

PIN N°	INPUT/ OUTPUT	SIGNAL	SIGNAL MARK	CHARACTERISTICS	N° INT#
35		Reserved			
36		Reserved			
37		Digital ground	GND1	Digital ground linked to general ground.	

J11 RF OUTPUT connector

Coaxial socket N type R161 252 (160 00133)

For transmitter connection to antenna using a 50 Ω coaxial cable equipped with UG1185A/U N plug (160 00047)

GROUND TERMINAL

4 mm diameter screw rod with butterfly nut.

5.3.2 Front panel connector

MAINTENANCE connector

SUB-D 9 pins socket DEP-09S-300 Code Telerad (150 00385)

The table here below gives the list of signals transiting this connector:

PIN N°	INPUT/ OUTPUT	SIGNAL	SIGNAL MARK	CHARACTERISTICS	N° INT#
1		Not used			
2	I	RD	J	Maintenance link: data reception Input level: $\pm 12V$.	127
3	O	TD	K	Maintenance link: data transmission Output level: max. $\pm 15 V$.	128
4	O	DTR	L	Maintenance link: Data terminal ready Output level: +12V.	123
5		Digital ground	GND1		
6	I	DSR	M	Maintenance link: Data set ready Input level: +9V to +12V for RS232 presence.	127
7		Not used			
8		Not used			
9		Not used			

5.3.3 Electrical interfaces used

The diagrams here after give the list of electrical interfaces used in the previous connectors:

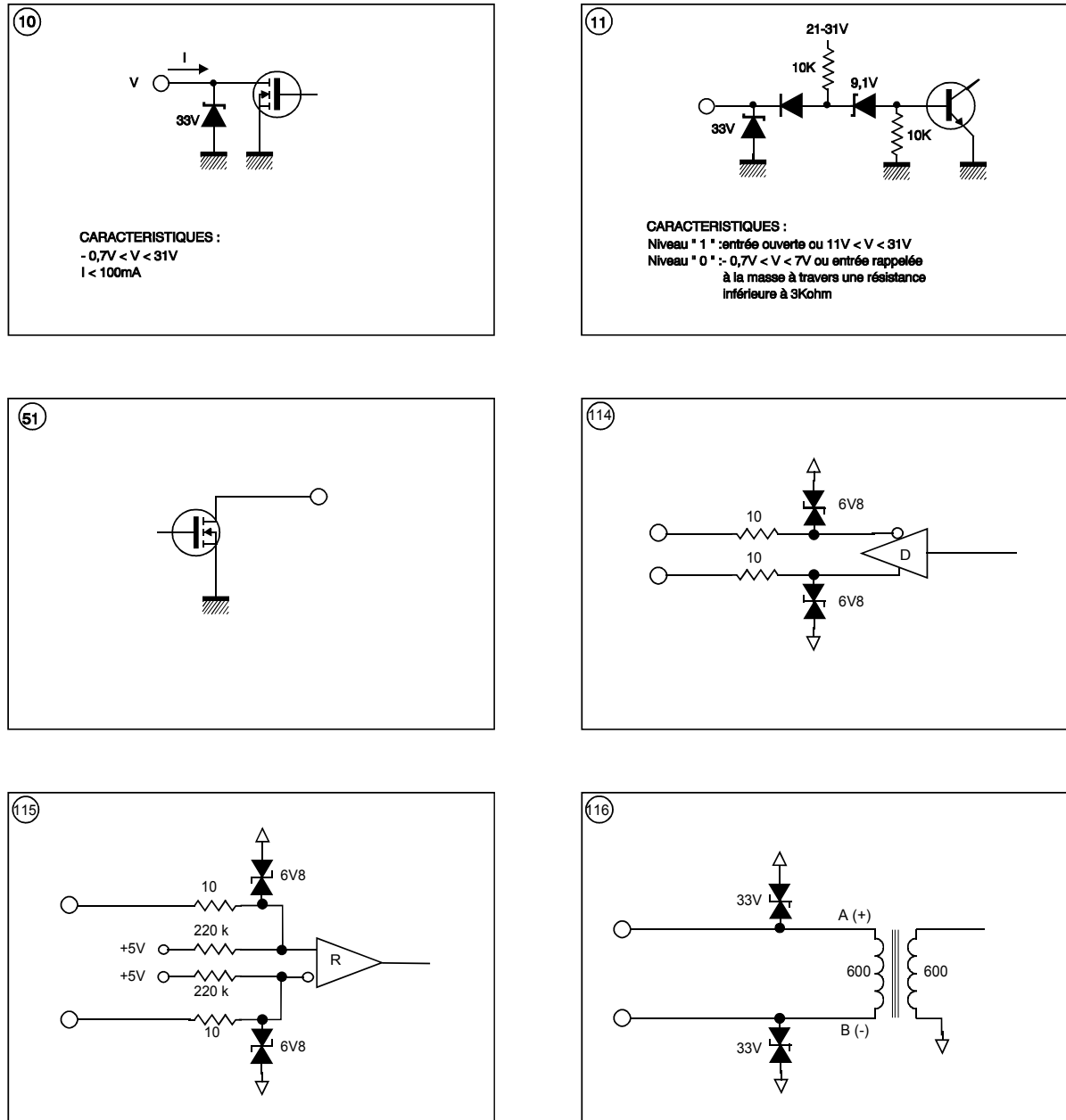


FIGURE 5 - INTERFACES USED (10 TO 116)

