

The PQM 2100 Unit is factory-set to the configuration options specified in the order. Therefore, no internal intervention configuration is required in the field on site. The following options are available:

- power supply (120 VAC or 230-240 VAC on request),
- management mode used, that is, local management (RS-232 interface) or remote management through an ETHERNET network using the SNMP protocol.

PQM 2100 Unit installation and start-up are performed in the following steps:

- installation,
- connections,
- power-up,
- test connections.

3.1 - Unit Installation

The PQM 2100 Unit comes in a 1-unit high enclosure suited to:

- desktop mounting with no particular precautions, or 19-inch rack-mounting.

Table top installation

For table top installation, the Unit is placed on a support providing stability and air circulation, with a 1U space between the table and the Unit. Grounding is performed using the Unit ground lug.

19-inch Rack-mounting

The PQM 2100 Unit is delivered with its side 19-inch rack-mounting brackets fitted.

Perform installation as follows:

- Mount the PQM 2100 Unit into the rack by sliding it in along the side guide rails provided for this purpose,
- attach the PQM 2100 Unit with four M6 screws onto the corresponding rack cage nuts, through the two oblong holes in each side rack-mounting bracket as shown in figure 3.1,
- Connect the PQM 2100 Unit to rack chassis ground.

PRECAUTION: It is recommended to leave one unit of rack height between the PQM 2100 Unit and the remaining rack equipment units in order to allow thermal dissipation and easy wiring.

3 - INSTALLATION AND START-UP

The PQM 2100 Unit is factory-set to the configuration options specified in the order. Therefore, no internal intervention configuration is required in the field on site. The following options are available:

- power supply (120 VAC or 230-240 VAC on request)
- management mode used (first is local management (RS-232 interface) or remote management through an ETHERNET network using the SNMP protocol)

PQM 2100 Unit installation and start-up are performed in the following steps:

1- Installation

2- Connections

3- Power-Up

4- Test connections

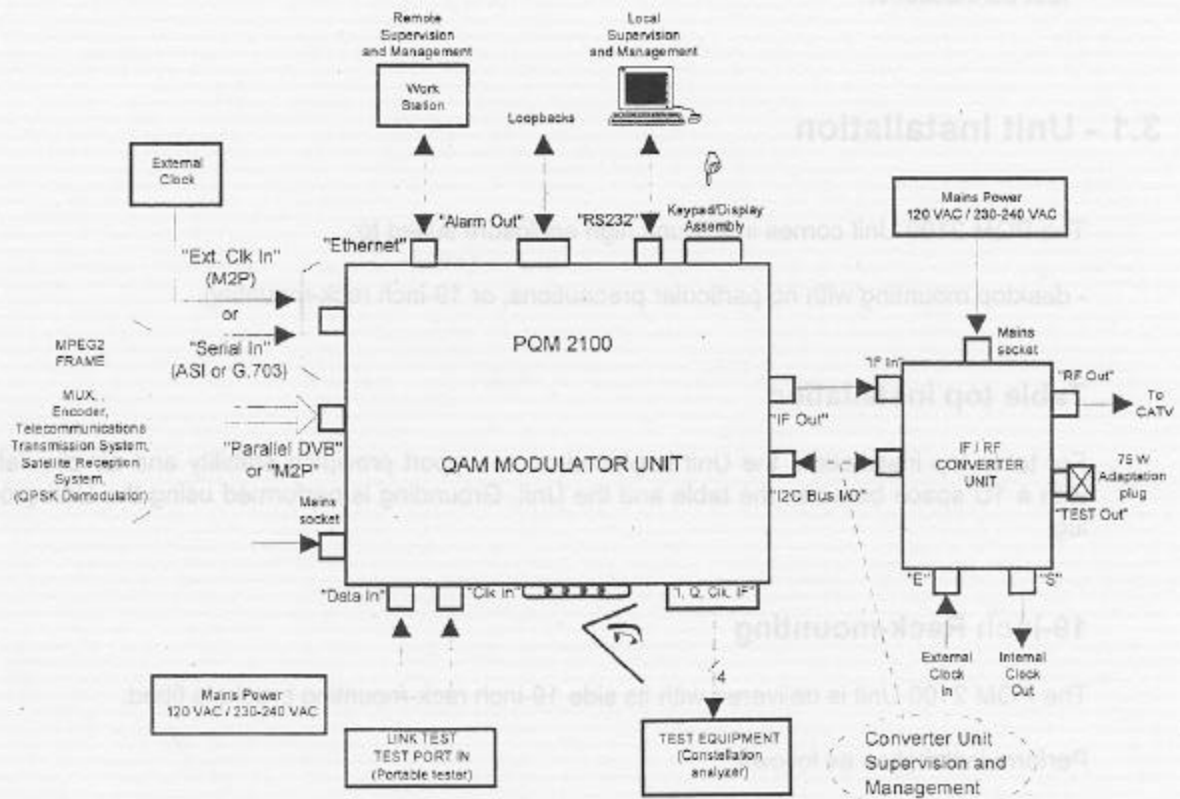


Figure 3.2- PQM 2100 Unit Interconnections

3.2 - Unit Connections

General Rules

Figure 3.2 shows the various signals to be connected: power, data, alarms, and management information. All connections are performed on the enclosure rear panel (see figure 3.3), with power off (ON/OFF switch set to the OFF position).

The PQM 2100 Unit is delivered with:

- 2 power cables for (120 VAC or 230-240 V AC) mains power to the PQM 2100 Unit,
- and a 9-pin HE501 female connector (SAT Part No. 4099967) and its cap (SAT Part No. 6485276) providing relay contact alarm connections.

IMPORTANT: Connections to the PQM 2100-Unit must be performed with shielded cable for compliance with electromagnetic compatibility standards.

When a IF-RF Converter is supervised and managed by the PQM 2100 Unit, the interconnexion cables (IF and I2C® bus) are delivered with this equipment.

3.2.1 - Mains Power Connection

Connection to the mains electricity supply is performed with a power cable to the 2-phase + ground male connector on the far left hand side of the enclosure rear panel.

The cable type depends on the mains power supply voltage (230-240 VAC or 120 VAC) used by the customer. The following table gives the reference number of the lead according to voltage.

Input Voltage	Cable Type	Connector Front View	SAT Cable Part No.
230-240 VAC	"Europe"		4980029
120 VAC	"US"		4980168

Note: The box ticked in the connector right side label indicates the factory-set option, following the ordering information given by the customer.

