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**TV MODULATOR**

**PULSAR BG**

**USER'S MANUAL**

**Serial Number:**

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Part Number: V598736/07



# CONTENTS

<b>1</b>	<b>GENERAL DESCRIPTION.....</b>	<b>1-1</b>
<b>2</b>	<b>SPECIFICATIONS.....</b>	<b>2-1</b>
	<b>INTERNAL LAYOUT.....</b>	<b>3-1</b>
<b>4</b>	<b>INSTALLATION.....</b>	<b>4-1</b>
4.1	RACK MOUNTING.....	4-1
4.2	POWER CONNECTION.....	4-1
4.2.1	Power Supply 230 VAC.....	4-2
4.2.2	Power Supply -48 VDC.....	4-2
4.3	INPUT & OUTPUT CONNECTORS.....	4-3
4.3.1	RS-485 Remote Control.....	4-5
4.3.2	Audio Input - Status & Control.....	4-5
4.4	INSTALLING THE PULSAR.....	4-7
4.4.1	Rear Panel of the PULSAR.....	4-7
4.4.2	Use of the Pulsar in the analog HE.....	4-7
4.4.3	Audio Connections.....	4-8
4.5	REMOTE CONTROL.....	4-9
4.5.1	General.....	4-9
4.5.2	Communication Example And Installation For ROSA.....	4-10
<b>5</b>	<b>OPERATION.....</b>	<b>5-1</b>
5.1	FRONT PANEL DESCRIPTION.....	5-1
5.2	USING THE MENU KEYS.....	5-3
5.3	SYSTEM CONFIGURATIONS.....	5-4
5.3.1	Menu Overview.....	5-4
5.3.2	Setting Up Communication.....	5-5
5.3.3	Configuration.....	5-5
5.3.4	Alarms And Errors.....	5-7
5.4	SETTINGS.....	5-8
5.4.1	Frequency Settings.....	5-8
5.4.2	RF Output Level.....	5-9
5.4.3	S/V Ratio.....	5-9
5.4.4	Calibration Slope.....	5-9
5.4.5	Slope Control.....	5-9
5.4.6	RF OUTPUT.....	5-9
5.4.7	Int. Sound Carrier.....	5-9
5.4.8	Clamping-VAGC- Mod meter.....	5-9
5.4.9	White Limiter.....	5-10
5.4.10	Audio Preemphasis.....	5-10
5.5	MODULATION.....	5-11
5.5.1	Video.....	5-11
5.5.2	Audio.....	5-11
5.6	INPUT.....	5-12
<b>6</b>	<b>INSTALLATION FILTER MODULE.....</b>	<b>6-1</b>
6.1	INSTALLATION.....	6-1
6.1.1	Opening The PULSAR.....	6-1
6.1.2	Opening The Converter.....	6-1
6.1.3	Installing The Filter Module.....	6-1
6.1.4	Updating The Software Version.....	6-1
6.1.5	Closing The PULSAR.....	6-3

6.2 LAYOUT..... 6-4  
    6.2.1 *Installation Of A VHF Or An Agile Filter Module* ..... 6-4  
        *Installation Of An UHF Filter Module*..... 6-5  
6.3 SETTINGS ..... 6-6  
**7 OPTIONS..... 7-1**

# 1 GENERAL DESCRIPTION

## PULSAR: THE ULTIMATE MODULATOR

The PULSAR is a TV modulator used to convert baseband audio and video signals into RF output signals ready to go into your cable network.

Barco's PULSAR is one of the first intelligent TV modulators in the world. Thanks to its built-in intelligence, all of the parameters important in a modulator, such as RF levels, modulation depth, audio deviation etc., can be remote controlled.

Typical applications are in those cable TV distribution systems where unsurpassed reliability, zero maintenance and excellent price/performance ratio are of the highest priority.

### **Standard features at a glance:**

- Fits into any 19" inch rack and takes up only one unit of space
- Tuneable or fixed output frequency for better combined C/N performance
- Video AGC
- Auto RF level alignment in combination with BARCO's HE supervisor, the FSM860 and ROSA.
- Monitoring of modulation depth , audio deviation and overmodulation.
- Intelligent white clipper to prevent overmodulation.
- SAW filter designed for real adjacent channel operation.
- State-of-the-art electronic design and use of PLL techniques for long term stability and extremely high reliability.
- Front panel LCD and buttons for user friendly control.
- Full configuration and remote control via ROSA.
- Available for certain country specific delay pre-corrections
- A complete set of options transform the Pulsar to suit any possible application



## 2 SPECIFICATIONS

All specifications are measured with the RF output terminated with a passive load of 75 Ohm.

### 2.1 General Specifications

- Ambient temperature range
 

Within specs	10 to 40 °C	( 50 to 104 °F )
Operation	0 to 45 °C	( 32 to 113 °F )
Storage	-20 to 80 °C	( -4 to 176 °F )
- Power supply 230 VAC  $\pm$  10 %, 48 - 62 Hz
- Power supply -48 V
 

Input voltage range	-48 VDC $\pm$ 10 %
Type	floating, reverse polarity proof
Filter input	yes
Fuse	0.5 AT slow blow
Max. DC current	< 15A, 60us
- Power consumption Max. 45 W
- Weight approx. 5.4 kg ( 12 lb. )
- Dimensions 1u x 19" x 467 mm  
19" W x 1.75" H x 18.5" D

### 2.2 Inputs

#### VIDEO INPUTS

- Input impedance 75 Ohm
- Input level 1 Vpp  $\pm$ 5 dB for modulation depth : 90%
- Connector BNC
- Return Loss  $\geq$  30 dB between 100 kHz and 6 MHz
- Hum rejection > 20 dB (Back-porch clamping)
- Alarm on Video Loss threshold level 0.50 Vpp  $\pm$  0.1 V

#### AUDIO INPUTS

- Connector screw terminal on quick disconnect plug
- mono**
- Input impedance 600 Ohm or 10 kHz (balanced or unbalanced)
  - Input level Nominal :+6 dBm for  $\pm$  50 kHz deviation  
Range : -10 to +10 dBm, front adjustable
  - Bandwidth 15 kHz
- IRT two carrier stereo**
- Input impedance 600 Ohm or 10 kHz (balanced or unbalanced)
  - Input level Nominal :+6 dBm for  $\pm$ 30 kHz deviation  
Range : -10 to +10 dBm
  - Bandwidth 15 kHz

### 2.3 RF output

- Connector BNC
- Output impedance 75 Ohm
- Return loss  $\geq 15$  dB between  $F_v - 1$  MHz and  $F_v + 5.5$  MHz; ref. =  $F_v$
- Frequency 1 channel between 45 MHz and 600 MHz or  
1 channel between 600 MHz and 890 MHz or  
an agile module (option) for the ranges  
5 MHz to 45 MHz  
45 MHz to 600 MHz  
600 MHz to 860 MHz  
adjustable in steps of 12.5 kHz.
- Output level 50 to 60 dBmV; adjustable on front  
tolerance on display value:  $\pm 1$  dB
- C/N ratio ( 5 MHz BW)  $\geq 67$  dB
- Amplitude response measured video to RF  
ref. = (  $F_v + 250$  kHz )  
 $\pm 0.5$  dB :  $F_v - 0.5$  MHz /  $F_v + 4.75$  MHz  
 $-2$  dB :  $F_v - 0.75$  MHz /  $F_v + 5$  MHz  
 $\pm 0.5$  dB with flat channel filter  
 $\pm 0.5$  dB correction of channel filter tilt
- Slope control  $> 98$  dBc/Hz @ 20 kHz offset
- Slope calibration  $\geq 60$  dB down (at max. output level)
- Phase noise front adjustable; tolerance on display :  $\pm 1$  dB
- Harmonics and spurious radiation Mono : -13 dB adj.: -8 dB to -20 dB
- Sound / Vision ratio IRT Stereo :  
Sound1 : -13 dB adj.: -11 dB to -23dB  
Sound2 : -20 dB adj.: -18 dB to - 23 dB

### 2.4 IF Loops

- Return loss  $\geq 18$  dB
- Connector Composite IF Loop : BNC, 50 Ohm  
All other IF Loops: F, 75 Ohm
- Input, output levels Composite IF Loop: 40 dBmV  $\pm 0.5$  dB  
IF Vision before SAW: 46 dBmV  $\pm 2$  dB (optional)  
IF Sound (1): 34 dBmV  $\pm 2$  dB (optional)

### 2.5 Remote Control

- Communication port SubD 9 pins for RS-485
- Status & Control screw terminal on quick disconnect plug

### 2.6 Sound modulation spec.'s (measured in RF)

#### mono

- IF sound carrier 33.4 MHz
- Preemphasis 50  $\mu$ s
- Frequency response 30 Hz - 15 kHz; tolerance :  $\pm 0.5$  dB; reference = 100 Hz
- Distortion 30 Hz - 15 kHz at  $\pm 50$  kHz :  $< 0.8\%$
- S/N ratio  $\geq 65$  dB at  $\pm 50$  kHz deviation @ 1 kHz audio signal



**IRT two carrier stereo**

- IF sound carriers 33.4 MHz and 33.158 MHz
- Preemphasis 50  $\mu$ s
- Frequency response 30 Hz - 15 kHz; tolerance :  $\pm 0.5$  dB; ref. = 100 Hz
- Distortion 30 Hz - 15 kHz at  $\pm 30$  kHz deviation:  $< 0.5\%$
- S/N ratio  $\geq 62$  dB (Quasi Peak Detector) at  $\pm 30$  kHz deviation @  
1 kHz audio signal; Video : sync only
- Crosstalk Dual sound at 1 kHz:  $> 60$  dB  
Stereo at 1 kHz :  $> 36$  dB

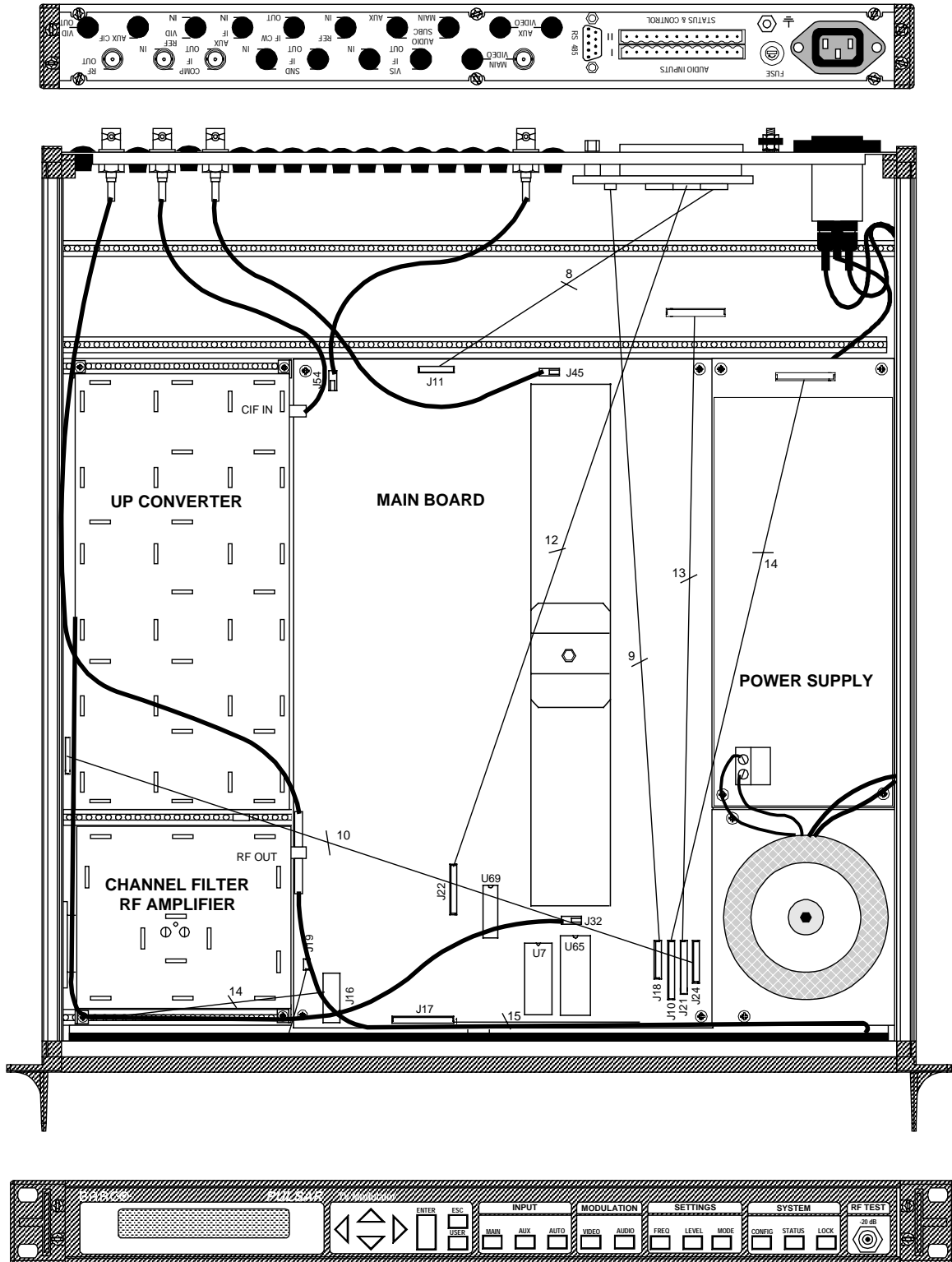
**2.7 Video modulation spec.'s (measured in RF)**

Measured with modulation depth : 90%  
DC restoration : Back-porch

	WORST CASE	TYPICAL
1 Luminance Bar Ampl. (rel. to 0.7 V)	$\leq \pm 2\%$	$\leq \pm 1\%$
2 Base line distortion	$\leq \pm 2\%$	$\leq \pm 1\%$
3 Luminance bar tilt	$\leq \pm 2\%$	$\leq \pm 1\%$
4 2T Amplitude	$\leq \pm 3\%$	$\leq \pm 1\%$
5 Line time non linearity	$\leq \pm 2\%$	$\leq \pm 1\%$
6 Color SubC on CCIR 331	$\leq \pm 5\%$	$\leq \pm 2\%$
7 Color SubC on 20T	$\leq \pm 5\%$	$\leq \pm 2\%$
8 Intermod. on CCIR 331	$\leq \pm 2\%$	$\leq \pm 1\%$
9 Intermod. on 20T	$\leq \pm 2\%$	$\leq \pm 1\%$
10 Chrominance to luminance delay	$\leq \pm 25$ ns	$\pm 25$ ns
11 Residual picture carr.	10% $\pm 1.5\%$	
12 S/N ratio (unweighted)	$\geq 59$ dB	60 dB
13 Differential gain	$\leq \pm 2\%$	$\leq \pm 1\%$
14 Differential phase	$\leq \pm 2^\circ$	$\leq \pm 1^\circ$
15 Sync pulse amplitude	$\leq \pm 3\%$	$\leq \pm 2\%$
16 Burst amplitude	$\leq \pm 5\%$	$\leq \pm 3\%$



### 3 INTERNAL LAYOUT





## 4 INSTALLATION

### 4.1 RACK MOUNTING

When mounting the PULSAR units, use 19 inch racks, preferably those with a depth of at least 70 cm. The units should be mounted adequately, so as to secure optimal operation and reliability of your unit. Use sliders compatible with the 19 inch racks used to support the PULSAR properly.

When mounting more than one unit, we advise you to leave a space of at least one unit in between. These spaces can be covered afterwards with ventilation profiles. Mounting other units together with the PULSAR obviously requires the air flow to be able to reach all units.

Additional components, such as combiners and netstrips are preferable to be mounted at the back of the racks, so that the free air flow between the sides of the unit and the rack is not restricted.

At the bottom and the top of the rack, ventilation profiles should be mounted so as to allow the fresh air to enter and the hot air to leave the rack. It is of great importance to place the racks in a conditioned room with a constant temperature of about 25 °C.

When mounting five or more units on top of one another, the use of fans is necessary. The power of the fan depends on the number of units mounted. For a rack containing 15 units with a free space of one unit between the units, an airflow of 300 m<sup>3</sup>/hour is required. Mounting the fans requires taking into account that the air should blow alongside the units and that it can enter the rack through the lower ventilation profiles.

### 4.2 POWER CONNECTION

Before any other connection is made, the unit must be connected to a protected earth terminal in both of the following ways (EMC requirements):

- Via the protected earth terminal.
- Via the three-wire power cable.



#### WARNING

Failure to ground the unit properly can result in personal injury. Do not defeat the earth-grounding protection by using an extension cable, power cable or autotransformer without a protective ground conductor.

Before connecting the unit to the mains of the building installation, the proper functioning of the protective earth lead of the building installation needs to be verified.

Check if your AC power source voltage corresponds to the appropriate power input voltage for the apparatus. This voltage is noted on the rear side.

To change the mains fuse, disconnect the power cable. Pull up the cap and replace the fuse by a new one.

#### WARNING

The use of repaired (jumpered) fuses and/or the short circuiting of the fuse holders is prohibited.

### 4.2.1 Power Supply 230 VAC

The fuse is a 0.5 AT (slow blow) fuse, ordernumber C314115.  
Use 250 V type fuses only.

### 4.2.2 Power Supply -48 VDC

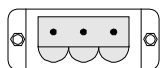
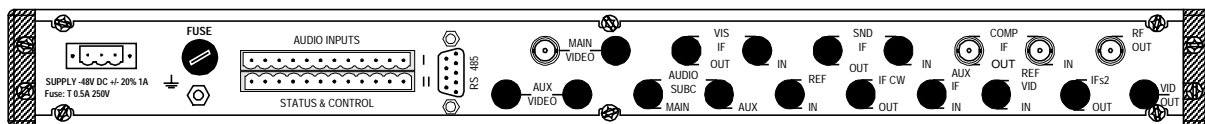
The PULSAR can be equipped with a -48 VDC power supply, typically demanded in telecom environments. The -48 VDC power supply connector can be a D-type or a ComBiCon type connector. Look at the following sections for a detailed information about the wiring.



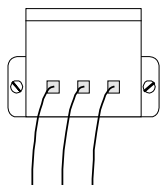
The -48 VDC voltage has to be a SELV - voltage (SELV = Safety Electric Low Voltage)

#### 4.2.2.1 Power Supply -48 VDC; ComBiCon version

If the PULSAR is modified with a -48 VDC power supply with ComBiCon connector, connections indicated in the figure below must be made. The fuse is a 2 AT (slow blow) type.

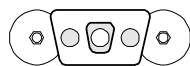
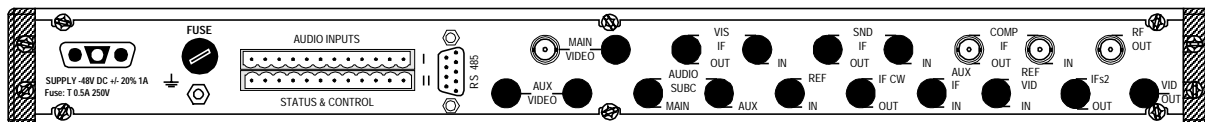


-48V ComBiCon Power Connector + Connections

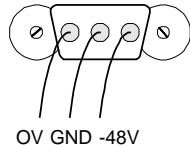


#### 4.2.2.2 Power Supply -48 VDC; D-type version

If the PULSAR is modified with a -48 VDC power supply with D-type connector, then the connections indicated in the figure below must be made. The fuse is a 2 AT (slow blow) type.



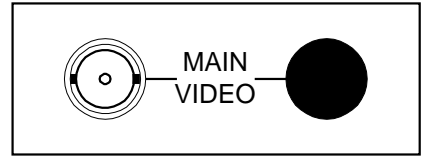
-48V D-type Power Connector + Connections



### 4.3 INPUT & OUTPUT CONNECTORS

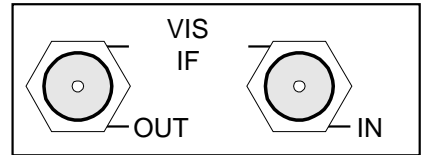
**MAIN VIDEO**

Baseband video signal input for the main program.  
 BNC type connector  
 (Loop through in option)



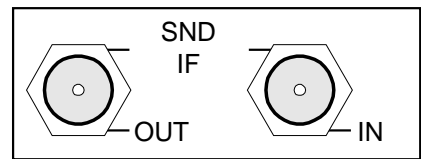
**VIS IF (Optional)**

Vision IF loop input & output. This IF loop can be used in combination with IF loop scramblers.  
 F type connectors



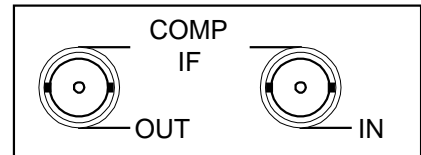
**SND IF (Optional)**

Sound IF loop input & output. This IF loop can be used in combination with IF loop scramblers.  
 F type connectors



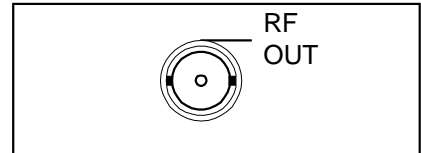
**COMP IF**

Composite IF loop input & output. The composite IF signal can be used in combination with scramblers and Nicam encoders.  
 BNC type connectors (F type optional)



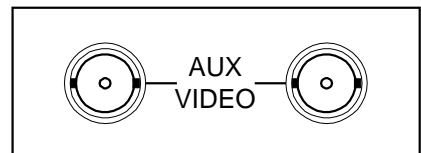
**RF OUT**

Connector with the RF output signal.  
 BNC type connector (F type optional)



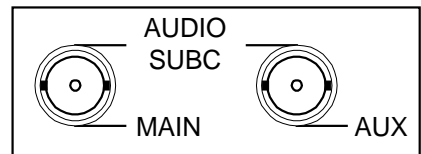
**AUX VIDEO (Optional)**

Baseband video signal input for the auxiliary program. This input is always a loop through, so you can connect one signal to more than one PULSAR.  
 BNC type connector



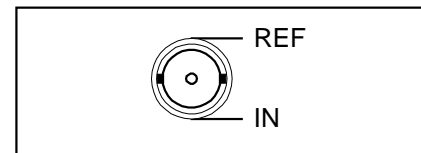
**AUDIO SUBC (Optional)**

Audio subcarrier input for the main program as well as for the auxiliary input. The subcarrier input can be used to insert a Nicam signal.  
 BNC type connector



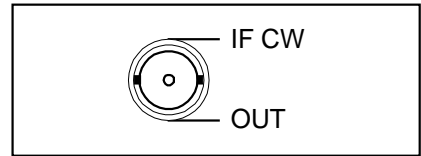
**REF IN (Optional)**

The reference input is used if either the option external reference input or vision carrier reference input has been installed. The reference signal is connected to this input.  
 BNC type connector



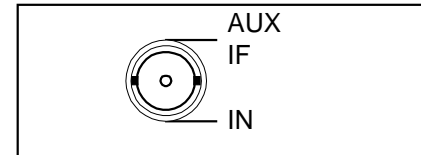
**IF CW OUT (Optional)**

When the PULSAR is equipped with the reference carrier output option or vision reference carrier output the signal will be available on this connector  
BNC type connector



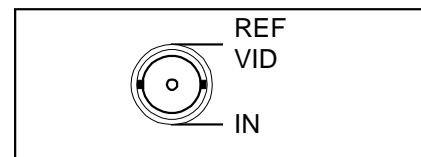
**AUX IF IN (Optional)**

When the option composite IF auxiliary input is installed this is the input connector for the IF signal.  
BNC type connector



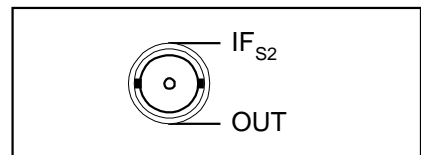
**REF VID IN (Optional)**

The reference input is used when the option main scrambled aux unscrambled is installed in combination with a two carrier stereo system. This input provides than the stereo coder with clear / unscrambled video.  
BNC type connector



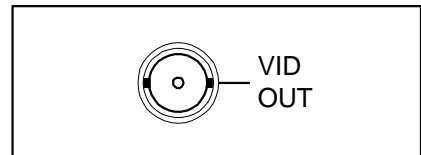
**IFs2 OUT (Optional)**

When the option separate sound and vision IF output is installed in combination with a two carrier stereo system this output connector provides the second sound carrier.  
BNC type connector



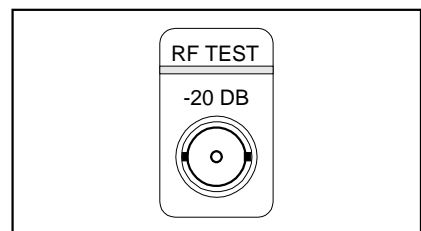
**VIDEO OUT (Optional)**

The video output connector is used when the option audio / video auxiliary input with additional video output for monitoring is installed. The connector provides the video (after input selector) at the output for monitoring purposes.  
BNC type connector



**RF TEST (On the front)**

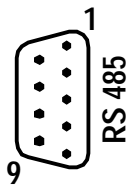
-20 dB test point on the RF output signal.  
BNC type connector





### 4.3.1 RS-485 Remote Control

The RS-485 Remote Control connector is a 9-pins SubD male connector. All important modulator parameters such as RF level, modulation depth, audio deviation and all possible functional selections can be remotely controlled from a PC with BARCO'S ROSA software and/or the client-server ROSA/COPERNICUS system. This makes it possible to use the PULSAR in applications such as digital to analog nodes in super trunk systems and headends in rural or remote areas. Using the PULSAR with other remote controllable equipment, such as FSM 860, SAT 200, QUASAR, allows the operator to have complete control over the headend.



Pin	Function	Pin	Function
1	Not Connected	6	Not Connected
2	TxB	7	Floating
3	RxB	8	Not Connected
4	TxA	9	Not Connected
5	RxA		

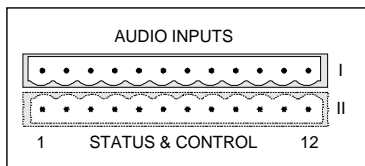
- Pin 7 : floating or grounded, selectable with bridge BR2 on the mainboard.

### 4.3.2 Audio Input - Status & Control

#### 4.3.2.1 Audio Inputs

The upper row of the screw terminal is used as input for the baseband audio signal, the configuration of the terminal is:

PIN	Function	PIN	Function
1	MAIN input left or mono (+)	7	AUX input left or mono (+)
2	MAIN input left or mono (-)	8	AUX input left or mono (-)
3	Ground	9	Ground
4	MAIN input right (+)	10	AUX input right (+)
5	MAIN input right (-)	11	AUX input right (-)
6	Ground	12	Ground



4.3.2.2 Status & Control

The lower row of the screw terminal is used as a status & control connector. Via these hard contacts (TTL level) it is possible to control certain parameters of the modulator.

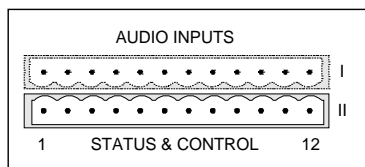
PIN	Function
1	MAIN / AUX output
2	B input MAIN sound coder control *
3	A input MAIN sound coder control *
4	B input AUX sound coder control *
5	A input AUX sound coder control *
6	RF OFF input; active low To disable the RF output, overrules all other settings
7	FORCED PRESET input; active low ** This pin forces the modulator to switch to the forced preset. All other input selections are overruled, also the AUX input pin 8.
8	FORCED AUX input; active low Selects the auxiliary input, whatever the selection on the front with the MAIN, AUX or AUTO key is.
9	ALARM output; active high *** Whenever there is an alarm, the output becomes high Video Fail Video Low (AGC out of range) Converter PLL unlock PLL vision carrier unlock Substitution input is selected (input AUTO/AUX) Forced preset active RF output OFF White limiter active Malfunction
10	Not connected
11	Not connected
12	Ground

\* Sound coder control

	MONO	MONO + P	STEREO	DUAL SOUND
A	0	0	1	1
B	0	1	0	1

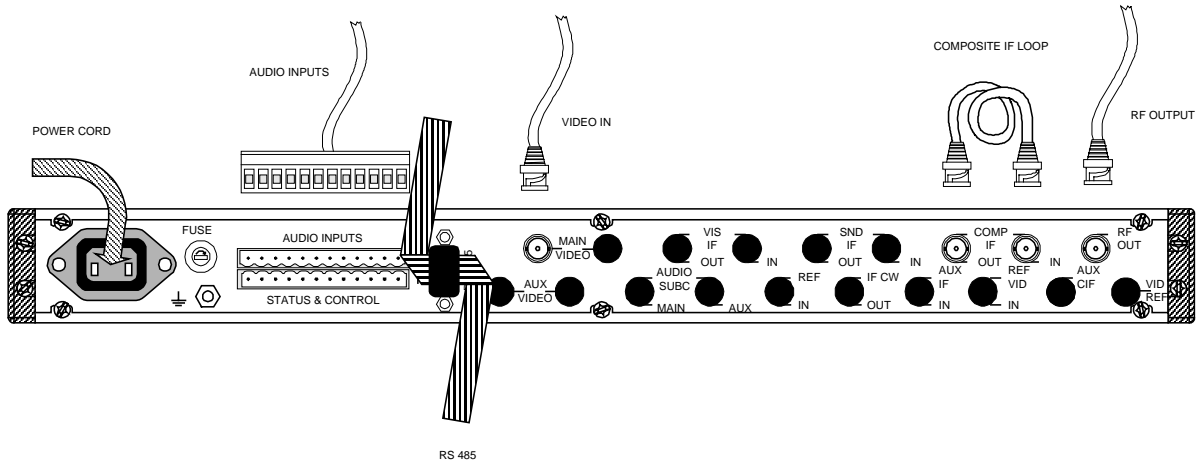
\*\* To save settings to the forced preset memory push the four arrows simultaneously.

\*\*\* From ROSA 1.5 on the alarm that activate pin 9 can be configured.