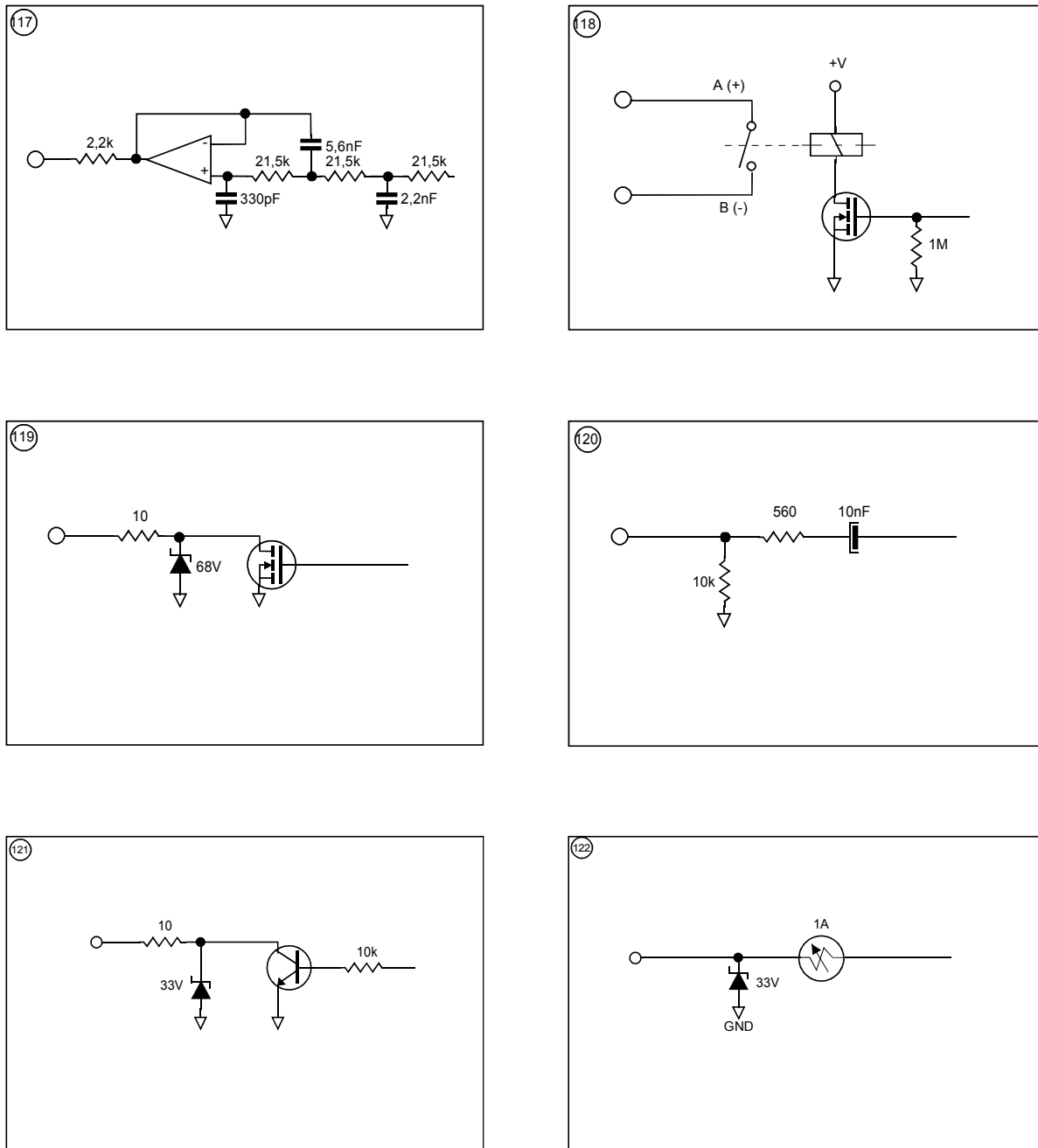


FIGURE 6 - INTERFACES USED (117 TO 122)