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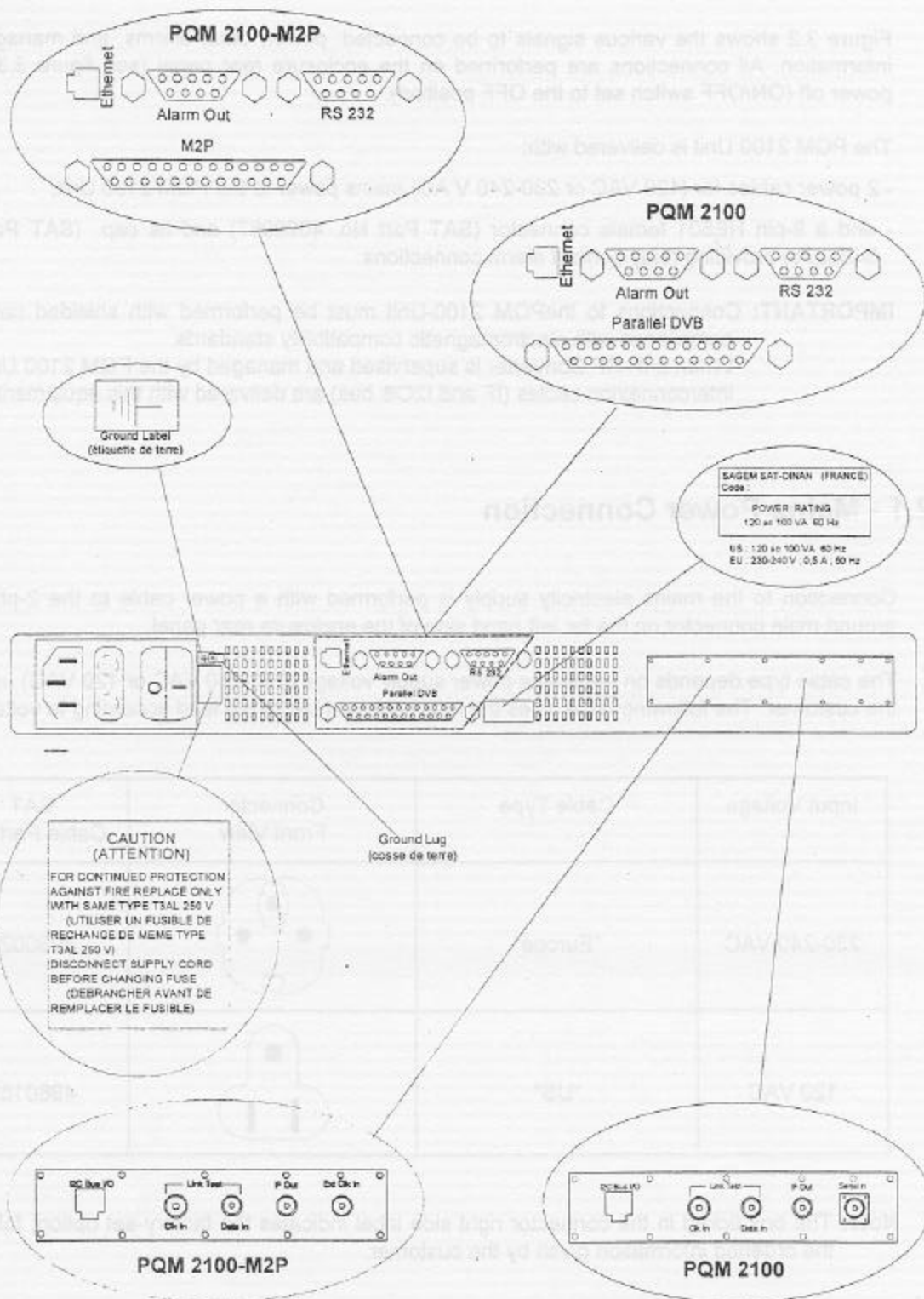
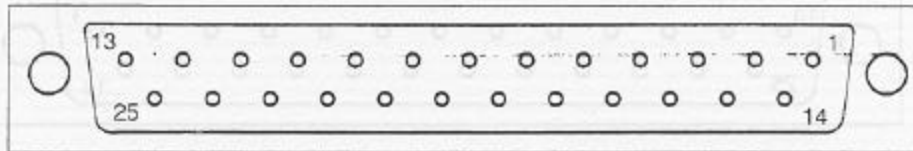


Figure 3.3 - Connector Layout on the PQM 2100 Unit Rear Panel

3.2.2 - Reception Digital Interface Connection

Parallel DVB Interface Connection

Connection is performed to the 25-pin HE501 connector marked **Parallel DVB** in figure 3.3. Connector pin assignments are given below.

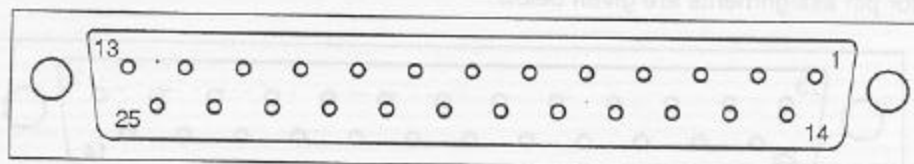


Pin No.	Signal Name	Abbreviation
1	Channel A clock	CLK A
2	OV (GND)	System Gnd
3	Channel A data bit 7 (MSB)	Data 7A
4	Channel A data bit 6	Data 6A
5	Channel A data bit 5	Data 5A
6	Channel A data bit 4	Data 4A
7	Channel A data bit 3	Data 3A
8	Channel A data bit 2	Data 2A
9	Channel A data bit 1	Data 1A
10	Channel A data bit 0	Data 0A
11	Channel A data validation signal	DVALID A
12	Channel A data synchronization	PSYNC A
13	Shield	Cable Shield
14	Channel B clock	CLK B
15	OV (GND)	System Gnd
16	Channel B data bit 7 (MSB)	Data 7B
17	Channel B data bit 6	Data 6B
18	Channel B data bit 5	Data 5B
19	Channel B data bit 4	Data 4B
20	Channel B data bit 3	Data 3B
21	Channel B data bit 2	Data 2B
22	Channel B data bit 1	Data 1B
23	Channel B data bit 0	Data 0B
24	Channel B data validation signal	DVALID B
25	Channel B data synchronization	PSYNC B

3 - INSTALLATION AND START-UP

M2P Port Connection

Connection is performed to the 25-pin HE501 connector marked **M2P** in figure 3.3. Connector pin assignments are given below.