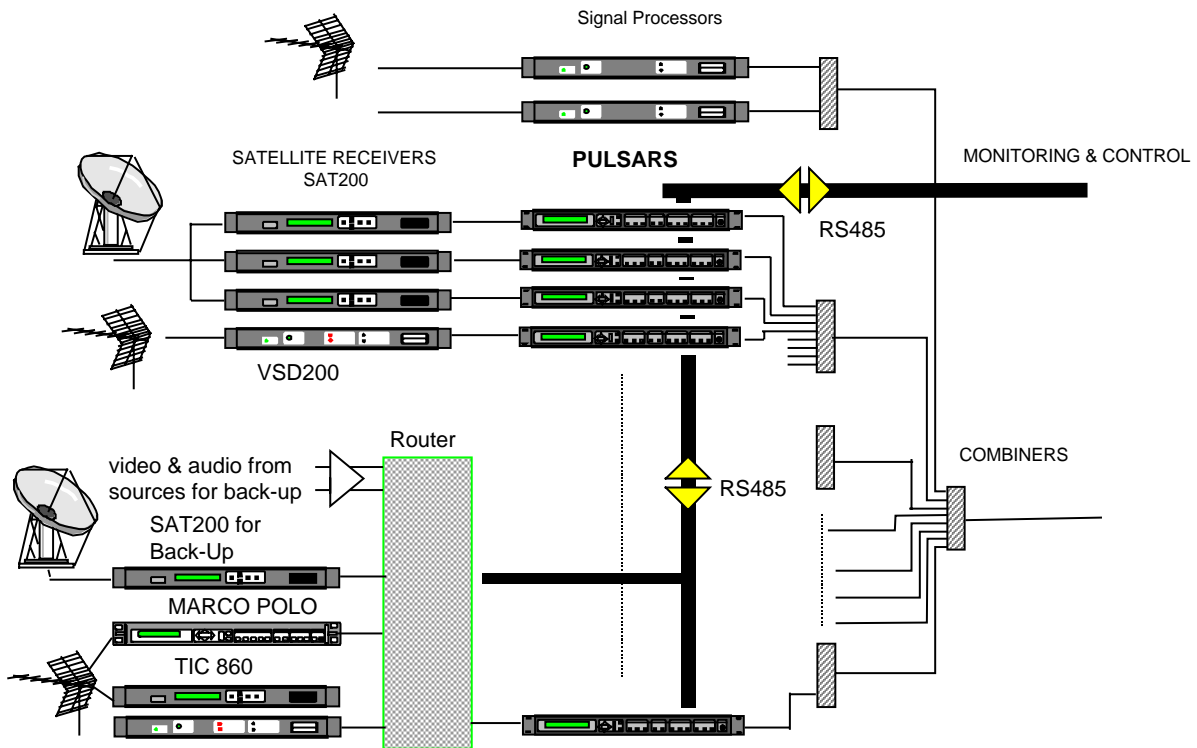
## 4.4 INSTALLING THE PULSAR

### 4.4.1 Rear Panel Of The PULSAR



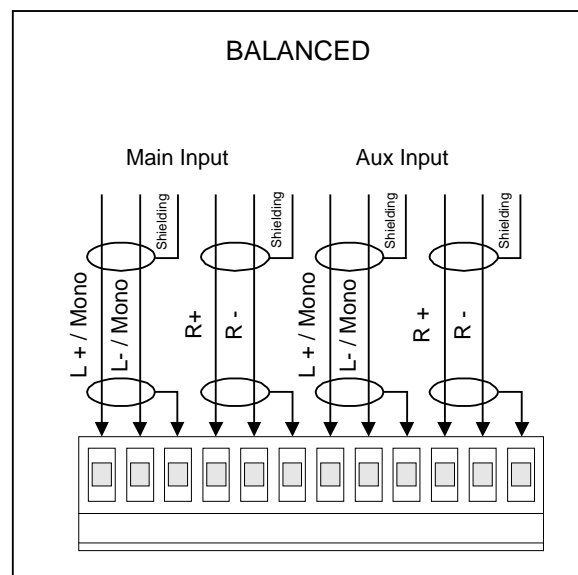
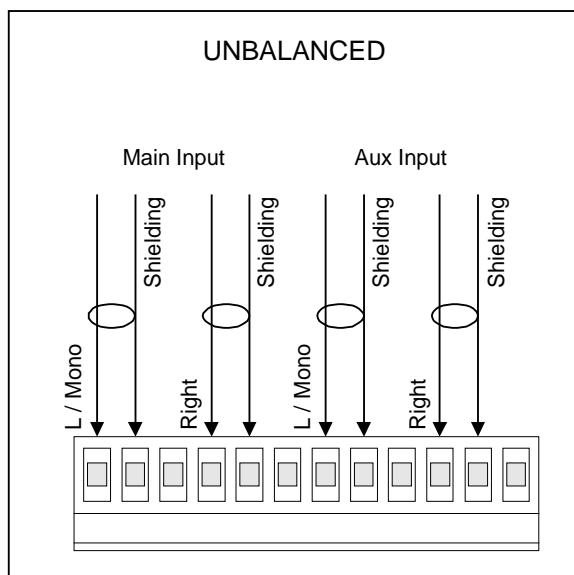
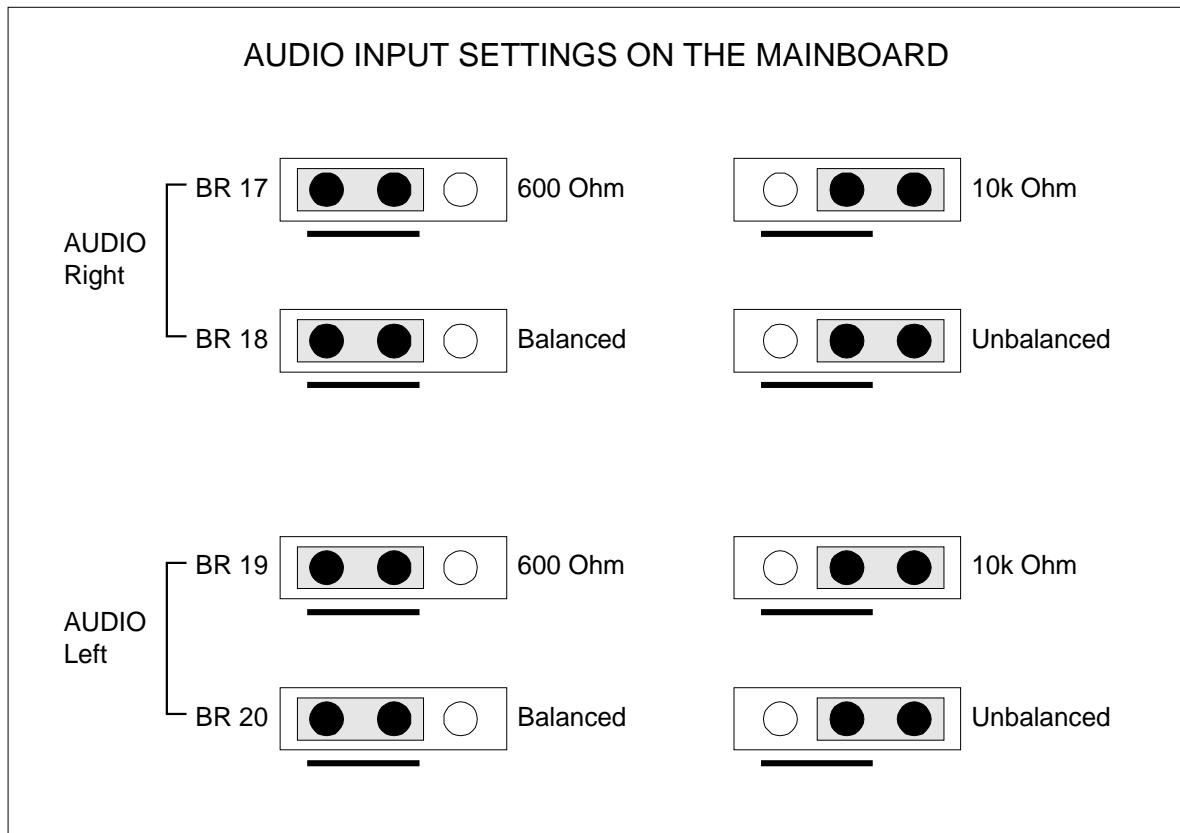
### 4.4.2 Use Of The Pulsar In The Analog HE

## Analog part HE



### 4.4.3 Audio Connections

The impedance and the balance of the input can be changed by means of jumpers on the mainboard. The factory setting is: balanced audio inputs with 600 Ohm impedance. The factory settings correspond to the “—” sign on the jumpers BR17 to BR20

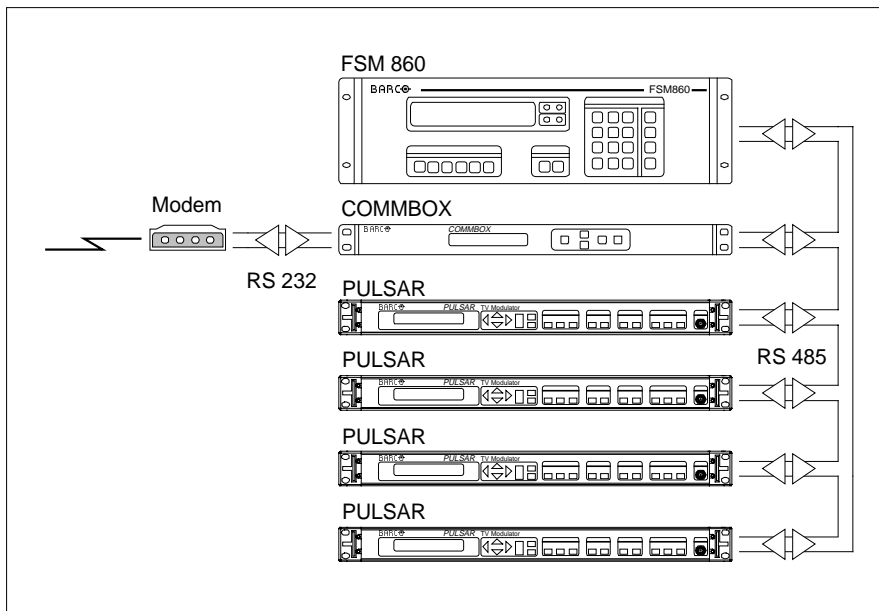


## 4.5 REMOTE CONTROL

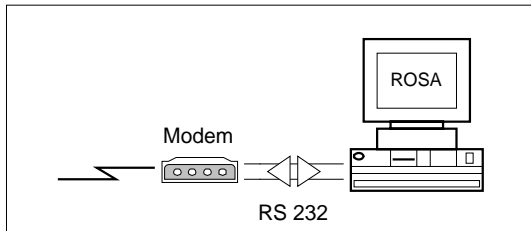
### 4.5.1 General

The RS-485 Remote Control connector is a 9-pins SubD male connector. All important modulator parameters such as RF level, modulation depth, audio deviation and all possible functional selections can be remotely controlled from a PC with BARCO'S ROSA software and/or the client-server ROSA/COPERNICUS system. This makes it possible to use the PULSAR in applications such as digital to analog nodes in super trunk systems and headends in rural or remote areas. Using the PULSAR with other remote controllable equipment, such as FSM 860, SAT 200, QUASAR, allows the operator to have complete control over the headend without the need to move around his technicians, thus saving a lot of money.

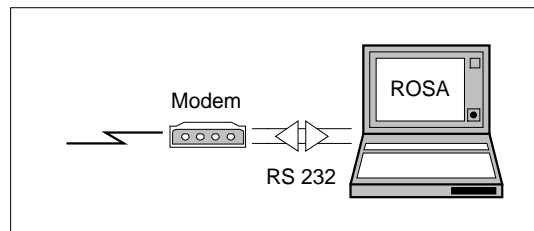
#### HEADEND



#### CONTROL CENTER



#### SERVICE ENGINEER



### 4.5.2 Communication Example And Installation For ROSA

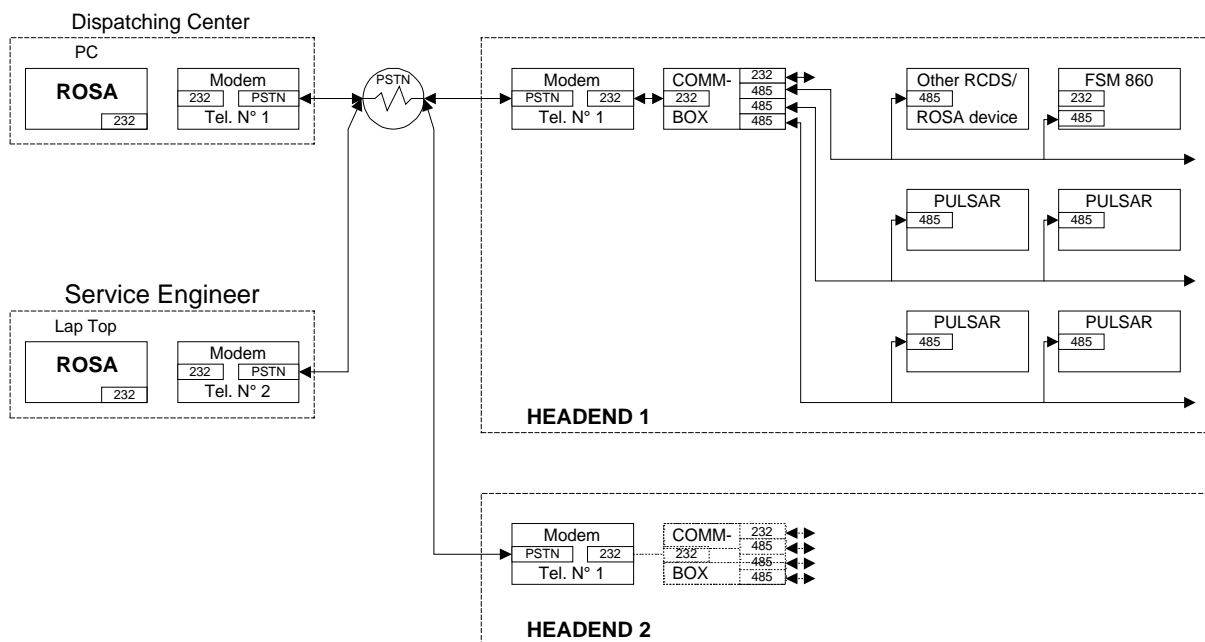
A communication example is shown in the figure below. The communication between the headend and the dispatching center in this example is established via a modem. The telephone network (PSTN) is used to communicate with the PC's.

The COMMBOX (Communication Organizer) in the headend is used to connect all the PULSAR modulators with the ROSA system. For more information about the interconnections between COMMBOX and modem, refer to the ROSA manual.

The COMMBOX has three RS-485 communication ports. Each port can be connected to maximum 32 ROSA controllable units. In total 96 units can be controlled and monitored with one COMMBOX. Use a 9 wire flat cable (daisy chain) to connect the PULSAR RS-485 port to the COMMBOX.

With the PULSAR application software, all important parameters can be controlled.

Before one can have communication, it is important to configure the communication port of each PULSAR. Once all the units are configured and connected to the COMMBOX, the "AUTO-CONFIG" function will poll and store all units that are connected. For more details, refer to the application software manual of the COMMBOX and PULSAR.



### Correct use of connectors

Make sure that all connections to the PULSAR are secure and that all cables are free of abrasions, tear and cuts. Also make sure that no strain is put on any of the cables that might cause connection problems.

The F-type connectors on the rear panel of the modulator should only accept a coaxial cable center conductor between 0.56 mm and 1.19 mm in diameter. Coaxial cable center conductor larger or smaller than these diameters should not be used. If used, it may result in damage or loss of signal at the F-type connector.

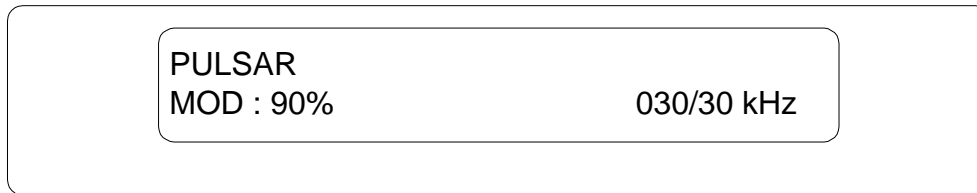
Due to the fact that the larger diameter center conductor (e.g. greater than 1.19 mm) will spread the contacts of an F-type connector further apart, once a larger diameter is inserted into a F-type connector, a smaller diameter center conductor should not be used in its place. If used, it may result in loss of signal at the F-type connector.

## 5 OPERATION

### 5.1 FRONT PANEL DESCRIPTION

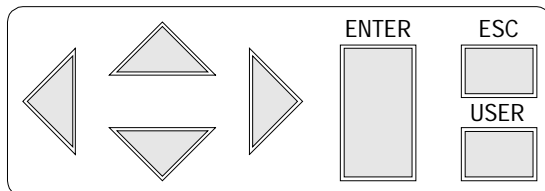
#### *Front Panel Display*

The settings of the active menu are displayed on the front panel display.



#### *Menu Push Buttons*

The menu push buttons are used to select and change settings.



**Arrows:** To scroll through the menus shown on the display.

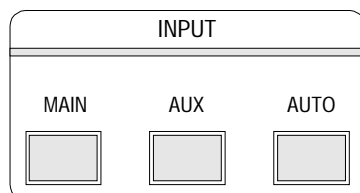
**Enter:** To confirm the setting.

**Esc:** To quit the setting without saving.

**User:** To select the setting saved in the *user settings memory*.

#### *Input Selection Buttons*

The input selection buttons are used to select the input signal of the modulator.



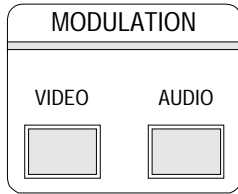
**Main:** The signal fed to the MAIN input is selected. Depending on the options installed, this signal can differ.

**Aux:** Depending on the option installed, you can select the AUX input. The options installed define also the type of signal that can be fed to the AUX input.

**Auto:** Only with the option Aud/Vid Aux input and Main scrambled/Aux unscrambled there is the possibility to switch automatically to the auxiliary input when Main video is lost.

### Modulation Selection Buttons

The modulation selection buttons are used to change the modulation parameters.

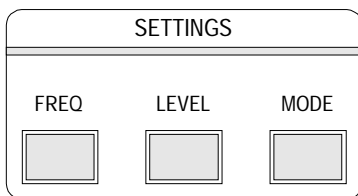


**Video:** To change the video modulation depth of the vision carrier.

**Audio:** To change the audio deviation of the sound carriers.

### Settings Selection Buttons

The settings selection buttons are used to enter some important modulator settings.



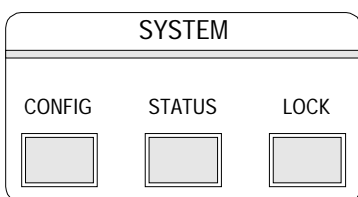
**Freq:** Channelized PULSAR: to enter the name of the modulator.  
 Agile PULSAR: to set the frequency and enter the name of the modulator

**Level:** To set all the levels of the PULSAR e.g. RF output level, S/V ratio etc.

**Mode:** To set a number of settings concerning the video and sound processing.

### System Selection Buttons

The system selection buttons are mainly used to configure the unit.



**Config:** To enter the configuration settings of the PULSAR.

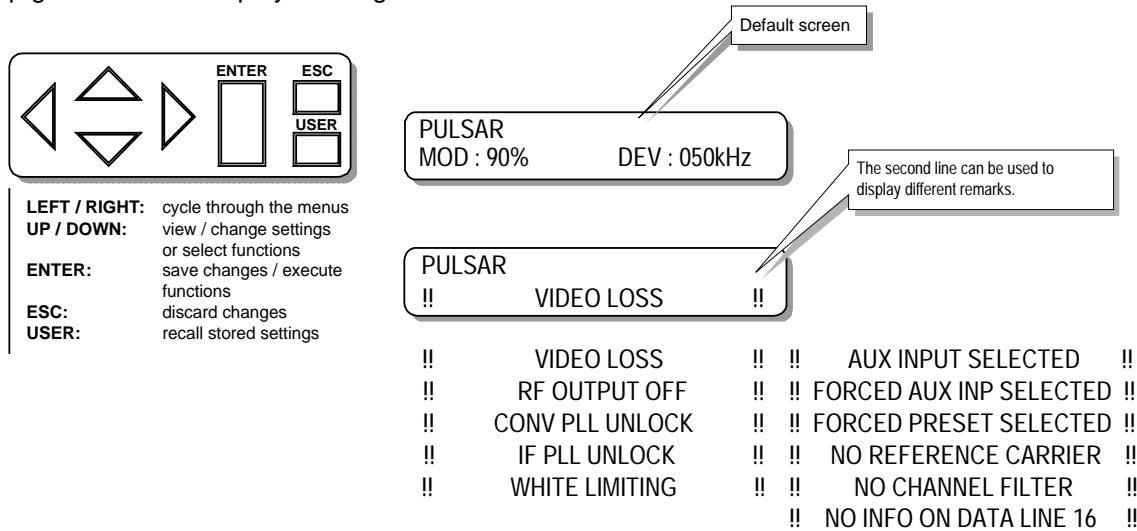
**Status:** Red blinking means that there is an alarm and/or error detected. Pushing this button will list all the alarms and/or errors. This button remains red until all alarms and errors have been canceled.

**Lock:** To set the PULSAR in the lock mode: all the menus are immediately locked. If the PULSAR is not used, it will go automatically in LOCK mode after 10 minutes to save power.

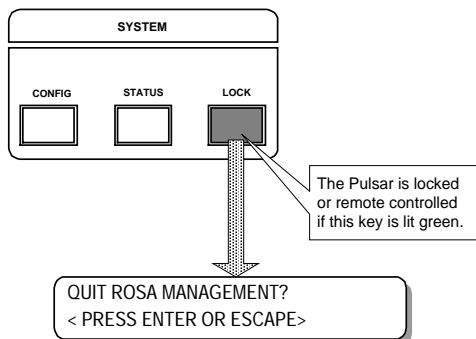


## 5.2 USING THE MENU KEYS

When starting up the unit or when the unit is in operation, the menus are locked: the LOCK button is lit up green and the display back-light is switched off.



The channel name is displayed on the first line. The name can be entered in the SETTINGS/FREQUENCY menu.



- MOD: 90%                      :                      value of the measured video modulation depth.
- DEV: 050 kHz                      :                      value of the measured audio deviation of the mono sound carrier.
- DEV: 030, 030 kHz                      :                      Value of the measured audio deviations for both sound carriers. Only for two carrier stereo devices.

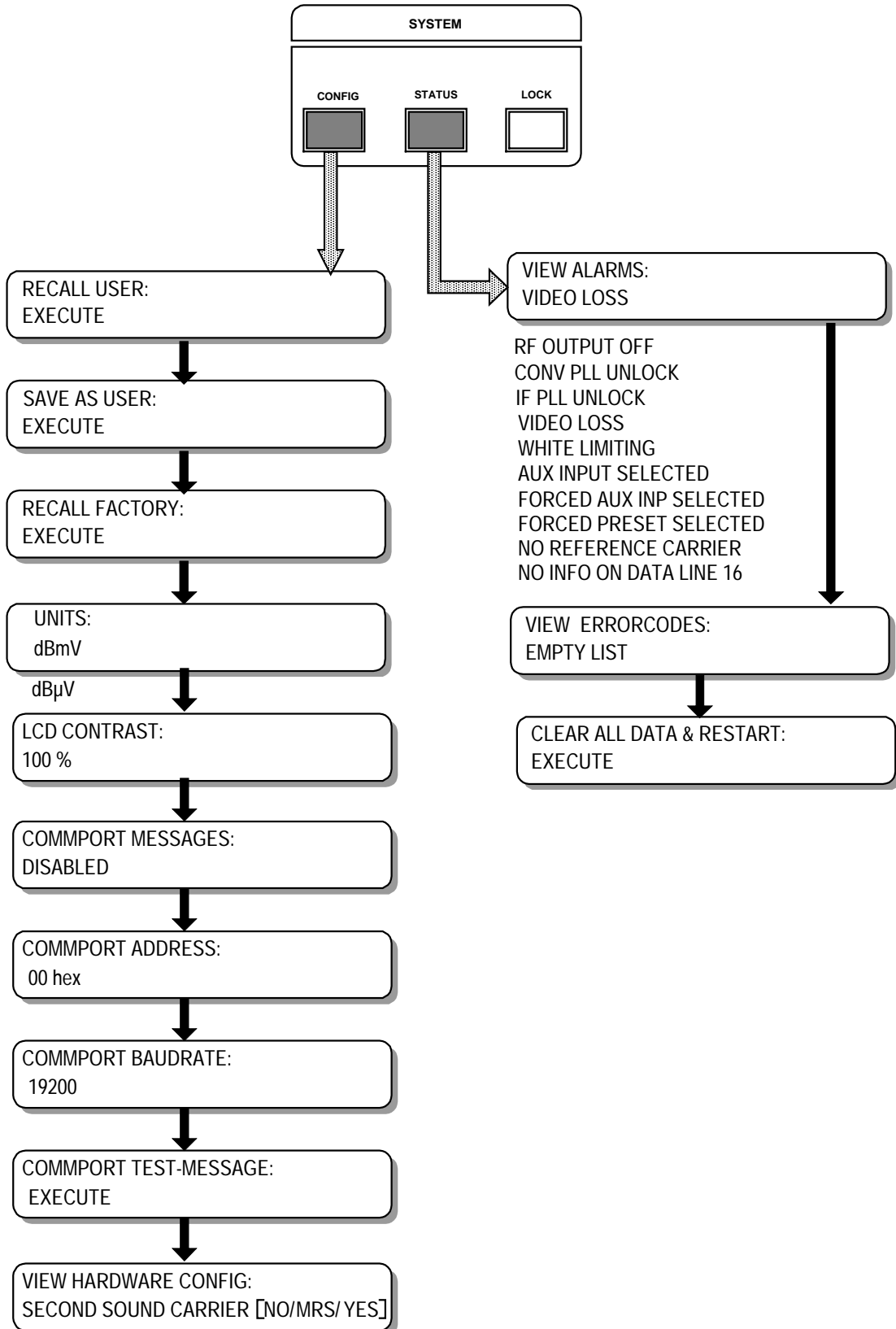
If the PULSAR is remotely controlled via the COPERNICUS ELEMENT MANAGER, no keys can be pressed except for the green-lit lock key. Pressing enter will then send a Local Control Request to the ROSA management system, but this functionality is currently not supported in the Rosa system. The device will return a message: "LOCAL CONTROL NOT ALLOWED".

If the PULSAR is not remote controlled, it will go into LOCKED mode after several minutes of keyboard inactivity. This is also to prevent changing settings when keys are pressed accidentally. Press the LOCK key to unlock the PULSAR.

TO ENTER INTO THE MENUS AND TO UNLOCK THE MODULATOR :  
**PRESS THE LOCK BUTTON**

### 5.3 SYSTEM CONFIGURATIONS

#### 5.3.1 Menu Overview



### 5.3.2 Setting Up Communication

Make following settings in the config menu to enable the PULSAR to send and receive data to and from the COPERNICUS ELEMENT MANAGER.

1. **COMMPORT MESSAGES:**    **Enabled**
2. **COMMPORT ADDRESS:**                    **Range: 01h to 7Eh**  
Each PULSAR must have an unique commport address. Do not use address 00h, because if another PULSAR is reset with "Clear all data & restart", it automatically gets address 00h too. Two devices with the same address will cause communication problems. Two different devices, e.g. a PULSAR and a SAT 200 can use the same address without any problem.
3. **COMMPORT BAUDRATE**            **Default value: 19200**  
Other baudrates: 1200, 2400, 4800, 9600. All devices connected to the same COPERNICUS port must be set to the same baudrate.
4. **COMMPORT TEST-MESSAGE**  
Send a test-message. If communication is OK, the message "TEST MESSAGES RECEIVED" will be displayed in the ROSA Message List.

### 5.3.3 Configuration

#### 5.3.3.1 Recall User

All settings saved in the user memory can be recalled at once by executing this function.

When in a menu the USER key is lit, it allows you to recall the setting saved as User for the specific menu item.

#### 5.3.3.2 Save As User

All current PULSAR settings can be stored in the user memory by executing this function. There is only one user memory available. Saving the current settings before you change settings enables you to recall them if you want to restore the PULSAR to the original settings.

#### 5.3.3.3 Recall Factory

To reset all PULSAR settings to their factory settings.

#### 5.3.3.4 Units

The RF output level can be displayed as dB $\mu$ V or dBmV.

#### 5.3.3.5 LCD Contrast

The contrast of the LCD can be controlled according to the user's needs.

## 5.3.3.6 View Hardware Configuration

This submenu displays the hardware configuration of the unit. The table below gives an overview of all possible messages.

<b>PULSAR HARDWARE CONFIGURATION</b>	
<b>SECOND SOUND CARRIER MRS/YES</b>	In case of a two carrier stereo system
<b>STANDARD BG</b>	TV standard of the Pulsar
<b>VIDEO MOD 90%</b>	Video modulation depth
<b>AUDIO DEV 30 kHz</b>	Audio deviation of the sound carrier
<b>VIS CAR FREQ 38.9 MHz</b>	Frequency of the vision carrier
<b>SND CAR1 FREQ 33.4 MHz</b>	Frequency of the first sound carrier
<b>SND CAR1 FREQ 33.158 MHz</b>	Frequency of the second sound carrier
<b>CONVERTER 5-45 MHz/NO</b>	Type of installed converter
<b>CONVERTER 45-600 MHz/NO</b>	Type of installed converter
<b>CONVERTER 600-860 MHz/NO</b>	Type of installed converter
<b>A/V AUX INPUT YES/NO</b>	Option 'A/V aux input' installed or not
<b>CompIF AUX INPUT YES/NO</b>	Option 'CompIF aux input' installed or not
<b>IF AUX INPUT YES/NO</b>	Option 'IF aux input' installed or not
<b>AUD. SUBCARR. INP YES/NO</b>	Option 'Aud. Subcarr. Input' installed or not
<b>MAIN SCR/AUX UNSCR YES/NO</b>	Option 'Main Scr/Aux Unscr' installed or not
<b>SEPARATE IF OUTPUTS YES/NO</b>	Option 'Separate IF Outputs' installed or not
<b>REF CARRIER INPUT YES/NO</b>	Option 'Ref. Carrier Input' installed or not
<b>VIS CAR REF INPUT YES/NO</b>	Option 'Vis Carrier Reference Input' installed or not
<b>DATALINE DECODER YES/NO</b>	Option dataline decoder installed or not
<b>PRESETS YES/NO</b>	Option 'Presets' installed or not
<b>AGILE VERSION YES/NO</b>	Agile Pulsar or not
<b>STATUS AND CONTROL YES/NO</b>	Option 'Status and control' installed or not
<b>SERIAL NUMBER</b>	The serial number of the Pulsar
<b>S/W RELEASE V X.XX</b>	The software version of the Pulsar
<b>H/W VERSION V.X.XX</b>	The hardware version of the Pulsar

### 5.3.4 Alarms And Errors

If the STATUS key is blinking red, there are alarms or errors that are not acknowledged yet. If you press the STATUS key, the VIEW ALARMS menu appears. If an alarm condition is over, that alarm is removed from the list.

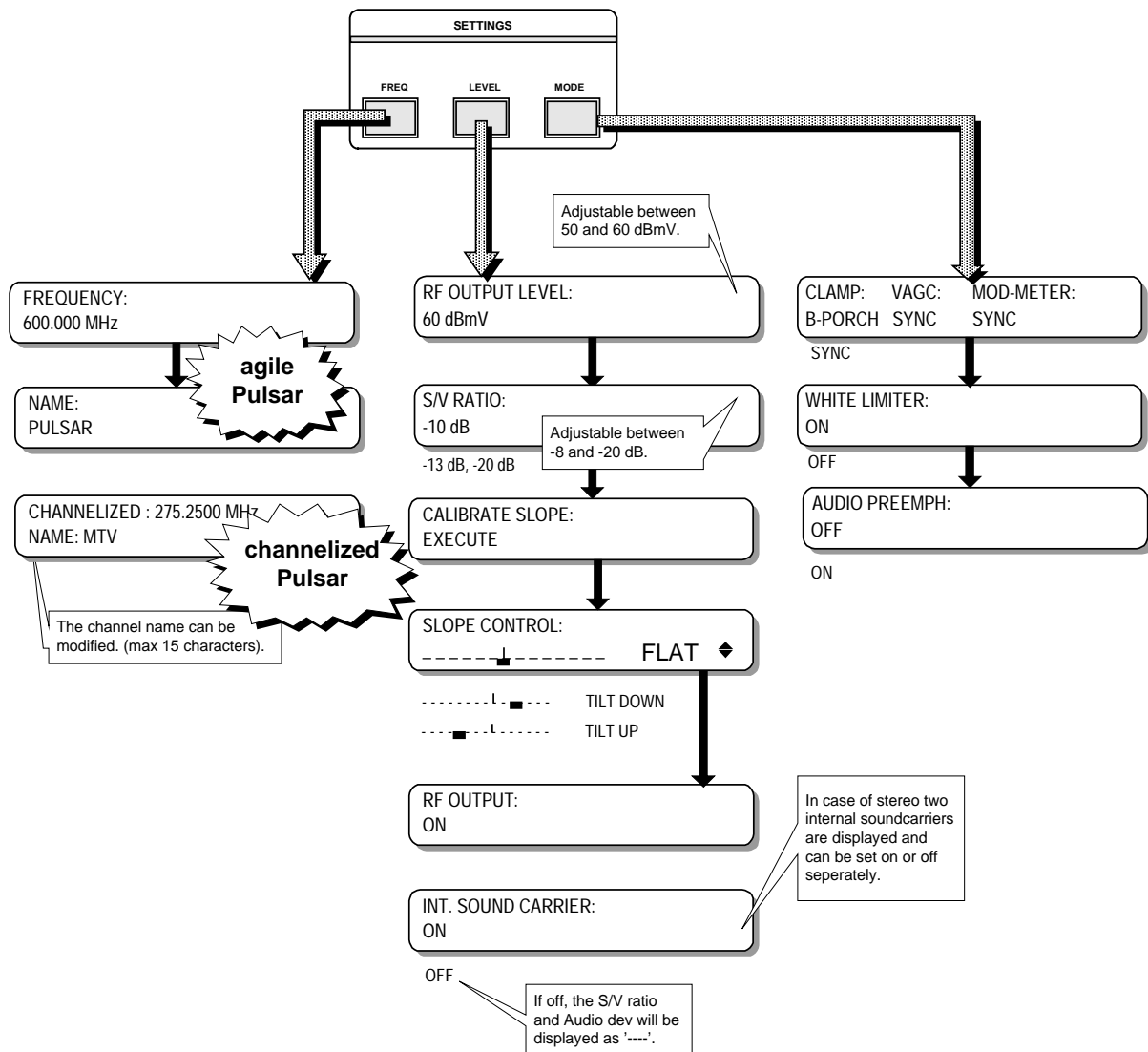
PULSAR Alarm List
RF OUTPUT OFF
CONV PLL UNLOCK
IF PLL UNLOCK
VIDEO LOSS
WHITE LIMITING
AUX INPUT SELECTED
FORCED AUX INP SELECTED
FORCED PRESET SELECTED
NO REFERENCE CARRIER
NO CHANNEL FILTER
NO INFO ON DATA LINE 16

If an error occurs, the error number is shown in the VIEW ERRORCODES menu, together with the number indicating how many times the error occurred. Errors are not automatically removed from the list.

If the error list is not empty, you can clear the errors by executing CLEAR ERRORLIST. Do not clear the error list too often. If any problem or malfunction occurs, the errors in this list can help to locate the problem.

