the total measure of the available output bitrates after inserting one or more programs.
 - **BR PEAK USED:** measures the maximum peak bitrate (bit/s) used by the programs in the output MUX.
 - **BR PEAK AVAILABLE:** measures the total peak bitrate (bit/s) available in the output MUX.
 - **RESET BR PEAK:** to reset the peaks to the initial values calculated according to the digital modulation settings. After a bitrate overflow, when the peaks have reached their limit value, this function has to be used.
 - **OVERFLOW ALARM:** manages the bitrate overflow alarms.
 - **ALARM STATUS:** shows if a bitrate overflow has occurred.
 - **RESET ALARM:** cancels the overflow alarm. With this function the product is reset on the standard working conditions (the red LED is turned off).
 - **ENABLE:** to enable (set to ON) the overflow alarm signal function. If the function is set on OFF the option is disabled.

5.1.4 PROGRAMS MENU: to configure the output signal from the 3DG 4T2 4T module.

PROGRAM FLOWCHART



-**MUX 1, MUX 2, MUX 3, MUX 4:** to select the MUX to be configured.

- **ALL PIDS:** to enable or disable the setting to one of the inputs or CAMS.
- **ORDER LIST:** to set the order criteria for the programs list.
 - **INPUT:** ordered by classification to the input number.
 - **LCN:** ordered by LCN, i.e. according to the number associated to the program, independently from the source input.
 - **PRIORITY:** ordered by priority, or according to the position number associated to the program.
- **PROGRAMS LIST:** set the list of output channels.
 - **ADD:** add the selected program to the list of output programs, once added, the program is marked with an 'A' before the name in the channel list.
 - **DELETE:** delete the selected program from the output programs list.
 - **POSITION:** to set the priority and, therefore, the program position in the list of output programs.
 - **LCN:** set the program LCN. The available values are between 0 and 999. Value 1000 means the LCN is deactivated.

- **BAND:** allows monitoring the program bitrate using the following parameters:
 - **MONITOR:** to enable/deactivate the program bitrate monitoring if it has not been added to the channel list. According to the program bitrate, it checks whether the program has been included in the output mux or not.
 - **AVERAGE VALUE:** shows the average program bitrate value.
 - **PEAK VALUE:** to display the program peak bitrate value.
 - **PROGRAM PROP.:** to display useful data about the programs.
 - **PROGRAM NAME:** to display the program name,
 - **PROVIDER NAME:** to display the provider name
 - **INPUT:** to display the program input origin.
 - **PROGRAM TYPE:** to display the program type (TV, RADIO,...).
 - **SERVICE ID:** to display the program service ID.
- **ADVANCED CONFIGURATION**
 - **SELECT COUNTRY:** to select the installation country.
 - **TSID:** to display and change the ID associated to the transport stream by the broadcaster.

6 WEB INTERFACE

The 3DGFLEX can easily be programmed using the WEB interface, which can be accessed from the PC browser. It is very important not to configure the 6 modules by using 6 different browsing boards at the same time, as the CU does not respond to multiple parameter requests from the web, rather it takes the last window opened as priority and the only one working.

IMPORTANT: in order to access web interface programming, the CU has to be outside the panel menu (logo 3DGFlex Fracarro shown on the display).

NOTE: the WEB interface could be altered depending on the firmware release loaded in the module.

6.1 WEB INTERFACE CONNECTION

The following procedure is correct:

1. Connect the PC to the central unit using a RJ-45 CAT-5E cable or passing through a switch.
2. Change the PC or central unit IP address so they are compatible in the same subnet (so they can dialogue).

Example:

- a. Parameters set in the properties of the PC Ethernet card:

IP: 192.168.0.3

SUBNET MASK: 255.255.255.0

GATEWAY: 192.168.0.1

- b. Parameters to set in the control unit

IP: 192.168.0.2

SUBNET MASK: 255.255.255.0

GATEWAY: 192.168.0.1

3. Start the internet browser (recommended browsers: Google Chrome, Mozilla);
4. In the address bar type in the IP address associated with the 3DGFlex; the initial screen is displayed (fig. 1).
Type in the username and password to access the web interface home page.

DI DEFAULT:
USERNAME: admin
PASSWORD: 1234

Fig 1

6.3 STATUS MENU

In the 3DGFLEX 'HOME' menu, select one of the modules to access its programming. You can go back to the Home page at any time by clicking on the key on the toolbar at the top of the screen. The module programming opens with the status window (Fig. 3).

The **STATUS** menu allows checking the product software release and relative serial number.

Status

Software Version: V.00.03
Serial number: 000000000000

Input

	Status	Frequency	Channel	RF Level	CBER	MER	Network Name
INPUT 1	Locked	602.00 MHz	E37	73 dBuV	1.00E-08	36 dB	La3
INPUT 2	Locked	546.00 MHz	E30	72 dBuV	1.30E-06	36 dB	Rai
INPUT 3	Locked	514.00 MHz	E26	68 dBuV	1.10E-07	35 dB	RAI
INPUT 4	Locked	626.00 MHz	E40	62 dBuV	1.40E-05	33 dB	Rai
USB	Disabled						Not Available

Output

	Status	Channel	Frequency	RF Level	ALL PIDS	Bitrate
MUX 1	Enabled	E21	474.00 MHz	95 dBuV	Disabled	15106 kbps / 31668 kbps (Peak Bitrate: 16056 kbps)
MUX 2	Enabled	E22	482.00 MHz	95 dBuV	Disabled	9987 kbps / 31668 kbps (Peak Bitrate: 14254 kbps)
MUX 3	Enabled	E23	490.00 MHz	95 dBuV	Disabled	19899 kbps / 31668 kbps (Peak Bitrate: 20143 kbps)
MUX 4	Enabled	E24	498.00 MHz	95 dBuV	Disabled	21081 kbps / 31668 kbps (Peak Bitrate: 23745 kbps)

Fig 3

The **INPUT** section gives the status of all inputs, showing the main data of the level parameters and reception quality (CBER and MER), plus the name and number of the received channel.