Pin No.	Signal Name	Abbreviation
1	P Reference master clock (output)	OUTCLK_P
2	P Frame byte clock	BCLK_P
3	Not connected	NC
4	P frame start bit	FSTART_P
5	P data bit 0	D0_P
6	P data bit 1	D1_P
7	P data bit 2	D2_P
8	P data bit 3	D3_P
9	P data bit 4	D4_P
10	P data bit 5	D5_P
11	P data bit 6	D6_P
12	P data bit 7	D7_P
13	0 V	GND
14	N reference master clock (output)	OUTCLK_N
15	N frame byte clock	BCLK_N
16	Not connected	NC
17	N frame start bit	FSTART_N
18	N data bit 0	D0_N
19	N data bit 1	D1_N
20	N data bit 2	D2_N
21	N data bit 3	D3_N
22	N data bit 4	D4_N
23	N data bit 5	D5_N
24	N data bit 6	D6_N
25	N data bit 7	D7_N

Serial Interface Input Port Connection

Connection is performed to a 75 Ω BNC connector, isolated from the ground and marked **Serial In** as shown in figure 3.3. This serial input port is used with the ASI-DVB interface, 34 or 45 Mbit/s Interfaces (PQM 2100).

or

External Clock Input Port Connection

Connection is performed to a 75 Ω BNC female connector, marked **Ext Clk In** as shown in figure 3.3. This input port is used with the M2P (RS422) interface (PQM 2100-M2P).

3.2.3 - Modulated IF Output Port Connection

Connection is performed to the 75 Ω BNC female connector marked **IF Out** as shown in figure 3.3.

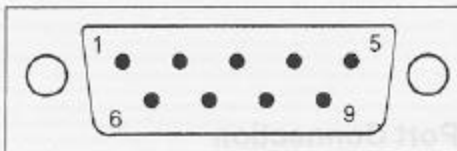
The connector provides connection to the corresponding IF-RF Converter Unit rear panel connector using appropriate cable (SAT Part No. 6485648).

The interconnection diagram is given in figure 3.2.

3 - INSTALLATION AND START-UP

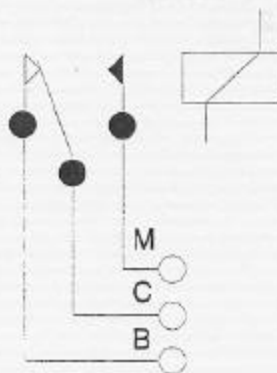
3.2.4 - Alarms Port Connection

Connection is performed to a 9-pin HE501 male connector marked **Alarm Out** as shown in figure 3.3. Connector pin assignments are given below.



Pin No.	Signal name	Abbreviation
1	Not Connected	NC
2	Relay 1 common return	Com-1
3	Not Connected	NC
4	Relay 2 common return	Com-2
5	0V (Gnd)	0V (Gnd)
6	Relay 1 make	Make-1
7	Relay 1 break	Break-1
8	Relay 2 make	Make-2
9	Relay 2 break	Break-2

Relay 1 is for the Major Alarm and relay 2 for the Minor alarm.



RELAY 1	RELAY 2
6	8
2	4
7	9

Two modes of operation are available for relay contact alarms:

- "Normal" mode,
- "Default" mode.

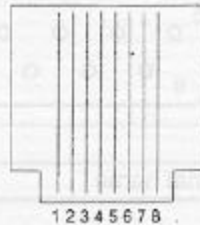
Both modes can be configured via the PQM 2100 Unit supervisory software. They operate as follows:

Relay Contact Alarm Mode of Operation	Unit Operation Without Any Alarm	Unit Operation With Alarms
Normal	Common - Make	Common - Break
Default	Common - Break	Common - Make

3.2.5 - Management Interface Connection

Connection to I²C® port

Connection is made to an RJ45 connector located on the right and marked **I2CBus I/O** in figure 3.3, details of which are as follows.

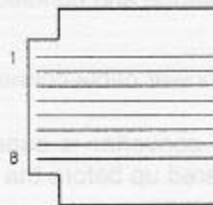


Pin No.	Signal name	Abbreviation
8	I ² C® clock	I ² C®-SCL
7	I ² C® data bus	I ² C®-DSA
6	I ² C® confirmation	I ² C®-ENA
5	Not connected	NC
4	Not connected	NC
3	Not connected	NC
2	0V (Gnd)	0V (Gnd)
1	Not connected	NC

This connector allows an IF-RF Converter Unit supervised and managed by the supervisory software to be connected via a lead (SAT part No. 6992863), to the connector on the rear panel of the same type marked **Interface E/S 1**.

Ethernet Port Connection (female RJ45)

This port is used for remote operation through a (Ethernet) LAN. Connection is performed to the connector marked **Ethernet** as shown in figure 3.3. Connector pin assignments are given below.

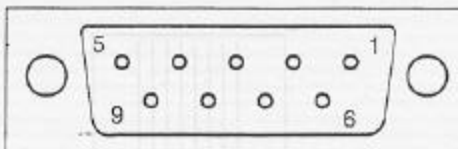


Pin No.	Signal name	Abbreviation
1	Transmitted data (TXD) +	ETHTRDP
2	Transmitted data (TXD) -	ETHTRDN
3	Received data (RXD) +	ETHRRDP
4	Not Connected	NC
5	Not Connected	NC
6	Received data (RXD) -	ETHTRDN
7	Not Connected	NC
8	Not Connected	NC

3 - INSTALLATION AND START-UP

RS-232 Port Connection

This port is used for local operation using a personal computer. Connection is performed to the 9-pin HE501 female connector marked **RS232** as shown in figure 3.3. Connector pin assignments are given below.



Pin No.	Signal name	Abbreviation
1	Not Connected	NC
2	Transmitted data (ED)	RSTX
3	Received data (RD)	RSRX
4	Data Set Ready (DSR)	RSDSR
5	0V (Gnd)	0V (Gnd)
6	Data Terminal Ready (DTR)	RSDTR
7	Clear To Send (CTS)	RSCTS
8	Request To Send (RTS)	RSRTS
9	Not connected	NC

The various connectors are shown in figure 3.3.