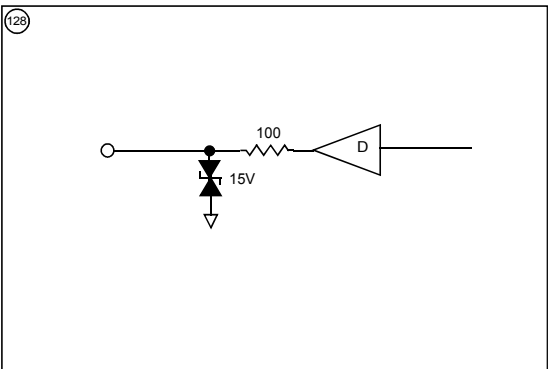
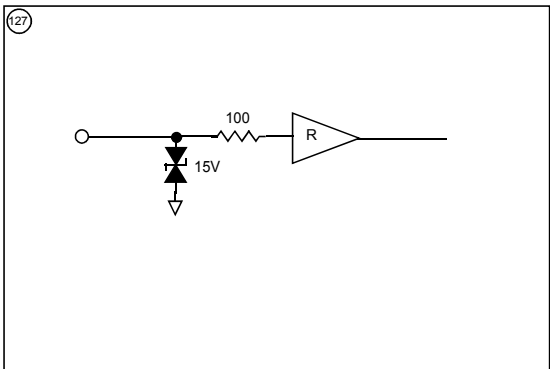
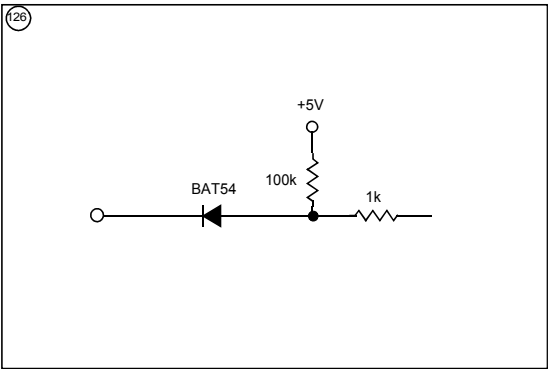
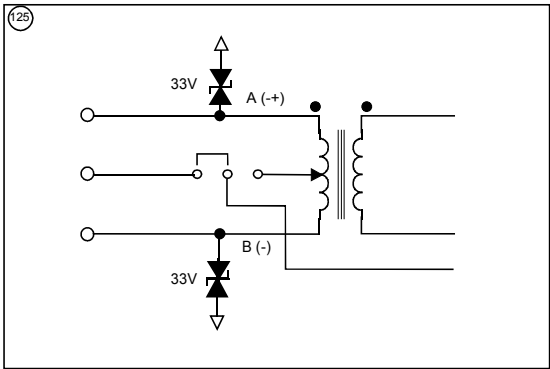
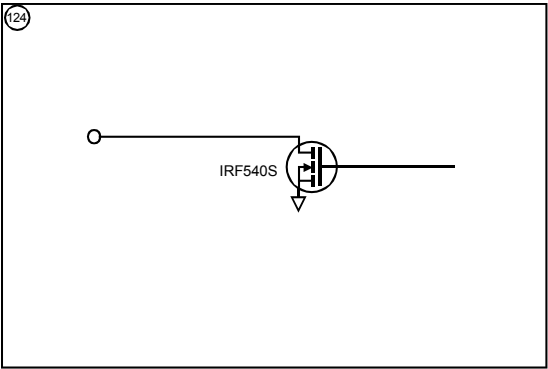
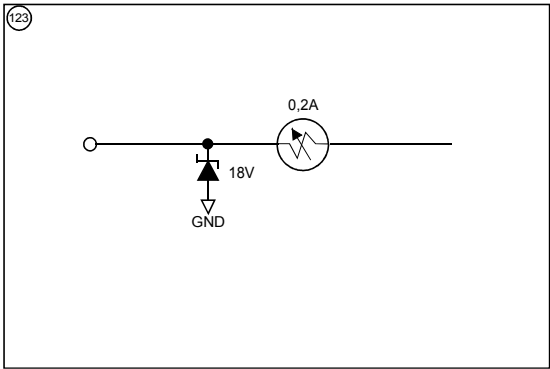


FIGURE 7 - INTERFACES USED (123 TO 128)