Each input also has a led indication that shows the input status, with the following signals:

- GREEN: the input is enabled and the receiver is locked (USB: enabled and file read correctly).
- YELLOW: the input is enabled but the receiver is not locked (USB: file missing, unselected or incompatible).
- RED: input current overload (remote power).
- GREY: the input is not enabled

(only for 3DG-4T2-4T module) The **OUTPUT** section gives the status of the 4 output MUX, displaying the channel and the output frequency, the RF level, the total bitrate used by the inserted programs and the bitrate available for the MUX. This data is given in both numerical and graphic form using the horizontal format bar: the GREEN part of the bar shows the instantaneously used bitrate, the GREY part shows the maximum peak and the WHITE part shows the bitrate that is still available.

There is also the **RESET PEAK** button to reset the peak level and the overflow details.

Each output MUX also has a led indication that shows the MUX status, with the following colours:

- GREEN: the MUX is in normal working conditions.
- DARK GREEN: the MUX is activated but overflow monitoring is deactivated.
- GREY: the MUX is off.
- RED: the MUX has recorded a bitrate overflow.

NOTE: the input and output sections can be scrolled by using the prev. and next keys, or by dragging to the right and left screen with the mouse pointer. The bitrate overflow alarm is shown by the red dot.

6.4 INPUT MENU

Select one of the **inputs** or use the status bar and dropdown menu (Configuration/Input/Input no.) to access the configuration screen.

The screenshot shows the configuration interface for INPUT 1. At the top, there are four tabs labeled INPUT 1, INPUT 2, INPUT 3, and INPUT 4. The main area is split into two columns: 'Settings' on the left and 'Measures' on the right. Below the main area is a 'Save' button.

Settings	Measures
Enable <input checked="" type="checkbox"/>	Lock <input checked="" type="checkbox"/> Locked
Link to <input type="text" value="Connector"/>	RF Level 72 dBuV
Remote Power Supply <input type="text" value="OFF"/>	CBER 1.10E-07
<input type="text" value="Settings by Channel"/>	MER 36 dB
Country <input type="text" value="EUROPE"/>	Standard DVB-T
Channel <input type="text" value="E37"/>	Modulation QAM64
Offset <input type="text" value="0"/>	Hierarchy HP
Standard <input type="text" value="DVB-T"/>	Code Rate 5/6
Hierarchy <input checked="" type="radio"/> High Priority	Guard Interval 1/4
<input type="radio"/> Low Priority	Mode 8K
DVB-T2 Profile <input type="text" value="Auto"/>	Network Name La3
Multi PLP ID <input checked="" type="checkbox"/> Auto 0	Network ID 12289
	Original Network ID 272
	Transport Stream ID 810

Fig 4

Fig. 4 shows the input programming menu:

- **ENABLE:** Checkbox to enable the receiver. It is recommended to disable all the inputs that are not used in order to save more energy.
- **LINK TO:** Link the receiver to the signal source, or the external CONNECTOR or the LOOP (so the signal is taken in cascade from the previous input).
- **REMOTE POWER SUPPLY:** select the power supply mode to be applied on the selected input (12V, 24V or OFF).
- **Settings mode selection:** select how to enter the transponder parameters (by frequency or by channel)
- **By FREQUENCY:** in this mode it is possible to enter the transponder frequency in MHz and the related channel bandwidth
- **By CHANNEL:** in this mode it is possible to specify the country, an offset (frequency correction in MHz) and a channel number to receive a transponder on the selected input
- **STANDARD:** set the DVB standard of the entered channel/frequency
- **HIERARCHY:** set the channel priority (High/Low)
- **DVB-T2 PROFILE:** set the DVB-T2 standard to demodulate the input signal (base o Lite)
- **MULTI PLP ID:** select the DVB-T2 multi PLP ID to use to receive a transponder. This can be automatic or a specific ID can be entered.

Click on SAVE to save the settings of all the inputs.

The right section shows the detailed information relative to the transponder locking status, the signal quality and the transport stream received.

IMPORTANT: remember that by selecting the LOOP option, the input signal is the one selected on the previous module and, therefore, if there are reception anomalies on the previous tuner (DTT transponder with unstable signal and/or unlocked) there could also be reception problems on the input tuners in the LOOP. In this case it is recommended to improve the input signal and decrease the risk of signal loss by deactivating the LOOP option and taking the DTT signal to all the required inputs.

CLICK ON "SAVE" TO STORE THE CHANGES.

6.5 USB INPUT MENU

The product allows distributing a user transport-stream from a .TS file: the programs in the specified file are

Input USB

Settings	Measures
Enable <input checked="" type="checkbox"/> Select file <input type="text" value="test-2-HD.ts"/>	<u>Lock</u> ● Locked
<input type="button" value="Save"/>	USB Status File OK Network Name Output 0 Network ID 0 Original Network ID 0 <u>Transport Stream ID</u> 1001

Fig 5

included in the program list and can be distributed in the output MUX together with the programs received from the input tuners.

The .TS file can be created from a generic audio-video file, using specific conversion tools which can be downloaded from the internet. To be reproduced, the file has to be stored in an external USB drive (flash key or hard disk) and formatted in the file system **FAT32**.

To use the USB functions, connect the USB drive to the 3DG-4T2-4T module and enter the configuration window of the USB from the status screen or using the menu CONFIGURATION -> INPUT -> USB (Fig.5)

Flag the **ENABLE** box to enable reading the USB drive.

Select the required file in **SELECT FILE** and click on SAVE to save the configuration.

If the file has never been used, the system analyses the file format and the bitrate used to perform an automatic configuration, after which the system creates and saves a file in the USB drive with the same name but an .FR extension, to make future use more fluid.

In the right section, the lock led should turn on green to show that the file is being successfully read. The transport stream data are shown in the fields on the bottom right. During the pre-analysis, which can take a few minutes, the USB status is "uploading".

When a file is started and the "File OK" green led status is shown, the programs in the selected file are added to the input programs list, and they can also be added to the output programs list.