3.3 - Power-up

PRECAUTION: Before applying power to the PQM 2100 Unit:

- check that the mains voltage value printed in the label is the same as one actually used in the installation,
- check for the presence and condition of the two 3 Amp delay fuses (Part No. HA20T3A),
- check the mains power cable connection.

IMPORTANT: If the external IF-RF converter is supervised and managed by the PQM 2100 Unit, it must be powered up before the PQM 2100 Unit.

Set the ON/OFF switch to the ON position, causing the front cover green "ON" LED to light up.

3.4 - TEST Port Connection

No connection is required to the TEST ports for normal operation. On the other hand, as the tests provide significant assistance for maintenance (see Sub-section 5.4), the ports are described in Sub-section 2.1.

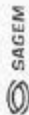
SECTION 4

OPERATION

Three modes of control access to the PQM 2100 Unit are available:

- local control via the keypad/display,
 - local control using a PC (on request),
- or
- remote control through an (Ethernet) LAN (on request).

Local control access via the keypad/display only is described in the following Sub-sections. The remaining modes of operation are described in separate documents (Line Terminal User's Guide - ref. No. 56714340 and System Controller User's Guide - ref. No. 56714300).



4.1 - Keypad/Display Description

The keypad/display provides local control access to the PQM 2100 QAM Unit.

It offers the following functions depending on the operator's user class:

- read access to equipment information (including card software versions, equipment composition),
- equipment configuration access,
- test access.

4.1.1 - User Interface

Most operations are performed using the PQM 2100 Unit front panel keypad.

Software functions are accessible from a pull-down menu.

4 - OPERATION

Depending on the particular menu used, the keys may be used for moving in the tree menu structure and for activating some functions.

Keys	Description	Function
◀	Left key	Returns to the upper level menu or to the welcome screen or is inoperative or selects by moving the cursor by one digit value
▶	Right key	Proceeds to the lower level menu, if any or is inoperative or selects by moving the cursor by one digit value
▲	Up key	Returns to the previous menu of the same level or increments a value or selects a status from a circular list
▼	Down key	Changes to the next menu of the same level or decrements a value or selects a status from a circular list
ENTER	Valid key	Accepts a value or an option in a lower level menu or is inoperative (warning beep) in all other menus

4.1.2 - User Classes

The clearance levels available are:

- 0 Observer mode with no write commands available,
- 1 User mode (configuration access) protected by a password, and with all read/write commands available.

4.2 - Welcome Screen

Upon power up or reinitialization of the PQM 2100 Unit (warm reset) this equipment executes all its self-tests.

Note : The **warm reset** control (see **Utilities** menu) is displayed if the O & M Ethernet card is present.

Upon PQM 2100 identification by the supervisory software, the following screen is displayed:

```
PQM2100 (C) SAT 1996
Press any key for access
```

Pressing any of the five keys causes the Password entry screen to be displayed:

```
PASSWORD
_
```

The PQM 2100 Unit is delivered without a password (password blank). To gain access the main menu, press ENTER. Enter the desired password using the Password modification menu (see Sub-section 4.3.6).

If the password exists, enter the current password, and confirm it by pressing ENTER to gain access to the first sub-menu in the main menu (see Sub-section 4.3.1).

Entry of an incorrect password causes the following error message to be displayed:

```
Access denied
Press any key
```

Upon pressing any one of the 5 keys, the operator is assigned the Observer user class, and gains access to the first sub-menu in the main menu (see Sub-section 4.3.1).

Comment: Failure to identify the PQM 2100 Unit upon power-up causes the following screen to be displayed:

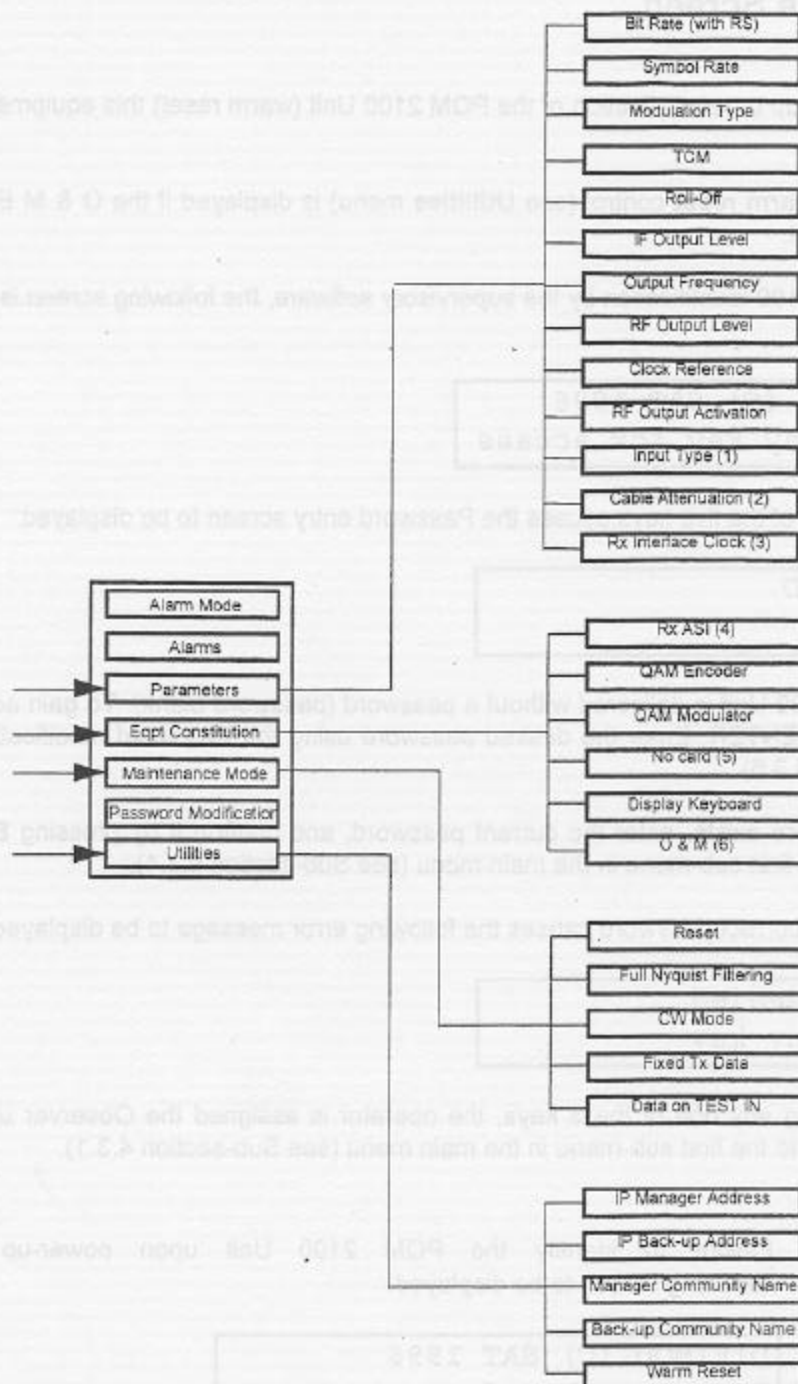
```
DIVIMOD (C) SAT 1996
Press any key for access
```