5.4 DESCRIPTION OF INTERNAL CONNECTORS - CONFIGURATION OF JUMPERS

5.4.1 Physical view of the CTRL 11170 PCB

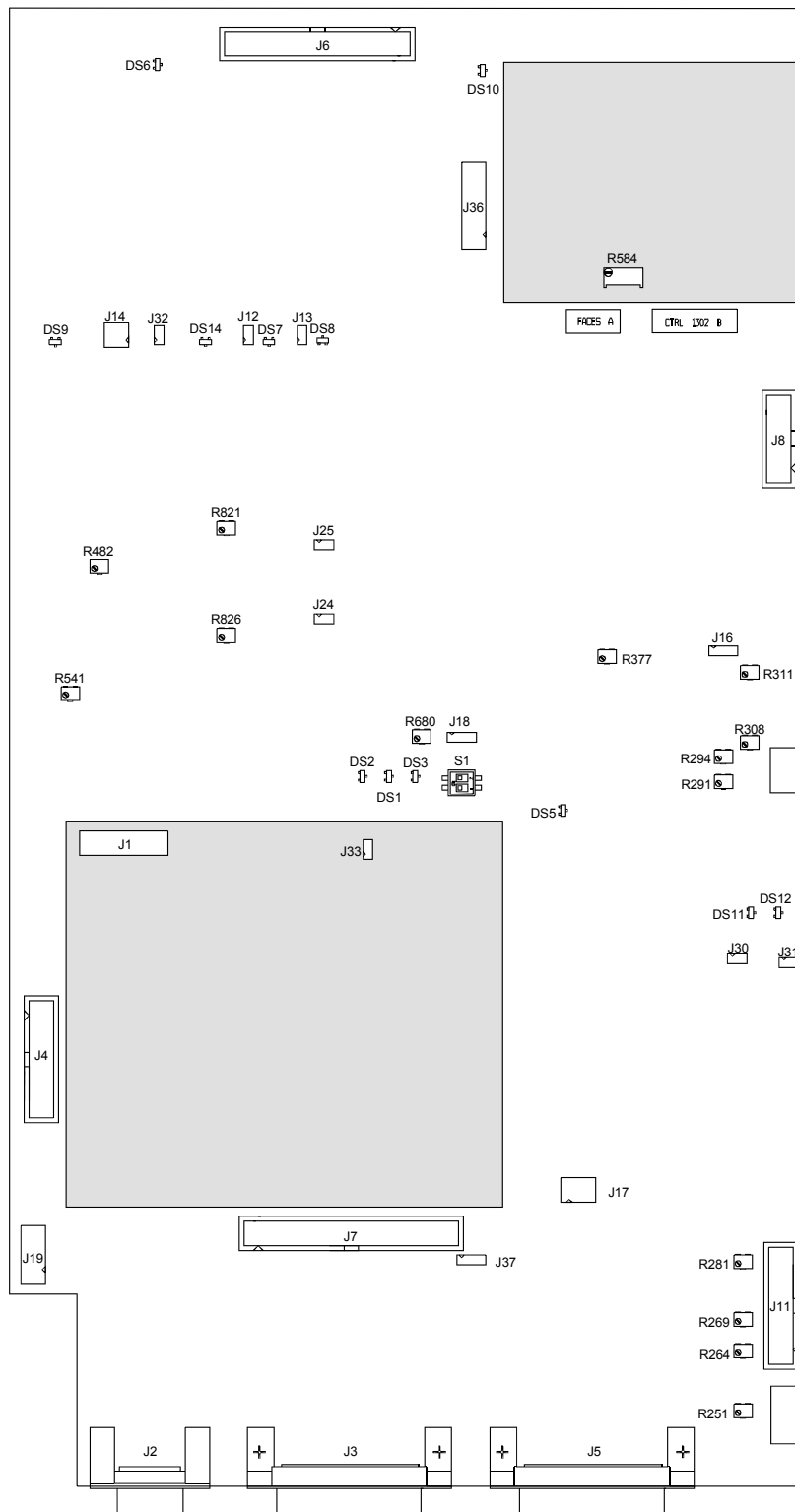


FIGURE 8 - CTRL 11170 PCB PHYSICAL VIEW

5.4.2 Description of internal connectors of CTRL 11170 PCB

Remark: The input or output signal direction is given concerning the CTRL 11170

J4 CTRL / REAL Connector:

HE10 20 pins plug609-2027 Code Telerad (150 00259)

20 contacts equipped cableCY 91326 Code Telerad (280 01083)

PIN N°	INPUT/OUTPUT	SIGNAL	SIGNAL MARK	CHARACTERISTICS	N° INT
1	I	Transmission inhibition by REAL PCB	R	Transmission inhibition signal enabled by the REAL16061 or 16069 PCB when the mains is lower than 19V. "0" = inhibition enabled	
2	I	Temperature in °K of mains module (+) (Only versionA)	T	Analog signal from the mains module sensor. 10mV/°K level, hence a voltage between 2.73V and 3.73V for a temperature varying between 0 and 100°C.	
3		Not connected			
4	I	Temperature in °K of mains module (-) (Only version A)	BA	Signal reference of pin 2.	
5		Analog ground	GND2	Analog ground linked to the general ground.	
6		Analog ground	GND2	Analog ground linked to the general ground.	
7	I	Power supply +V=	PWR1	24V dc voltage.	
8	I	Power supply +V=	PWR1	24V dc voltage.	
9		Analog ground	GND2	Analog ground linked to the general ground.	
10		Analog ground	GND2	Analog ground linked to the general ground.	
11	I	Mains +V= permanent	PWR6	Permanent 24V dc voltage.	
12	I	Battery presence indicator (only version A)	A	24V dc voltage from battery input before On/Off switch.	
13	I	To contact 1 front panel On/Off switch	V	24V dc voltage from battery input before On/Off switch.	
14	I	Operation on mains indicator (only version A)	B	24V dc voltage from mains input before On/Off switch.	
15	O	From contact 1 front panel On/Off switch	W	24V dc voltage from battery input after On/Off switch.	
16	I	+V= indicator	C	24V dc voltage.	
17	I	To contact 2 front panel On/Off switch	X	24V dc voltage from mains input before On/Off switch.	
18		Analog ground	GND2	Analog ground linked to the general ground.	
19	O	From contact 2 front panel On/Off switch	Y	24V dc voltage from mains input after On/Off switch.	
20		Not connected			