PULSAR Error List	
<b>ERROR 1-25</b>	Software error
<b>ERROR 26</b>	RAM memory or EEPROM failure (hardware)
<b>ERROR 27-39</b>	Software error
<b>ERROR 40-62</b>	I <sup>2</sup> C failure, internal communication error, <b>causes malfunctions</b>
<b>ERROR 63-78</b>	Not used, reserved for future applications
<b>ERROR 79-85</b>	Memory error (software), <b>causes malfunctions</b>
<b>ERROR 86</b>	Calibration error (memory, no calibration), <b>causes malfunctions</b>
<b>ERROR 87</b>	Memory error (software), <b>causes malfunctions</b>
<b>ERROR 88-89</b>	Calibration error (memory, no calibration), <b>causes malfunctions</b>
<b>ERROR 90</b>	Memory error (software), <b>causes malfunctions</b>
<b>ERROR 91</b>	Calibration error (memory, no calibration), <b>causes malfunctions</b>
<b>ERROR 92</b>	Memory error (software), <b>causes malfunctions</b>
<b>ERROR 93-97</b>	Not used, reserved for future applications
<b>ERROR 98</b>	Error list full
<b>ERROR 99</b>	Unknown error

## 5.4 SETTINGS



### 5.4.1 Frequency Settings

The basic PULSAR version is the channelized PULSAR. As the output frequency is a fixed frequency, only the channel name can be changed. Press the UP or DOWN arrow to enter into the edit mode. The character that can be changed is underlined. Move to another character of the channel name with the LEFT and RIGHT arrows. Select the desired character, sign or number with the UP and DOWN arrow.

In case of an agile PULSAR, both the channel name and output frequency can be changed in the same way as described above. The frequency is adjustable in steps of 12.5 kHz. The frequency range is 45 to 600 MHz or 600 to 860 MHz depending on the PULSAR's converter type.

### 5.4.2 RF Output Level

The RF output level can be set between 50 and 60 dBmV in steps of 0.5 dB. The factory setting is 60 dBmV.

### 5.4.3 S/V Ratio

The S/V ratio can be changed between -8 and -20 dB. The factory setting is -13 dB.

In case of two sound carriers: the S1/V and S2/V ratio are displayed. The S1/V ratio can be changed between -11 and -23 dB and is default -13 dB. The level of S2/V is default -20 dB and changes proportional to the S1/V value i.e. if S1/V is reduced with 2 dB, S2/V will also automatically be reduced with 2 dB. Cable network characteristics could influence these levels and result in a wrong sound2/sound1 ratio. That's why it is also possible to adjust the S2/S1 ratio with -2dB/+3dB.

### 5.4.4 Calibration Slope

The slope of the RF output signal can be recalibrated. Recalibration is necessary in case a new filter module has been installed or whenever calibration seems to be necessary.

### 5.4.5 Slope Control

This feature is very useful to align the PULSAR in the headend after combining all modulated signals to be sent on the network. Use measurement equipment e.g. a spectrum analyser to check the slope of the PULSAR's RF output after being combined with all the other channels. It is possible that the slope of the RF spectrum is not flat anymore because of f.i. network characteristics. This can be compensated by tilting up or down the slope of the PULSAR's output.

Next to the control bar, the state of the slope is shown:

FLAT: No correction is done w.r.t. the calibrated slope

TILT UP: The slope is tilted up on the high frequency end.

TILT DOWN: The slope is tilted down on the high frequency end.

### 5.4.6 RF OUTPUT

The RF output can be switched on or off

In case of a PLL unlock error the RF output cannot be switched on.

### 5.4.7 Int. Sound Carrier

Use this submenu to switch on/off the internally generated sound carrier. In case of stereo sound the internal sound carrier 1 will be displayed. The second internal sound carrier will be shown in the next display.

### 5.4.8 Clamping-VAGC- Mod meter

These three important settings are shown on the same display because they are related to each other.

The LEFT and RIGHT arrows are used to move through the different submenus. Press the UP and DOWN arrow to enter into the edit mode of the different functions. The second line starts blinking.

- CLAMPING

The video clamper is used to hold the blanking level constant, regardless of the changes in the average picture level. Two different methods of clamping are selectable: back porch or sync tip clamping. Back porch clamping is used in most cases and is based upon the sample & hold principle. It is especially used when hum rejection is wanted. If the video signal becomes too noisy or when specific types of scrambled video signals are used, back porch clamping is no longer possible. The solution is the sync tip (peak) clamping method which is based on a simple peak detection system which is a slow system. Use sync tip clamping in case of a too noisy video signal or some specific types of scrambled video signals.

- VAGC

The video AGC can be white referred or sync referred. The selectable AGC mode depends upon the clamping mode:

CLAMPING = B-PORCH:	video AGC: OFF
	video AGC: WHITE (white referred)
	video AGC: SYNC (sync referred)

CLAMPING = SYNC:	video AGC: OFF
	video AGC: SYNC

**REMARK**

White referred video AGC can only be selected in case back porch clamping is used. The white level meter will only work if VITS lines with white level are included in the video signal. White referred video AGC is not possible without these lines.

- MOD-METER:

The modulation meter detector follows the AGC when switched to sync or white. The modulation meter can never be put on white if sync clamping is used.

### 5.4.9 White Limiter

The white limiter circuit is used to avoid overmodulation. Overmodulation could cause audio buzz in home receivers. Press the UP and DOWN arrow to toggle between on or off.

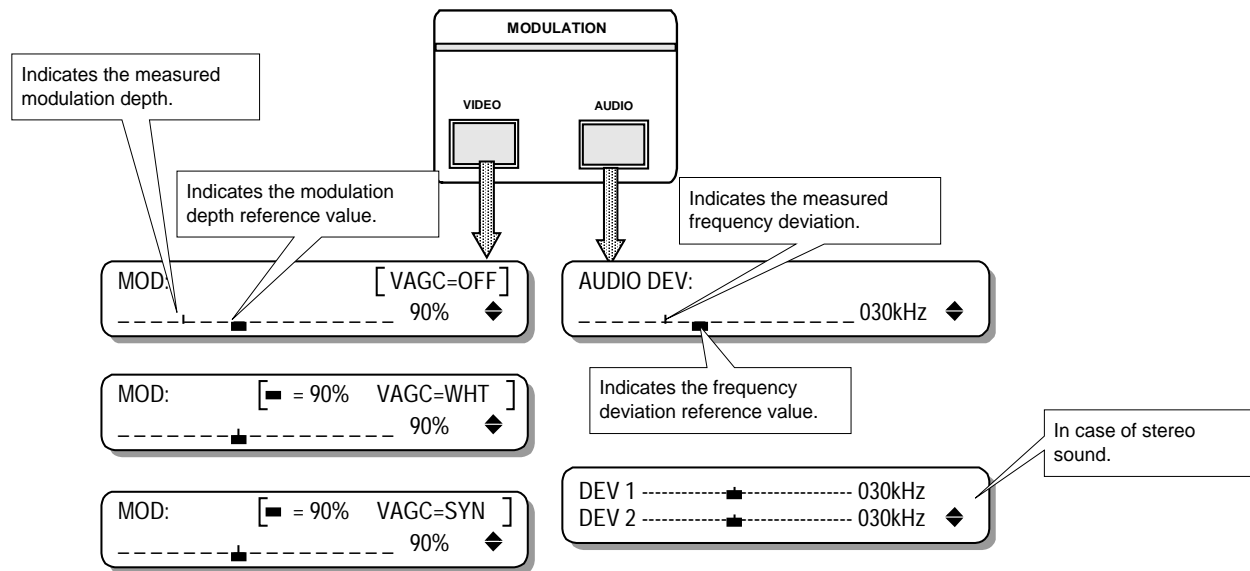
### 5.4.10 Audio Preemphasis

The audio preemphasis can be activated or disactivated using this menu.

The unit is only prepared for IRT stereo. There is no standard stereo encoder inside the modulator.



## 5.5 MODULATION



### 5.5.1 Video

The modulation depth can be adjusted in this submenu.

- In case the VAGC is off

Change the modulation depth by pressing the UP/DOWN arrows. The little black rectangle on the scale indicates a modulation depth of 90%. The modulation depth is constantly measured while the result is displayed on the right part of the screen. The vertical line on the scale is an indication for this measured value. While pressing the arrows, the black rectangle disappears and the scale is now an indication for the total available control range.

The white limiter is active if the letter 'W' is in front of the modulation depth value.

- In case the VAGC is on

Change the modulation depth by pressing the UP/DOWN arrows. The video AGC will control the gain to the desired modulation depth. The first line of the display shows the desired modulation depth while the measured value is shown on the right part of the display and also indicated by the vertical line on the scale. After AGC autoranging, the vertical line should be on top of the black rectangle.

### 5.5.2 Audio

The frequency deviation is indicated on this display. The deviation can be changed with the UP and DOWN arrow. The black rectangle is an indication of the reference value of 50 kHz. The vertical line on the scale is an indication of the measured value, which is also shown on the display. While pushing the arrows, the black rectangle disappears, the horizontal line is now an indication of the total control range.

## 5.6 INPUT

The basic version of the PULSAR only has a main video input. When unlocking the PULSAR, the MAIN button lights up and the default screen is displayed. When pushing the AUX or AUTO button you will get the following messages:

! OPTION NOT !  
! INSTALLED !

Input selection is only possible when one of the following options has been installed:

AUDIO / VIDEO AUX INPUT  
COMBINED SOUND & VISION IF AUXILIARY INPUT  
MAIN SCRAMBLED / AUX UNSCRAMBLED SUBSTITUTION

For more details about these input selections, see Options.

## 6 INSTALLATION FILTER MODULE

### INSTALLATION OF A CHANNEL FILTER OR AN AGILE FILTER INTO THE PULSAR

#### 6.1 INSTALLATION

See the layout diagram for the correct locations of the boards, connectors and screws

##### 6.1.1 Opening The PULSAR:

- Unplug the power cord to switch off the PULSAR.
- Unscrew the nine screws (Torx 10) holding the top cover.
- Pull the top cover backwards and remove it.
- Loosen the nine screws (Torx 10) holding the bottom cover.
- Remove the bottom cover.

##### 6.1.2 Opening The Converter:

- Straighten the tabs of the tab/slot-fixing. Try to do this precisely.
- Remove the cover of the RF amplifier of the converter. If a filter is already installed, follow the instructions. Otherwise, go to the procedure *Installing the filter module*.
- Unscrew the filter board.
- Pull out the installed filter module.
- In case of a VHF filter : also remove the two coaxial cables.

##### 6.1.3 Installing The Filter Module

- In case of a VHF filter: put the coax cables into the connectors of the new filter module.
- Place the new filter module on the converter board. Be careful with the red connector on both boards.
- Fix the filter module with the two screws.
- Fix the cover of the RF-amplifier by twisting back all the tabs to ensure good RF-shielding. Be careful not to break the tabs.

##### 6.1.4 Updating The Software Version



Persons working with the PULSAR should be grounded with a resistor isolated wrist strap before touching the electronic components and before removing any assembly from the unit.

- In case of the installation of an agile filter, the included eeprom **U7** must be plugged in. Check the layout diagram for the correct location.

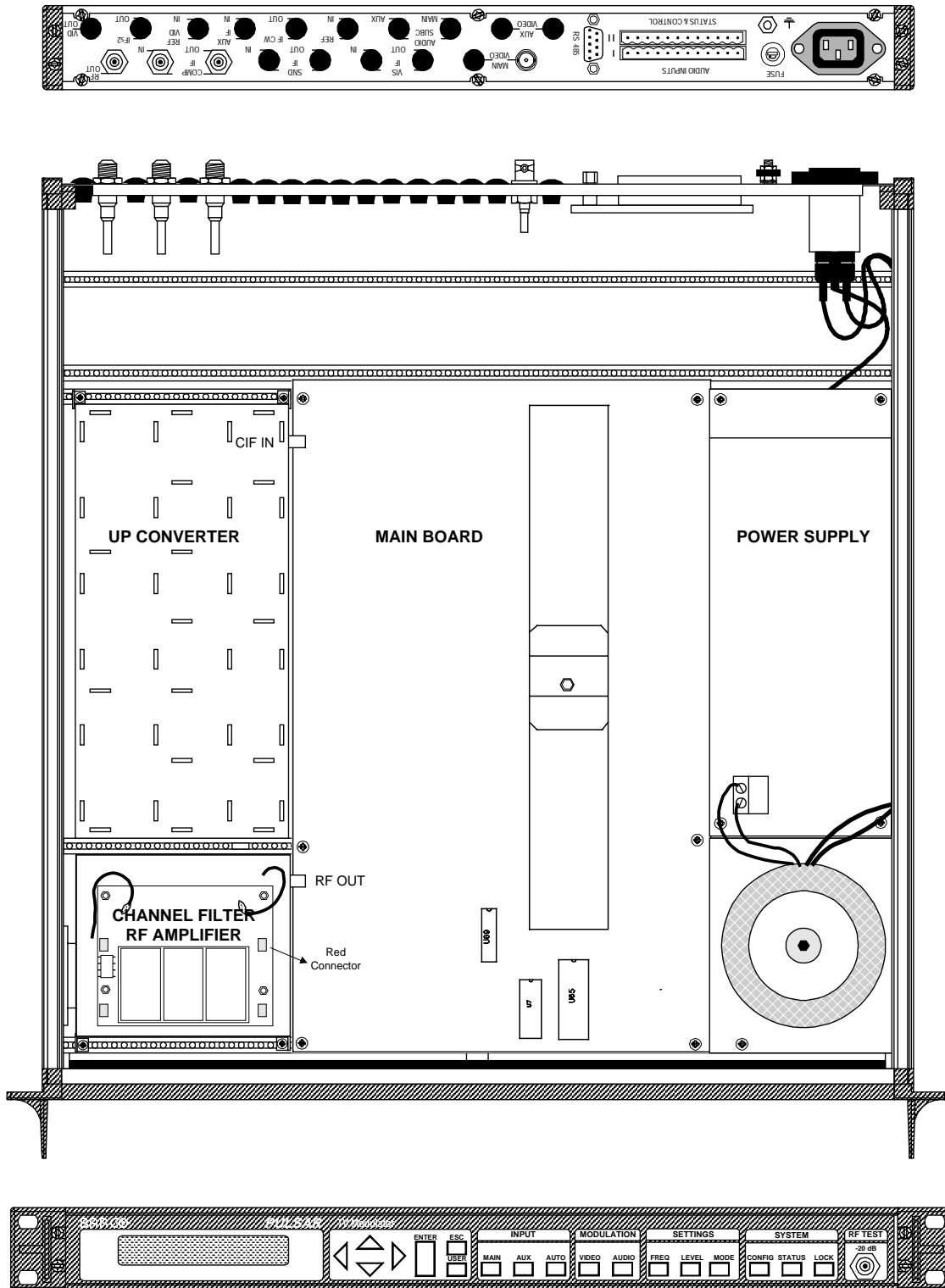


### **6.1.5 Closing The PULSAR**

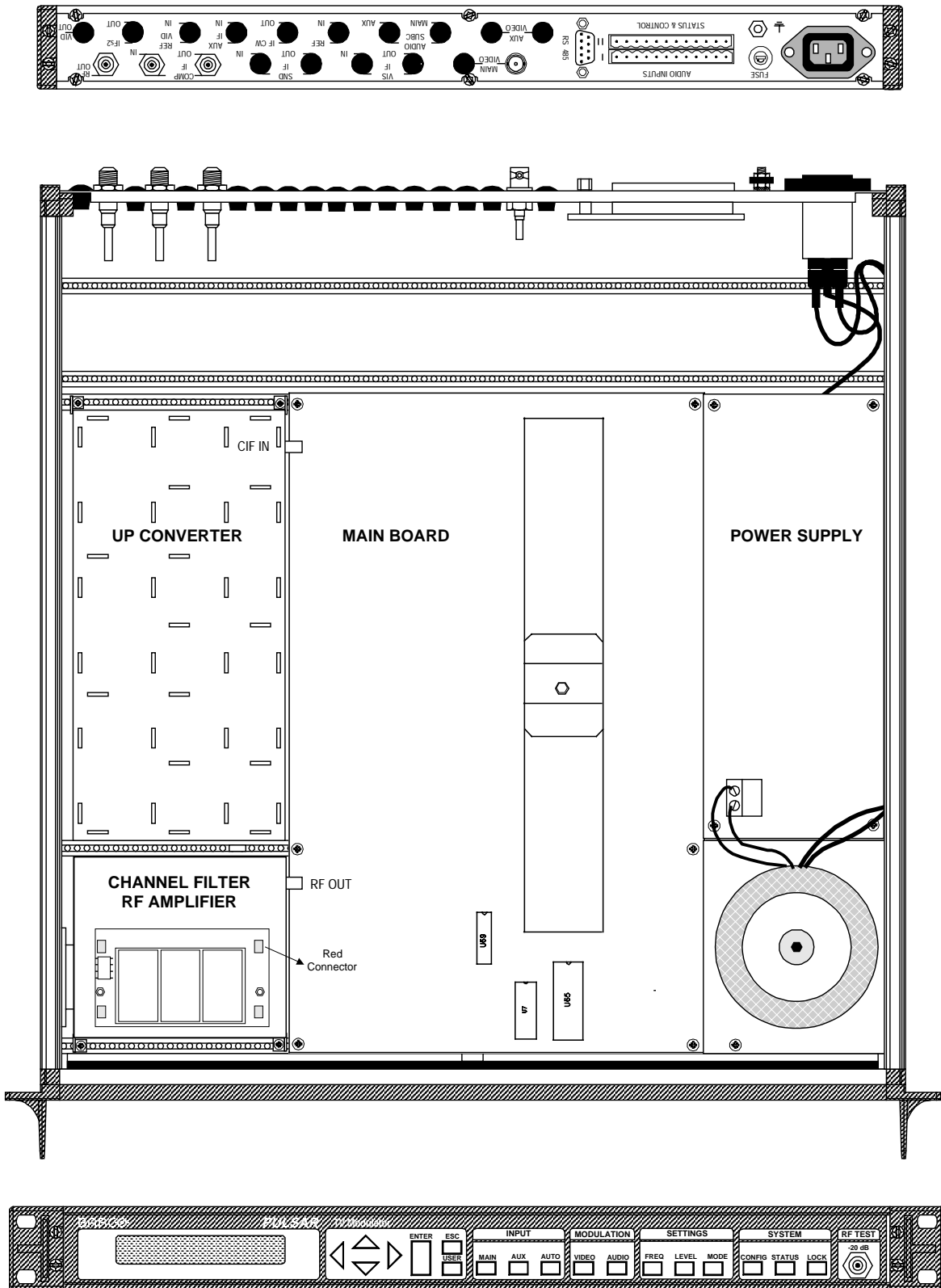
- Put the bottom cover back onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the bottom cover down.
- Turn the PULSAR upright.
- Put the top cover onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the top cover down.

## 6.2 LAYOUT

### 6.2.1 Installation Of A VHF Or An Agile Filter Module

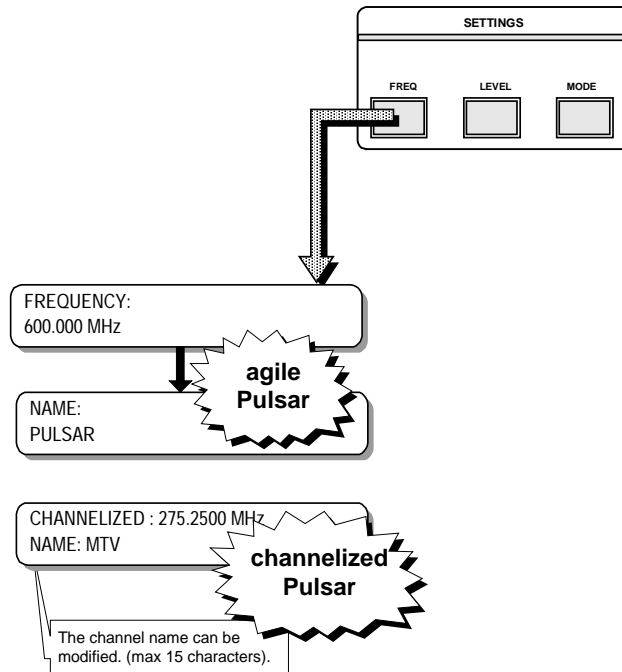


### 6.2.2 Installation Of An UHF Filter Module



### 6.3 SETTINGS

As soon as the PULSAR has been powered up, the new frequency programmed in the eeprom of the filter module will be read. In the menu **FREQ**, the new frequency and name will be displayed for a channelized PULSAR. In case of an agile filter: the name and the frequency of the devices are displayed in separated items. The frequency can be changed in steps of 12.5 kHz by using the **UP** and **DOWN** arrow. With the **LEFT** and **RIGHT** arrow you can move through the different digits.





## 7 OPTIONS

1. AUDIO/VIDEO AUX INPUT (P001)
2. IRT STEREO CODER (P010)
3. MAIN SCRAMBLED/AUX UNSCRAMBLED SUBSTITUTION (P002)
4. NICAM INTERCARRIER INPUT(P005)
5. COMBINED SOUND & VISION IF AUXILIARY INPUT (CIF) (P009)
6. VIDEO LOOP THROUGH (P003)
7. IF VISION/IF SOUND LOOPS (P011)
8. REFERENCE CARRIER INPUT (P007)
9. SEPARATE IF OUTPUTS (P012)
10. VISION CARRIER REFERENCE INPUT(P008)
11. DATALINE DECODER (P018)
12. REFERENCE CARRIER OUTPUT (P021)
13. VISION CARRIER REFERENCE OUTPUT (P020)
14. DUAL CIF OUTPUTS (P023)



**OPTION: AUDIO/VIDEO AUX INPUT**

ORDER NUMBER: C9825506

## 1 DESCRIPTION

The Audio / Video Auxiliary Input for automatic fall-back switching enables the switching between main and auxiliary baseband input signals. With the front panel on "AUTO" the circuit will check the presence of sync pulses in the main video signal. If these are not available the unit will switch -after a short selectable delay- to the auxiliary standby signal. This feature is remotely controllable by means of a hard contact on the rear panel (see 3.3.2.2 Status and Control) or by the RS-485 connector and the ROSA software.

## 2 SPECIFICATIONS

- Video and audio specifications.....	unchanged
- Inputs Main .....	BNC, 75 Ohm
Aux .....	BNC, 75 Ohm, loop through
- Isolation between main and aux .....	Video: > 60 dB
.....	Audio: > 60 dB
- Isolation between audio and video .....	> 60 dB
- Video detector on main input .....	threshold level: 0.55 Vpp

## 3 INSTALLATION

***Please read this chapter carefully before installing the option.***

**REMARK**

The installation procedure is only necessary when ordering this option separately. When ordering a PULSAR with Audio/Video Auxiliary Input, the installation of the board is carried out during production.

For location of the boards, connectors and jumpers use the different layouts in chapter 4: layouts.

**WARNING**

Before changing anything in the PULSAR remove the power cord to switch off the power supply.

### 3.1 Opening The PULSAR

- Remove the power cord to switch off the power supply.
- Unscrew the nine screws (Torx 10) holding the top cover.
- Pull the top cover backwards and remove it.
- Loosen the nine screws (Torx 10) holding the bottom cover.
- Remove the bottom cover.

### 3.2 Installing The Audio/Video Aux Input Board:

- Bridges to be set on the Mainboard:

Bridge	Function	Position*
BR15	<b>Enables</b> / Disables the Audio/Video Auxiliary Input board	<b>non-default</b>
BR16	<i>Only when a Stereo Coder board is installed</i> <b>Enables</b> / Disables the Audio/Video Auxiliary Input board	<b>non-default</b>
BR27	<b>Activates</b> / De-activates Audio/Video Auxiliary Input option	<b>remove</b>

\* The default position is the marked position.

- Bridges to be set on the Audio/Video Auxiliary Input board:

Bridge	Function	Position*
BR1	Audio Right <b>balanced</b> / unbalanced	<b>down</b> / up
BR2	Audio Right <b>600 Ohm</b> / 10k Ohm	<b>down</b> / up
BR3	Audio Left <b>balanced</b> / unbalanced	<b>down</b> / up
BR4	Audio Left <b>600 Ohm</b> / 10k Ohm	<b>down</b> / up
BR5	Auxiliary Video input <b>High impedance</b> / 75 Ohm	<b>down</b> / up**

\* Down and up as seen from the front, see also *Input Selection* in chapter 4 : Layout.

\*\*If one uses or wants to use the loop through possibility in the future the bridge has to be put in the up-position. If the loop through possibility is NOT used the loop through output should be terminated with a 75 Ohm terminator.

*Remark:* In a mono PULSAR bridge BR3 and BR4 have no application.

- Place the board on the mainboard in the right position. Be carefully with the red connectors on both boards. While pressing the board onto the mainboard, prevent bending the mainboard. Support the mainboard if necessary.

#### WARNING

When making the connections, be thoughtful of the position of the wires.

- Fix the board on the mainboard with the split pin.
- Cable connections to be made:

Cable	From	To
Audio Input Cable	<b>J3</b> on the optional board	<b>J1</b> on the I/O board
Aux Video Input Cable	<b>Left*</b> Aux Video Connector	<b>J58</b> on the mainboard
Aux Video Loop Through Cable	<b>Right*</b> Aux Video Connector	<b>J59</b> on the mainboard
Main Video Input Cable	Main Video Connector	<b>J54</b> on the mainboard

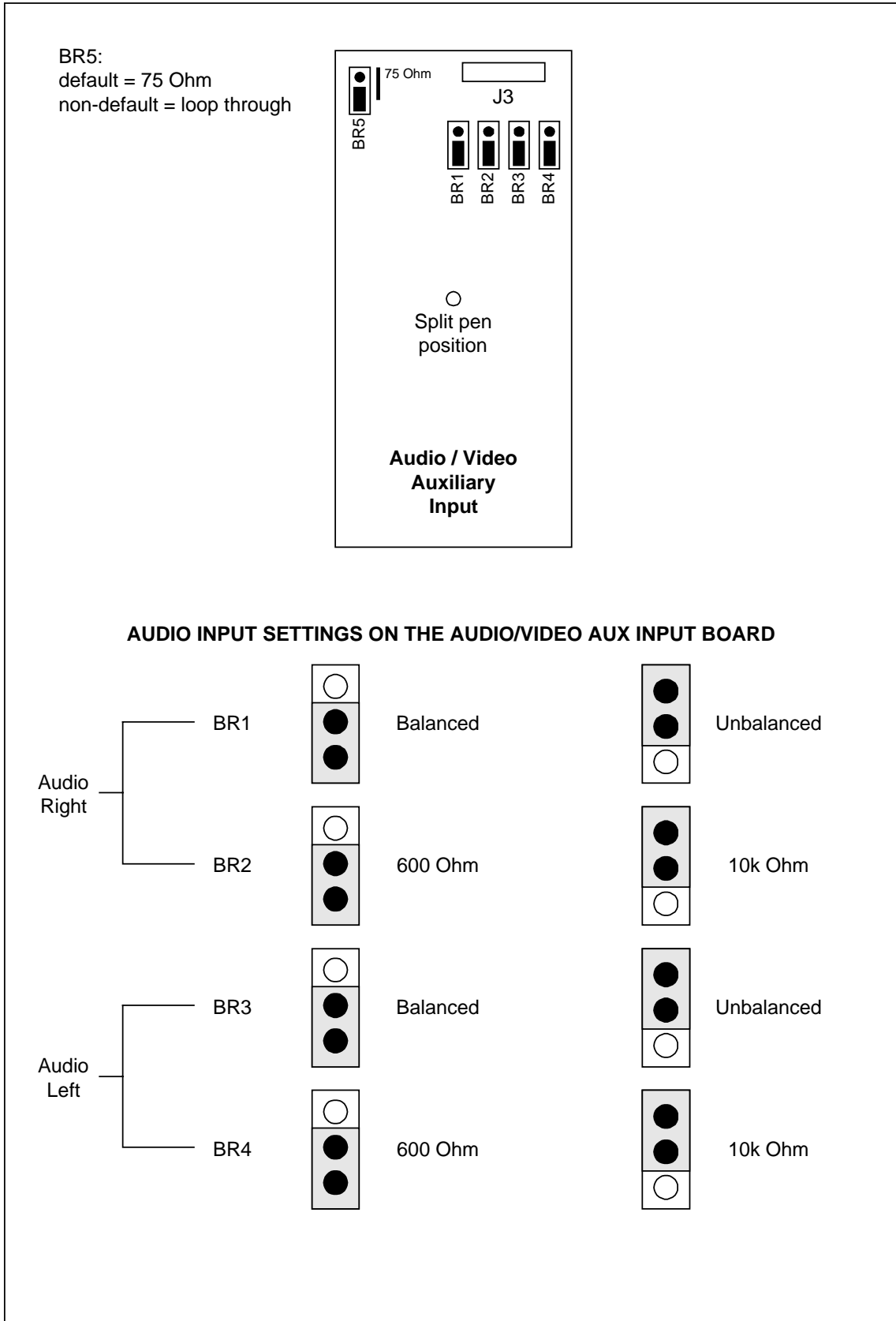
\* Left and right as seen from the front.

### 3.3 Closing The PULSAR

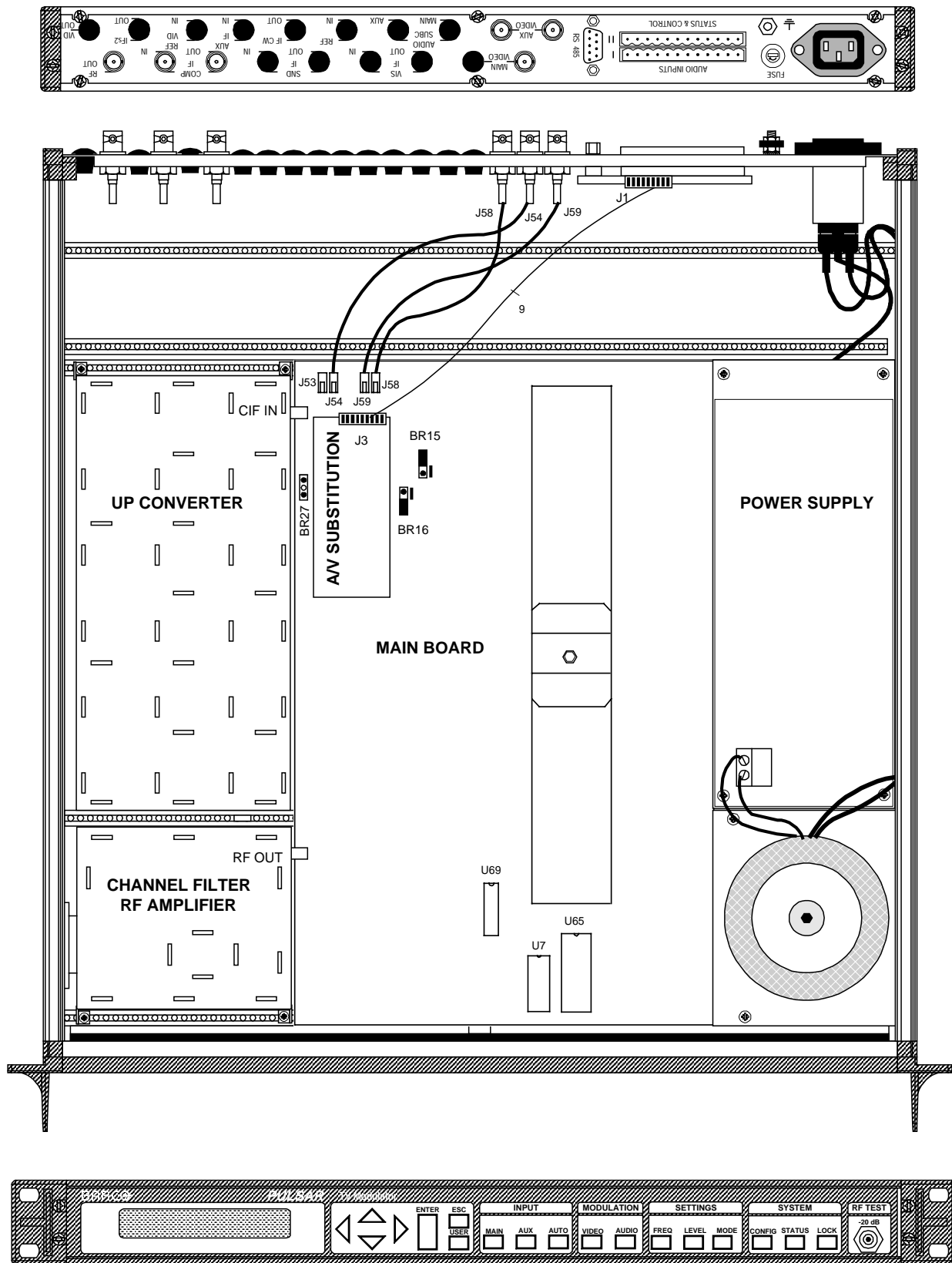
- Put the bottom cover back onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the bottom cover down.
- Turn the PULSAR upright.
- Put the top cover onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the top cover down.
- Replug the power cord.