Pressing any of the five keys causes the following screen to be displayed:

```
DIVIMOD (C) SAT 1996
Eqpt constitution->
```

The screen provides access to the Equipment constitution sub-menu only in the main menu (see Sub-section 4.3.4). Note the error and contact the After Sales department.

4 - OPERATION



- (1) 34 Mbit/s G703 Int. or 45 Mbit/s G703 Int. or ASI-DVB Int.
Int. G703 à 34 Mbit/s ou Int. G703 à 45 Mbit/s ou Int. ASI-DVB
- (2) 34 Mbit/s G703 Int. only
seulement carte Int. G703 à 34 Mbit/s
- (3) M2P Int. only
Int. M2P seulement
- (4) or 34 Mbit/s G703 Int. or 45 Mbit/s G703 Int. or M2P Int.
ou Int. G703 à 34 Mbit/s ou Int. G703 à 45 Mbit/s ou Int. M2P
- (5) or VHF1 (VHF2 or UHF) IF/RF Converter
ou Transposeur FI/RF VHF1 (VHF2 ou UHF)
- (6) RS232 or Ethernet
RS232 ou Ethernet

Figure 4.1 - Main Menu Tree Structure for Operation with the Keypad/Display Assembly

4.3 - Main Menu Tree Structure

The main menu consists of six menus which are accessible from a pull-down menu (see figure 4.1).

The menus are arranged circularly in the following order:

- 1) Alarm Mode,
- 2) Active Alarms,
- 3) Parameters,
- 4) Equipment constitution,
- 5) Maintenance Mode,
- 6) Password Modification,
- 7) Utilities.

4.3.1 - Alarm Mode Menu

The Alarm mode menu is displayed upon user password identification.

```
PQM2100 (C) SAT 1996
Alarm mode->
```

Press > to gain access to the Alarm mode selection screen.

Alarm Mode Selection Screen

```
Alarm mode:
Normal (or Default)
```

Two modes of operation are available for relay contact alarms (see Sub-section 3.2.4 - Alarm Port Connection):

- Normal mode: alarm relay contact opening in the event of an alarm.
- Default mode: alarm relay contact closure in the event of an alarm.

Press ▲ or ▼ to change the desired mode, then press **ENTER** to accept.

4 - OPERATION

4.3.2 - Alarms Menu

PQM2100 (C) SAT.1996
Alarms->

Press > to gain access to the Active Alarms display screen.

Active Alarms Display Screen

In the absence of any active alarm, the following screen is displayed:

Alarms:
No active alarm

Upon initiation of an active alarm, the following screen is displayed:

Alarms:
Encoder in clock fail

Alarms may be displayed using the keys. The alarm display is arranged circularly. The ▲ and ▼ keys provide access to the various active alarms in increasing or decreasing order.

The table after lists all active alarms (Fit Inds) available for PQM 2100 Unit Cards.

Active Alarm	Display
Power Supply Unit	
Power Supply Unit Alarm	Pwr Sup Unit Alm
Digital Rx Int Card	
G.703 input signal failure (34 or 45 Mbit/s G.703 Rx Int Cards only)	G.703 In Signal Fail
Loss of 34 MHz synchronization (34 Mbit/s G.703 Rx Int Cards only)	34 MHz G.703 Clock Fail
Loss of 45 MHz synchronization (45 Mbit/s G.703 Rx Int Card only)	45 MHz G.703 Clock Fail
Loss of Line Frame Alignment (34 or 45 Mbit/s G.703 Rx Int Cards only)	G.703 LFA
Rx Int Card bit PLL unlock	Rx Int PLL Alm
Loss of MPEG2 signal frame alignment	MPEG2TS-F LFA
MPEG-2 frame error uncorrected by R-S encoder (34 or 45 Mbit/s G.703 Rx Int Cards only)	Uncorrected errors
DVB Encoder Card	
Encoder Input Clock Fail	Encoder In Clock Fail
Non-conforming MPEG2 Frame	Non-conforming MPEG2TS-F
Encoder bit rate PLL Alarm	Encoder bin rate PLL Alm
Encoder symbol rate PLL Alarm	Encoder sym rate PLL Alm
IF/RF Converter Unit (*)	
IF/RF Converter Access Error	IF/RF. Conv. Access Err.
Converter Power Supply Unit Alarm	Conv. Pwr Sup Unit Alm
IF/RF Converter PLL Alarm	IF/RF Conv. PLL Alm
Output RF Signal Fail	Out RF Signal Fail
IF-RF Converter reference signal Fail	External Clock Fail
RF output level variation > ± 5 dB	Out variation > ± 5 dB
RF output level variation > ± 2 dB	Out variation > ± 2 dB

(*) These alarms are only taken into account if the external IF-RF converter is supervised and managed by the equipment.

1) Bit rate	1) Bit rate
2) Symbol rate	2) Symbol rate
3) Modulation type	3) Modulation type
4) TCM Mode	4) TCM Mode
5) FEC	5) FEC
6) RF Output Level	6) RF Output Level
7) Selection of input type used (analog, digital)	7) Selection of input type used (analog, digital)
8) Cable attenuation (*)	8) Cable attenuation (*)
9) MPEG Int. Clock (*)	9) MPEG Int. Clock (*)
10) Selection of input type used (analog, digital)	10) Selection of input type used (analog, digital)
11) Cable attenuation (*)	11) Cable attenuation (*)
12) MPEG Int. Clock (*)	12) MPEG Int. Clock (*)

4.3.3 - Parameters Menu

The menu provides read and/or write access to the following PQM 2100 Unit parameters depending on the operator's user class:

- 1) Bit rate,
- 2) Symbol rate,
- 3) Modulation type,
- 4) TCM Mode,
- 5) Roll-Off,
- 6) IF Output Level,
- 7) RF Output Frequency,
- 8) RF Output Level,
- 9) IF/RF Converter Clock,
- 10) RF Output Activation,
- 11) Selection of input type used (serial, parallel),
- 12) Cable attenuation (34 Mbit/s G.703 Rx Int Card only),
- 13) Rx Interface Clock (M2P Interface Card only).