J6 CTRL / PAV connector:

HE10 34 pins plug..... 609-3427 Code Telerad (150 00546)

34 contacts equipped cable..... CY 91327 Code Telerad (280 01084)

PIN N°	INPUT/OUTPUT	SIGNAL	SIGNAL MARK	CHARACTERISTICS	N° INT
1	O	Analog ground	GND2	Analog ground linked to the general ground.	
2	O	Analog ground	GND2	Analog ground linked to the general ground.	
3	O	Battery indicator (only version A)	A	24V dc voltage from battery input before the On/Off switch.	
4	O	Operation on mains indicator (only version A)	B	24V dc voltage from battery input before the On/Off switch.	
5	O	+V= indicator	C	DC 24V voltage.	
6	O	RF indicator	D	Open collector. "0" = RF detection OK.	
7		Not connected			
8	O	TxSTATUS indicator	F	Open collector "0" = Status OK.	
9	O	SWR Indicator	G	Open collector. "0" = SWR detected.	
10	O	Tx alarm indicator	H	Open collector "0" = Alarm.	
11	I	RF test push-button	I	Contact to the ground. "0" = Push-button pushed.	
12	O	+V= CTRL	PWR1	24V dc voltage provided by CTRL11179.	
13	S	Analog ground	GND2	Analog ground linked to the ground.	
14	I	RxD2	J	Data reception from maintenance connector. Level $\pm 12V$.	
15		Not connected			
16	O	TxD2	K	Data transmission to maintenance connector. Level $\pm 12V$.	
17	O	To contact 1 front panel On/Off switch	V	24V dc voltage from REAL battery input before front panel On/Off switch.	
18	O	DTR2	L	Data Terminal Ready to the maintenance connector. Level +12V.	
19	I	From contact 1 front panel On/Off switch	W	24V dc voltage from REAL battery input after the front panel On/Off switch.	
20	I	DSR2	M	Data Set Ready from maintenance connector. Level $\pm 12V$.	
21		Not connected			
22	O	Digital ground	GND1	Digital ground linked to the general ground.	
23		Reserved			
24		Not connected			
25		Reserved			
26	O	To contact 2 front panel On/Off switch	X	24V dc voltage from REAL battery input before the front panel On/Off switch.	
27		Reserved			
28	I	From contact 1 front panel On/Off switch	Y	24V dc voltage from REAL battery input after the front panel On/Off switch.	
29		Reserved			
30		Not connected			
31	O	Analog ground	GND2	Analog ground linked to the general ground.	
32	O	Analog ground	GND2	Analog ground linked to the general ground.	
33		Reserved			
34		Not connected			

J8 CTRL / AMPV n°1 Connector:

HE10 14 pins plug609-1427 Code Telerad (150 00712)
14 contacts equipped cableCY 91325 Code Telerad (280 01082)

PIN N°	INPUT/ OUTPUT	SIGNAL	SIGNAL MARK	CHARACTERISTICS	N° INT
1	O	Qmod (-)	AG	Q modulation signal reference from slaving loop.	
2	O	Qmod (+)	AF	Q modulation signal from the slaving loop. Level: 1.5V for 50W carrier, with channel I to 0, or 1.06V on both channels.	
3	O	Phase shift command (-)	AD	Signal reference of phase shift command.	
4	O	Phase shift command (-)	AE	Phase shift command analog voltage signal. Level: between 0 and 10V.	
5		Analog ground	GND2	Analog ground linked to the general ground.	
6	O	Auxiliary voltage command	CG	Open collector. "0" = enabled auxiliary voltage command.	
7		Analog ground	GND2	Analog ground linked to the general ground	
8	O	Imod (+)	CC	I modulation signal from slaving loop. Level 1.5V for 50W carrier, with the channel Q to 0, or 1.06V on both channels.	
9	O	Imod (-)	CD	I modulation signal reference from the slaving loop.	
10	O	Variable attenuator command	CH	Variable attenuator command analog voltage signal. Level: 0V in stand-by or in attenuation max., 5V for 0dB attenuation.	
11		Not connected			
12		Not connected			
13		Not connected			
14		Not connected			

J11 Connector CTRL / AMPV n°2

HE10 20 pins plug..... 609-2027 Code Telerad (150 00259)

20 contacts equipped cable..... CY 91326 Code Telerad (280 01083)