6.6 COMMON INTERFACE MENU

The CONFIGURATION -> COMMON INTERFACE -> CAM 1 / CAM 2 menu is used to access the CAM module configuration pages, which are in the respective slots (Fig 6):

Common Interface CAM 1

Link to: FLEX Module: 1 Input: INPUT 1 Apply

CAM: ItalyProSD

Name	Module	Input	Free to Air	Decrypt
Rai Radio3 mono	2	INPUT 1		<input type="checkbox"/>
Rai Radio1 Sport	2	INPUT 1		<input type="checkbox"/>
Italia 1	2	INPUT 2		<input checked="" type="checkbox"/>
Canale 5	2	INPUT 2		<input checked="" type="checkbox"/>
Rete 4	2	INPUT 2		<input type="checkbox"/>
Iris	2	INPUT 2		<input checked="" type="checkbox"/>
Boing	2	INPUT 2		<input checked="" type="checkbox"/>
La 5	2	INPUT 2		<input type="checkbox"/>
TgCom24	2	INPUT 2		<input type="checkbox"/>
Mediaset EXTRA	2	INPUT 2		<input type="checkbox"/>
Mediaset ITALIA DUE	2	INPUT 2		<input type="checkbox"/>
Topcrime	2	INPUT 2		<input checked="" type="checkbox"/>
Cartoonito	2	INPUT 2		<input type="checkbox"/>
Focus	2	INPUT 2		<input type="checkbox"/>
20 Mediaset	2	INPUT 2		<input type="checkbox"/>
LA7	2	INPUT 2		<input type="checkbox"/>
LA7d	2	INPUT 2		<input type="checkbox"/>

180 of 180 Programs

Save

Fig 6

The screen (Fig. 6) can be used to display and configure the CAM connected to the module.

At the top of the screen the CAM link is shown, and the POOL technology (paragraph 2.3) enables decrypting the CAM to any input of any module in the central unit.

The ASSOCIATE TO field enables setting the function mode for the selected CAM slot:

- **Associate to input** (select the module number and the input INPUT1 / INPUT2 / INPUT3 / INPUT4), the CAM will be associated only to the selected Input and It will decrypt the programs only received from that input.
- **Associate to FLEX mode:** the CAM can decrypt any program coming from any of the Inputs in any module In the central unit (POOL Technology, chapter 2.3).

Before showing the list of programs to decrypt, the CAM name in the selected slot is displayed, if it is not present or is not correctly initialised, the CAM status is "NO MODULE".

For each received program, the source module can be verified ("Module" column), from which input ("Input" column); the icon in the "free to air" column shows if the program is free to air or decrypted: to enable the program for decrypting just flag the box in the "decrypt" column.

The CAM advanced functions can be accessed by clicking the relative keys:

- **RESET CAM:** Reset/restart the CAM module inserted in the slot.

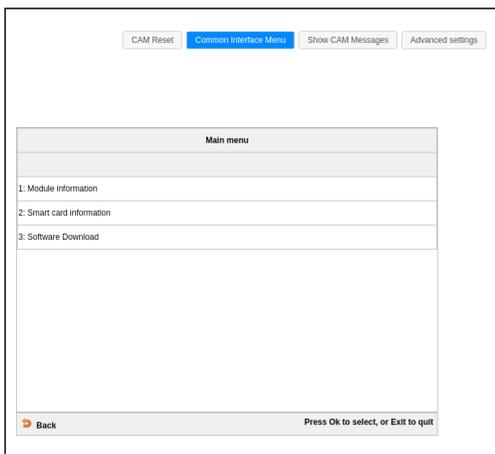


Fig 7

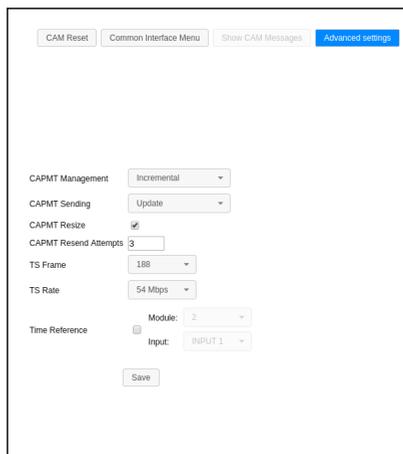


Fig 8

- **COMMON INTERFACE MENU:** to access the common interface menu (only enabled if the CAM supports this function[(see fig. 7).
- **SHOW CAM MESSAGES:** shows the CAM messages (only enabled if there are pending messages).
- **SAVE:** to save the configuration.
- **ADVANCED SETTINGS:** to change the advanced settings in the CAM module (see fig. 8).

Figure 7 shows the “COMMON INTERFACE MENU” associated to the CAM: the page enables displaying the menu for the included CAM (this menu varies according to the type of CAM used). Figure 8 shows the “ADVANCED SETTINGS” for the CAM: this page enables changing the advanced CAM module settings.

Items “CAPMT Management” and “CAPMT Sending” refer to the CAM decrypt management: the various modes can be selected from the dropdown menu.

If “CAPMT Resize” is flagged, it enables decrypting just the audio and video part of the program (in this case, the number of decrypted programs could be higher), if it is not flagged everything is decrypted: audio, video, ttx, subtitles, MHP, etc.

“CAPMT Resend Attempts” enables setting the number of decrypting attempts of a program that the CAM will perform before starting again automatically. By default the value is 3.

Items “TS Framing” and “TS Clock” enable specifying, respectively, to send the data via transport stream with packages of 188 or 204 bytes, and which bitrate to use (change this only after consulting the CAM technical specifications, as incorrect setting could compromise the headend operation. The default parameters are normally suitable for the majority of CAMS available on the market).

The “Time Reference” function enables synchronising the CAM with the information contained in the input programs: if the CAM is set on AUTO, it will automatically search the various INPUTS.

Click the APPLY key and then OK to save the changes.

6.7 OUTPUT MENU (only for 3DG-4T2-4T module)

Using the “OUTPUT” menu click on CONFIGURATION -> OUTPUT -> MUX 1 / MUX 2 / MUX 3 / MUX 4 to access the Multiplex configuration page.

The screenshot shows the 'Settings' page for MUX 1. At the top, there are four tabs: MUX 1, MUX 2, MUX 3, and MUX 4. The 'Settings' section contains the following parameters:

- Standard: DVB-T (dropdown)
- Modulator Frequency: Settings by Channel (dropdown)
- Country: EUROPE (dropdown)
- Channel: E25 (dropdown)
- RF Level: 95 dBuV (dropdown)
- FEC: Radio buttons for 1/2, 2/3, 3/4, 5/6, and 7/8 (7/8 is selected)
- Guard Interval: Radio buttons for 1/32, 1/16, 1/8, and 1/4 (1/32 is selected)
- Constellation: Radio buttons for 64 QAM, 16 QAM, and QPSK (64 QAM is selected)
- Carrier Number: Radio buttons for 8K and 2K (8K is selected)
- Spectrum: Radio buttons for Normal and Inverted (Normal is selected)
- Overflow Alarm:

A 'Save' button is located at the bottom left of the settings area.