ATTENTION: Parameters 7 to 10, which concern the external IF-RF converter, can only be displayed and/or modified if the Converter Unit is supervised and managed by the equipment.

IMPORTANT: In the **Observer** user class, read only access is available to this menu. Press < to exit from the current display.

The parameters are displayed in two orders according to the use or not the use of the FI/RF unit and/or the 34 Mbit/s G.703 Rx Interface Card and the M2P Interface Card (see summary table below).

With IF-RF Converter	Without IF-RF Converter
1) Bit rate	1) Bit rate
2) Symbol rate	2) Symbol rate
3) Modulation type	3) Modulation type
4) TCM Mode	4) TCM Mode
5) Roll-Off	5) Roll-Off
6) RF Output Frequency	6) IF Output Level
7) RF Output Level	7) Selection of input type used (serial, parallel) (*)
8) IF/RF Converter Clock	8) Cable attenuation (**)
9) RF Output Activation	9) M2P Int. Clock (***)
10) Selection of input type used (serial, parallel) (*)	
11) Cable attenuation (**)	
12) M2P Int. Clock (***)	

(*) Except M2P Int. Card.

(**) If a 34 Mbit/s G.703 Rx Int Card is used.

(***) If a M2P Int. Card is used.

The display for this menu is as follows:

```
PQM2100 C) SAT 1996
Parameters->
```

4.3.3.1 - With IF-RF Converter

Press > to access the Bit Rate screen

1) Bit Rate

This option provides the capability of reading and/or changing the bit rate parameter value.

```
Parameters:
Bit rate (with RS)->
```

The Bit Rate Display Screen below is selected by pressing >.

```
Bit rate (with RS):
21250 kbit/s
(ou 21250.00 kbit/s) (*)
```

(*) Accuracy is roughly 1/10 bit with an INR - M2P Card using a synthesizer.

This parameter can only be changed by operators having the user class **User** (indicated by a cursor).

The operator enters a new value using the keypad as follows:

Key	Description
<	Returns to Bit Rate or shifts the cursor to the left if possible
>	Shifts the cursor to the right if possible
▲	Increments the underlined digit
▼	Decrements the underlined digit
ENTER	Accepts

Pressing the ENTER key can have five effects:

- 1) The value entered is correct and does not require the modulation type or modulation mode to be changed; **the change is saved.**

4 - OPERATION

- 2) The value entered is correct and requires the modulation type to be changed; **changes are saved and the following screen is displayed.**

Modulation type:
xxQAM

xx can have the following values: 16, 32, 64, 128 or 256.

Pressing any key causes return to the following screen:

Parameters:
Bit rate (with RS) ->

- 3) The value entered is correct and requires the TCM mode to be changed; **changes are saved and the following screen is displayed.**

TCM:
ON (or OFF)

Pressing any key causes return to the following screen:

Parameters:
Bit rate (With RS) ->

- 4) The value entered is correct and requires the modulation type and the TCM mode to be changed; **changes are saved and the following screen is displayed.**

Modulation type:
xxQAM

xx can have the following values: 16, 32, 64, 128 or 256.

Then, when pressing any key, **the following screen is displayed.**

TCM:
ON (or OFF)

Pressing any key causes return to the following screen:

Parameters:
Bit rate (With RS) ->

- 5) The value entered is incorrect and does not range between the maximum and the minimum bit rate values.; **the following screen is displayed.**

Out of range
Press any key

Pressing any key causes return to the Bit rate display and modification screen.

Bit rate (D') limitation

In the case of a 34.368 Mbit/s G.703 input, bit rate (D') is a multiple of 0.13425 Mbit/s $\pm$ 20 ppm, and therefore is limited to 33.96525 Mbit/s.

In the case of a 44.736 Mbit/s G.703 input, bit rate (D') is a multiple of 0.17475 Mbit/s $\pm$ 20 ppm, and therefore is limited to 44.21175 Mbit/s.

Note: The display screen resolution is 1 kbit/s.

Relationship Between Symbol Rate, Bit Rate and Modulation Type

This relationship is given by:

$$D_s = D' / ((M + 4) \times R)$$

Where : R is the inner rate,

D_s is symbol rate in MBaud,

D' is bit rate in Mbit/s,

M is modulation type for 0 = 16-QAM, 1 = 32-QAM, 2 = 64-QAM,

3 = 128-QAM, 4 = 256-QAM.

$$D' \text{ min.} = D_s \text{ min.} \times R_{\text{min}} \times (M_{\text{min.}} + 4) \text{ and } D' \text{ max.} = D_s \text{ max.} \times R_{\text{max}} \times (M_{\text{max.}} + 4)$$

Bit rate limit values depend on the Modulator Card type used, the Rx Interface Card used and the TCM mode.

The bit rate cannot be less than:

$$- 4 \times 7/8 \times 4 = 16 \text{ Mbit/s (IF = 44 MHz, TCM on),}$$

$$- 5.5 \times 7/8 \times 4 = 19.25 \text{ Mbit/s (IF = 36 MHz and 36.15 MHz, TCM on).}$$

In the case of an Rx Int Card using a 34 or 45 Mbit/s G.703 serial interface, the maximum bit rate limit value is respectively equal to 33.96525 or 44.21175 Mbit/s. The minimum bit rate limit value depends on the Modulator Card type used (4 to 5.2 MBaud or 5.5 to 7 MBaud).

The maximum bit rate limit value is given by the Modulator Card type used (4 to 5.2 MBaud).

The bit rate cannot be greater than:

$$- 5.2 \times 8 \times 1 = 41.6 \text{ Mbit/s (IF = 44 MHz, TCM off),}$$

$$- 7 \times 8 \times 1 = 56 \text{ Mbit/s (IF = 36 MHz and 36.15 MHz, TCM off).}$$

2) Symbol Rate

This option provides read only access to the symbol rate parameter value.