# 4 LAYOUT

## 4.1 Input Selections



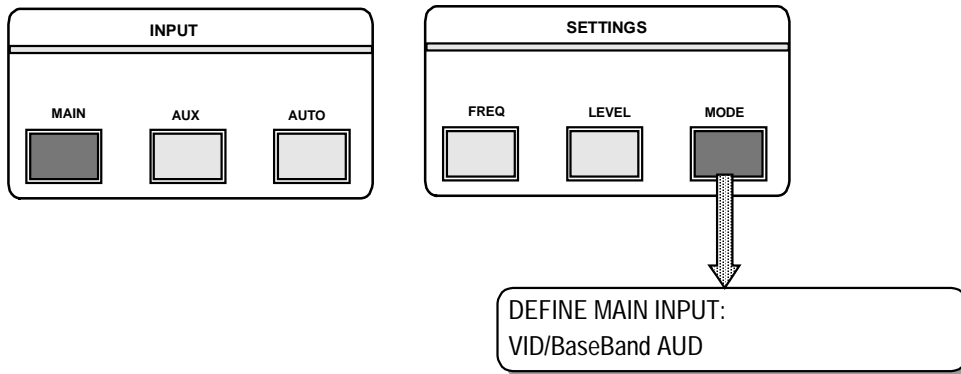
### 4.2 Internal Layout



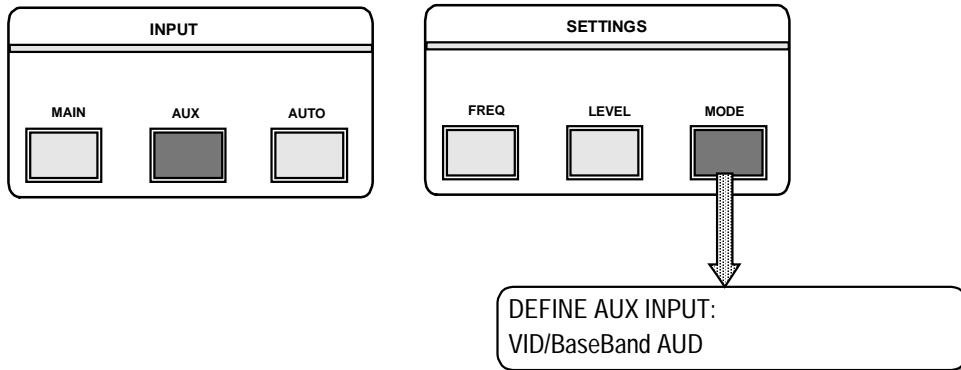


## 5 SETTINGS

- Connect video and audio signals to the MAIN and AUX inputs. The aux video input is standard loop through. If necessary use the 75 Ohm termination delivered with the accessory set.
- Select the MAIN input.
- Select MODE
- Scroll into the MODE settings with the LEFT or RIGHT arrow for the DEFINE MAIN INPUT command.
- Select the VID/Baseband AUD mode with the UP or DOWN arrow. Confirm by pressing ENTER.



- Select the AUX input.
- Select the VID/Baseband AUD mode with the UP or DOWN arrows. Confirm by pressing ENTER.

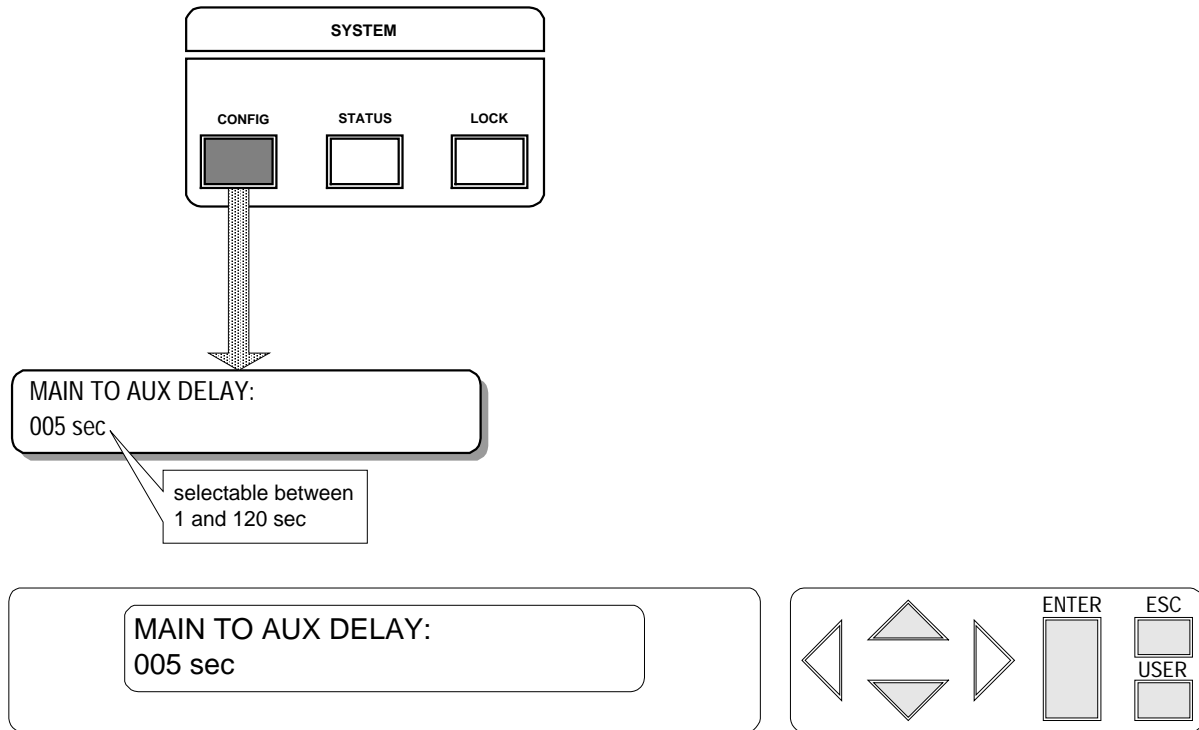


### REMARK

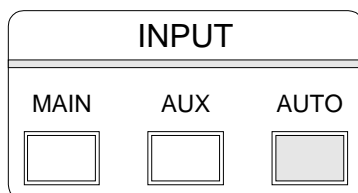
All video, audio and mode parameters for the aux input have to be selected because you can define all these parameters separately from the main input. For the description of these settings, refer to the user's manual.



- Select CONFIG
- Scroll in the CONFIG menu with the LEFT or RIGHT arrow for the MAIN TO AUX DELAY.
- Change the value to the desired main to auxiliary input delay by the UP or DOWN arrow.
- The selectable delay time is 1 to 120 seconds.
- Confirm by pressing ENTER.



- Select the AUTO input, the automatic fall-back switching is selected now.
- The message ! AUX INPUT SELECTED ! appears on the display when the aux input is selected.



**WARNING**

In combination with the options Audio Subcarrier Input or Composite IF auxiliary input more inputs are selectable. For more information refer to the descriptions about those options.



**OPTION: STEREO CODER (IRT)**

ORDER NUMBER: C9825509

## 1 DESCRIPTION

A Mono PULSAR can be converted into analogue two carrier stereo modulator only by plugging in the IRT Stereo Coder board on the mainboard.

The second sound carrier will be automatically activated and the appropriate menus will be added or changed. The customer needs to do a minimum of settings.

## 2 INSTALLATION

*Please read this chapter carefully before installing the option.*

**REMARK**

The installation procedure is only necessary when ordering this option separately. When ordering a PULSAR with the Stereo Coder option, the installation is already carried out during production.

For location of the boards, connectors and jumpers use the internal layout diagram.

**WARNING**

Before changing anything in the PULSAR remove the power cord to switch off the power supply.

### 2.1 Opening The PULSAR

- Unplug the power cord to turn off the PULSAR.
- Unscrew the nine screws (Torx 10) holding the top cover.
- Pull the top cover backwards and remove it.
- Loosen the nine screws (Torx 10) holding the bottom cover.
- Remove the bottom cover.

### 2.2 Installing The Stereo Coder Board

- Bridges to be set on the Mainboard:

Bridge	Function	Position*
BR13	<b>Enables</b> / Disables the Stereo Coder board	<b>non-default</b>
BR14	<b>Enables</b> / Disables the Stereo Coder board	<b>non-default</b>

\*The default position is the marked position.

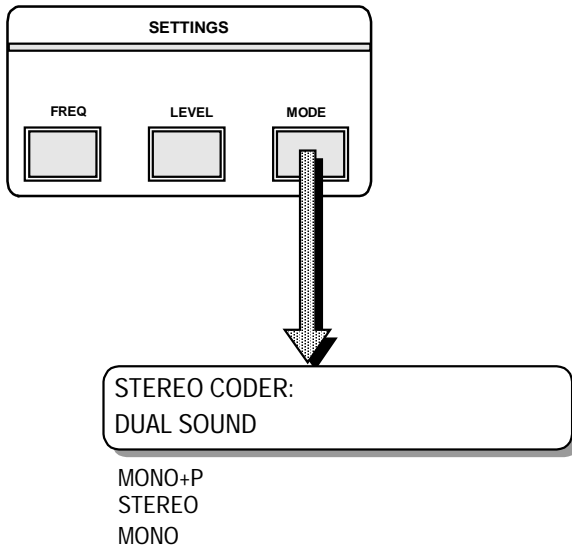
- Place the stereo coder board on the mainboard. For the correct direction, look for the position of the red connectors.
- Fix the board with the split pin.

## **2.3 Closing The PULSAR**

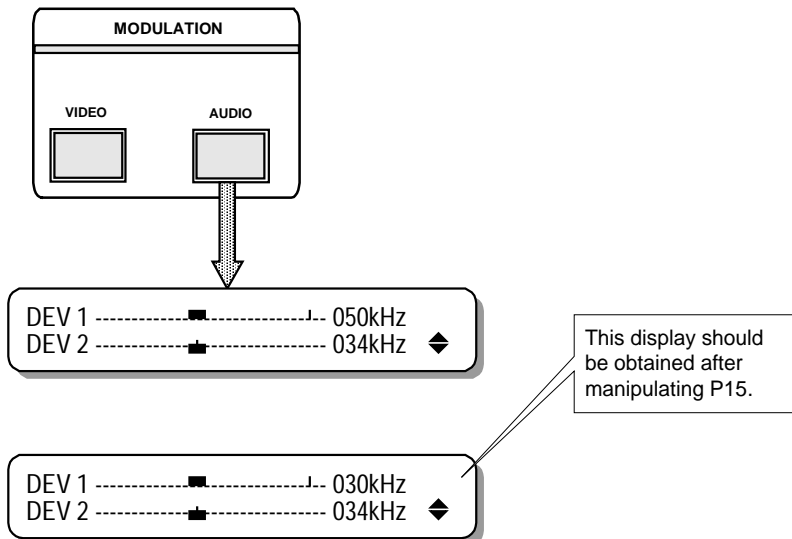
- Put the bottom cover back onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the bottom cover down.
- Turn the PULSAR upright.
- Put the top cover onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the top cover down.
- Replug the power cord.

### 3 ALIGNMENT

- Select FACTORY RECALL in the CONFIG menu, press the DOWN arrow and ENTER.
- P15 (on the mainboard) has been aligned for Mono, thus needs to be realigned.
- For the alignment:
  - Connect any kind of video (1 Vpp) to the input.
  - In the menu MODE, scroll to the item STEREO CODER and select DUAL SOUND.

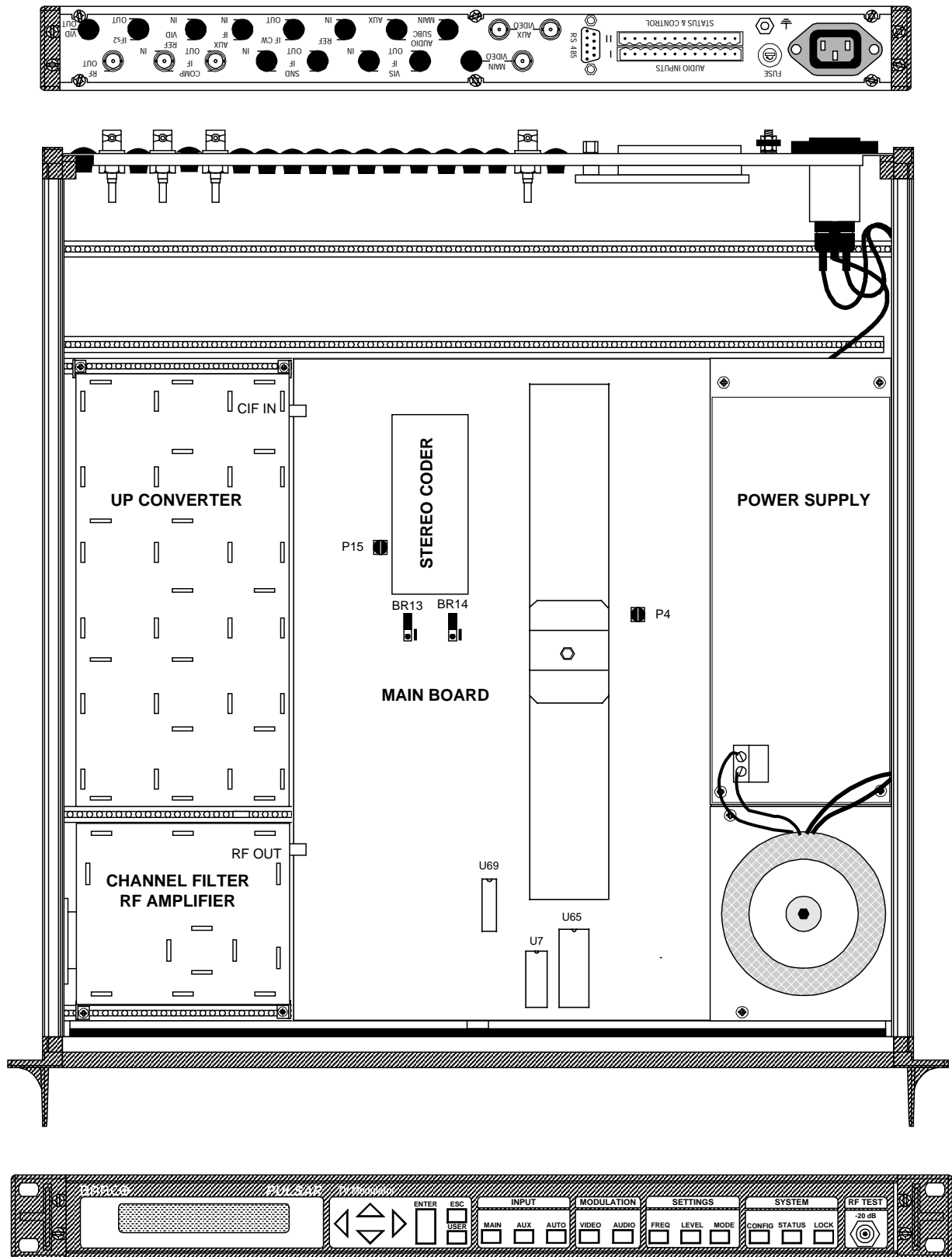


- In the AUDIO menu two bars are visible now.
- After manipulating P15 one must obtain following display (DEV 1 -----030 kHz):



Normally you should expect 30 kHz for the deviation of the second sound carrier but you find 34 kHz deviation because the deviation of the pilot is included. The value of the stereo crosstalk is conform to the specifications but can be optimized. By use of a measurement grade stereo demodulator one can measure crosstalk. Manipulation of P4 (on the mainboard) optimizes the stereo crosstalk. Be aware of the high sensitivity of P4. Therefore, we suggest that only authorized technicians do this setting. If no video is connected, the PULSAR will switch back to MONO configuration on both audio channels, indicating the following warning:!! PILOT FAIL, CHECK VIDEO !!

# 4 LAYOUT

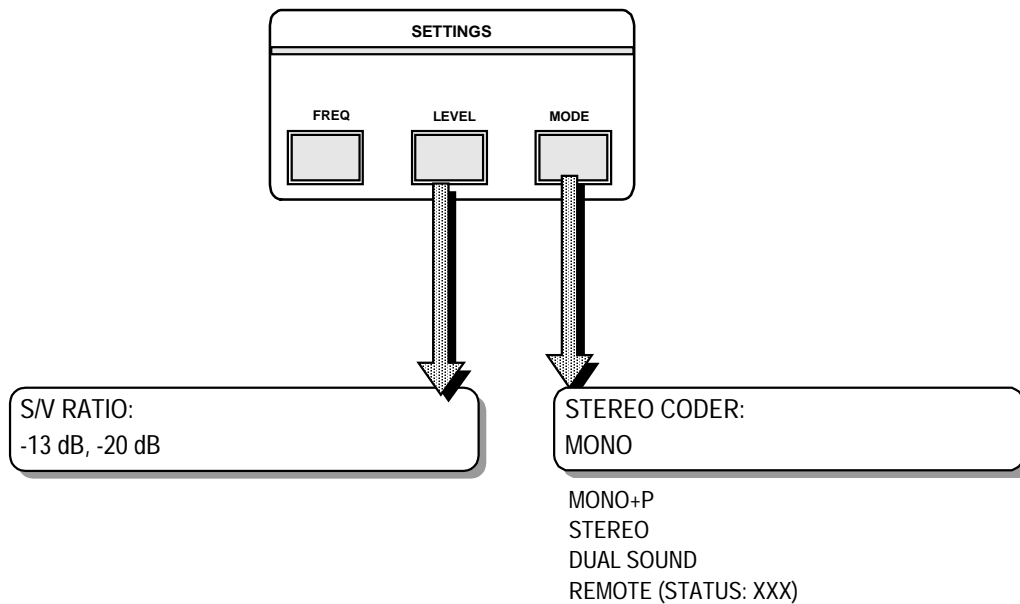


# 5 SETTINGS

Automatically some menus will be adapted:

- In the menu AUDIO, there are now two bars indicating the deviation for each sound carrier. Refer to the chapter 3: Alignment for more details.
- In the menu LEVEL, scroll to S/V RATIO where you can see the following display:
- In the menu MODE an extra item is displayed: STEREO CODER, in which different selections become possible:
  - MONO
  - MONO + P(ilot)
  - STEREO
  - DUAL SOUND
  - REMOTE [STATE : xxxxxx]
  - DATALINE [STATE: xxxxxx]

xxxxxx can be one of the different modes: Mono, Mono + P, Stereo, Dual Sound.



Remote refers to contacts on the Status & Control connector. The configuration is as follows:

Pin	Description
2	B input MAIN sound coder control
3	A input MAIN sound coder control
4	B input AUX sound coder control
5	A input AUX sound coder control

REMARK :

Pin 4 and pin 5 are only available when the option Audio/Video Auxiliary Input is installed in the PULSAR.

Sound coder control table:

	Mono	Mono + P	Stereo	Dual Sound
<b>A</b>	0	0	1	1
<b>B</b>	0	1	0	1





**OPTION: MAIN SCRAMBLED/AUX UNSCRAMBLED SUBSTITUTION**

ORDER NUMBER: C9825565

## 1 DESCRIPTION

A PULSAR equipped with this option is able to work with specified (see warning) scrambled video on the main (scrambled) input. An unscrambled signal will be placed on the aux input. If the detector does not find any signal at the main input, the PULSAR will switch automatically -after a short selectable delay- to the unscrambled signal at the aux input. The audio signal will be switched also. It is also remotely controllable by means of a hard contact at the rear panel or by the RS-485 connector.

There are some conditions that must be fulfilled before this main scrambled/aux unscrambled option can be used:

- The scrambled signal must be well clamped in the scrambler itself: no DC-level variation in time or temperature. However, if there would be a constant DC-shift in the video, it can be compensated by setting the DC-offset.
- Hum is not allowed. This can be prevented by using double screened coaxial cables, as short as possible e.g. install the modulator and the scrambler next to each other.

There are different ways to connect a scrambler to the PULSAR. The most common are shown in the figures on the next pages.

**REMARK**

If the PULSAR has a built-in stereo coder or is going to be modified to a stereo device, the REF VID input connector must be installed. Without the stereo coder this connection is not needed.

**Figure 1:** The UNSCR VIDEO enters the PULSAR via a BNC T-connector where the signal is branched to the REF VID input connector in order to separate the sync pulses for locking the pilot on the stereo coder module. The other direction of the T-connector leads to the scrambler. The scrambled signal is connected now to the main input. In this case, there is a different signal connected to the main (SCR) and the aux (UNSCR) input. The signal on the aux can be e.g. a test pattern.

**Figure 2:** Basically, the principle is the same as in figure 1, except that the same signal is connected to the main (SCR) and the aux (UNSCR) input. Remark that on the main input the signal is scrambled and on the aux input the same signal is unscrambled. One the of the T-connector is still put on the REF VID input of the PULSAR, while the other side is connected to the aux input. Via the standard loop through connection (BR21 must be put into the non-default position) of the aux input, the signal enters the scrambler.

**Figure 3:** If the scrambler has a loop through, the BNC T-connector is not necessary.

**Figure 4:** As an option the main input can be made loop through.

Notice that different combinations of these models are possible.

CONNECTION DIAGRAM SCRAMBLER - PULSAR (1/2)

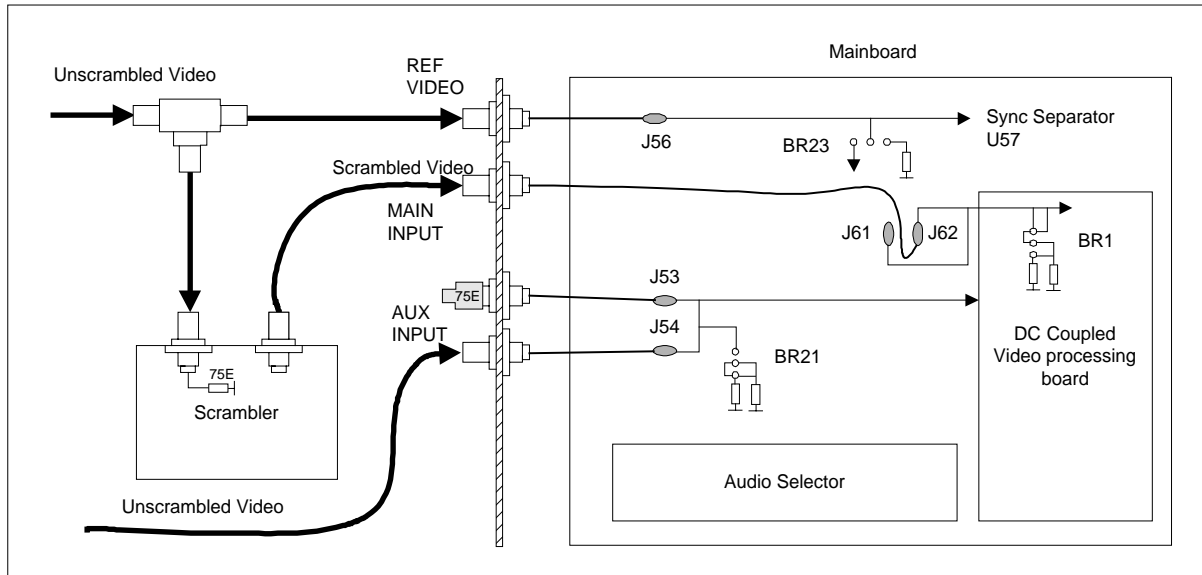


Figure 1 : Connection Diagram Scrambler - Pulsar

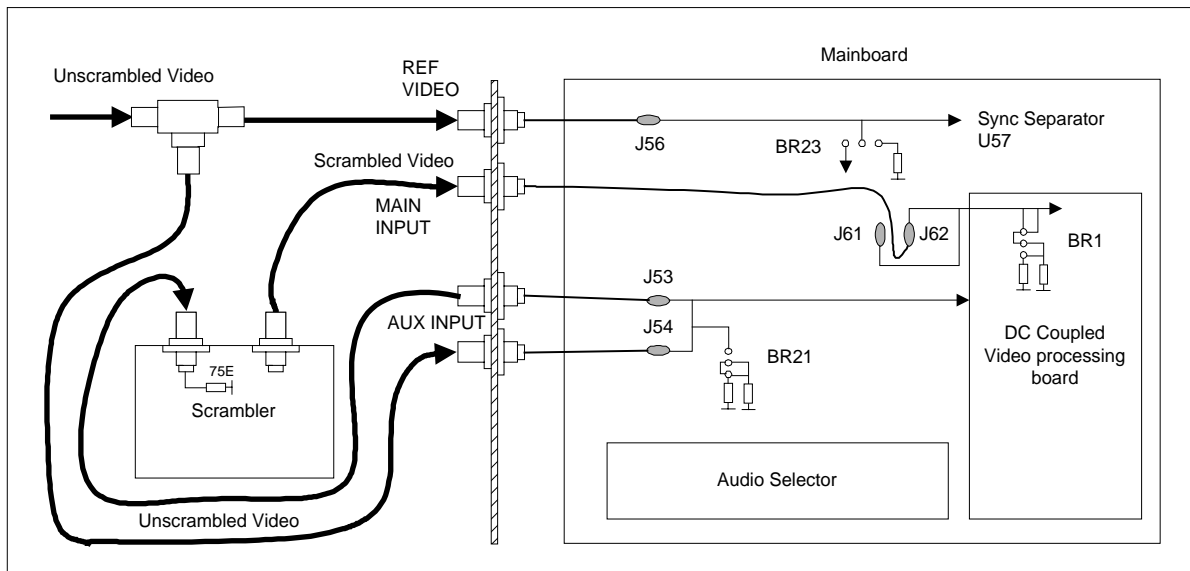


Figure 2 : Connection Diagram Scrambler - Pulsar  
Using auxiliary unscrambled video loop through input

CONNECTION DIAGRAM SCRAMBLER - PULSAR (2/2)

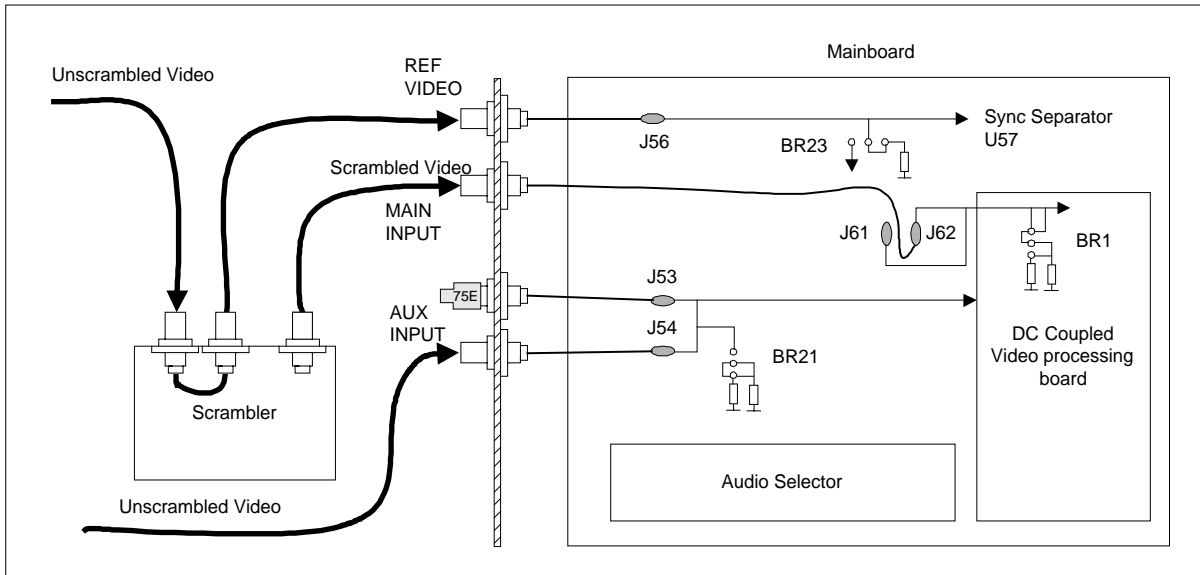


Figure 3 : Connection Diagram Scrambler - Pulsar  
With loop through on scrambler

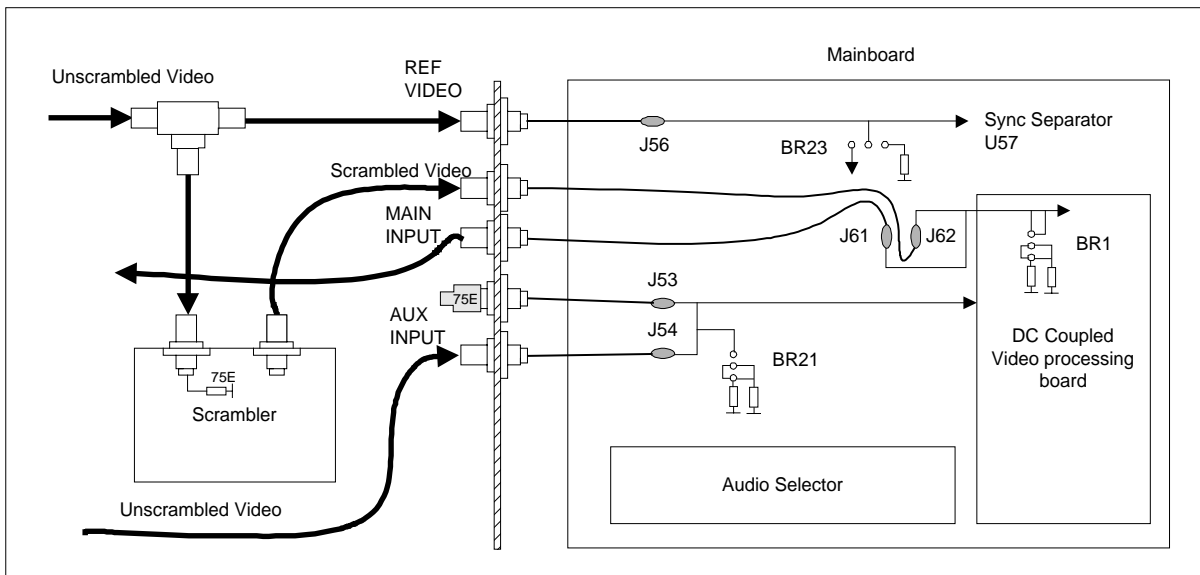


Figure 4 : Connection Diagram Scrambler - Pulsar  
With optional main scrambled video loop through input

## 2 SPECIFICATIONS

- Video/Audio specifications ..... unchanged
- DC-offset .....  $\pm 0.5$  V (adjustable)

## 3 INSTALLATION

*Please read this chapter carefully before installing the option.*

### REMARK

The installation procedure is only necessary when ordering this option separately. When ordering a PULSAR with Audio/Video Auxiliary Input, the installation has already been carried out during production.

This option cannot be installed together with the AUDIO/VIDEO AUX INPUT. If this option has been installed, you can switch between two clear signals. With the option MAIN SCRAMBLED / AUX UN-SCRAMBLED SUBSTITUTION, it is possible to switch between a scrambled signal or an unscrambled signal. However, it is not possible to work with two scrambled signals.

For the location of the boards, connectors and jumpers use the internal layout diagram.

### WARNING

Before changing anything in the PULSAR remove the power cord to switch off the power supply.



Persons working with the PULSAR should be grounded with a resistor isolated wrist strap before touching the electronic components and before removing any assembly from the unit.

### 3.1 Opening The PULSAR

- Unplug the power cord to turn off the PULSAR.
- Unscrew the nine screws (Torx 10) holding the top cover.
- Pull the top cover backwards and remove it.
- Loosen the nine screws (Torx 10) holding the bottom cover.
- Remove the bottom cover.

### 3.2 Installing The MAIN SCR / AUX UNSCR SUBSTITUTION Boards

- The following jumpers on the Mainboard must be set:

Bridge	Function	Position*
BR15	<b>Enables</b> / Disables the Audio Selector board	<b>non-default</b>
BR16	<b>Enables</b> / Disables the Audio Selector board	<b>non-default</b>
BR21	Auxiliary Video Input <b>75 Ohm / High Impedance</b>	<b>non-default</b>
BR23	VID REF input <b>75 Ohm</b> / High Impedance	<b>non-default</b> / remove
BR24	<b>Enables</b> / Disables the DC-coupled board	<b>non-default</b>
BR25	<b>Enables</b> / Disables the DC-coupled board	<b>non-default</b>
BR26	<b>Enables</b> / Disables the DC-coupled board	<b>non-default</b>
BR27	<i>Only if the option Audio/Video Auxiliary Input was installed</i> <b>Audio Selector**</b> / Audio/Video Auxiliary Input	<b>place back</b> / remove

\* The marked position is the default position.