Fig 9

In this menu the MUX output parameters from the central unit can be changed.

- **STANDARD:** the modulation standard for the output MUX (DVB-T or DVB-C)
- **MODULATOR FREQUENCY:** the modulator output frequency can be set according to the frequency in MHz or by channel according to the standard channelling in the different countries.

NOTE: the output MUX are not independent but are linked to other pairs by the following parameters: output frequency, bandwidth and output level. Therefore, when these parameters are changed in a multiplex, the settings of the other mux in the same pair are also immediately changed. The 2 pairs are divided: MUX1-MUX2 and MUX3-MUX4.

- **RF LEVEL:** to set the output power in dBuV, in the range foreseen by the technical specification (75 - 95 dbuV).

Below are a few parameters relative to the DVB-T modulation standard:

FEC (1/2, 2/3, 3/4, 5/6, 7/8), guard interval (1/4, 1/8, 1/16, 1/32), constellation (QPSK, 16QAM ad 64QAM), number of carriers (8K, 2K), spectrum (normal or inverted).

The “Alarm overflow” checkbox shows if a band overflow has to be reported to the user by the led on the bottom or not.

NOTE: Click on “SAVE” to save the changes.

6.8 DRM SETTINGS

It is possible to activate an encrypted protection of the output muxes by enabling the DRM feature (Digital Rights Management).

3DG-4T2-4T allows to setup up to 8 DRM groups each with an independent encryption system.

DRM settings

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Encryption type	Samsung Lynk Sinc ▼						
CA System ID	0x0112						
Server IP Address	127.0.0.1						
Server port	9999						
Crypto period duration	10 (Minutes)						

Save

Fig 10

It is possible to choose between Samsung Lynk™ Sinc and a fixed encryption key.

If Samsung Lynk™ Sinc is selected, it is necessary to set also:

- the DRM server IP address
- the DRM server port
- the crypto period duration (the time interval when the encryption key changes)

NOTE: When using an external Samsung Lynk™ DRM server, it is necessary to manually add a connection in the EMMG setup web page with the following parameters:

- IP Address: the Control Unit IP address
- Port: 8989
- Channel ID: 1
- Stream ID: 1

It is also suggested to set the EMMGPeriod parameters to 2000ms.

When selecting a fixed key encryption method, it is mandatory to enter a key exactly 32 characters long in hexadecimal format.

NOTE: Future upgrades of the modules software might add more encryption systems compatibility.

6.9 PROGRAM CONFIGURATION

The CONFIGURATION -> PROGRAMS -> MUX 1 / MUX 2 / MUX 3 / MUX 4 menu allows access to the output Multiplex configuration page (Fig 11).

The screenshot displays the 'Input Program List' and 'Output' configuration sections. The 'Input Program List' table shows various programs with columns for Name, Module, Input, CAM Input, Type, Free to Air, and Bandwidth (Kbps). The 'Output' section shows a table for MUX 1 [E25], MUX 2 [E26], MUX 3 [E27], and MUX 4 [E28], with columns for Name, Module, Input, Position, LCN, LCN HD, Bandwidth (Kbps), and Actions. The 'Rai News 24' program is highlighted in the input list and is also shown in the output table for MUX 2.

Input Program List							Output											
Name	Module	Input	CAM Input	Type	Free to Air	Bandwidth (Kbps)	MUX 1 [E25]	MUX 2 [E26]	MUX 3 [E27]	MUX 4 [E28]	Name	Module	Input	Position	LCN	LCN HD	Bandwidth (Kbps)	Actions
Hor Bird 4k1	1	INPUT 4		TV	<input type="checkbox"/>	-					Rai News 24	2	INPUT 1	1	0	0	3633	<input type="checkbox"/>
FTV UHD	1	INPUT 4		TV	<input type="checkbox"/>	-					TyCom24	2	INPUT 2	2	0	0	2205	<input type="checkbox"/>
Love Nature 4K	1	INPUT 4		TV	<input type="checkbox"/>	-					Itis	2	CAM 1	3	0	0	3913	<input type="checkbox"/>
SID_00272	2	INPUT 1		Data	<input type="checkbox"/>	-					Rai09	2	CAM 1	4	0	0	2307	<input type="checkbox"/>
SID_00273	2	INPUT 1		Data	<input type="checkbox"/>	-												
SID_00274	2	INPUT 1		Data	<input type="checkbox"/>	-												
Rai Radio Tutta italiana	2	INPUT 1		Radio	<input type="checkbox"/>	-												
Rai News 24	2	INPUT 1		TV	<input checked="" type="checkbox"/>	3633												
Invulink	2	INPUT 1		TV	<input type="checkbox"/>	-												
Radio OM unica	2	INPUT 1		Radio	<input type="checkbox"/>	-												
Rai Radio2 mono	2	INPUT 1		Radio	<input type="checkbox"/>	-												
Rai Radio3 mono	2	INPUT 1		Radio	<input type="checkbox"/>	-												
Rai Radio1 Sport	2	INPUT 1		Radio	<input type="checkbox"/>	-												
Rete 4	2	INPUT 2		TV	<input type="checkbox"/>	-												
La 5	2	INPUT 2		TV	<input type="checkbox"/>	-												
TyCom24	2	INPUT 2		TV	<input type="checkbox"/>	2205												
Mediaset EXTRA	2	INPUT 2		TV	<input type="checkbox"/>	-												
Mediaset ITALIA DUE	2	INPUT 2		TV	<input type="checkbox"/>	-												
Topcrime	2	INPUT 2		TV	<input type="checkbox"/>	2604												
Cartoonito	2	INPUT 2		TV	<input type="checkbox"/>	-												
170 of 180 Programs							4 Programs				Estimated total bandwidth 12058 Kbps							
							Module: [2] Input: [INPUT 3]				Add All Programs							
							PID Management				Advanced Settings							

Fig 11

The left section shows the program list: received from the inputs and the modules, decrypted by the CAMS and input to the system in a .TS file in a USB drive.