Parameters:
Symbol rate->

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Access to the Symbol rate display screen below is gain by pressing ➤, causing the PQM 2100 Unit symbol rate to be displayed.

Symbol rate:
5100 kbaud

3) Modulation type

This option provides the capability of displaying and/or changing the M-QAM modulation type (M = 16, 32, 64, 128 or 256) used. Read access to Modulation type is available from the following screen.

Parameter:
Modulation type->

Access to the Modulation type display or change screen below is gained by pressing ➤.

Modulation type:
64 QAM

This parameter can only be changed by operators having the user class **User** (indicated by a cursor).

Control via the keypad is as follows:

Keys	Description
------	-------------

- | | |
|---|-----------------------------------|
| ⬅ | Returns to Modulation type screen |
| ➤ | Inoperative (warning beep) |
| ▲ | Modulation type 128 QAM* |
| ▼ | Modulation type 32 QAM * |

ENTER Accepts

* The preset values available are those allowed by the bit rate/min. and max. Ds value consistency check.

4) TCM mode

This option is used to switch on the Trellis Coded Modulation.

Parameter:
TCM->

Access to the TCM mode display or change screen below is gained by pressing ➤.

TCM:
ON (or OFF)

This parameter can only be changed by operators having the user class **User** (indicated by a cursor).

Press ▲ or ▼ to select the desired mode by changing from no TCM mode ("OFF") to TCM mode ("ON") or vice versa, then press ENTER to accept.

Pressing the ENTER key can have two effects:

- 1) The value entered is correct and does not require the modulation type to be changed; **the change is saved.**
- 2) The value entered is correct and requires the modulation type to be changed; **changes are saved and the following screen is displayed.**

Modulation type:
xxQAM

xx can have the following values: 16, 32, 64, 128 or 256.

Pressing any key causes return to the following screen:

Parameter:
TCM->

5) Roll-Off

This menu provides the capability of displaying and/or changing the roll-off from 0.15 to 0.13, and vice-versa, as shown below:

Parameters:
Roll-Off->

Access to the Roll-Off display or modification screen below is gained by pressing ➤.

Roll-Off :
0.15

This parameter can only be changed by operators having the user class **User** (indicated by the presence of a cursor).

Press ▲ or ▼ to change the selected roll-off from 0.15 to 0.13, or vice versa, then press ENTER to accept.

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6) RF Output frequency

IF-RF Converter RF output frequency may be programmed via the keypad/display supervisory software via the I²C® bus.

The menu allows RF output frequency to be displayed and/or changed using the RF Output frequency screen below:

Parameters:
Output frequency->

Comment: The function is only accessible when the RF output is activated (see Sub-section 4.3.3.1 - RF Output Activation).

The RF Output frequency display or change screen below is selected by pressing ➤.

Output frequency:
170.5625 MHz

This parameter can only be changed by operators having the user class **User** (indicated by the presence of a cursor).

The operator can gain access to the functions using the keypad as follows:

Keys	Description
←	Returns to the RF Output Frequency screen or moves the cursor to the left
➤	For the first four digits: Moves the cursor to the right For the decimal value: no effect (warning beep)
▲	For the first three digits: Increments the underlined digit For the decimal value: Increases the value * in steps of 62.5 kHz
▼	For the first three digits: Decrements the underlined digit For the decimal value: Reduces the value * in steps of 62.5 kHz
ENTER	Validation

* Admissible minimum values: 108 MHz for the VHF1 IF-RF converter,
240 MHz for the VHF2 IF-RF converter,
470 MHz for the UHF IF-RF converter.

Admissible maximum values: 240 MHz for the VHF1 IF-RF converter,
470 MHz for the VHF2 IF-RF converter,
862 MHz for the UHF IF-RF converter.

At values below the minimum and above the maximum values, the following screen appears:

Out of range
Press any key

7) RF Output Level

The IF-RF Converter RF output level may be programmed via the keypad/display supervisory software via the I²C® bus.

This menu allows the RF output level to be displayed and/or modified from the RF Output Level screen below:

```
Parameters:
RF Output level->
```

The RF Level Display or change screen below is selected by pressing ➤.

```
RF Output level:
0 dBm
```

This parameter can only be changed by operators having the user class **User** (indicated by the presence of a cursor).

Press ▲ and ▼ to respectively increase or decrease the underlined value* in steps of 1 dBm then press **ENTER** to confirm.

* The standard minimum admissible value is -16 dBm
The standard maximum admissible value is +4 dBm.

8) IF/RF Converter Clock

The IF-RF Converter Clock reference may be programmed via the keypad/display supervisory software via the I²C® bus.

This menu allows the chosen clock reference to be displayed and/or modified from the Clock Reference screen below:

```
Parameters:
IF/RF Converter Clock->
```

The Clock reference display or change screen below is selected by pressing ➤.

```
IF/RF Converter Clock:
Internal (or External)
```

This parameter can only be changed by operators having the user class **User** (indicated by the presence of a cursor).

Press ▲ or ▼ to change the selected clock reference from "Internal" to "External" or vice versa, then press **ENTER** to confirm.

9) RF Output activation/deactivation

The activation or deactivation of the IF-RF Converter RF Output may be programmed via the keypad/display supervisory software via the I²C® bus.

The menu allows the RF output status (ON, OFF or AUTO) to be displayed and/or changed using the RF Output Activation screen below:

Parameters:
RF output activation->

The RF output activation screen below is selected by pressing ➤.

RF output activation:
ON (or OFF or AUTO)

This parameter can only be changed by operators having the user class **User** (indicated by the presence of a cursor).

ON RF Output Activation

OFF RF Output Deactivation

AUTO The RF Output is active if only a MPEG.2 signal is present at the PQM 2100 Unit Input ; the RF signal is automatically deactivated if a MPEG.2 signal is absent at the PQM 2100 Unit Input

Press ▲ or ▼ to switch the RF output status (ON, OFF or AUTO), then press **ENTER** to confirm.

10) Selection of the input used

The function provides the capability of displaying and/or changing the serial (34 or 45 Mbit/s G.703 or ASI) or parallel (DVB) input type in order to select the MPEG2-TS transport stream to be applied to the Rx Int Card contained in the PQM 2100 enclosure. The Input type selection screen below is displayed.