PIN N°	INPUT/OUTPUT	SIGNAL	SIGNAL MARK	CHARACTERISTICS	N° INT
1	I	Demodulated Q (-)	AI	Demodulated Q signal reference from IQ demodulator.	
2	I	Demodulated Q (+)	AH	Demodulated Q signal from IQ demodulator. Level: 500mV on both channels for carrier 50W.	
3		Analog ground	GND2	Analog ground linked to the general ground.	
4	I	I demodulated (+)	CE	Demodulated I signal from IQ demodulator. Level: 500mV on both channels for 50W carrier.	
5	I	I demodulated (-)	CF	Demodulated I signal reference from IQ demodulator.	
6		Analog ground	GND2	Analog ground linked to general ground.	
7	I	PDIR Detection	AJ	Analog voltage proportional to the transmitted RF output signal. Level: 0.4V for 50W carrier.	
8		PDIR Compensation	AK	Voltage from compensating diode.	
9	I	PRFL detection	AL	Analog voltage proportional to the reflected RF signal. Level 0.4V for 50W carrier.	
10	I	PRFL compensation	AM	Voltage from the compensating diode.	
11		Analog ground	GND2	Analog ground linked to the general ground.	
12		Analog ground	GND2	Analog ground linked to the general ground.	
13	I	Temperature in °K of module VHF (+)	AO	Analog signal from the temperature sensor on the VHF module. Level of 10mV/°K, hence a voltage between 2.73V and 3.73V for a temperature varying between 0 and 100°C.	
14	I	Temperature in °K of module VHF (-)	AN	Reference for analog signal of pin 13.	
15		Not connected			
16		Not connected			
17		Not connected			
18		Not connected			
19	O	+15V	PWR7	+15V voltage provided to VHF module.	
20	O	-15V	PWR8	-15V voltage provided to VHF module.	

5.4.3 Description of CTRL 11170 PCB jumpers

The use of different connectors and jumpers is given in the table here below:

CONNECTOR N°	SIGNAL	SIGNAL MARK	CHARACTERISTICS	POSITION BY DEFAULT
J1	Debug DSP	I9	<i>Present</i> : DSP Debug can be connected. <i>Absent</i> : DSP debug not possible.	Absent
J12	+15V	P8	<i>Present</i> : PCB powered in +15V. <i>Absent</i> : No +15V on PCB.	Present
J13	-15V	P7	<i>Present</i> : PCB powered in -15V. <i>Absent</i> : No -15V on the PCB.	Present
J14	+5VD	P10	<i>Present</i> : PCB powered in +5V digital. <i>Absent</i> : No +5V digital on the PCB.	Present
J16	Slaving	K2	<i>Pos. A (1/2)</i> : Slaving loop closed. <i>Pos. B (2/3)</i> : Slaving loop opened.	Position A
J17	Coaxial relay	D3	<i>Present</i> : Supply and control of the coaxial relay. <i>Absent</i> : Relay not supplied.	According to relay presence
J19	Stock	D10	<i>Present</i> : Jumper stock. <i>Absent</i> : No effect.	Present
J24	Iref	L7	<i>Present</i> : Reference I given by CODEC output. <i>Absent</i> : External reference I.	Present
J25	Qref	M7	<i>Present</i> : Ref. Q given by CODEC output. <i>Absent</i> : External reference Q.	Present
J30	Protection inhibition I	G2	<i>Present</i> : Inhibition of channel I protection. <i>Absent</i> : Channel I protection enabled	Absent
J31	Protection inhibition Q	G1	<i>Present</i> : Inhibition of channel Q protection. <i>Absent</i> : Channel Q protection enabled	Absent
J32	+5VA	P9	<i>Present</i> : PCB powered in +5V analog. <i>Absent</i> : No +5V analog on PCB.	Present
J33	Flash	I6	Reserved for Télérad	Absent
J36	Synthesizer	Q5	<i>Present</i> : PLL programming by an external system or presence of daughter PCB. <i>Absent</i> : Without any effect if R746, R747, R748 and R831 soldered. No RF if not.	R746 - R747, R748 - R831 soldered. Connector absent
J37	Interface enabling RxCLK1	D5	<i>Pos. A (1/2)</i> : Receiver clock interface RxCLK1 enabled. <i>Pos. B (2/3)</i> : Receiver clock interface RxCLK1 disabled.	Position B
S1-1	DSP monitoring	J5	<i>ON</i> : No DSP+CODEC watchdog operation (used in DSP debug environment) Monitoring of DSP + CODEC watchdog. <i>OFF</i> :	OFF
S1-2	Learning authorization	J5	<i>ON</i> : Learning not authorized. <i>OFF</i> : Authorized learning	OFF

5.4.4 Description of CTRL 11170 PCB potentiometers

COMPONENT MARK	TOPOLOGICAL MARK	CHARACTERISTICS
R251	A1	Setting the PDIR channel offset of CODI
R264	B1	Setting the PDIR channel gain of CODI
R269	C1	Setting the PRFL channel offset of CODI
R281	C1	Setting of the PRFL channel offset of CODI
R291	I1	Nominal power setting on the I channel
R294	J1	Setting of the demodulated I feedback channel offset
R308	J1	Nominal power setting on the Q channel
R311	K1	Setting of the demodulated Q feedback channel offset
R377	K3	2:1 SWR setting
R482	L9	Mains module temperature display setting
R541	K10	VHF module temperature display setting
R586	P3	PLL master oscillator setting
R821	M8	Setting of channel Q offset in Codec output.
R826	L8	Setting of channel I offset in Codec output.