The text box and the dropdown menus at the top of the table allow filtering the program list for an easier search. The last column is used to set the display mode for the program list: simple, automatically hide duplicated programs in the case of CAM decryption: if a program comes from an input it is added in decrypt, only the decrypted version will be shown. The programs which are not added in decrypt will always be shown, while the advanced mode shows all the programs regardless of whether they are decrypted or not.

The other input program columns show respectively: the program name, the module and input it comes from, the program type (TV, Radio, Data), if reception is free to air or encrypted, if decryption is activated for one of the two CAMS and the band used by the program (if the relevant box is flagged). If the program is used to create one of the 4 output MUX, the box is automatically flagged and the relative band is shown.

To add programs to an output, drag and drop the program name from the input list to the output list. To do this, click the left button of the mouse over the program in the list and keep it pressed and drag it to the output table of the MUX and then release the button.

The OUTPUT columns in the table on the right show:

The program name, the input and module it comes from, the program priority (the lower the number the higher the priority), the assigned LCN value (0 if not specified), the assigned LCN HD value (0 if not specified), the band used. The position (or priority) determines the importance of the programs and, therefore, which will be cut first if there is a bitrate overflow, for example: 1 = top priority, therefore the most important program and the one to save (see the paragraph Programming Indications).

The LCN and LCN HD parameters must be set so that each generated output program, including among a number of devices, has a distinct value. If this is not to be specified, enter 0.

To remove a program from the output list click on X in the right hand column (ACTIONS).

The bottom part of the table shows the estimated band used by the programs (sum of programs, excluding the TS and PID common tables) in output and the indication of the total viewed programs.

By clicking on the icon <properties> in the right hand column, access is given to more advanced program settings. By clicking on <program properties>, the following window will appear

Program Properties
Das Erste HD on MUX 4

	Original	Modified
Name	Das Erste HD	<input type="text"/>
Provider	ARD	<input type="text"/>
Type	HD TV	<input type="text"/>
SID	10001	<input type="text"/>
PMT PID	5100	<input type="text"/>
Free To AIR	Yes	<input type="button" value="Always Automatic"/>
Status	running	

PID List

PID	Type	Value MUX 4	Actions
1101	PCR - H.264 video stream	<input type="text"/>	<input type="button" value=""/>
1120	Application Information Table	<input type="text"/>	<input type="button" value=""/>
1121	ISO/IEC 13918-6 type C	<input type="text"/>	<input type="button" value=""/>
2121	ISO/IEC 13918-6 type B	<input type="text"/>	<input type="button" value=""/>
5102	MPEG-1 audio stream (hev)	<input type="text"/>	<input type="button" value=""/>
5103	MPEG-1 audio stream (ms)	<input type="text"/>	<input type="button" value=""/>
5104	Teletext (hev)	<input type="text"/>	<input type="button" value=""/>
5105	Subtitle (hev)	<input type="text"/>	<input type="button" value=""/>

11 PID

OK Apply Close

Fig 12

In the first table, the program parameters can be changed by writing directly in the blank space, such as: name, provider SID, the PMT PID. When a parameter has been changed it can be reset (returning to the original shown in the second column) by clicking on the arrow on the right. The last parameter in the list opens a dropdown menu to select whether the program is declared as free to air, or encrypted by the decoder:

- Always automatic: the program is declared as free to air automatically if it is decrypted by the CAM.
- Always yes: the program is always declared as free to air even if it is not decrypted by the CAM.
- Always no: the program is always declared as encrypted, even if it is decrypted by the CAM.
- Unchanged: the program is declared free to air if it is not changed or if it is not sent to the CAM for decryption.

The second table is to manage the PID list. The PID values can be changed by entering the values in the appropriate spaces as follows: PCR video stream, audio stream, teletext, MHP, application information table.

In the last column in this table, by clicking on the symbol, certain actions can be performed on each program PID:

Delete the PID (the deleted PID line is highlighted grey), reinstate the PID, change the PID.

Note: Click on "Apply" to save the changes.

The PID advanced configuration keys for the MUX are located beneath the OUTPUT table, by clicking on the "MUX PID Configuration" key, the following screen opens:

PID Settings MUX 4

Added PID List

PID	Module	Input	Remapped value	Actions
<input type="text"/>	1	INPUT 1	<input type="text"/>	<input type="button" value=""/>

Removed PID List

PID	Module	Input	Actions
<input type="text"/>	1	INPUT 1	<input type="button" value=""/>

OK Apply Close

Fig 13

In figure 13, in the “Added PID List” table you can: enter the PID to add in the space which is shown under the “remapped value” column, select the signal input (INPUT 1, INPUT 2, INPUT 3, INPUT 4, CAM 1, CAM 2, USB).

Other actions are also possible, such as: add the PID , delete the added PID , change the added PID value  and restore any changed PID .

In the second table “Deleted PID list”, a few PID can be deleted from the output MUX by entering the PID to delete in the space, add it to the list  and select the relevant output (INPUT 1, INPUT 2, INPUT 3, INPUT 4, USB).

Later the deleted PID  can be reinstated and removed from the deleted PID list.

NOTE: Click on “Apply” to save the changes.

By clicking on the “MUX Advanced Configuration” key the following window opens:

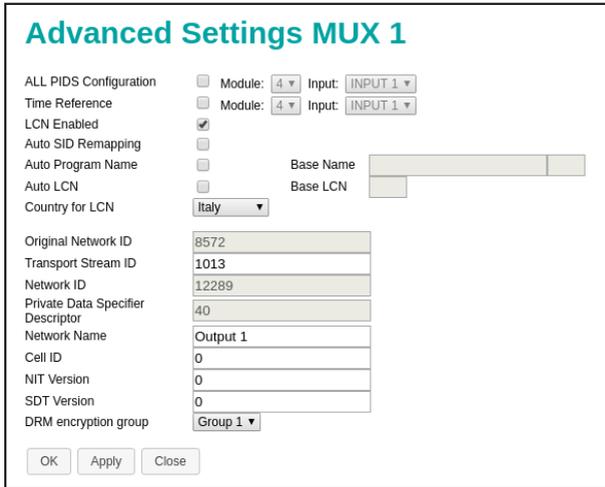


Fig 14

The window shown in figure 14 is used to configure:

- Time reference: to give a synchronisation time reference by selecting (INPUT 1, INPUT 2, INPUT 3, INPUT 4, USB). (e.g. time, EPG, etc.).
- Enabled LCN: after flagging the checkbox the LCN can be enabled or deactivated and then order the programs according to their assigned priority.
- Auto SID Remapping: if enabled, this innovative function allows automatically assigning a new progressive SID to the programs, allowing changes to the output program list without having to tune the channels of the TV.
- Auto program name: if enabled, this innovative function allows automatically assigning a new progressive name to the programs, writing it in the spaces (base name), e.g. program 1, program 2, etc.
- Auto LCN: if enabled, this function allows setting up a base LCN number that is assigned to the first program in the list, the following ones will then be set automatically in sequence from the base number.
- LCN country: select the country for setting the LCN.
- DRM encryption group: the association of an output MUX with a DRM group (if at least one DRM group has been configured). A single DRM group can be associated to multiple output muxes.