\*\* The audio selector is the one of the two boards of the option Main Scr/Aux Unscr but is located on the same position as the Audio/Video Auxiliary input board. This is the reason why a PULSAR can not be equipped with both options.

- The following jumpers on the Audio Selector board must be set according to your requirements:

Bridge	Function	Position*
BR1	Audio Right <b>balanced</b> / unbalanced	<b>down</b> / up
BR2	Audio Right <b>600 Ohm</b> / 10k Ohm	<b>down</b> / up
BR3	Audio Left <b>balanced</b> / unbalanced	<b>down</b> / up
BR4	Audio Left <b>600 Ohm</b> / 10k Ohm	<b>down</b> / up

\* Down and up as seen from the front, see also *Input Configuration* in chapter 4 : Layout.

- The following jumper on the DC-Coupled board must be set according to your requirements:

Bridge	Function	Position*
BR1	Main Video Input <b>75 Ohm</b> / High Impedance	<b>Default</b> / non- default

\* The marked position is the default position.

- Place the boards on the mainboard in the correct position. Be careful with the red connectors on both boards.
- Fix the boards on the mainboard with the split pin.
- Cable connections to be made:

Cable	From	To
Audio Input Cable	<b>J3</b> Audio Selector board	<b>J1</b> on the I/O board
VID REF Input Cable	VID REF connector	<b>J56</b> on the mainboard
Aux Video Input Cable	<b>Left*</b> Aux Video connector	<b>J53</b> on the mainboard
Aux Video Loop Through Cable	<b>Right*</b> Aux Video connector	<b>J54</b> on the mainboard
Main Video Input Cable	Main Video Connector	<b>J62</b> on the mainboard

\* Left and right as seen from the front.

- For keeping the coaxial cables in place, use the supplied cable ties.

- If the option Stereo Coder is installed following two items must be configured:

Bridge	Function	Position*
BR1	Retrieve sync pulses of the scrambled input from <b>VID REF Input / Mainboard</b>	<b>Down</b>

\* Down as seen from the front.

Cable	From	To
Sync pulses Cable*	<b>J1</b> on the DC-Coupled board	<b>J5</b> on the Stereo Coder board

\* This cable must be removed when NO Stereo Coder is installed. Be aware that if one installs in the future a stereo coder, the cable is needed again. So do not throw the cable away.

### 3.3 Updating Software Version

Updating the software is only necessary if the index of the software installed is of a lower version than the newly delivered software. The index of the software is indicated on the label stuck on the EPROM or GAL. On the label one can find "/ XX". This number indicates the software version.



Observe Precautions for Handling Electrostatic Sensitive Devices. Electrostatic discharge (ESD) can damage the electronic components. Therefore it is required to work in a static-safe work station.

For the location of the IC's, use the internal layout diagram.

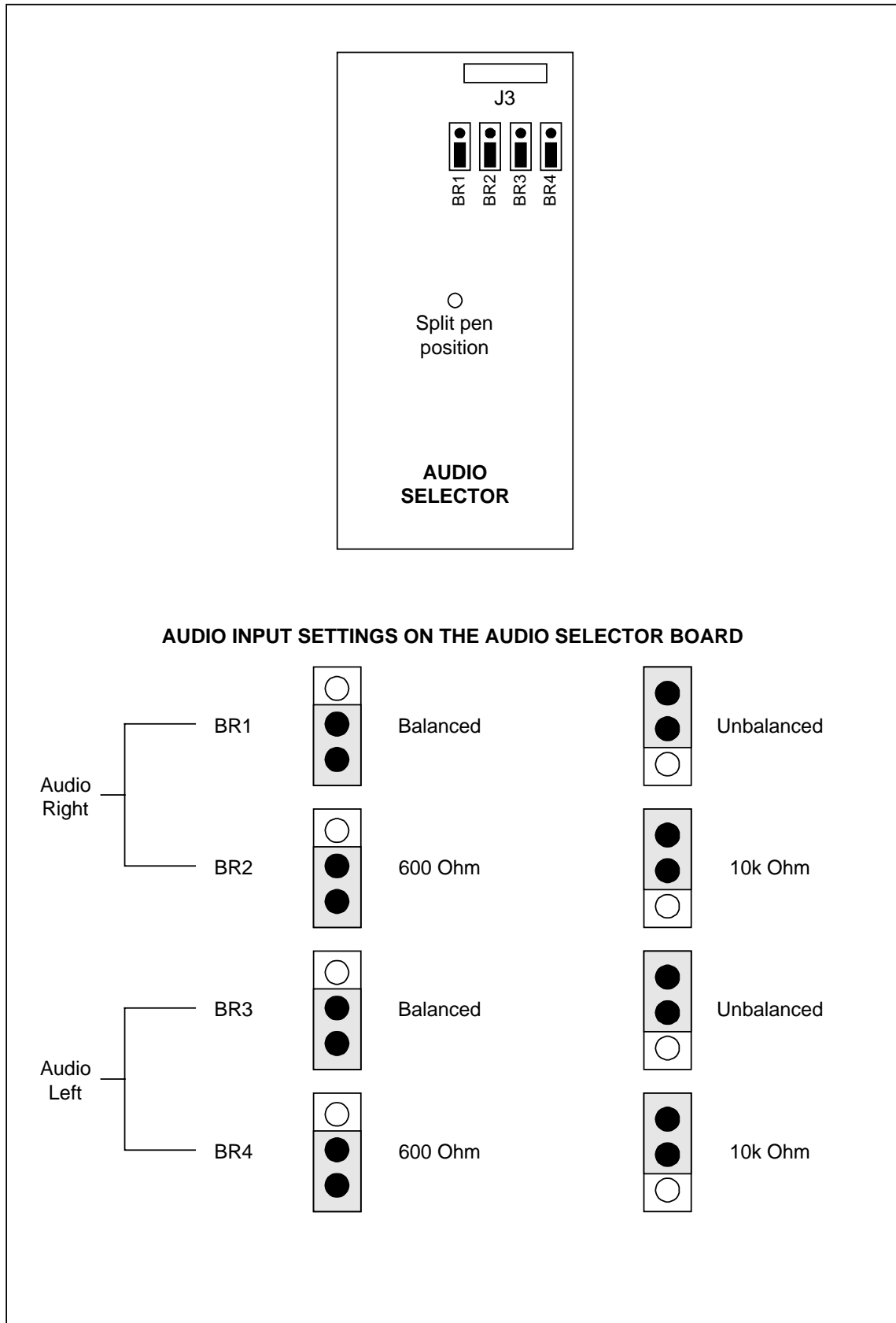
- Replace EPROM **U65** with the one include in the kitbox. Only needed when the index of the EPROM in the kitbox is higher than the one that is installed.
- Replace GAL **U69** with the one include in the kitbox. Only needed when a GAL is included in the kitbox and the index of the GAL in the kitbox is higher than the one that is installed.

### 3.4 Closing The PULSAR

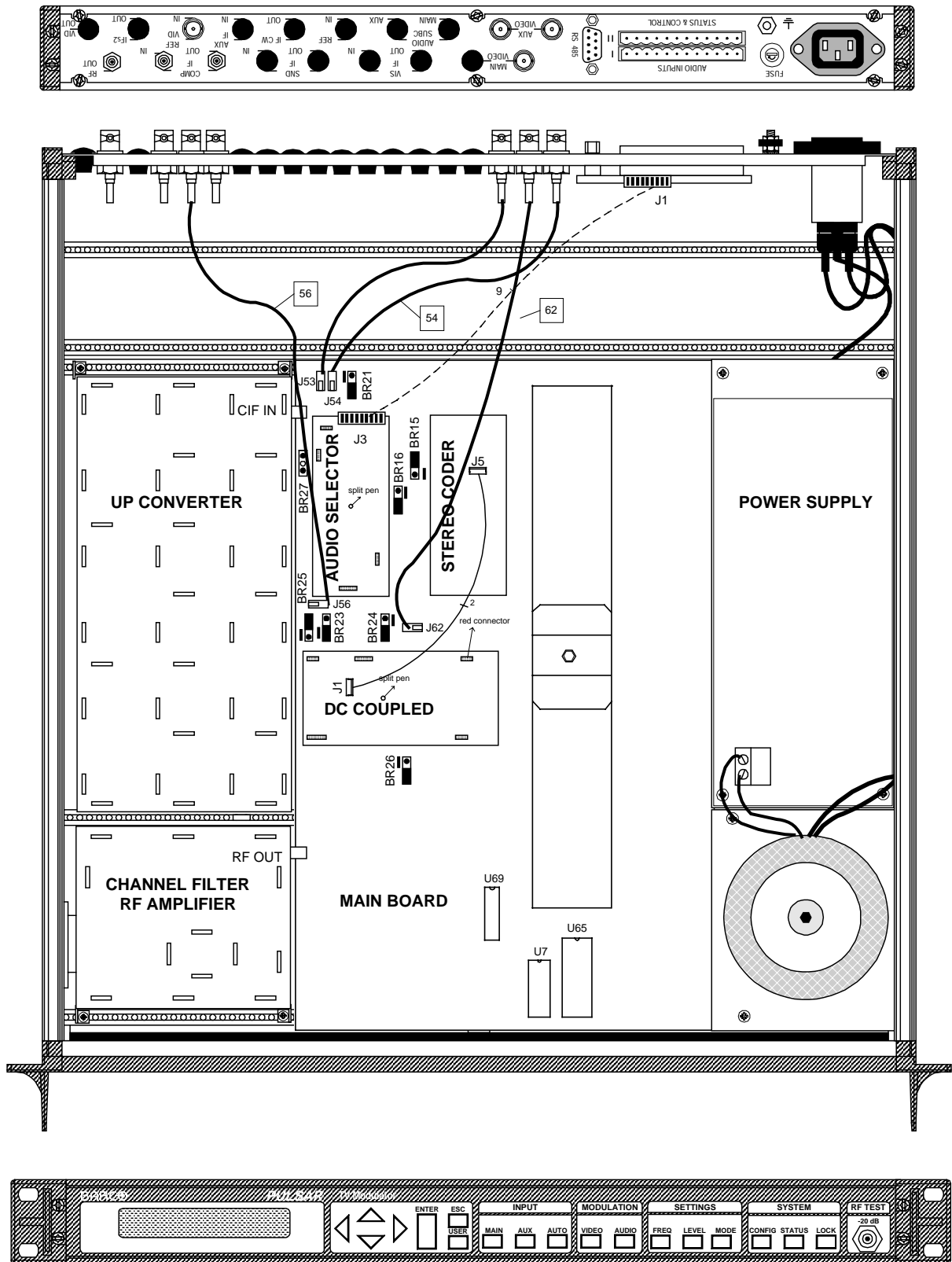
- Put the bottom cover back onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the bottom cover down.
- Turn the PULSAR upright.
- Put the top cover onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the top cover down.
- Replug the power cord.

# 4 LAYOUT

## 4.1 Input Configuration



### 4.2 Internal Layout



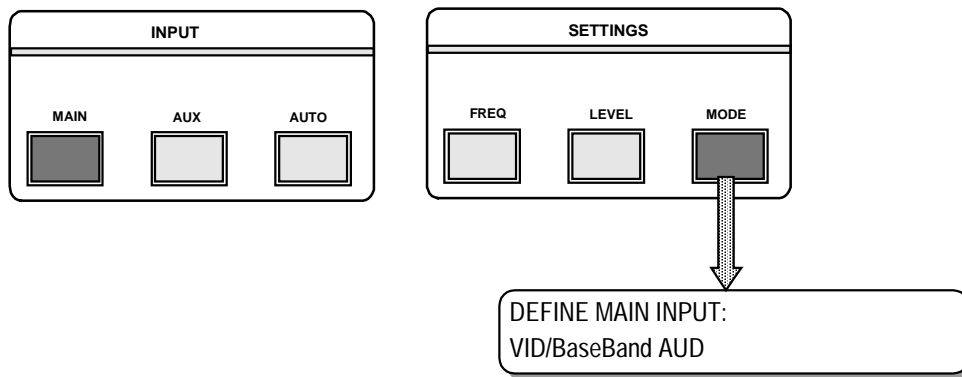


## 5 SETTINGS

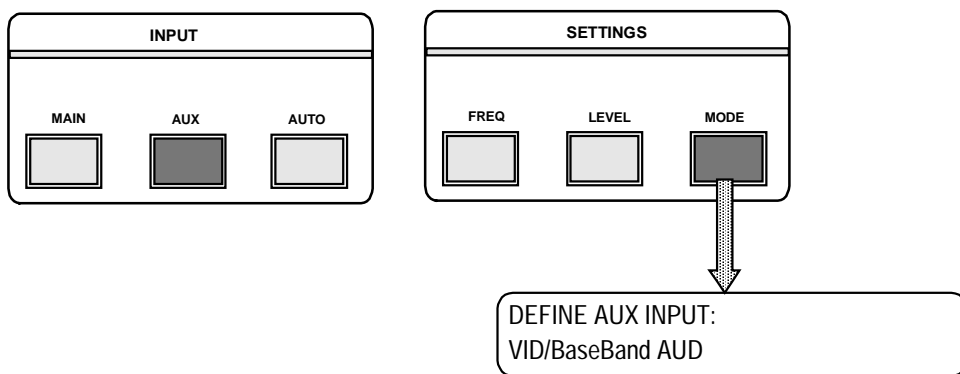
### REMARK

- In the AUX status the PULSAR works as in a standard configuration.
- When selecting the MAIN input, note that the item about clamping, video and modulation depth measurement in the MODE menu is not available anymore.

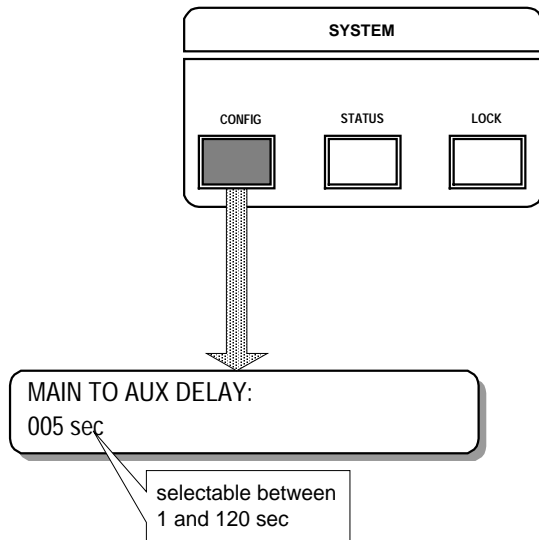
- Select the MAIN input.
- Scroll into the MODE settings with the LEFT or RIGHT arrow to the DEFINE MAIN INPUT item.
- Use the UP or DOWN arrow to scroll through the different types of signal. Select VID/Baseband AUD and confirm with ENTER.
- Select the AUX input



- Scroll into the MODE settings with the left or right arrow to the DEFINE AUX INPUT item.
- Use the UP or DOWN arrow to toggle through the different types of signal. Select VID/Baseband AUD and confirm with ENTER.



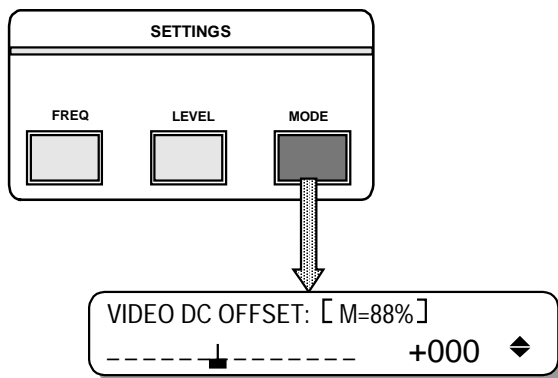
- Select the CONFIG button
- Select the MAIN TO AUX DELAY with the UP and DOWN arrow.
- Select the delay time (between 1 and 120 seconds) with the UP and DOWN arrow.
- Confirm by pressing ENTER.



- Select the VIDEO DC OFFSET in the MODE menu with the RIGHT or LEFT arrow.
- The modulation depth of the main input is indicated. Pushing the UP or DOWN arrow will result in the following display:

!THIS IS AN ALIGNMENT!  
<PRESS ENTER OR ESCAPE>

- Press ENTER



- Align the Video DC-offset to obtain the correct modulation depth (and RF-level). The correct modulation depth depends on the standard.
- The modulation depth of the scrambled video signal can be changed in an identical way as for a clear video signal.

### REMARK

As long as the scrambler remains the same, the offset should not be changed.

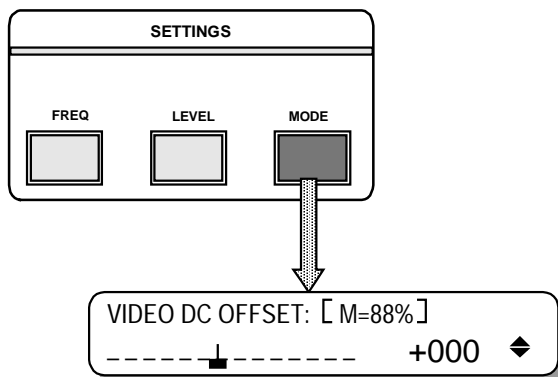
## 6 ALIGNMENT

To align the PULSAR with scrambled signals.

- Connect a test signal with full white (1 Vpp) to the AUX input. Use the AUX loop through to connect the same signal to the scrambler. The scrambler output is then connected to the MAIN input. Now the same signal is available at both inputs, only one is clear while the other one is scrambled.
- Put the scrambler in clear mode (unscrambled).
- Start with selecting RECALL FACTORY in the CONFIG menu. Now the default settings are installed.
- Select the VIDEO DC OFFSET in the MODE menu with the RIGHT or LEFT arrow.
- The modulation depth of the MAIN input is indicated. Pushing the UP or DOWN arrow will result in the following display:

!THIS IS AN ALIGNMENT!  
<PRESS ENTER OR ESCAPE>

- Press ENTER



- Align the Video DC-offset to obtain the correct modulation depth (and RF-level). The correct modulation depth depends on the standard.
- The modulation depth of the scrambled video signal can be changed in the usual way. See the user's manual.

### REMARK

As long as the scrambler remains the same, the offset should not be



**OPTION: AUDIO SUBCARRIER INPUT**Type: **Nicam Intercarrier Input**

ORDER NUMBER: C9825510

## 1 DESCRIPTION

Installation of this option into the PULSAR offers the possibility to connect an external audio subcarrier that will be mixed with the internal vision carrier. This external carrier is used instead of or together with the internal sound carrier.

This audio subcarrier can be generated by:

- e.g.
- an intercarrier output of a demodulator (e.g. VSD 200)
  - a Nicam encoder (NE 728)

With this option two extra inputs become available at the rear:

- a MAIN audio subcarrier input
- an AUX audio subcarrier input

## 2 SPECIFICATION

- Connector .....	BNC
- Input impedance .....	50 Ohm
- Return loss .....	>20 dB $F_{\text{subc}} \pm 1$ MHz
- Input level .....	+37 dBmV to +50 dBmV

## 3 INSTALLATION

***Please read this chapter carefully before installing the option.***

**REMARK**

The installation procedure is only necessary when ordering this option separately. When ordering a PULSAR with Audio Subcarrier Input, the installation has already been carried out during production.

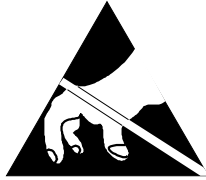
For location of the boards, connectors and jumpers use the internal layout diagram

**WARNING**

Before changing anything in the PULSAR, remove the power cord to switch off the power supply.

### 3.1 Opening The PULSAR

- Unplug the power cord to turn off the PULSAR.
- Unscrew the nine screws (Torx 10) holding the top cover.
- Pull the top cover backwards and remove it.
- Loosen the nine screws (Torx 10) holding the bottom cover.
- Remove the bottom cover.



Observe Precaution for Handling Electrostatic Sensitive Devices. Electrostatic Discharge (ESD) can damage the electronic components. Therefore it is required to work in a static-safe work station.

### 3.2 Installing The Audio SubCarrier Board

- Bridges to be set on the mainboard:

Bridge	Function	Position
BR29	Enables / Disables the Audio SubCarrier Input board	remove

- Place the option board on the fixation profiles and align it with the right side of the mainboard. See internal layout page.
- Fix the option board with the four screws.
- Cable connections to be made:

Cable	From	To
IF Sound Out cable (n° 68)	J4 on the Audio SubC board	J68 on the Mainboard
Internal IF Sound cable (n°69)	J7 on the Audio SubC board	J69 on the Mainboard
Vision Carrier Input cable (n°29)	J3 on the Audio SubC board	J29 on the Mainboard
Main Aud. SubC In Cable (N°6)	Main Audio SubC In Connector	J6 on the Audio SubC board
Aux Aud. SubC In Cable (N°5)	Aux Audio SubC In Connector	J5 on the Audio SubC board
Power supply option board	J1 on the Audio SubC board	J21 on the Mainboard (already done)

### 3.3 Updating Software Version

Updating the software version is only necessary if the index of the installed software is of a lower version than the newly delivered. The index of the software is indicated on the label you can find on the EPROM or GAL. On the label you can find "/ XX". This number indicates the software version.



Observe Precautions for Handling Electrostatic Sensitive Devices. Electrostatic discharge (ESD) can damage the electronic components. Therefore it is required to work in a static-safe work station.

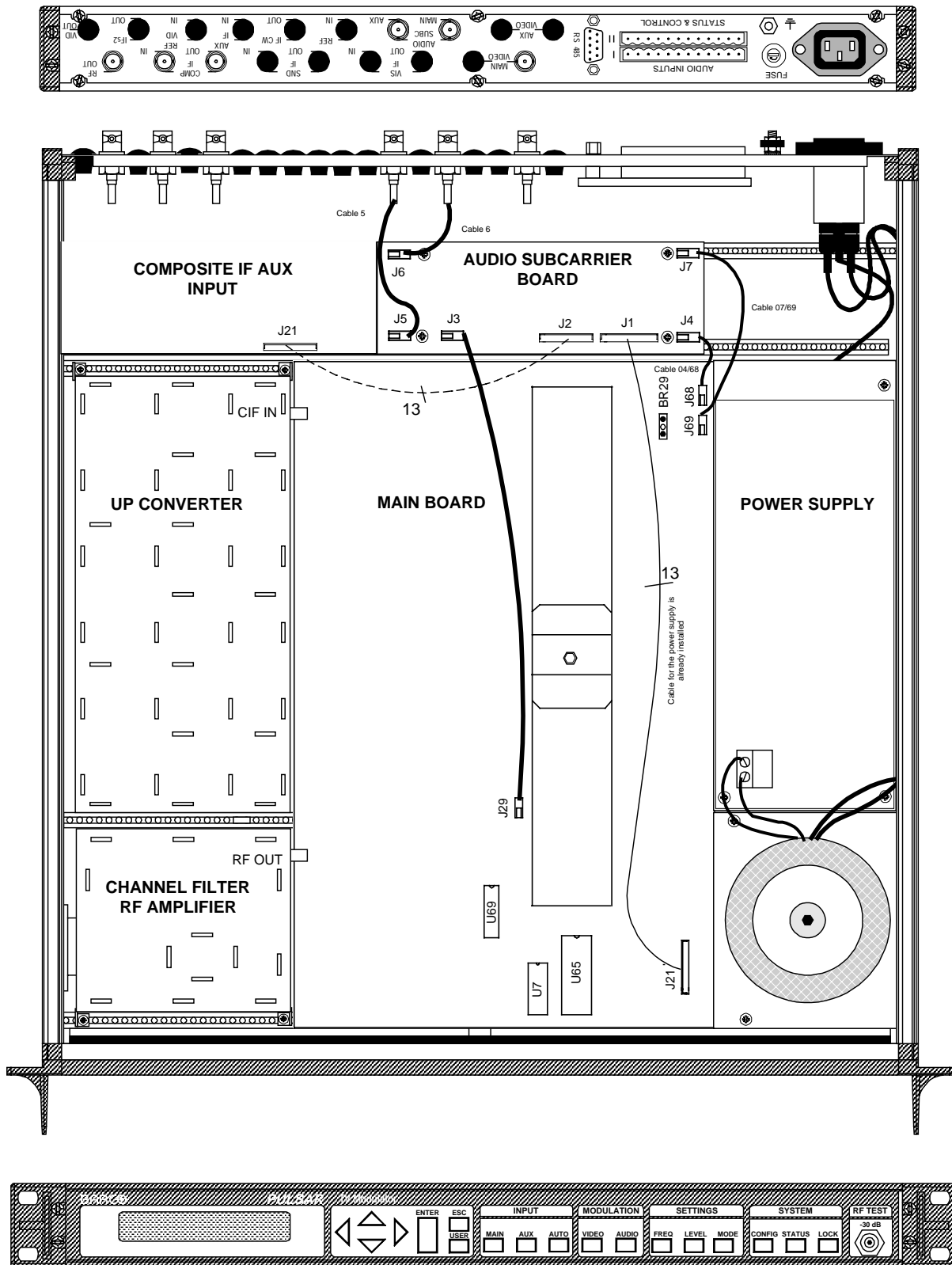
For the location of the IC's, use the Internal layout diagram.

- Replace EPROM **U65** with the one included in the kitbox. Only needed when the index of the EPROM in the kitbox is higher than the one that is installed.
- Replace GAL **U69** with the one included in the kitbox. Only needed when a GAL is included in the kitbox and the index of the GAL in the kitbox is higher than the one that is installed.

### **3.4 Closing The PULSAR**

- Put the bottom cover back onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the bottom cover down.
- Turn the PULSAR upright.
- Put the top cover onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the top cover down.
- Replug the power cord.

# 4 Layout

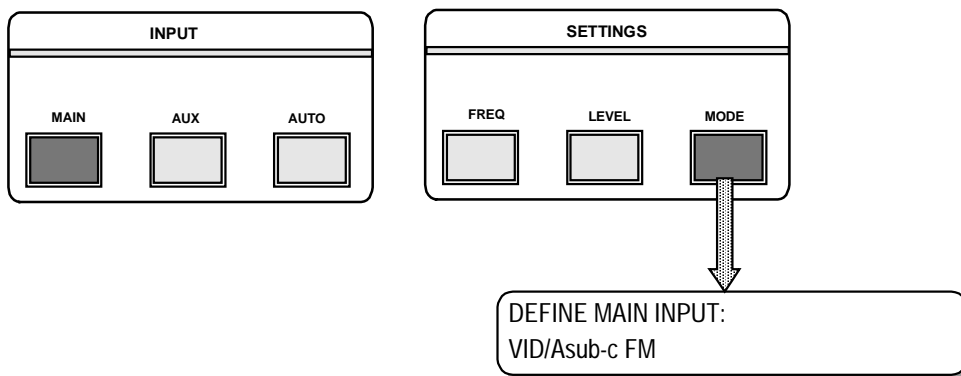




## 5 SETTINGS

### 5.1 Settings MAIN Input

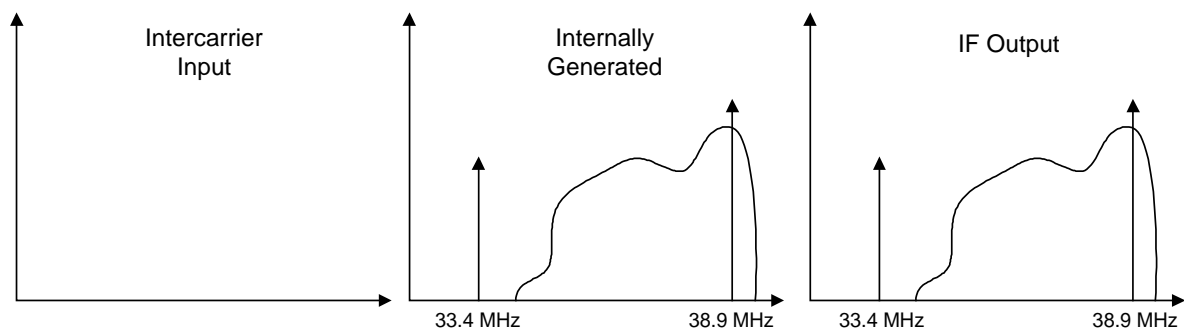
- Connect an audio subcarrier signal to the AUDIO SUBC MAIN input on the rear panel. The level must be within the AGC range from +37 till +50 dBmV.
- Select the MAIN input.
- Select MODE.
- Scroll into the MODE settings with the LEFT or RIGHT arrow until you find the DEFINE MAIN INPUT.
- With the UP and DOWN arrow you can choose the type of desired signal.



All these possibilities are visualized in following figures.

#### VID/Baseband AUD

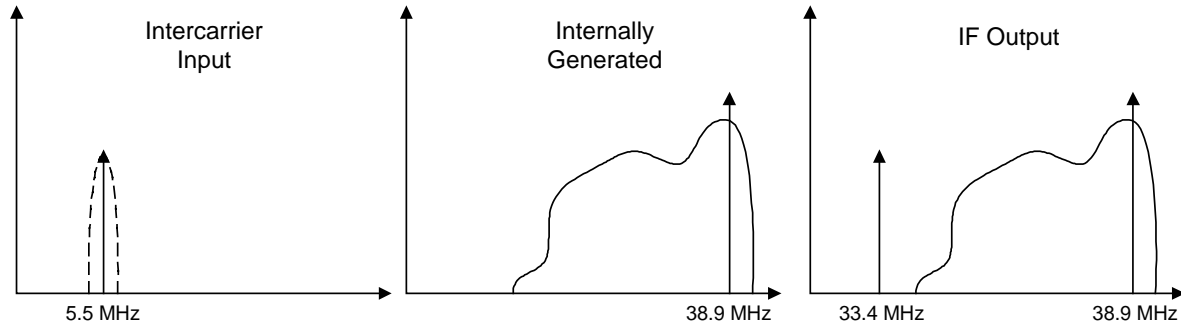
No external audio subcarrier is connected or used. The internal one is used to combine with the vision carrier (VC).



**VID/A Sub-C FM**

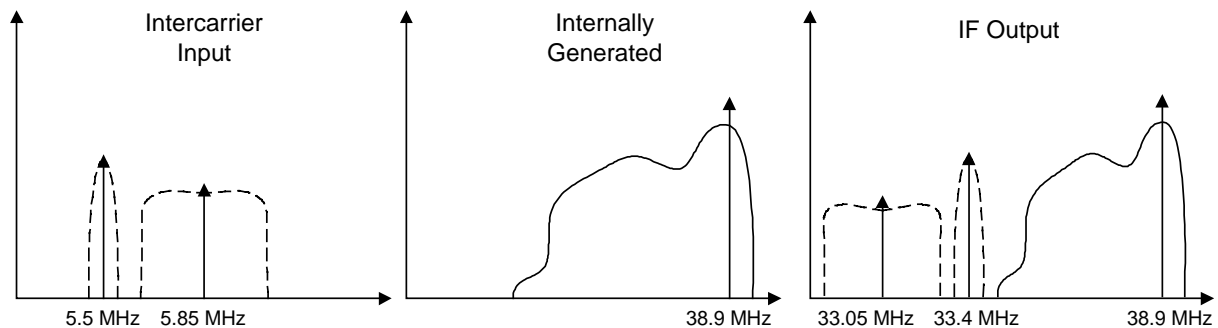
A 5.5 MHz audio subcarrier is connected externally. Mixed with a VC of 38.9 MHz this audio subcarrier will result in an audio carrier of 33.4 MHz.

If there is a **Stereo Coder** installed, a 5.5 MHz audio subcarrier combined with a 5.74 MHz audio subcarrier can be connected. After mixing with the with the VC, two sound carriers at 33.4 MHz, respectively 33.158 MHz appear.



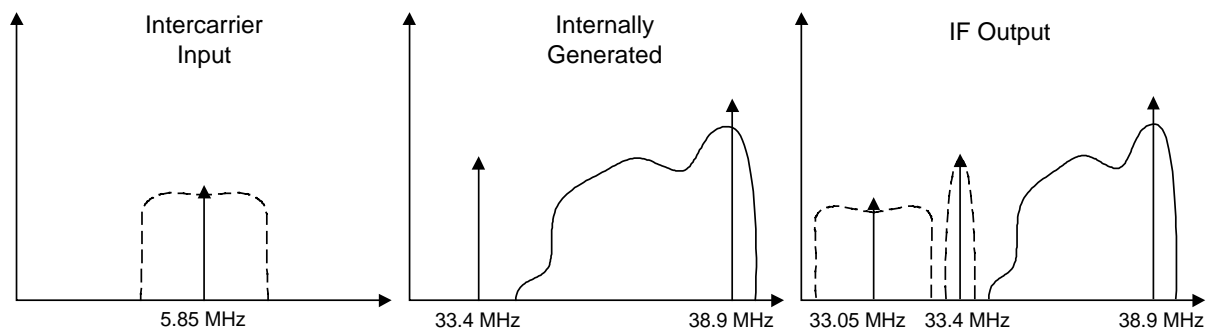
**VID/A Sub-C FM + NICAM**

Combined with a FM modulated subcarrier, another carrier of 5.85 MHz (Nicam) will also be connected. Mixed with the vision carrier of 38.9 MHz two audio subcarriers of 33.4 and 34.05 will be achieved.