5.4.5 Description of CTRL 11170 PCB indicators

COMPONENT MARK	TOPOLOGICAL MARK	INDICATOR COLOUR	CHARACTERISTICS
DS1	J6	Green	CPU activity. Blinking.
DS2	J6	Red	Reset DSP. Lit when the reset is enabled.
DS3	J5	Red	Microcontroller reset. Lit when the reset is enabled.
DS5	I3	Yellow	PTT. Off during transmission.
DS6	S9	Green	Presence 24V. Lit when 24V is available in PCB.
DS7	O7	Green	+15V analog. Lit when +15V present in PCB.
DS8	O7	Green	-15V analog. Lit when -15V present in PCB.
DS9	O10	Green	+5V digital. Lit when +5V digital is present in PCB.
DS10	S5	Green	PLL locking. Lit when PLL is locked.
DS11	H1	Red	Channel I shutdown. Lit when channel has shutdown.
DS12	H1	Red	Channel Q shutdown. Lit when the channel has shutdown.
DS14	O8	green	+5V analog. Lit when +5 analog is present in PCB.

CHAPTER 6 SETTING INTO SERVICE - OPERATION

6.1 FRONT PANEL OPERATING ELEMENTS

6.1.1 Definitions

Before describing the meaning and the operating condition of the different front panel indicators, it is necessary to explain the meaning of the transmission inhibition information.

Transmission inhibition: *This signal prevents the transmitter from changing to transmission and therefore disables the PTT. It is enabled on one of the following conditions:*

a) External transmission inhibition:

It corresponds to an external condition of the transmitter by a software command (with the JBUS supervision link).

b) System transmission inhibition:

It corresponds to an internal condition of the transmitter displaying an operation failure. This inhibition can be **hardware**: in this case the inhibition sources are:

- "REAL transmission inhibition", signal R, triggered by the REAL16061 or REAL16069 PCB as soon as the mains voltage falls below 19V.
- "PLL transmission inhibition", INHIB_PLL_F signal, triggered by the frequency synthesizer as soon as the PLL is unlocked.
- "3 second time delay at the starting", TEMPO_DEM signal, triggered at the power up of the transmitter for inhibiting any transitory states showing up in this phase.

REMARK: *The PD4 input port provides the "OR-wired" of the operating transmission inhibition and the hardware system transmission inhibition to the microcontroller.*

The inhibition can be **software**: in this case the inhibition sources are:

- " DSP operating failure" given by the DSP+CODEC watchdog status.
- "VHF module temperature default" given by the temperature sensor reading of the VHF module.
- "mains module temperature default", read only in version A, and given by the temperature sensor reading of the mains module.
- "PLL transmission inhibition", INHIB_PLL_F signal (PD7 input port), triggered by the frequency synthesizer as soon as the PLL is unlocked.

c) Frequency change:

This pertains to a 200 ms software time-delay enabled during a frequency change by the user.