Other advanced parameters can then be displayed for the signal, such as: Original Network ID, Network ID, and Private Data Specifier Descriptor.

Other parameters however, like Transport Stream ID, Network Name, Cell ID can be set/changed by writing the new name in the space.

NOTE: Click on “Apply” to save the changes.

7 MONITORING

The central unit allows monitoring events and problems that could occur over time (e.g. no input signal, etc.). A log can be created, a removable file or an email can be set with the list of anomalies or events.

To enable this function, enter the control unit programming page from “Home”, “Monitoring” and “Configuration” to open the following screen:

Monitoring settings

Monitoring settings	
Enable monitoring	<input checked="" type="radio"/> Enabled <input type="radio"/> Disabled
Save to Log File	<input checked="" type="radio"/> Enabled <input type="radio"/> Disabled
Log file depth	30 days
	Empty
Send Alarm e-mail	<input type="radio"/> Enabled <input checked="" type="radio"/> Disabled
Date/Time settings	
Date	03/07/2012
Time	16:17
Date/Time web synchronization (NTP)	<input type="radio"/> Enabled <input checked="" type="radio"/> Disabled
Date/Time server (NTP) synchronization	0.it.pool.ntp.org
Timezone	Europe/Rome
Email settings	
Smtp	
Receiver email address	
Sender email address	
	Send test email

Save

Fig 15

Monitoring Status

Settings	
Interval	5 Minutes
Attempts	3
Parameters	
CAM Reset	CAM 1 CAM 2
CAM Blocking	CAM 1 CAM 2
Not Decryptable Program	
Reset	
HW Fault	
Configuration Change	
Software Version	

Save

Fig 16

In the “Monitoring settings” section (Fig. 15) you must enable monitoring and you can enable saving the log list on a local file, the time for file saving and enable sending an email with the alarm events.

In the second section, set the date and time for the control unit or automatically synchronise the date with a link with an NTP server.

NOTE: to send the emails correctly the system date must be correctly set.

The last section is for the settings to send the emails: you must set the server and SMTP port, the email address of the sender and receiver, the connection type and the name and password of the sender's email.

After programming the monitoring function, the monitoring can be set for each module.

From the Home page, select any module and in its status bar enter the menu “Configuration” - “Monitoring” - “Status”:

The time interval and number of monitoring attempts can be set for the various parameters and alarms.

Some of the monitored parameters are given in series, the others can be identified in the various menus.

Move the mouse pointer over the parameters to display a question mark, then click on the right key of the mouse to enter the monitoring screen:

Monitoring Reset

Settings	
Monitoring Enable	<input checked="" type="checkbox"/>
Current Value	External Reset
Message	System restart occurred due to [RESET].

OK Apply Close

Fig 17

For program decrypt monitoring, it is advisable to enable it from this general menu and, if there are problems, from those of the single programs (enabled from the input program list menu <  >)

For each monitored parameter, you can enable monitoring, personalise the alarm message text that will be sent and, for certain parameters, set the function range or the min. and max. tolerance levels.

Important: monitoring can only be enabled for output programs.

NOTE: Click on “Apply” to save the changes.

In the green option bar at the top select “Configuration”-> “Monitoring”-> “Log” to open the following screen:

History							
Event ID	Module	Date	Time	Value	Alarm	Description	
From <input type="text"/>	to <input type="text"/>	Module <input type="text"/>	From <input type="text"/> to <input type="text"/>	Time <input type="text"/>	Value <input type="text"/>	Alarm <input type="text"/>	Description <input type="text"/>
415	3	11/07/2013	17:14	No Fault	No	No	Hardware Trouble
416	3	11/07/2013	17:14	0	No	No	Decrypt Trouble
413	3	11/07/2013	17:09	No Fault	No	No	Hardware Trouble
414	3	11/07/2013	17:09	0	No	No	Decrypt Trouble
411	3	11/07/2013	17:04	No Fault	No	No	Hardware Trouble
412	3	11/07/2013	17:04	0	No	No	Decrypt Trouble
409	3	11/07/2013	16:59	No Fault	No	No	Hardware Trouble
410	3	11/07/2013	16:59	0	No	No	Decrypt Trouble
407	3	11/07/2013	16:54	No Fault	No	No	Hardware Trouble
408	3	11/07/2013	16:54	0	No	No	Decrypt Trouble
405	3	11/07/2013	16:40	No Fault	No	No	Hardware Trouble
406	3	11/07/2013	16:40	0	No	No	Decrypt Trouble
403	3	11/07/2013	16:44	No Fault	No	No	Hardware Trouble
404	3	11/07/2013	16:44	0	No	No	Decrypt Trouble
401	3	11/07/2013	16:39	No Fault	No	No	Hardware Trouble
402	3	11/07/2013	16:39	0	No	No	Decrypt Trouble
399	3	11/07/2013	16:34	No Fault	No	No	Hardware Trouble
400	3	11/07/2013	16:34	0	No	No	Decrypt Trouble
397	3	11/07/2013	16:29	No Fault	No	No	Hardware Trouble
398	3	11/07/2013	16:29	0	No	No	Decrypt Trouble
395	3	11/07/2013	16:24	No Fault	No	No	Hardware Trouble
396	3	11/07/2013	16:24	0	No	No	Decrypt Trouble
393	3	11/07/2013	16:19	No Fault	No	No	Hardware Trouble
394	3	11/07/2013	16:19	0	No	No	Decrypt Trouble
390	3	11/07/2013	16:14	1	Alarm		Change Configuration
391	3	11/07/2013	16:14	No Fault	No	No	Hardware Trouble
389	3	11/07/2013	16:14	0	No	No	Decrypt Trouble

Fig 18

In this screen you can display and search the log for events recorded during monitoring. It gives the event ID, the related module, the date, time, value, if an alarm is generated or not and the event description.