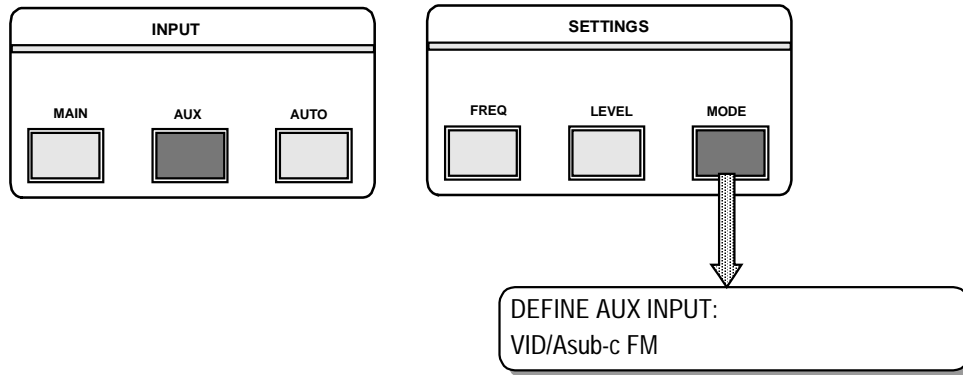
**VID/A Sub-C NIC + BB AUD**

Only the NICAM audio subcarrier of 5.85 MHz will be connected externally, as second subcarrier the internal 33.4 MHz carrier is used. At the output, again two carriers will be found: one at 33.05 MHz and another at 33.4 MHz.



- Confirm with ENTER.
- To align the audio subcarrier gain with the internal vision carrier: see chapter 6 : Alignment.

## 5.2 Settings AUX Input



Basically, the procedure is the same.

- Connect now the signal to the AUDIO SUBC AUX Input on the rear panel.
- To do the alignment refer to chapter 6: Alignment.

If the option Audio/Video Aux Input is installed, the PULSAR switches automatically from Main to Aux input, after a selectable delay. Otherwise it is only possible to toggle manually on the front.

In the menu DEFINE AUX INPUT, an extra selection will become available: VID/Baseband AUD. Together with the CompIF Aux Input option an extra selection will be possible in the DEFINE AUX input: CompIF Aux Input

It is not necessary to select the same kind of signal in the DEFINE AUX INPUT as in the DEFINE MAIN INPUT menu.

### WARNING

It is not possible to work with a combined audio and video subcarrier signal. The video and the audio subcarrier signal have to be connected separately.

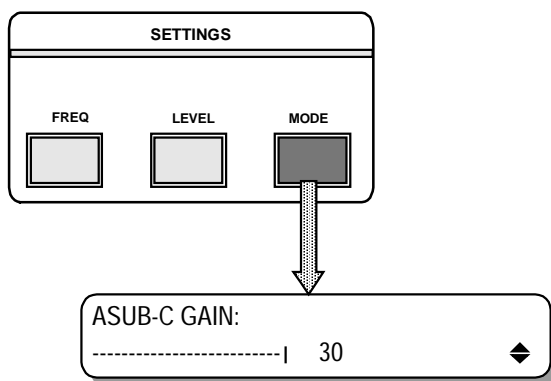
## 6 ALIGNMENT

### 6.1 Alignment Of An FM Audio Subcarrier

- Connect a FM subcarrier (5.5 MHz) signal to the AUDIO SUBC input.
- Connect a spectrum analyzer to the RF output of the PULSAR.
- Check the selected S/V ratio in the LEVEL menu and on the spectrum analyzer.
- Select in the MODE menu the item called ASub-C GAIN. Pressing the UP or DOWN arrow gives the following message:

! THIS IS AN ALIGNMENT !  
<PRESS ENTER OR ESCAPE>

Pressing ENTER will start the alignment.



You can change the ASub-C GAIN by pressing the DOWN arrow until the ratio on the spectrum analyzer is the same as in the LEVEL menu.

- Confirm by pressing ENTER.
- Once this alignment is done you can change the S/V ratio without the need to do the alignment again.

### 6.2 Alignment Of A NICAM Audio Subcarrier

- Connect a NICAM subcarrier (5.85 MHz) signal to the AUDIO SUBC input.
- Connect a spectrum analyzer to the RF output of the PULSAR.
- Check the selected S/V ratio in the LEVEL menu is that of the internal soundcarrier.
- On the spectrum analyzer one will see that the NICAM and the baseband carrier are aligned.
- Changing ASub-C GAIN will bring the NICAM carrier to its ratio w.r.t. the mono carrier, that is 20 dB lower than the vision carrier or 10 dB lower than the internal sound carrier.
- After this matching is done, one can change the S/V ratio in the LEVEL menu with the UP or DOWN arrow. If one tunes the S/V ratio, both level of the NICAM carrier and the internal carrier will change.

**OPTION: COMPOSITE IF AUX input AFTER LOOP (CIF)**

ORDER NUMBER: C9825511

# 1 DESCRIPTION

With the option Composite IF AUX input it is possible to switch to an alternate CIF source. This source can be an IF backup or IF channel.

The input is ALC (automatic level controlled) referred to the vision carrier. The input level ranges between +30 dBmV and +45 dBmV. (default = + 40 dBmV) Within that range a constant RF output is maintained.

Manual gain control remains available by the front panel: e.g. scrambled signals.

**WARNING**

External CompIF is only available if the Aux input is selected.

**REMARK**

Together with the Audio/Video Auxiliary input and or the Audio SubCarrier input, different combinations are possible. More information can be found in the description of these options.

# 2 SPECIFICATIONS

- Connector .....	BG, I, DK:	BNC
.....	MN:	F-type
- Input impedance .....	BG, I, DK:	50 Ohm
.....	MN:	75 Ohm
- Return loss .....		> 18 dB
- Input level .....		+30 to +45 dBmV
- Frequency response .....		flat between Fv and Fs: tol: ± 0.1 dB
- Intermodulation between Fv and Fs .....		< 65 dB

# 3 INSTALLATION

***Please read this chapter carefully before installing the option.***

**REMARK**

The installation procedure is only necessary when ordering this option separately. When ordering a PULSAR with Audio Subcarrier Input, the installation has already been carried out during production.

For the right location of the boards, connectors and screws, refer to the layout diagram.

**WARNING**

Before changing or removing anything in the PULSAR, remove the power cord to switch off the power supply.

### 3.1 Opening The PULSAR

- Unplug the power cord to turn off the PULSAR.
- Unscrew the nine screws (Torx 10) holding the top cover.
- Pull the top cover backwards and remove it.
- Loosen the nine screws (Torx 10) holding the bottom cover.
- Remove the bottom cover.

### 3.2 Installing The Composite IF Aux Input Board



Observe Precaution for Handling Electrostatic Sensitive Devices. Electrostatic Discharge (ESD) can damage the electronic components. Therefore it is required to work in a static-safe work station.

- Install the optional board. See the internal layout for the correct location.
- Fix the board with the 4 screws on the chassis profiles.
- Cable connections to be made:

Cable	From	To
IF Aux Input Cable (n°23)	AUX IF connector	<b>J23</b> on the CompIF Aux board
CompIF output Cable	<b>Left*</b> Aux Video Connector	<b>J58</b> on the mainboard
Aux Video Loop Through Cable	<b>Right*</b> Aux Video Connector	<b>J59</b> on the mainboard
Main Video Input Cable	Main Video Connector	<b>J54</b> on the mainboard

\* Left and right as seen from the front.

### 3.3 Updating Software Version

Updating the software is only necessary if the index of the software installed is of a lower version than the newly delivered. The index of the software is indicated on the label stuck on the EPROM or GAL. On the label you can find "/ XX". This number indicates the software version.



Observe Precautions for Handling Electrostatic Sensitive Devices. Electrostatic discharge (ESD) can damage the electronic components. Therefore it is required to work in a static-safe work station.

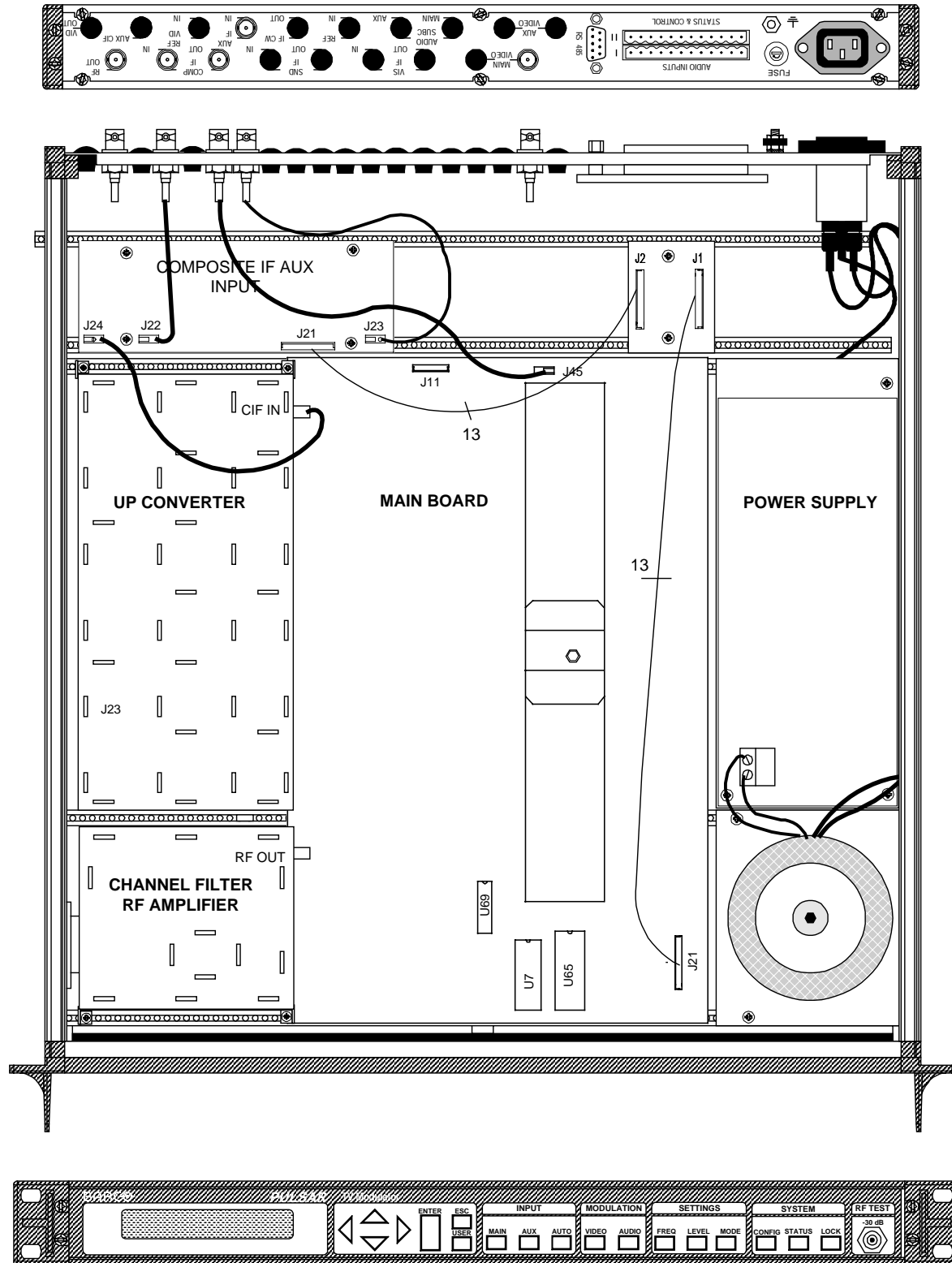
For the location of the IC's, use the Internal layout diagram.

- Replace EPROM **U65** with the one included in the kitbox. (only necessary when the index of the EPROM in the kitbox is higher than the one that is installed).
- Replace GAL **U69** with the one include in the kitbox. (only necessary when a GAL is included in the kitbox and the index of the GAL in the kitbox is higher than the one that is installed).

### **3.4 Closing The PULSAR**

- Put the bottom cover back onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the bottom cover down.
- Turn the PULSAR upright.
- Put the top cover onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the top cover down.
- Replug the power cord.

# 4 LAYOUT





## 5 SETTINGS

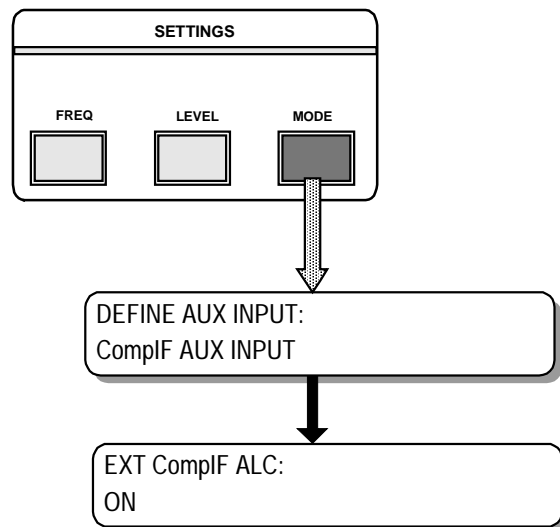
### WARNING

This option is only available as an auxiliary input.

- In the menu **MODE**, you can select the **CompIF AUX INPUT** in the item **DEFINE AUX INPUT**.
- Confirm by pressing **ENTER**.

If the option **Audio/Video Auxiliary input** is installed, the **PULSAR** switches automatically from **MAIN** to **AUX**, after a selectable delay. Otherwise it is only possible to toggle manually on the front. In the menu **DEFINE AUX INPUT**, an extra selection will become available: **VID/Baseband AUD**. Together with the option **AUDIO SUBCARRIER** extra input selections will become possible as well in the **DEFINE MAIN** as in the **DEFINE AUX** input.

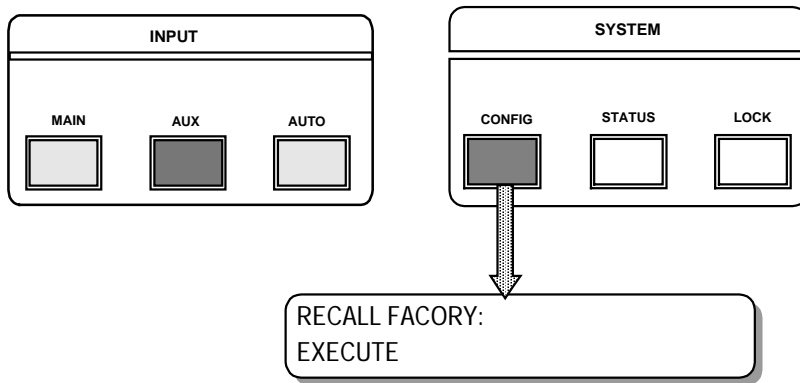
- Scroll in the **MODE** menu to the item **EXT Comp IF ALC**: the **ALC** can be turned **ON** or **OFF** by pushing the **UP** or **DOWN** arrow.
- Confirm by pressing **ENTER**.
- If **ON** is selected: the **RF** output level remains constant within the **IF** input range of **+30** to **+45 dBmV**.



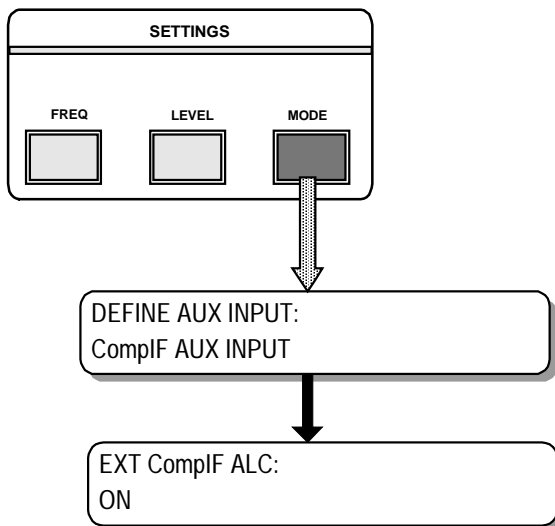
- If **OFF** is selected there becomes an extra item selectable: **EXT Comp IF GAIN**. With this item one can change the level of the **IF** input manually.

## 6 ALIGNMENT

- Do not forget to select the AUX input.
- Start with a FACTORY RECALL in the CONFIG menu, to start with the default settings. Be aware that all the settings will be lost. One can store these settings first in the user settings memory by means of the SAVE AS USER command in the CONFIG menu.



- Select in the MODE menu DEFINE AUX INPUT and set in to Comp IF AUX INPUT. Scroll to EXTCompIF ALC and turn it ON by means of the UP or DOWN arrow.
- Confirm with ENTER.



- Connect a CIF signal, which level is within the range of +30 dBmV to +45 dBmV, to the AUX IF input on the rear. (e.g. for BG 38.9 MHz, for MN 45.75 MHz).
- Check if the RF output level in the LEVEL menu is set on 60 dBmV. (120 dBuV)
- Connect a spectrum analyzer on the RF output at the rear panel.
- Set the REF LEVEL of the spectrum analyzer on 60 dBmV.
- With the potentiometer P1 on the optional board one can change the RF output level for exactly + 60 dBmV. For the position of P1, see the chapter 4: Layout.





**OPTION: VIDEO LOOP THROUGH**

ORDER NUMBER: C9825515

## 1 DESCRIPTION

The option video loop through provides the PULSAR with a loop through output on the main video input. With this option it is possible to connect other devices to the same video source. e.g. a mosaic generator.

## 2 INSTALLATION

*Please read this chapter carefully before installing the option.*

**REMARK**

The installation procedure is only necessary when ordering this option separately. When ordering a PULSAR with Video Loop Through, the installation has already been carried out by production.

For location of the boards, connectors and jumpers use the internal layout diagram.

**WARNING**

Before changing anything in the PULSAR, remove the power cord to switch off the power supply.

### 2.1 Opening The PULSAR

- Unplug the power cord to turn off the PULSAR.
- Unscrew the nine screws (Torx 10) holding the top cover.
- Pull the top cover backwards and remove it.
- Loosen the nine screws (Torx 10) holding the bottom cover.
- Remove the bottom cover.

### 2.2 Installing The Option

- Remove the black bushing dome located at the left MAIN VIDEO connector. Seen from the front.
- Bridges to be changed on the mainboard.

Bridge	Function	Position*
BR23	Main Video input <b>High impedance</b> / 75 Ohm**	<b>non-default</b>

\*The default position is the marked position.

\*\*When needed the Main Video input can be terminated externally with a terminator of 75 Ohm.

- Cable connections to be made.

Cable	From	To
Video loop through Cable	<b>Right*</b> Main Video connector	<b>J52</b> on the mainboard

\* Right as seen from the front.

In case the option Main scrambled / Aux unscrambled is installed:

- Bridges to be changed on the DC coupled board (see option description Main scrambled / Aux unscrambled for the location).

Bridge	Function	Position*
BR1	Main Video input <b>High impedance</b> / 75 Ohm**	<b>non-default</b>

\*The default position is the marked position.

\*\*When needed the Main Video input can be terminated externally with a terminator of 75 Ohm.

- Cable connections to be made.

Cable	From	To
Video loop through Cable	<b>Right*</b> Main Video connector	<b>J61</b> on the mainboard

\* Right as seen from the front.

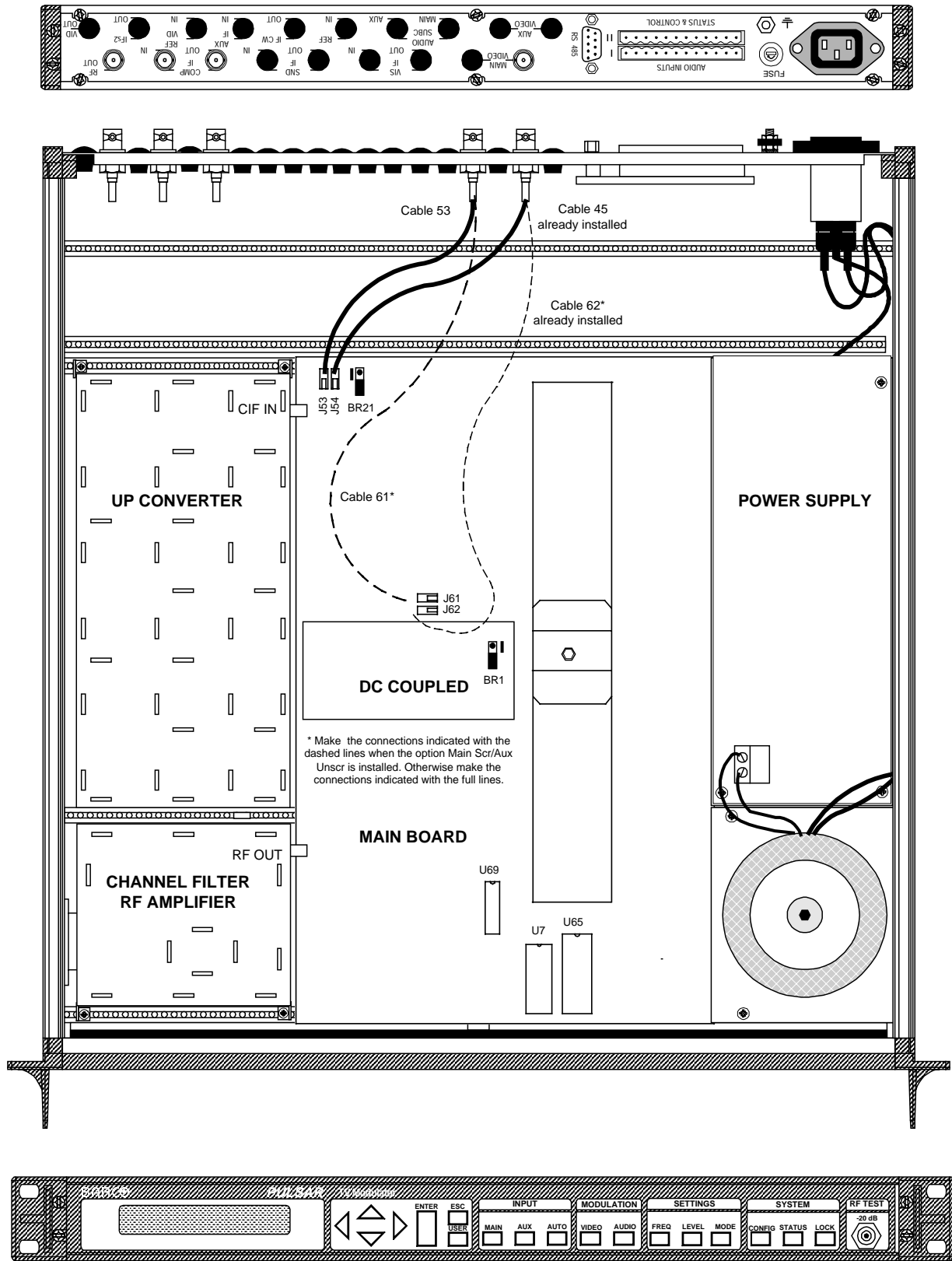
#### REMARK

If the loop through is not used it should be terminated with a 75 Ohm terminator.

## 2.3 Closing The PULSAR

- Put the bottom cover back onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the bottom cover down.
- Turn the PULSAR upright.
- Put the top cover onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the top cover down.
- Replug the power cord.

### 3 LAYOUT







**OPTION: IF VISION / IF SOUND LOOPS**

ORDER NUMBER: C982516

# 1 DESCRIPTION

The IF vision signal as well as the IF sound 1 signal can be taken from the PULSAR. Another device will use these IF signals (or one of them) and put the processed signal back to the PULSAR. Such a device is e.g. a scrambler.

# 2 SPECIFICATIONS

- Connector ..... F, 75 Ohm
- Input, Output levels
  - IF Vision Loop before SAW ..... +46 dBmV
  - IF Sound Loop (1)..... +34 dBmV

# 3 INSTALLATION

***Please read this chapter carefully before installing the option.***

**REMARK**

The installation procedure is only necessary when ordering this option separately. When ordering a PULSAR with IF Vision / IF Sound Loops, the installation has already been carried out during production.

For location of the boards, connectors and jumpers use the internal layout diagram

**WARNING**

Before changing anything in the PULSAR, remove the power cord to switch off the power supply.

## 3.1 Opening The PULSAR

- Unplug the power cord to turn off the PULSAR.
- Unscrew the nine screws (Torx 10) holding the top cover.
- Pull the top cover backwards and remove it.
- Loosen the nine screws (Torx 10) holding the bottom cover.
- Remove the bottom cover.

## 3.2 Installing The Coaxial Cables

- Remove the 4 black bushing domes on the VIS IF and SND IF positions. See chapter 4 : Layout.

### VISION IF LOOP

- Bridges to set on the mainboard

Bridge	Function	Position
BR9	<b>Enables / Disables</b> IF Vision Loop before SAW	<b>remove</b>

- Cable connections to be made

Cable	From	To
IF Vision Input cable (n° 44)	<b>Left*</b> IF Vision connector (In)	<b>J44</b> on the mainboard
IF Vision Output cable (n° 43)	<b>Right*</b> IF Vision connector (Out)	<b>J43</b> on the mainboard

\*Left and right as seen from the front.

### SOUND IF LOOP

- Bridges to be set on the mainboard

Bridge	Function	Position
BR7	<b>Enables</b> / Disables IF Sound Loop	<b>remove</b>

- Cable connections to be made

Cable	From	To
IF Sound Input cable (n° 40)	<b>Left*</b> IF Sound connector (In)	<b>J40</b> on the mainboard
IF Sound Output cable (n° 38)	<b>Right*</b> IF Sound connector (Out)	<b>J38</b> on the mainboard

\*Left and right as seen from the front.

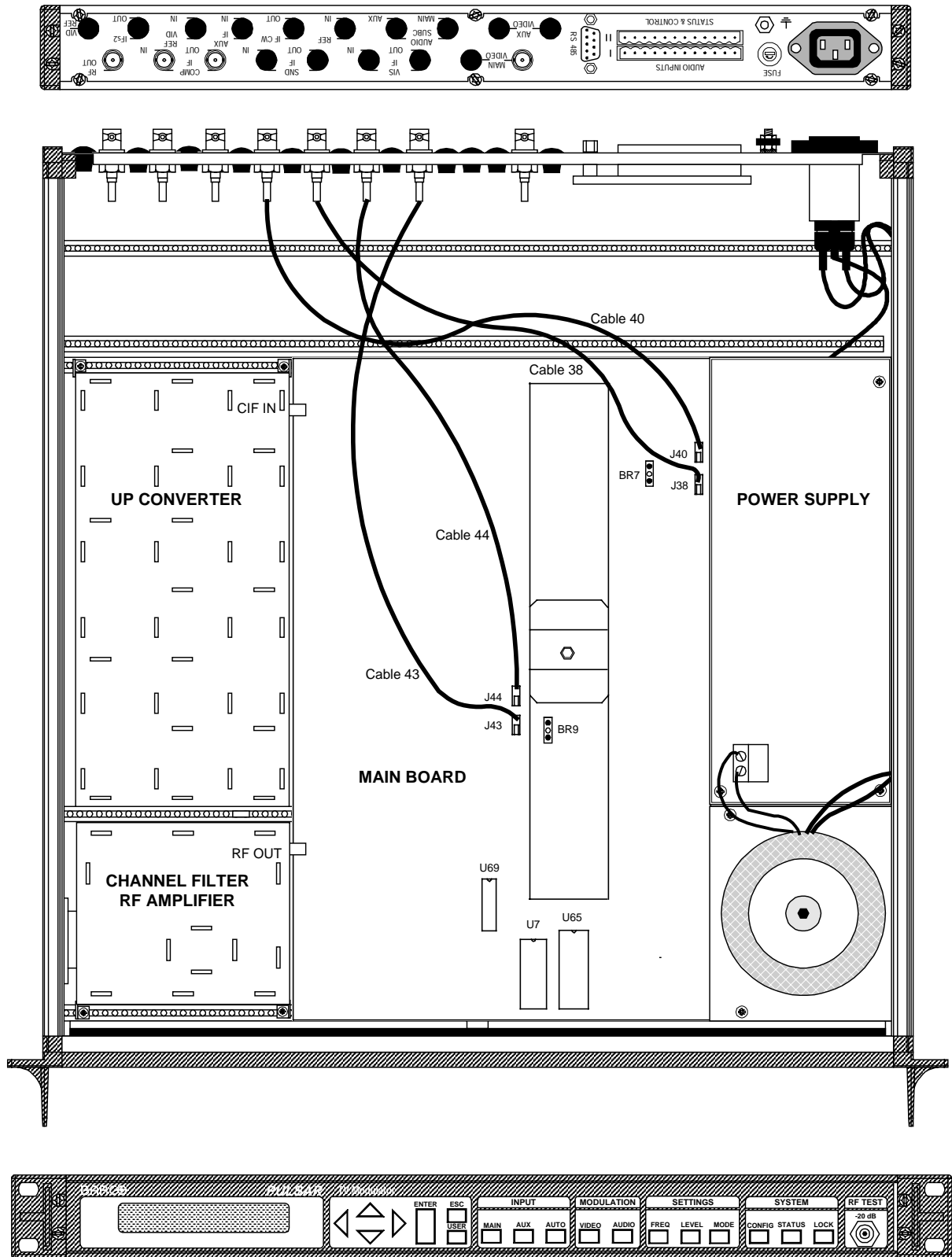
- Tighten all cables in place with the delivered cable ties.

If the loops are not used, it is needed to connect the external IF links with the cables delivered in the kit.

### 3.3 Closing The PULSAR

- Put the bottom cover back onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the bottom cover down.
- Turn the PULSAR upright.
- Put the top cover onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the top cover down.
- Replug the power cord.

# 4 LAYOUT





**OPTION: REFERENCE CARRIER INPUT**

ORDER NUMBER: C9825570

# 1 DESCRIPTION

If this option is installed, the output frequency is referred to an external reference which will provide higher frequency stability. It will also be possible to lock a group of modulators to one reference. The possible external reference frequencies are 6, 7, 8 and 10 MHz.

The input impedance is always high, and a loop through connection is provided by the included BNC T-connector.

If the level of the selected external reference carrier becomes too low the internal reference will automatically be selected.

# 2 SPECIFICATIONS

- Connector ..... BG, I, DK : BNC
- Input impedance ..... high impedance
- Input level ..... + 40 dBmV ± 6 dB

# 3 INSTALLATION

***Please read this chapter carefully before installing the option.***

**REMARK**

The installation procedure is only necessary when ordering this option separately. When ordering a PULSAR with Reference Carrier Input, the installation has already been carried out during production.

For location of the boards, connectors and jumpers use the internal layout figure.

**WARNING**

Before changing anything in the PULSAR, remove the power cord to switch off the power supply.

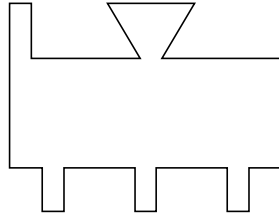
## 3.1 Opening The PULSAR

Unplug the power cord to turn off the PULSAR.

- Unscrew the nine screws (Torx 10) holding the top cover.
- Pull the top cover backwards and remove it.
- Loosen the nine screws (Torx 10) holding the bottom cover.
- Remove the bottom cover.

### 3.2 Installing The Reference Carrier Board

If needed, solder the three pins of the two supporting plates in the correct place. (see layout diagram)



- Cable connections to be made.