6.1.2 Front panel of EM 9009

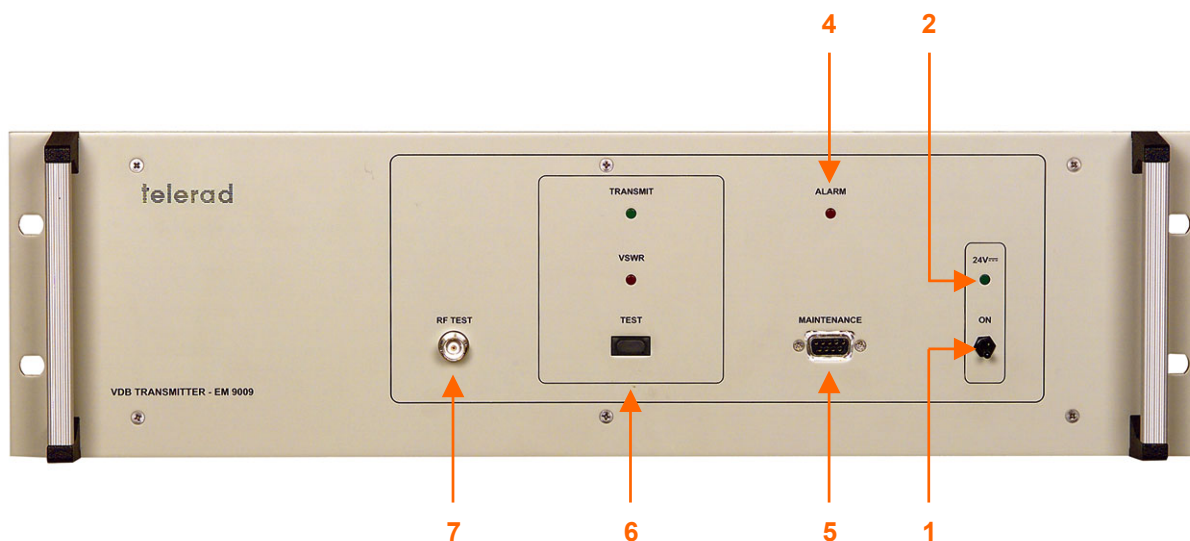


FIGURE 9 - EM 9009 FRONT PANEL

6.1.3 Front panel of EM 9009 A

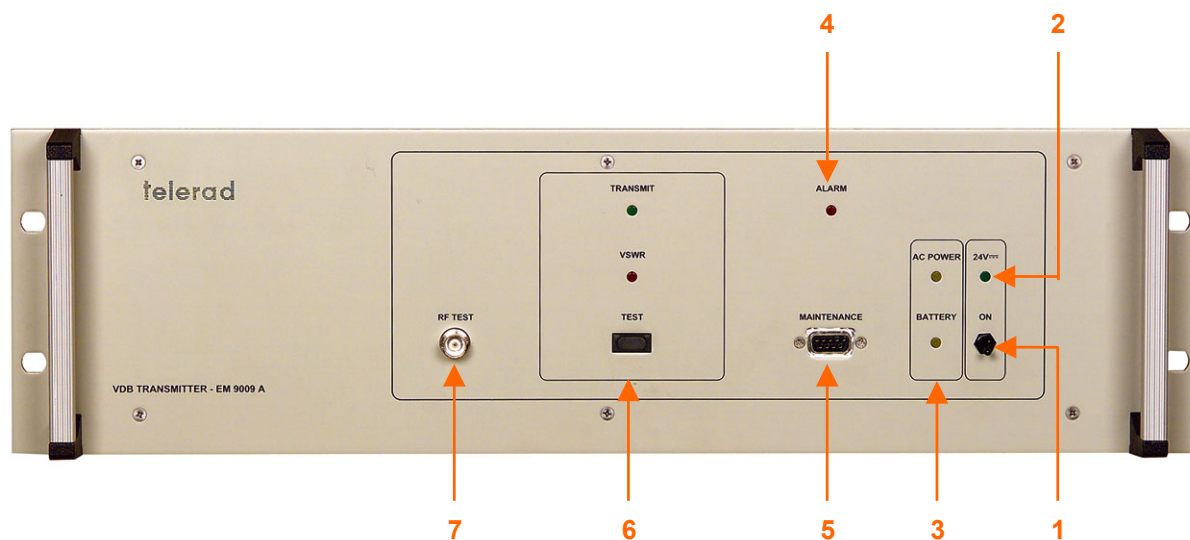


FIGURE 10 - EM 9009 A FRONT PANEL

6.1.4 Description of light indicators and switches

- ① **ON/OFF Switch:**
It switches on the transmitter.
- ② **V= indicator:**
It signals that the transmitter is switched on (dc voltage in mains output).
- ③ **MAINS and BATTERY indicators: (version A only)**
These indicators signal the presence of sources, which supply the power to the unit.
- ④ **ALARM indicator:**
It signals an operating default of the transmitter.

The Alarm indicator is illuminated if:

- the **"software system transmission inhibition"** signal is enabled (see previous definitions),
- the **"RF information"** signal, valid in all the modes, signals "No RF" without SWR detection. In case of SWR detection this information is not read due to the power reduction, which follows,
- the **"Microcontroller alarm"** is enabled,
- the **"DSP Alarm"** is enabled,
- the **"SWR"** signal indicating an infinite SWR is enabled,
- the result from the **software test command** signals a defect,
- the transmitter is **loading a software release**.

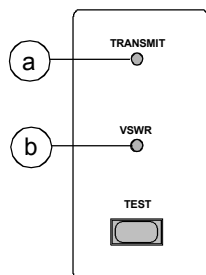
REMARK: *When the On/Off switch changes from Off to On, the test result and the test memory are positioned at: OK.*

- ⑤ **MAINTENANCE Socket (liaison RS232):**
SUB-D 9 pins socket for connection to the Telerad programmer PGM 9000 (see specific guide), or an ASCIL terminal, or a PC in a terminal emulation.

⑥ **TEST push-button and indicators:**

It permits the transmitter to operate in CW transmission. At the same time the main parameters of operation are analyzed and the result is provided by RF, SWR and ALARM indicators.

The indicators are active, apart from the TEST push-button.



a) *Transmit indicator:*

It is illuminated during transmission when the power is higher than -3dB of nominal power. In test, the level is -2dB of nominal power.

b) *SWR indicator:*

It is illuminated when the SWR detected is higher than 2.

⑦ **RF TEST socket (BNC):**

On this socket, a sample of the ANTENNA signal is available to measure directly the frequency on transmission (drift control of the master oscillator). Output level: about 0dBm/50 ohms.