8. OPERATIONS MENU

8.1 COPY CONFIGURATION

Select the dropdown menu OPERATIONS/COPY CONFIGURATION to access the menu to copy the configuration between modules.

Copy configuration

Copy from	Copy to
Module 1-3DG-4S2-4T ▼	Module 3-3DG-4S2-4T ▼
Copy	

Fig 19

Fig. 19 shows the menu, select the module to copy from and the one to copy the configuration to.

8.2.SAVE CONFIGURATION

From the menu OPERATIONS/ SAVE CONFIGURATION / ON FILE / ON USB DRIVE, you can access the pages to save the configuration directly to files in the PC (Fig. 20) or USB drive (Fig. 21).

Save configuration to file

Module	Click to save
Module 2-3DG-4S2-4T	

Fig 20

Save configuration to USB

Module	Click to save
Module 2-3DG-4S2-4T	

Fig 21

Click on the disk icon, the 3DG-4T2-4T module configuration is automatically saved directly on the PC or USB drive In an XML format file.

8.3. LOAD CONFIGURATION

From the OPERATIONS -> LOAD CONFIGURATION -> FROM FILE / USB DRIVE menu you can access the configuration save pages respectively from a PC file (fig. 22) or from a USB drive (fig. 23).

Load configuration from file

Module	Configuration
Module 2-3DG-4S2-4T ▼	Scegli file Nessun file selezionato
Load configuration	

Fig 22

Load configuration from USB

Module	Configuration
Module 2-3DG-4S2-4T ▼	Mod2_20181008_1708.xml ▼
Load configuration	

Fig 23

Select the saved configuration file and confirm the download by clicking on “Upload configuration”.

8.4 RESTORE FACTORY DEFAULT SETTINGS

From the menu OPERATIONS -> FACTORY DEFAULT the product can be reset with the factory default parameters.



Fig 24

After clicking on "Factory Default" a new screen opens (Fig. 24) where you can select whether to restore the factory settings for the selected module. In the dropdown menu, select the module to reset and select "Factory default" to complete resetting the default for the module.

8.5 FIRMWARE UPGRADE

From the OPERATIONS -> UPDATE FIRMWARE -> UPDATE FIRMWARE menu, you can check the firmware release version installed and then update the system if required.

To update the system, check there is the correct update package available in a PC folder or in the USB drive, then select the update package and press on BROWSE and then UPDATE MODULES. Wait until the end of the updating operation.

Firmware Upgrade

	Module	Version HW.SW	Number of partitions	Partition 1 version	Partition 2 version	Partition 3 version	Partition 4 version	Partition 5 version	Partition 6 version	Partition 7 version
<input checked="" type="checkbox"/> 1	3DG-4S2-4T	0.3	7	4	5 (T)	4	20 (T)	2 (T)	2 (T)	12 (T)
<input checked="" type="checkbox"/> 2	3DG-4S2-4T	0.3	7	4	5 (T)	4	20 (T)	2 (T)	2 (T)	12 (T)
<input checked="" type="checkbox"/> 3	3DG-4S2-4T	0.3	7	4	5 (T)	4	20 (T)	2 (T)	2 (T)	12 (T)
<input checked="" type="checkbox"/> 4	3DG-4S2-4T	0.3	7	4	5 (T)	4	20 (T)	2 (T)	2 (T)	12 (T)
<input type="checkbox"/> 5	3DG-BP-IPOUT	0.3	7	2	3	3	9	3	2	7
<input type="checkbox"/> 7	3DG-CU	0.8	6	8	9	6	14	0	12	

Scegli file 3DG-4S2-4T_..._b5_TEST.fr

Module Update

Fig 25

After updating, check the result from the menu OPERATIONS -> UPDATE FIRMWARE -> UPDATE RESULT menu.

8.6 RESTART MODULES

From the OPERATIONS -> RESTART menu the system can be restarted.

9. PROGRAMMING INSTRUCTIONS

INTRODUCTION: before programming the 3DG-4T2-4T the following general instructions should be observed. Decide whether you want to use the ALL PID OUT function or to program every single program (PID) that will have to be available in the output.

With the ALL PID function, the transport stream received from the specified input is rebroadcast at the output with no further processing.

Therefore the output channels need no management, and all the contents, including non-standard or erroneous in the original transport stream, will be rebroadcast without change, ensuring compatibility with other more "rigid" decoders in managing the input data. However, at the same time, the programs or priorities cannot be managed in the case of overflow issues.

If the output available bitrate is insufficient, due to the lack of priority management, EACH program in the output transport could lose packages, meaning only artefacts are viewed on the TV. Therefore, the ALL PID mode should only be used when the output band is the same or higher than the input band.

If the programs are managed singularly for every PID, it is advisable to carefully follow the following indications so they are available on output. Given the overall bitrate for an output MUX, determined according to the standard and selected modulation parameters, the overall output band for the associated programs must be much lower, otherwise the low priority programs will be lost or will not work properly.

After configuring the output mux parameters, the available band can be viewed in the web configuration homepage or from the panel menu in the section OUTPUT -> MUX1 / MUX2 / MUX3 / MUX4 -> BITRATE.

Programs can then be added to the output mux until the overall peak band for the added channels exceeds the mux band, as the excess band data that cannot be broadcast are rejected by the system.

Therefore, the installer needs to check that the maximum peak bitrate of the programs inserted does not exceed the available band.

If the output band limit is exceeded, and for as long as it lasts, the system automatically chooses which programs to broadcast according to the priority order, guaranteeing correct broadcasting of the high priority programs (with a lower position number).

The first programs to be penalised are the low priority ones (with a higher position number), which lose their packages and are displayed as an error.

If the output band falls below the available band again, all the programs are broadcast without the loss of any data. To facilitate this, the system offers a band graphic indicator in the web management, which is updated automatically every second.