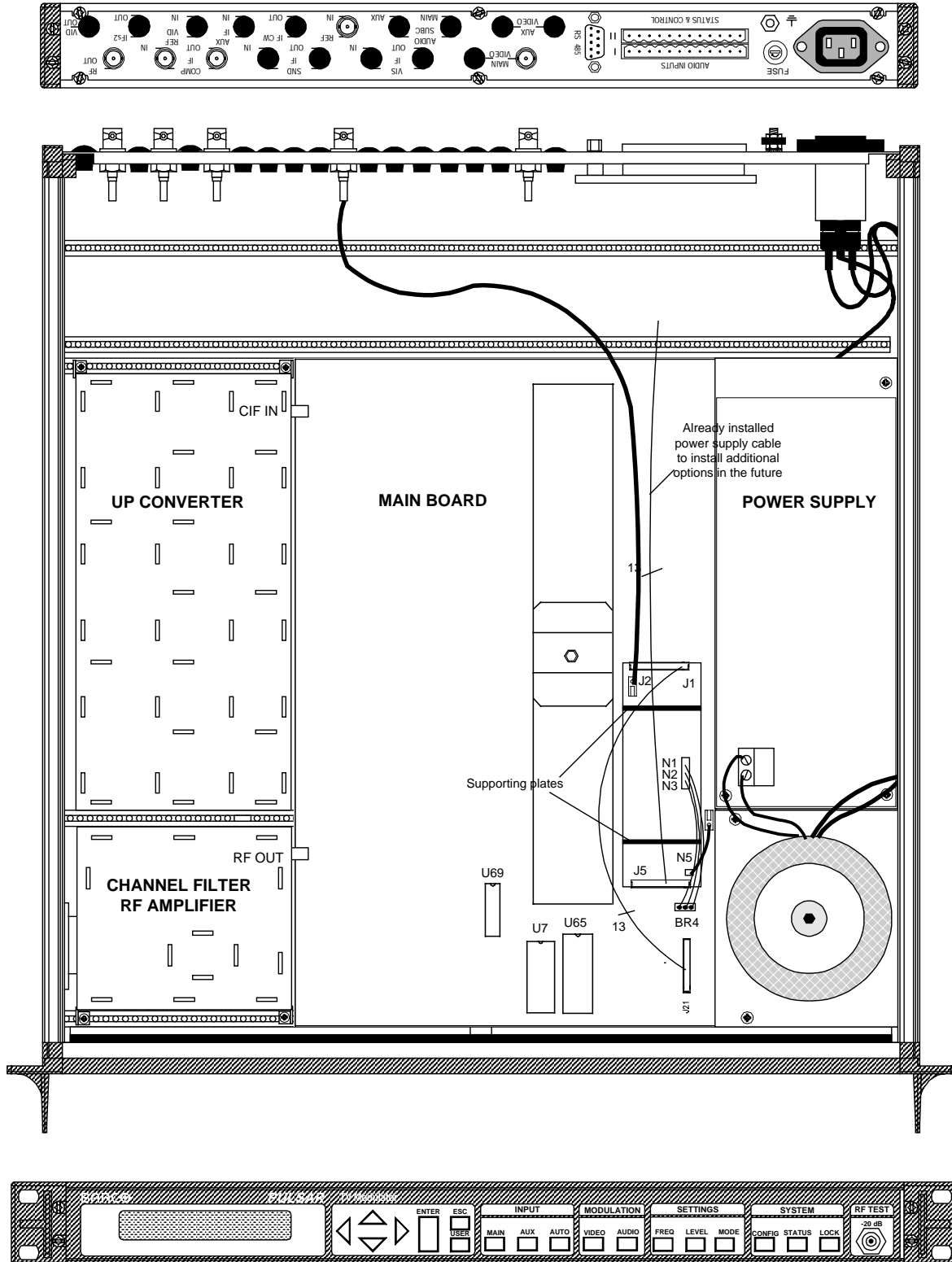
Cable	From	To
Reference Input Cable	REF IN connector	<b>J2</b> on the optional board
Power Supply Cable 1	<b>Remove</b> from <b>J21</b> on the mainboard.	<b>Connect</b> this end to <b>J5</b> on the optional board.
Power Supply Cable 2 (13-wire)	<b>J1</b> on the optional board	<b>J21</b> on the mainboard
Reference Output Cable	<b>N5</b> on the optional board	<b>J25</b> on the mainboard
Control Cable	<b>N1, N2 &amp; N3</b> on the optional board	<b>BR4</b> on the mainboard (remove BR4 first)

- Place the optional board over the tabs and twist them so the board will be fixed.
- Use the delivered cable ties to tight the cables.

### 3.3 Closing The PULSAR

- Put the bottom cover back onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the bottom cover down.
- Turn the PULSAR upright.
- Put the top cover onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the top cover down.
- Replug the power cord.

# 4 LAYOUT



## 5. SETTINGS

The default situation is the selection of the internal 10 MHz reference carrier. Select in the CONFIG menu the item CONFIG REF CARR INPUT. Scroll with the UP and DOWN arrow until INTERNAL appears. Confirm with ENTER.

However, it is possible to select an external reference carrier input. In the CONFIG REF CARR INPUT menu you can select with the UP or DOWN arrow the mode: AUTO [STATE : INTERNAL]. STATE indicates which of the reference carriers is used, the internal or external one.

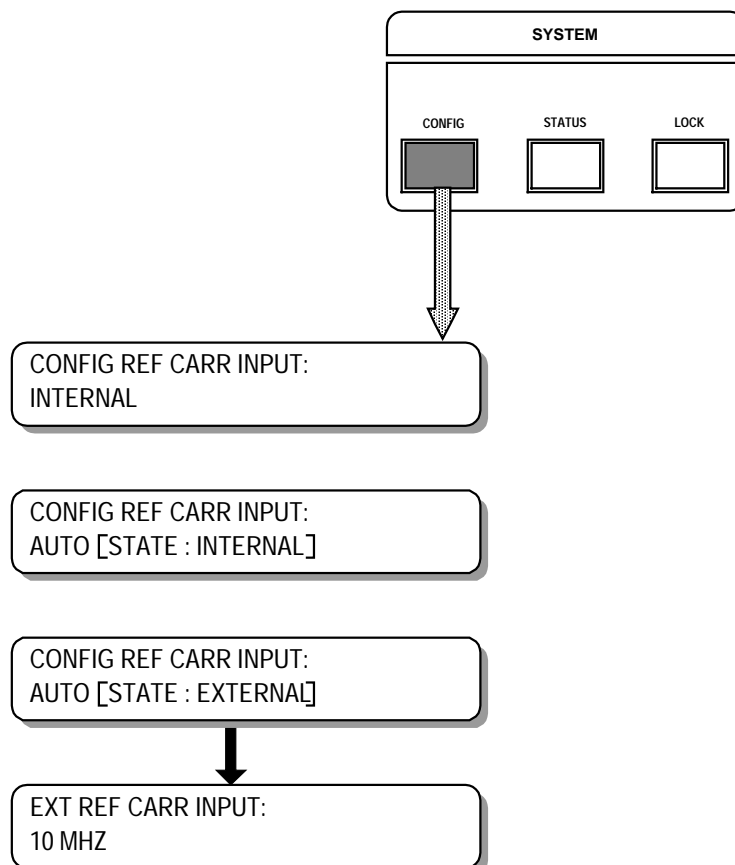
Only if an reference carrier of 40 dBmV  $\pm$  6 dB with the correct frequency (adjustable by the user) is connected to the connector REF IN at the rear panel, the STATE indication will change to EXTERNAL. Now the external reference carrier is used.

The frequency of the carrier is depending on the user's selection. This selection is done in the following menu CONFIG / EXT REF CARR INPUT. With the UP and DOWN arrow the required selection between 6, 7, 8 or 10 MHz can be made.

Pressing the UP or DOWN arrow gives the following message:

'THIS IS AN ALIGNMENT!!'  
<PRESS ENTER OR ESCAPE>

Press ENTER and make the selection of the required frequency.





**OPTION: SEPARATE IF OUTPUTS**

ORDER NUMBER: C9825580 (BG / I / DK, 75 Ohm)  
 C9825581 (BG / I / DK, 50 Ohm)

**1 DESCRIPTION**

With this option separated vision IF and Sound IF outputs are available. The composite IF output will be no longer available but the connectors on the rear panel get another function. If this option is already built in, the converter part is not present. This option can only be installed in a PULSAR IF and can not be combined with a channelized or agile converter.

**2 SPECIFICATIONS**

## IF Vision (modulated vision carrier)

- level + 40 dBmV ( 50 or 75 Ohm)
- return loss .....  $\geq 18$  dB
- connector ..... BNC: 50 Ohm  
 ..... BNC: 75 Ohm  
 ..... F-type: 75 Ohm
- range ..... fixed

## IF Sound 1 (sound carrier 1)

- level + 40 dBmV ( 50 or 75 Ohm)
- return loss .....  $\geq 18$  dB
- connector ..... BNC: 50 Ohm  
 ..... BNC: 75 Ohm  
 ..... F-type: 75 Ohm
- range ..... from 0 to -15 dB w.r.t. peak vision  
 ..... carrier.  
 ..... from -10 to -25 dB w.r.t. peak vision  
 ..... carrier.

## IF Sound 1 (sound carrier 1)

- level + 40 dBmV ( 50 or 75 Ohm)
- return loss .....  $\geq 18$  dB
- connector ..... BNC: 50 Ohm  
 ..... BNC: 75 Ohm  
 ..... F-type: 75 Ohm
- range ..... from 0 to -15 dB w.r.t. peak vision  
 ..... carrier.  
 ..... from -10 to -25 dB w.r.t. peak vision  
 ..... carrier.

### 3 INSTALLATION

**Please read this chapter carefully before installing the option.**

**REMARK**

The installation procedure is only necessary when ordering this option separately. When ordering a PULSAR with Separate IF Outputs, the installation has already been carried out during production.

For location of the boards, connectors and jumpers use the different layouts in chapter 4 : layouts.

**WARNING**

Before changing anything in the PULSAR, remove the power cord to switch off the power supply.

#### 3.1 Opening The PULSAR

**REMARK**

Before changing or removing anything in the PULSAR, remove the power to switch of the power supply.

- Unplug the power cord to turn off the PULSAR.
- Unscrew the nine screws (Torx 10) holding the top cover.
- Pull the top cover backwards and remove it.
- Loosen the nine screws (Torx 10) holding the bottom cover.
- Remove the bottom cover.

#### 3.2 Installing The Separate IF Outputs Board

**REMARK**

Installing this option has as a consequence that the option 4.5 MHz Aural Subcarrier or the Nicam Intercarrier is only possible in a single sound carrier version or in a dual sound carrier version delivered as a mono device. The option Composite IF Aux input is not possible any more.

For the right location of the boards, connectors and screws see the internal layout diagram.

- Install the Separate IF output board.
- Fix the board with the 4 screws on the chassis profiles.
- Install the power supply interconnection board.
- Fix the board with the screws on the chassis profiles.
  
- Bridges to be set on the mainboard.

Bridge	Function	Position
BR5	<b>Enables</b> / disables separate IF outputs	<b>Remove</b>
BR6	<b>Enables</b> / disables separate IF outputs	<b>Remove</b>

- Cable connections to be made.

Cable	From	To
Power supply cable 1 (yellow)	<b>J6</b> on the Sep IF output board	<b>J2</b> on the interconnection board
Power supply cable 2 (pre-installed)	<b>J21</b> on the mainboard (already installed)	<b>J1</b> on the interconnection board
First Sound Carrier Cable (n°34)	<b>J34</b> on the mainboard	<b>J5</b> on the Separate IF Outputs board
Second Sound Carrier Cable (n°36)	<b>J36</b> on the mainboard	<b>J3</b> on the Separate IF Outputs board
IFs1 Output Cable (n°94)*	CompIF In Connector position on the rear panel	<b>J4</b> on the Separate IF Outputs board
IFs2 Output Cable (n°92)	IFs2 Connector position on the rear panel	<b>J2</b> on the Separate IF Outputs board

\* Remove the connector CompIF In and replace it by this one.

- Use the labels to indentificate the new outputs. Mark the CompIF In with the label IFs1 Out and the CompIF Out with the label IFv Out.
- Tighten all cables with the supplied cable ties.

### 3.3 Updating Software Version

This updating is only necessary if the index of the software installed is of a lower version than the new delivered. The index of the software is indicated on the label one finds on the EPROM or GAL. On the label one can find "/ XX". This number indicated the software version.



Observe Precautions for Handling Electrostatic Sensitive Devices. Electrostatic discharge (ESD) can damage the electronic components. Therefore it is required to work in a static-safe work station.

For the location of the IC's, use the internal layout diagram

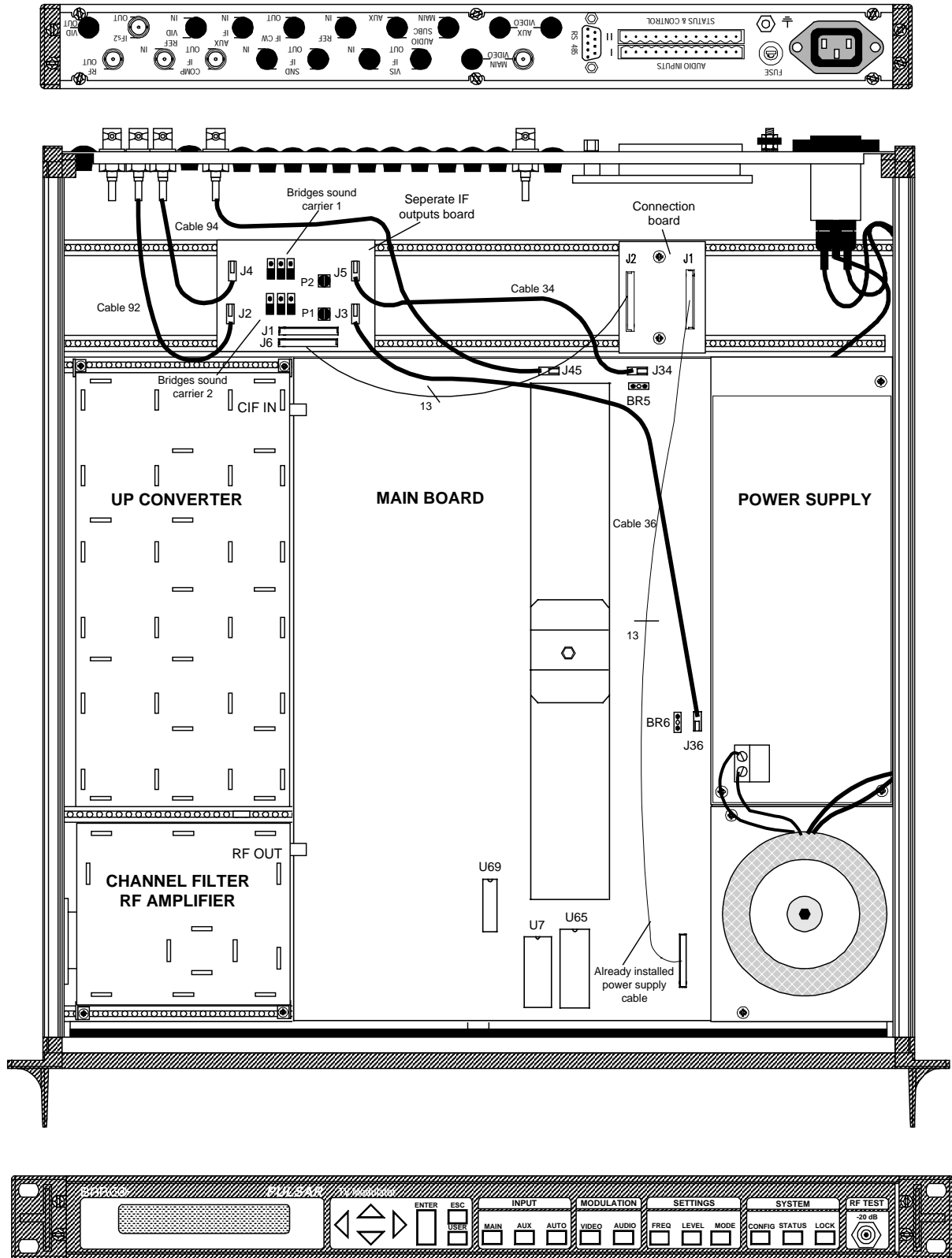
Replace EPROM U65 with the one include in the kitbox. Only needed when the index of the EPROM in the kitbox is higher than the one that is installed.

Replace GAL U69 with the one included in the kitbox. Only needed when a GAL is included in the kitbox and the index of the GAL in the kitbox is higher than the one that is installed.

### 3.3 Closing The PULSAR

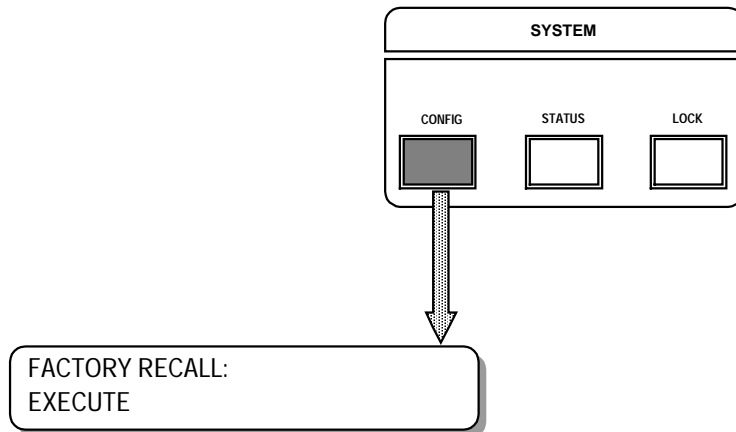
- Put the bottom cover back onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the bottom cover down.
- Turn the PULSAR upright.
- Put the top cover onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the top cover down.
- Replug the power cord.

# 4 LAYOUT



## 5 ALIGNMENT

Start the alignment with executing FACTORY RECALL in the CONFIG menu.



After a factory recall the three output levels are put on +40 dBmV. It is possible to do some fine tuning with the potentiometer P2 and P1 in case of a dual sound carrier system.

Connect a spectrum analyzer to the IFv Out connector on the rear panel. Check if the level is +40 dBmV.

Connect a spectrum analyzer to the IFs1 Out connector on the rear panel. Check if the level is +40 dBmV. When the level is not +40 dBmV it can be adjusted with potentiometer P2 until the level is reached.

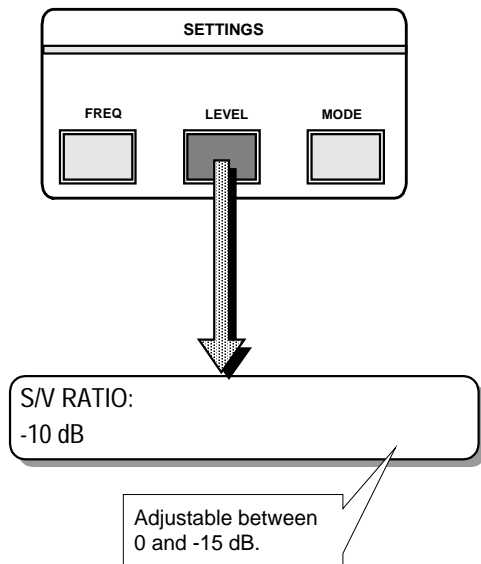
Connect a spectrum analyzer to the IFs2 Out connector on the rear panel. Check if the level is +40 dBmV. When the level is not +40 dBmV it can be adjusted with potentiometer P1 until the level is reached.

## 6 SETTINGS

After installing this option the display concerning the Sound / Vision ratio in the LEVEL menu will be changed.

### 6.1 MONO PULSAR

The default setting for the S/V ratio is 0 dB with a range from 0 to -15 dB.



By changing bridges BR1, BR2 and BR6 simultaneously, it is possible to have a S/V ratio with an attenuation of 10 dB. After changing the positions of the bridges, confirm this change by executing CLEAR ALL DATA & RESTART in the STATUS menu. Be aware that when executing this function all user settings will be lost.

The range is now changed from -10 to -25 dB.

### TOP VIEW

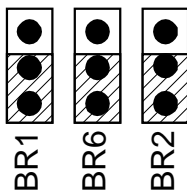


figure 1: the default position of the bridges (towards front panel)

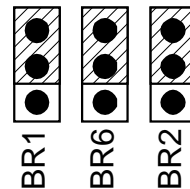


figure 2: position of the bridges when an attenuation of 10 dB is inserted

## 6.2 STEREO PULSAR

In a standard configuration it is not possible to change S/V1 and S/V2 separately. With the Separate IF Outputs the S/V ratios can be set individually.

The default setting for the S/V ratios is 0 dB with a range from 0 to -15 dB for both.

Both S/V ratios can be attenuated 10 dB by changing some bridges. For S1/V ratio this is done by bridges BR1, BR2 and BR6, for S2/V ratio by bridges BR3, BR4 and BR5. When one changes the bridges one has to execute CLEAR ALL DATA & RESTART in the STATUS menu.

### TOP VIEW

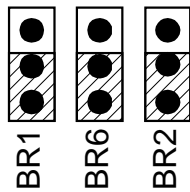


figure 1: the default position of the bridges (towards front panel)

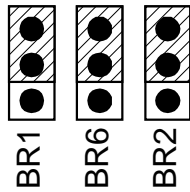
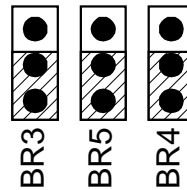
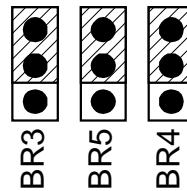


figure 2: position of the bridges when an attenuation of 10 dB is inserted







**OPTION: VISION CARRIER REFERENCE INPUT**

ORDER NUMBER: C9825576

# 1 DESCRIPTION

If this option is installed, the output frequency is referred to an external connected Vision Carrier Reference which will provide higher frequency stability. Also the sound carrier IF frequency is related to this external reference signal.

**WARNING**

An offset on this reference carrier will not only change the IF vision frequency but also the sound / vision frequency spacing.

This option is normally only used in an IF PULSAR. This means a PULSAR without upconverter. The only exception is in case of a PULSAR that will be used in combination with a OPL 200 Mark II.

The vision carrier reference input option can not be used in combination with the option reference carrier input.

The input impedance is always high, and a loop through connection is provided by the included BNC T-connector.

If the level of the selected external reference carrier becomes too low the internal reference will automatically be selected.

# 2 SPECIFICATIONS

- Connector ..... BNC
- Input impedance ..... 50 Ohm
- Input level ..... + 40 dBmV ± 6 dB

# 3 INSTALLATION

***Please read this chapter carefully before installing the option.***

**REMARK**

The installation procedure is only necessary when ordering this option separately. When ordering a PULSAR with Vision Carrier Reference Input, the Installation has already been carried out during production.

For location of the boards, connectors and jumpers use the internal layout figure.

**WARNING**

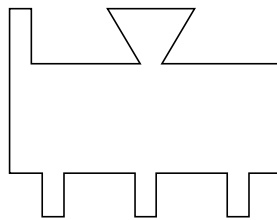
Before changing anything in the PULSAR, remove the power cord to switch off the power supply.

### 3.1 Opening The PULSAR

- Unplug the power cord to turn off the PULSAR.
- Unscrew the nine screws (Torx 10) holding the top cover.
- Pull the top cover backwards and remove it.
- Loosen the nine screws (Torx 10) holding the bottom cover.
- Remove the bottom cover.

### 3.2 Installing The Reference Carrier Board

If needed, solder the three pins of the two supporting plates in the correct place. (see layout diagram)



- Bridges to be set on the mainboard.

Bridge	Function	Position
BR31	Enables / disables the option Vision Carrier Reference Input	Remove

- Cable connections to be made.

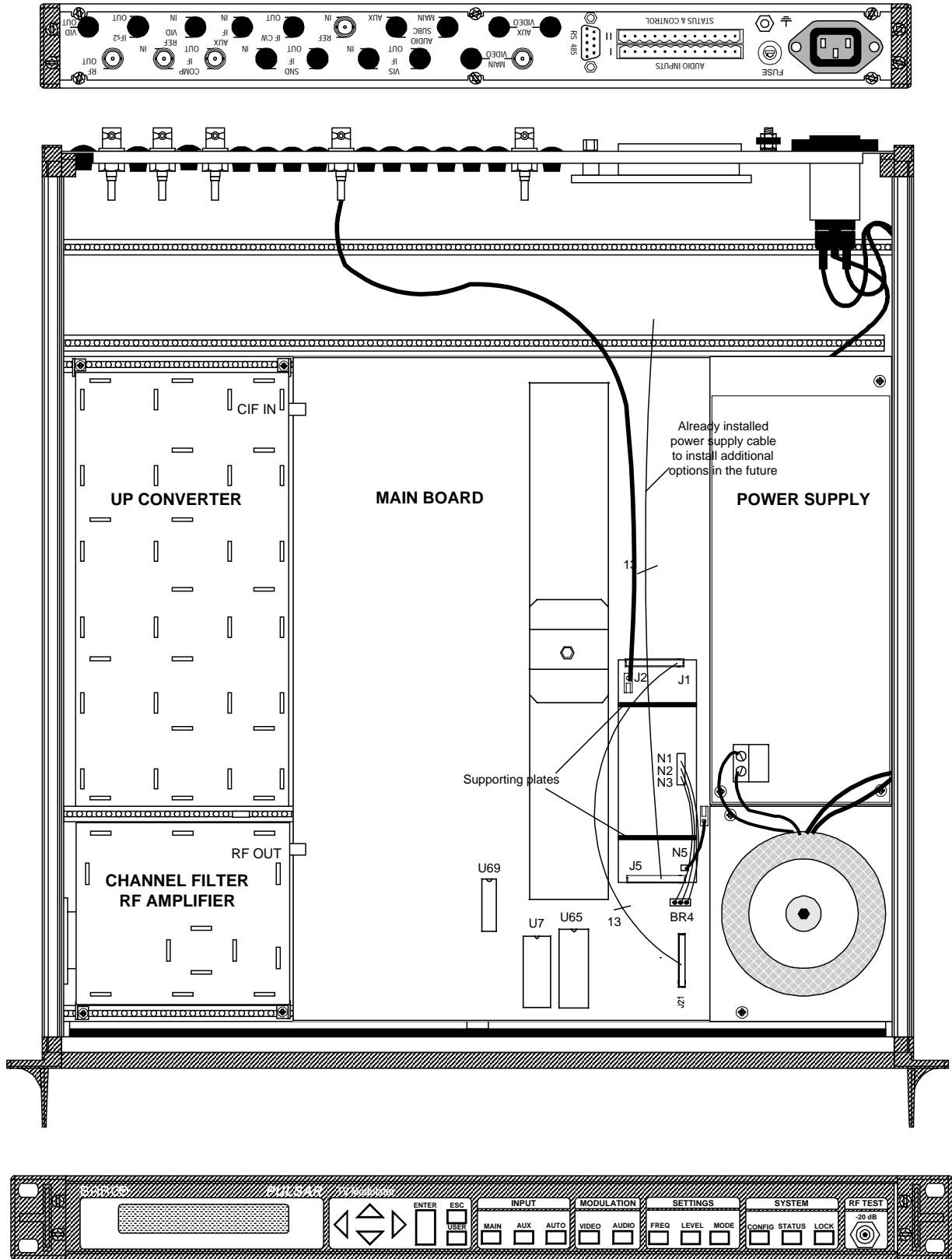
Cable	From	To
Vision Carrier Reference Input Cable from rear panel	REF IN connector	J2 on the optional board
Power Supply Cable 1 (13-wire)	Remove from J21 on the mainboard.	Connect this end to J5 on the optional board.
Power Supply Cable 2 (13-wire)	J1 on the optional board	J21 on the mainboard
Vision Carrier Reference Input Cable from mainboard	N4 on the optional board	J72 on the mainboard
Vision Carrier Reference Output Cable to mainboard	N5 on the optional board	J72* on the mainboard

- Place the optional board over the tabs and twist them to fix the board.
- Use the delivered cable ties to tighten the cables.

### 3.3 Closing The PULSAR

- Put the bottom cover back onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the bottom cover down.
- Turn the PULSAR upright.
- Put the top cover onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the top cover down.
- Replug the power cord.

# 4 LAYOUT

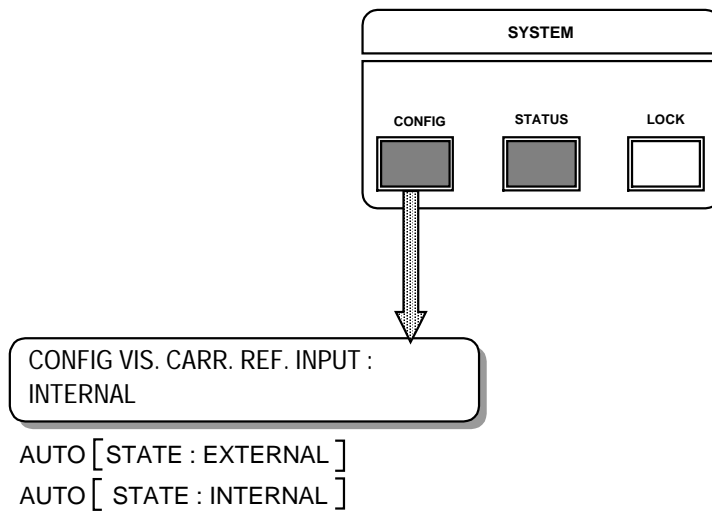


## 5. SETTINGS

The default situation is the selection of the internal reference carrier. Select in the CONFIG menu the item CONFIG VIS CARR REF INPUT. Scroll with the UP and DOWN arrow until INTERNAL appears. Confirm with ENTER.

However, it is possible to select an external reference carrier. In the CONFIG VIS CARR REF INPUT menu one can select with the UP or DOWN arrow the mode: AUTO [STATE : INTERNAL]. STATE indicates which of the reference carrier is used, the internal or external one.

Only if a reference carrier of  $40 \text{ dBmV} \pm 6 \text{ dB}$  with the correct frequency (39.8 Mhz) is connected to the connector REF IN at the rear panel, the STATE indication will change to EXTERNAL. Now the external reference carrier is used.



**OPTION: DATA LINE DECODER**

ORDER NUMBER: C9825648 (Plug in version)  
C9825649 (In combination with the option Main Scrambled / Aux Unscrambled)

## 1 DESCRIPTION

A PULSAR with this built-in option can use the information on video line 16 to switch the stereo coder in the correct sound mode: stereo, dual sound or mono. This option is only possible in combination with a IRT stereo coder.

## 2 INSTALLATION

*Please read this chapter carefully before installing the option.*

**REMARK**

The installation procedure is only necessary when ordering this option separately. When ordering a PULSAR with Data Line Decoder, the installation has already been carried out during production.

For location of the boards, connectors and jumpers use the internal layout diagram.

### 2.1 Opening The PULSAR

**REMARK**

Before changing or removing anything in the PULSAR, remove the power to switch of the power supply.

- Unplug the power cord to turn off the PULSAR.
- Unscrew the nine screws (Torx 10) holding the top cover.
- Pull the top cover backwards and remove it.
- Loosen the nine screws (Torx 10) holding the bottom cover.
- Remove the bottom cover.

### 2.2 Installing The Data Line Decoder Board.

There are two situations possible: a PULSAR with the option Main Scrambled / Aux Unscrambled or a PULSAR without that option. This is because normally the Data Line Decoder board is installed at the same position as the option Main Scrambled / Aux Unscrambled.

**Case 1** : Data Line Decoder without the option main scrambled / aux unscrambled.

Plug the optional board on the right location. See the Internal layout for more details and the exact location.

Fix the board with the supplied split pin.

Bridges to be set on the optional board.

Bridge	Function	Position*
BR2	Defines if the option is used <b>with</b> or without the option mains scrambled / auxiliary unscrambled input	<b>Default</b>

\* The marked position is the default position.

**Case 2** : Data Line Decoder with the option main scrambled / aux unscrambled.

Fix the optional board with the four supplied screws in a free position at the rear of the PULSAR. This will have the consequence that either the option Auxiliary IF Input or the option Nicam Intercarrier not possible is anymore.

Bridges to be set on the optional board.

Bridge	Function	Position*
BR1	Reference Video terminated at <b>75 Ohm</b> / High Impedance	<b>Default</b>
BR2	Defines if the option is used <b>with</b> or without the option mains scrambled / auxiliary unscrambled input.	<b>Default</b>

\* The marked position is the default position.

Cable connections to be made.

Cable	From	To
Power Supply Cable (pre-installed)	<b>J21</b> on the mainboard (already installed)	<b>J21</b> on the optional board
REF VID Input Cable*	REF VID Connector	<b>J23</b> on the optional board
REF VID Connection Cable	<b>J24</b> on the optional board	<b>J56</b> on the mainboard

\* The REF VID cable has first to be removed from connector J56 on the mainboard.

## 2.3 Updating Software Version

This updating is only necessary if the index of the software installed is of a lower version than the new delivered. The index of the software is indicated on the label one finds on the EPROM or GAL. On the label one can find "/ **XX**". This number indicated the software version.



Observe Precautions for Handling Electrostatic Sensitive Devices. Electrostatic discharge (ESD) can damage the electronic components. Therefore it is required to work in a static-safe work station.

For the location of the IC's, use the Internal layout in chapter 4 : Layout

Replace EPROM **U65** with the one include in the kitbox. Only needed when the index of the EPROM in the kitbox is higher than the one that is installed.

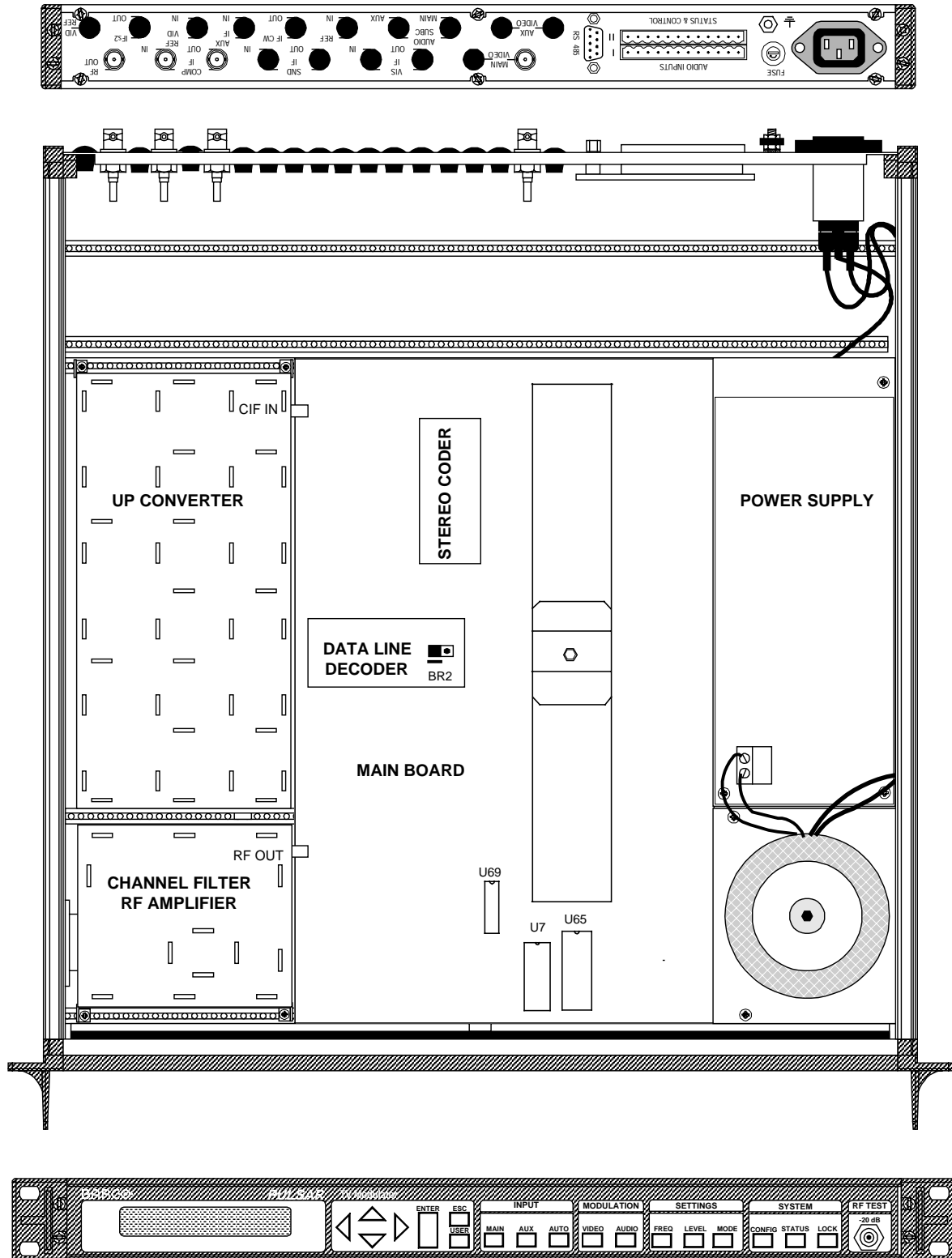
Replace GAL **U69** with the one include in the kitbox. Only needed when a GAL is included in the kitbox and the index of the GAL in the kitbox is higher than the one that is installed.

## **2.4 Closing The PULSAR**

- Put the bottom cover back onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the bottom cover down.
- Turn the PULSAR upright.
- Put the top cover onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the top cover down.
- Replug the power cord.

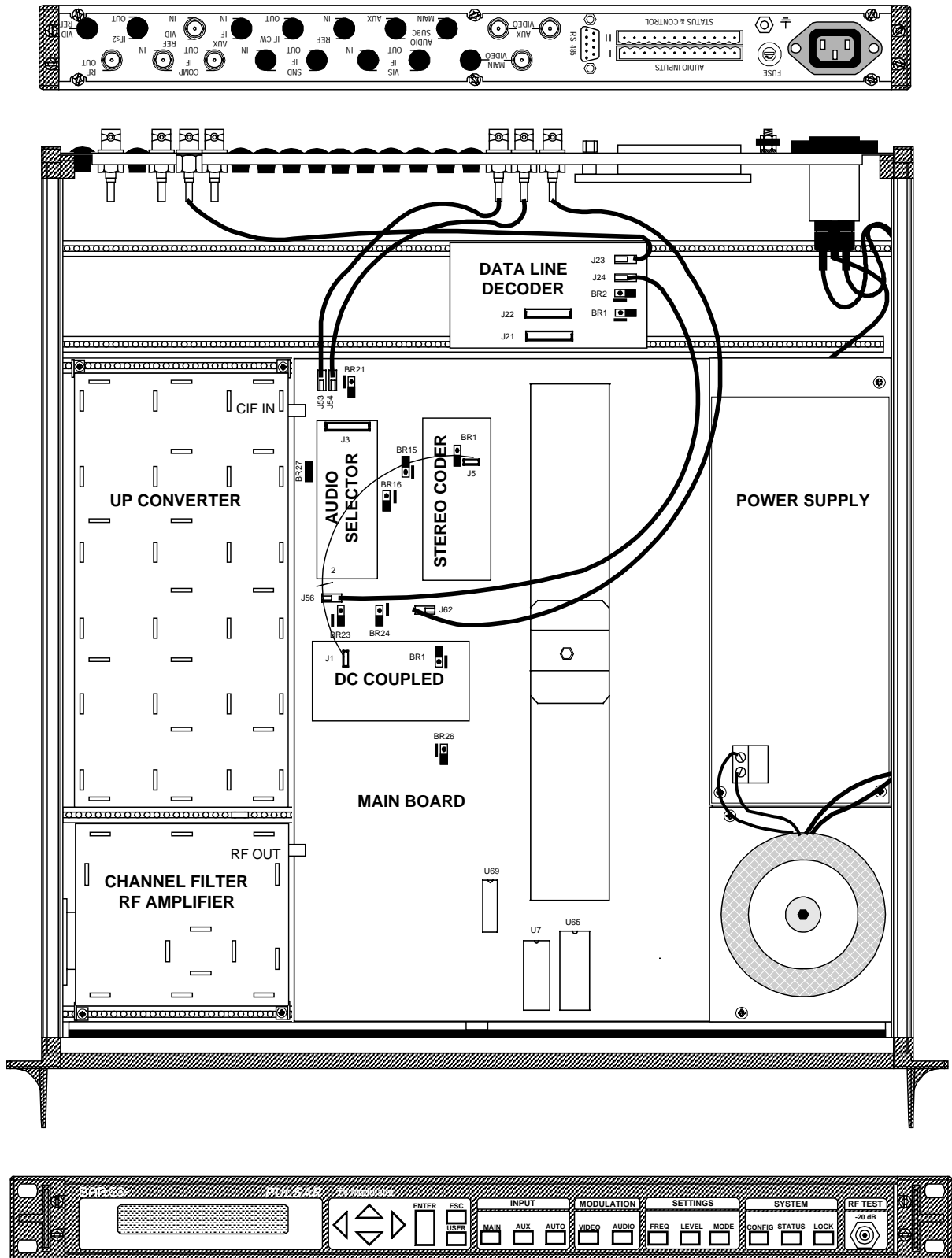
### 3 LAYOUT

#### 3.1 Without The Option Main Scrambled / Auxiliary Unscrambled





### 3.2 With The Option Main Scrambled / Auxiliary Unscrambled



## 4 SETTINGS

When the option Data Line Decoder is installed an additional item in the Sound Coder Control will be available. The options are :

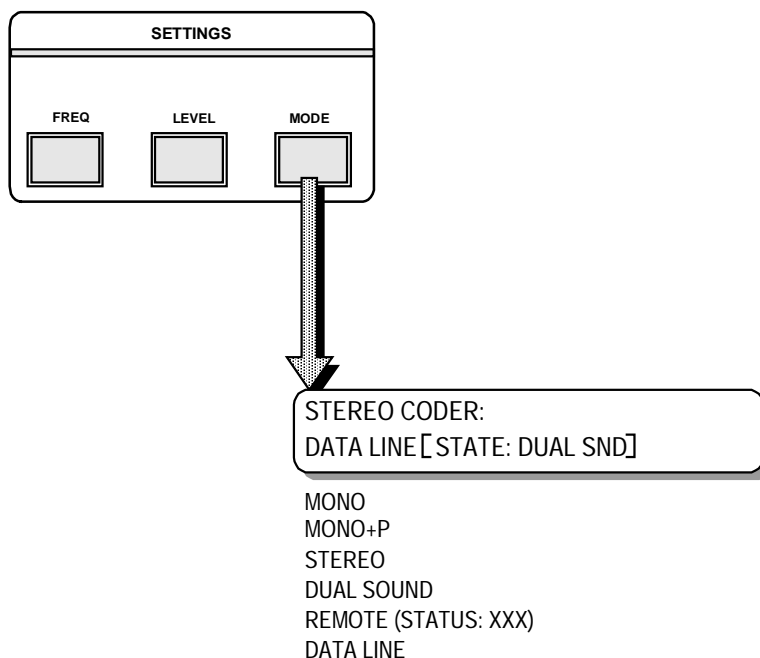
STEREO  
DUAL SOUND  
MONO  
MONO + P  
REMOTE  
DATA LINE

The mode can be selected in the menu MODE. With the left and right arrow one can move through the different menu's. In the menu Stereo Coder you can select the desired sound coder control mode.

According to the data on line 16, the stereo coder is set on the correct mode:

MONO  
MONO + P  
DUAL SOUND  
STEREO

The state of the Data Line Decoder is found between brackets.



If there is no data on data line 16 and the Stereo Coder is set in data line mode, an alarm will be generated. The alarm message will be: '!!NO DATA ON LINE 16!!'

**OPTION: REFERENCE CARRIER OUTPUT**

ORDER NUMBER:	VOPT5014	With BNC 50 Ohm Connector
	VOPT5015	With BNC 75 Ohm Connector
	VOPT5016	With F 75 Ohm Connector (kit C9825590)

## 1 DESCRIPTION

In a PULSAR an additional output can be installed to have the reference carrier available at the rear panel.

The signal at the output will be the 10MHz internal reference carrier. Only in case the option reference carrier input has been installed the output will provide the externally connected reference carrier. In case no external reference carrier is connected or the level is too low the internal 10 MHz reference carrier will be available. The external reference carrier can be a 6, 7, 8 or 10 MHz carrier depending on the settings of the Reference Carrier Input. These settings can be modified in the MODE menu. For more information refer to the description of the Reference Carrier Input option.

*Remark: this option does not involve any change in the PULSAR software.*

## 2 SPECIFICATIONS

- Connector	.....	BNC 50 Ohm	(VOPT5014)
	.....	BNC 75 Ohm	(VOPT5015)
	.....	F 75 Ohm	(VOPT5016)
- Output level	.....	43 dBmV, $\pm 3$ dB	

## 3 INSTALLATION

### 3.1 Opening The Pulsar

- Unplug the power cord to turn off the PULSAR.
- Unscrew the nine screws (Torx 10) holding the top cover.
- Pull the top cover backwards and remove it.
- Loosen the nine screws (Torx 10) holding the bottom cover.
- Remove the bottom cover.

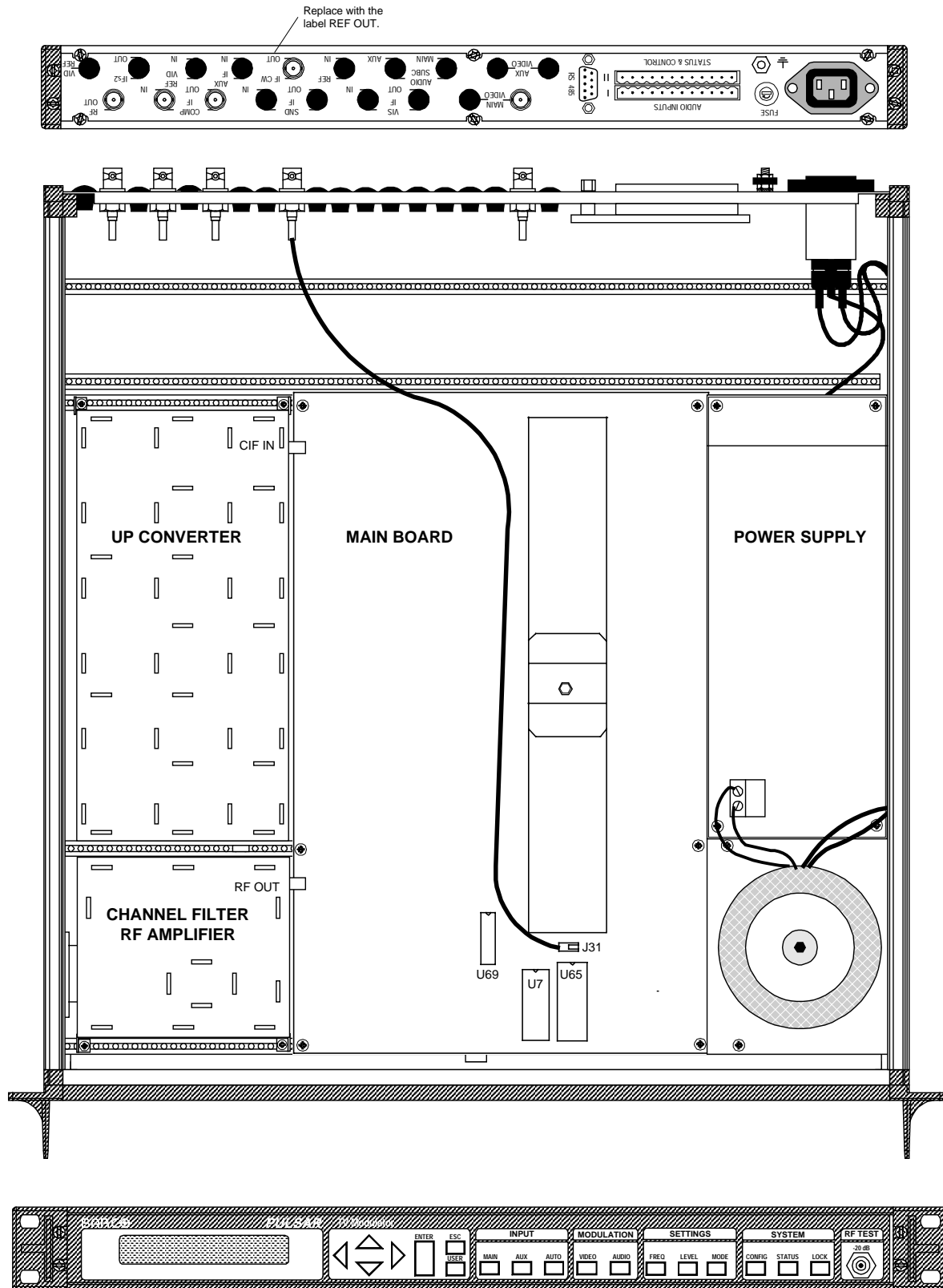
### 3.2 Installing The Option

- Remove the black bushing dome on the position IFCW at the rearpanel of the PULSAR.
- Replace the label IFCW by the label REF OUT
- Mount the cable, included in the kit, between the rear plate (position REF OUT) and J31 on the mainboard (see layout).

### 3.3 Closing The Pulsar

- Put the bottom cover back onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the bottom cover down.
- Turn the PULSAR upright.
- Put the top cover onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the top cover down.
- Replug the power cord to turn on the PULSAR.

# 4 LAYOUT







**OPTION: Vision Carrier Reference Output**

ORDER NUMBER:	VOPT5003	With F 75 Ohm Connector
	VOPT5004	With BNC 50 Ohm Connector
	VOPT5013	With BNC 75 Ohm Connector

# 1 DESCRIPTION

In a PULSAR an additional output can be installed to have the unmodulated vision carrier available at the output.

The additional output is labeled IF CW OUT. CW means Continuous Wave or Carrier Wave and is an unmodulated carrier. There are no changes in the menu of the PULSAR.

# 2 SPECIFICATIONS

- Connector	.....	F 75 Ohm	(VOPT5003)
	.....	BNC 50 Ohm	(VOPT5004)
	.....	BNC 75 Ohm	(VOPT5013)
- Output level	.....	46 dBmV, ±3 dB	
- Return loss	.....	≥ 15 dB	

# 3 INSTALLATION

## 3.1 Opening The PULSAR

- Unplug the power cord to switch off the PULSAR.
- Unscrew the nine screws (Torx 10) holding the top cover.
- Pull the top cover backwards and remove it.
- Loosen the nine screws (Torx 10) holding the bottom cover.
- Remove the bottom cover.

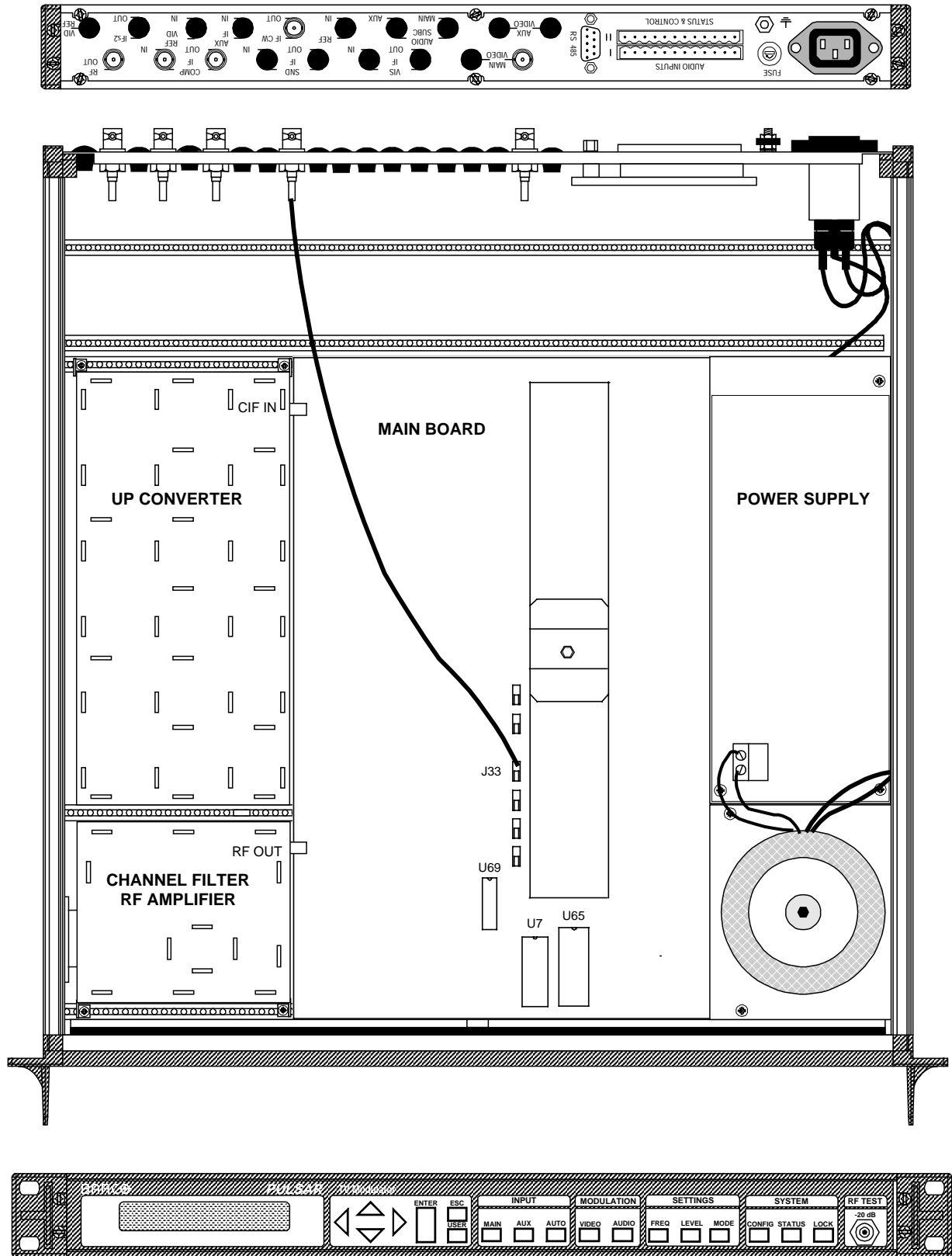
## 3.2 Installing The Reference Carrier Output Option

- Mount the cable, included in the kit, between the rear panel (position IF CW) and J33 on the mainboard (see layout).

## 3.3 Closing The PULSAR

- Put the bottom cover back onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the bottom cover down.
- Turn the PULSAR upright.
- Put the top cover onto the chassis.
- Tighten the nine screws (Torx 10) while pressing the top cover down.

### 3 LAYOUT





**OPTION: Dual Composite IF Outputs**

ORDER NUMBER:	C9825685	KIT DUAL CIF OUT BG B50
	C9825686	KIT DUAL CIF OUT BG B75
	C9825687	KIT DUAL CIF OUT BG F75

## 1. DESCRIPTION

The dual composite IF outputs option provides a second CIF output. The connector carrying the second CIF is located at the rear panel (IFS2 output position) and relabeled 'AUX CIF'.

The board consists of a splitter, two buffer amplifiers and two low pass filters. The output level is fixed at +40 dBmV  $\pm$  1dB. The optional board is internally located at the CIF Aux Input option position or at the Audio Subcarrier / BTSC Encoder position. This manual will give an overview of the different installation possibilities.

## 2. SPECIFICATIONS

- Connector BNC or F (depending on ordered kit)
- Impedance 50  $\Omega$  or 75  $\Omega$  ( depending on ordered kit )
- Output level + 40 dBmV  $\pm$  1 dB
- Return loss  $\geq$  18 Db

## 3. INSTALLATION

The option can be default mounted on the location of the COMP IF AUX IN option (P009). In combination with this option, the board could be placed on the location of the AUDIO SUBC option (P005) or BTSC ENCODER option (P006). Consequently, one of these options has to be removed if already installed.

Each basic PULSAR already has a CT cable connected to the connector J21 of the main board in order to provide a power and data connection to the optional boards. Some options still need an additional interconnection board if the CT cable cannot reach the location of the board. In this case, the interconnection board will be included in the installation kit.

### Remark

*The Dual CIF outputs option can never be combined with the Separate IF Outputs (P012) option.*

## 3.1 Installation

Two different locations to install the board will be described:

- Installation on the COMP IF AUX IN position.
- Installation on the AUDIO SUBC/BTSC Encoder position.



Before changing or removing something in the PULSAR, remove the power cord to switch off the power supply

Opening the PULSAR

- Loosen the screws at the back and at both sides of the unit (9 screws)
- Lift the backside of the top cover, push the top cover backwards to get it out of the front panel. The top cover should be completely removed now.

More information about the position of connectors and cables can be found back on the internal layout drawings.

### 3.1.1 Installation On The Composite IF Aux In Position

The Composite IF Aux position is the default position to install the optional board. It is located at the left top side of the unit.

- Loosen cable 1 at the CIF input of the converter and connect this cable to J1 (CIF IN) of the Dual CIF Outputs board.
- The main output of the Dual CIF Output Board (J4) must be connected with the CIF input of the converter with cable 74.
- Mount cable 75 between J5 (aux output of the Dual CIF Outputs Board) and the rearplate. (position lfs2) . Stick a label called 'AUX CIF' on the old label.
- The yellow 13 pins CT cable:

In case the audio subcarrier module or a BTSC encoder is installed.

Connection from J2 on the Audio Subcarrier Board or BTSC Encoder Board to J2 on the Dual CIF Output Board.

In case neither the Audio Subcarrier Board nor BTSC encoder are installed.

Mount the interconnection board (V5637385) in the position as shown on the internal layout drawing (see page 4-2). Make sure the CT cable coming from the main board (J21) can reach the connector on the interconnection board. Connect J21 of the mainboard with J1 of the interconnection board and connect the other connector to J2 of the dual CIF outputs module.

### 3.1.2 Installation On The Audio Subc Position

The installation on this position is only carried out if the default position, namely the CIF Aux Input location, is already occupied. Consequently, it is not possible anymore to install a BTSC encoder option or Audio Subcarrier Board because the available space inside the unit will be occupied by the CIF Aux Input Board, the Dual CIF Outputs Board and the Interconnection Board.

- Loosen cable 24 at the CIF input of the converter and connect the cable to J1 (CIF IN) of the Dual CIF Outputs Board.
- The main output of the Dual CIF Outputs Board must be connected with the CIF input of the converter with cable 74.
- Mount cable 75 between J5 (aux output of the Dual CIF Outputs Board) and the rearplate. (position lfs2). Stick a label called 'AUX CIF' on the old label lfs2.
- The CT cable for power feeding and data connection:
- Connect the interconnection board with J21 of the mainboard and to J2 of the Dual CIF Outputs board.

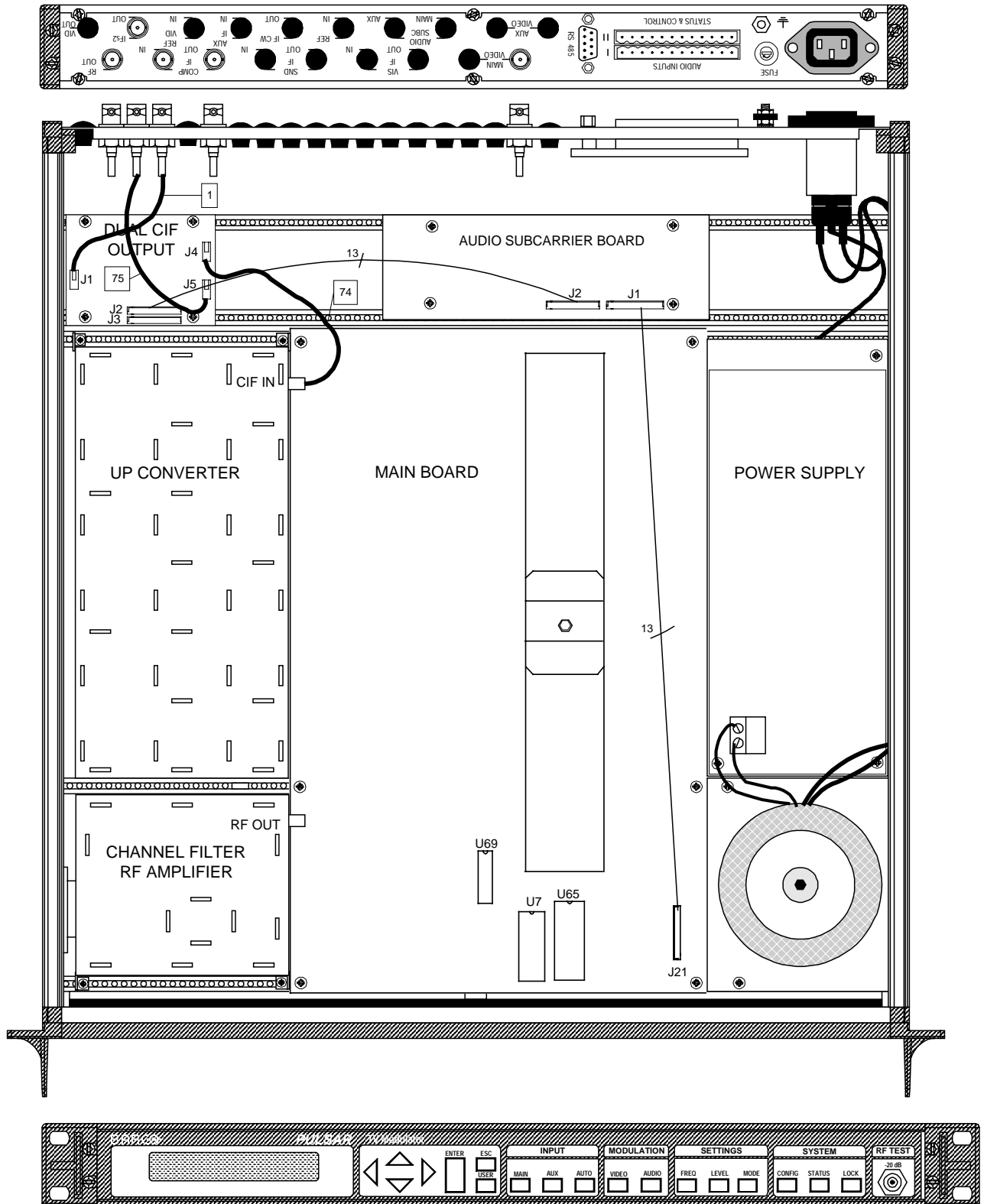
#### Closing the PULSAR

Before closing the unit, check once more all the cables and connectors. A badly fixed connector could take a lot of troubleshooting time. Also, use the cable ties to fasten the cables in a decent way.

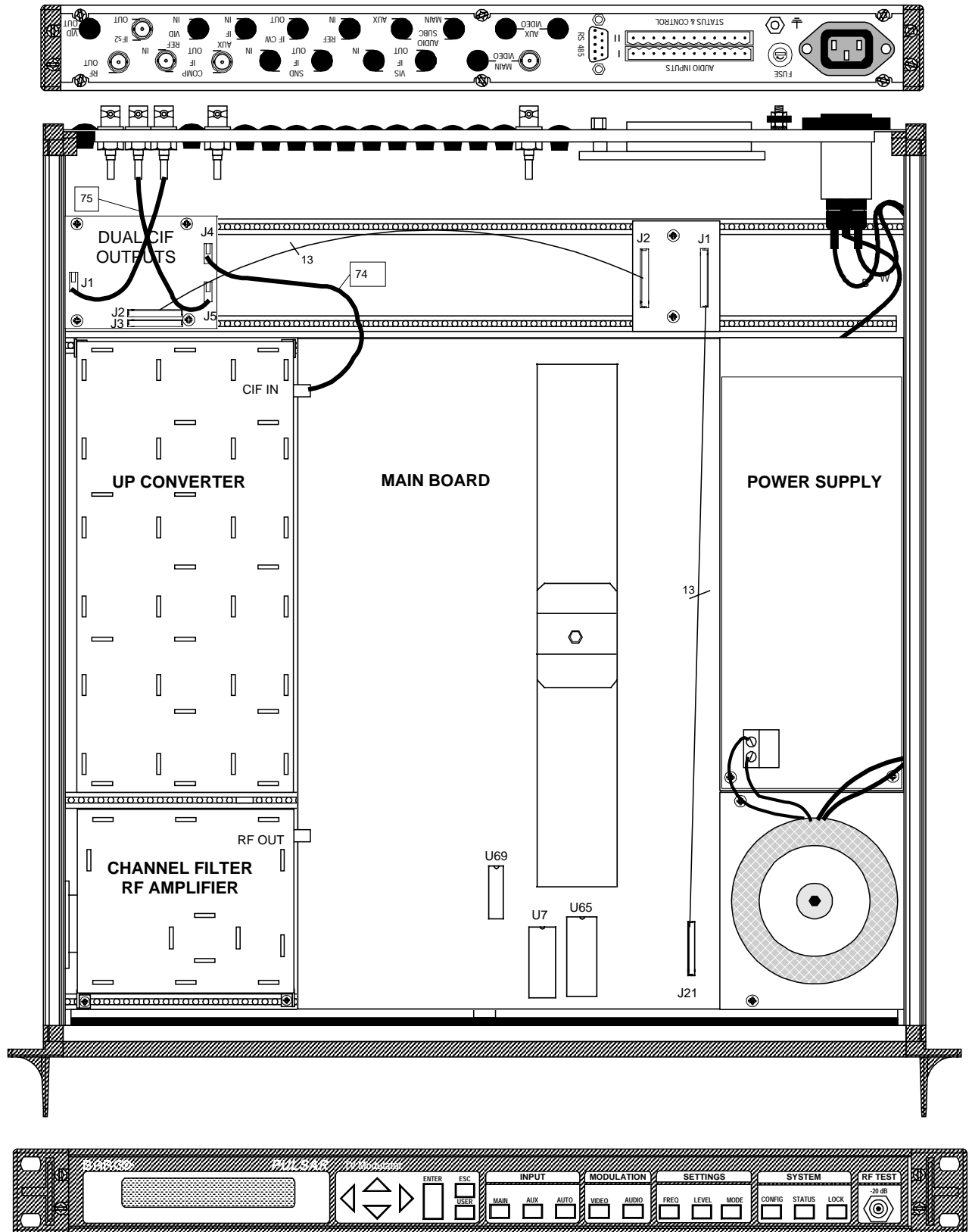
- Replace the top cover on the PULSAR chassis.
- Screw down the top cover with the 9 screws.

# 4. INTERNAL LAYOUT

- Installation On The CIF AUX IN Position With The Audio Subcarrier Board Installed



- Installation On The CIF AUX IN Position



- Installation On The Audio Subcarrier/BTSC Encoder Position