Firmware Upgrade

	Module	Version HW.SW	Number of partitions	Partition 1 version	Partition 2 version	Partition 3 version	Partition 4 version	Partition 5 version	Partition 6 version	Partition 7 version
<input checked="" type="checkbox"/> 1	3DG-4S2-4T	0.3	7	4	5 (T)	4	20 (T)	2 (T)	2 (T)	12 (T)
<input checked="" type="checkbox"/> 2	3DG-4S2-4T	0.3	7	4	5 (T)	4	20 (T)	2 (T)	2 (T)	12 (T)
<input checked="" type="checkbox"/> 3	3DG-4S2-4T	0.3	7	4	5 (T)	4	20 (T)	2 (T)	2 (T)	12 (T)
<input checked="" type="checkbox"/> 4	3DG-4S2-4T	0.3	7	4	5 (T)	4	20 (T)	2 (T)	2 (T)	12 (T)
<input type="checkbox"/> 5	3DG-BP-IPOUT	0.3	7	2	3	3	9	3	2	7
<input type="checkbox"/> 7	3DG-CU	0.8	6	8	9	6	14	0	12	

Scegli file 3DG-4S2-4T..._b5_TEST.fr

Module Update

File name: 3DG-4S2-4T_v_0_3_b5_TEST.fr
File size: 31543296 bytes

Fig 26

The length of the complete graphic bar (including the green, grey and white colours) shows the overall available band for the output mux, while the band immediately used by the programs is green.

As the overall band of all the programs could change during time, the maximum acquired value since the last reset (done by pressing RESET PEAK) is shown in grey.

If there is a white section, it shows the available bitrate and, therefore, the margin that can still be used. If at any time a band peak reaches and exceeds the maximum, there is no white section and the red overflow led is lit.

The same values numerically are available in the OUTPUT -> MUX1 / MUX2 / MUX3 -> BITRATE section menu.

The second indication is in the input program list menu with 3 signalizations: the total bitrate will be given in red with a yellow triangle and the low priority programs, that are discarded, will be written in red.

Therefore, the installer should configure the output program list, after being fully documented about the maximum band required by each program (online or from technical literature) and monitor the total bitrate for a sufficient period of time to make sure that the overall peak never reaches the maximum available, but that there is always a minimum margin available to offset any problems that may occur.

Always assess carefully how to assign the priority position to each program, to ensure that the most important programs are always guaranteed.

IMPORTANT: to maximize the available band, in standard installations it is advisable to maintain the default modulation settings (for DVB-T constellation 64QAM, FEC 7/8, guard interval 1/32, number of carriers 2K).

IMPORTANT: to avoid bitrate overflow issues, the total bitrates must be kept sufficiently lower than the maximum limit during the modulations setting. Remember that high definition programs, broadcast with dynamic bitrates, can have broadcast peaks up to 20 Mbit/s. Therefore the installer must carefully monitor the bitrate peaks during the programming, and find information beforehand about the broadcast modes for the channels being distributed.

10. FIRMWARE UPGRADE

The 3DG-4T2-4T can be updated in the field by uploading the firmware saved on a USB drive, directly on the module through its USB port (see the programming flowchart).

IMPORTANT: do not remove the USB drive while the update is in progress, because it would block the card.

To obtain the latest firmware and update instructions, refer to the section "Software update" in our website www.fracarro.com.

11. TECHNICAL DATA

General features		
Working temperature	°C	-10° - +50° (-10° - +45°C with CAM)
Max. consumption	W	15 W (without CAM), 20 W (with CAM)
Compliance to standards		EN50083-2, EN60065
Common Interface		2 x PCMCIA (Standard EN50221, TS10169)
Connectors	Tipo	F-female (RF), RJ45, USB port (type A, FAT32 filesystem, reproduction .TS file)
Size	mm	360x230x54 (without CAM), 246x52x209 (with CAM)
Input signals		
Inputs	n°	4
Input frequency	MHz	110-862 (170-862 on connector 1)
Connector type	tipo	F, female
Input frequency steps	MHz	50
Input RF level	dB μ V	40 - 55
Input impedance	Ohm	75
Remote power supply	VDC	12V (200mA) / 24V (100mA)
Demodulation		DVB-T, DVB-T2, DVB-C
AFC range DVB-T, DVB-T2	MHz	-400 / +400
AFC range DVB-C	MHz	-100 / +100
Loop-through insertion loss (one passage)	dB	3
Output signals		
Generated MUX	n°	4 (two pairs of adjacent channels)
Broadcasting standard		DVB-T, DVB-C
Connector type	tipo	F, female
Output frequency	MHz	111 - 862 (S2 - E69)
Output frequency steps	kHz	250
Output signal level	dB μ V	95
Output level regulation (for each pair of channels)	dB	-20 - 0
Output impedance	Ohm	75
Spurious	dBc	- 50
MER	dB	37

USB		
File System		FAT 32
File extension		.TS
Average file bitrate	Mbps	15
CAM mode		
Number of CAMS		2 can be configured in INPUT ASSOCIATION or FLEX mode
Output DVB-T (only for 3DG-4T2-4T module)		
Carriers		2k, 8k
Modulation		QPSK, 16-QAM, 64-QAM
Guard interval		1/4, 1/8, 1/16, 1/32
FEC		1/2, 2/3, 3/4, 5/6, 7/8
Spectrum type		Normal, inverted
Bandwidth	MHz	6, 7, 8
Output in DVB-C (only for 3DG-4T2-4T module)		
Symbol rate	M symb	1000 - 6999
Modulation type		DVB-C J.83 annex A/C
Modulation		16QAM, 32QAM, 64QAM, 128QAM, 256QAM
Bandwidth	MHz	depends on the set output SR

COMPLIANCE TO EUROPEAN DIRECTIVES

Fracarro states that the product complies to the 2014/53/EU and 2011/65/EU directives. The complete text of the EU compliance statement is available at the website ce.fracarro.com.

USER INFORMATION

Pursuant to Article 26 of Legislative Decree No. 49 of 14 March 2014 "Implementation of Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE)"



The crossed out wheeled bin symbol on the appliance indicates that at the end of its life the product must be collected separately from other waste. The user must therefore take the end-of-life appliance to a recycling centre for Waste Electrical and Electronic Equipment, or return it to the vendor when purchasing a new appliance of the same type, as part of the One for One scheme. The correct collection and subsequent recycling, treatment and environmentally friendly disposal of appliances contributes to avoiding any negative effects on the environment and our health, and promotes the recycling of the materials that the appliance is made with.

Garantito da/ Guaranteed by/ Garanti par/ Garantizado por
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