Parameters:
Input type->

The Input type display and/or change screen below is selected by pressing the key ➤.

Input interface type display or change screen

Input.type:
ASI (or G703 or Parallel)

This parameter, which depends on the Rx Int Card type installed, is only accessible to operators having the user class **User** (identified by the presence of the cursor).

Press the keys Δ or ∇ to change the serial (G.703 or ASI) or parallel (DVB) input type by changing from the serial interface selection (G.703 or ASI) to the parallel interface selection (Parallel) or vice versa, then **ENTER** to confirm.

IMPORTANT: In the case of a 45 Mbit/s G.703 Rx Int Card using a parallel input, if bit rate is too high (greater than 44.21175 Mbit/s), selection of the serial G.703 interface is not available.

11) Cable attenuation

The Cable attenuation parameter is only available if a 34 Mbit/s G.703 Rx Int Card is used. It provides the capability of compensating for attenuation to the interconnecting cable.

The function allows display and/or change of the value of compensation for attenuation due to the interconnecting cable using the Cable attenuation screen below:

Parameters:
Cable attenuation->

The Cable attenuation display or change screen below is selected by pressing the key $\triangleright$.

Cable attenuation:
0 to 6 dB (or 6 to 15 dB)

This parameter can only be changed by operators having the user class **User** (identified by the presence of the cursor).

Press the keys Δ or ∇ to change from the values 0 to 6 dB (0 to 6 dB) to the values 6 to 15 dB (6 to 15 dB) or vice versa, then **ENTER** to confirm.

12) Rx Interface Clock

This menu provides the capability of displaying and/or changing the M2P Int. Card clock using the M2P interface clock screen below:

Parameters:
Rx Interface Clock->

Access to the M2P Int. clock display or modification screen below is gained by pressing $\triangleright$.

Rx Interface Clock
Internal (or External)

This parameter can only be changed by operators having the user class **User** (indicated by the presence of a cursor).

Press Δ or ∇ to change the selected M2P interface clock option from Internal to External, or vice versa, then press **ENTER** to accept.

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Two kinds of M2P Int. cards can be installed in the PQM 2100 Unit, the one with a VCXO function, the other with a synthesizer function.

The **External** mode is used to connect a external clock for synchronization of the MPEG.2 frame carried by the M2P Rx Int Card.

The **Internal** mode allows :

- in the case of a M2P Int. card with a VCXO function, the mode display followed by the synchronization frequency (VCXO frequency expressed in kHz),
- in the case of a M2P Int. card with a synthesizer function, only the mode display ; the synthesizer frequency being directly related to the bit rate.

4.3.3.2 - Without IF-RF Converter

Press $\triangleright$ to access the Bit Rate screen.

1) Bit rate

Refer to the same parameter described previously for a QAM modulator with an IF-RF converter.

2) Symbol rate

Refer to the same parameter described previously for a QAM modulator with an IF-RF converter.

3) Modulation type

Refer to the same parameter described previously for a QAM modulator with an IF-RF converter. The next parameter to be processed is TCM Mode.

4) TCM Mode

Refer to the same parameter described previously for a QAM modulator with an IF-RF converter. The next parameter to be processed is Roll-Off.

5) Roll-Off

Refer to the same parameter described previously for a QAM modulator with an IF-RF converter. The next parameter to be processed is IF Output level.

6) IF Output Level

This option is only available in the absence of any IF-RF converter. It provides the capability of displaying and/or changing IF output level via the screen below:

```
Parameters:
IF output level->
```

Access to the IF output level display or change screen below is gained by pressing ➤.

```
IF output level:
-10 dBm
```

This parameter can only be changed by operators having the user class **User** (indicated by the presence of a cursor).

Press ▲ and ▼ to increase or decrease, respectively, the underlined value* in 1 dBm steps, then press **ENTER** to accept.

* The minimum limit value available is -27 dBm and the maximum limit value, -7 dBm.

Note: In the case of supervision and management of an IF-RF converter, the Output Level (Lo) is automatically programmed to a default value of -10 dBm.

7) Selection of the input used (serial or parallel)

Refer to the same parameter described previously for a QAM modulator with an IF-RF converter.

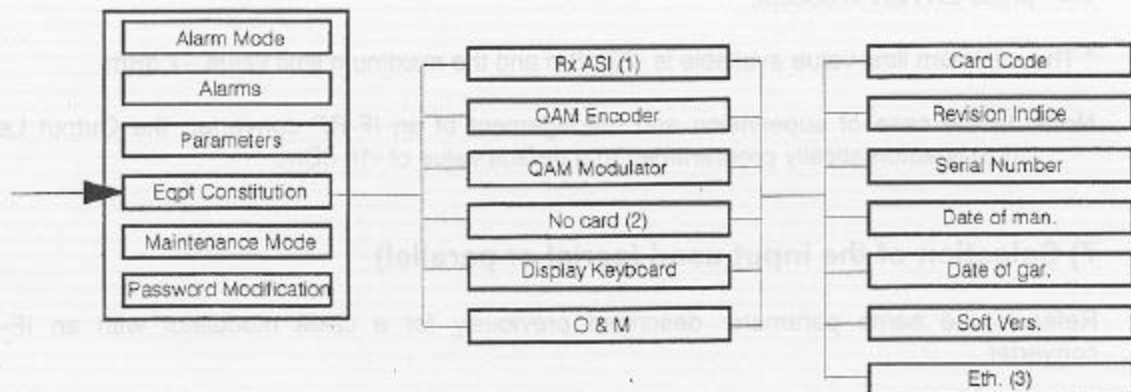
8) Cable attenuation

Refer to the same parameter described previously for a QAM modulator with an IF-RF converter.

9) Rx Interface Clock

Refer to the same parameter described previously for a QAM modulator with an IF-RF converter.

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- (1) or 34 Mbit/s G.703 Int. or 45 Mbit/s G.703 Int. or M2P Int.
ou Interface G.703 à 34 Mbit/s ou Interface G.703 à 45 Mbit/s
ou Interface M2P
- (2) or VHF1 (VHF2 or UHF) IF/RF Converter
ou Transposeur FI/RF VHF1 (VHF2 ou UHF)
- (3) For O & M, IF/RF Converter and Display/Keypad cards only
Pour cartes O & M, Transposeur FI/RF et Ecran/Clavier seulement

Figure 4.2 - Equipment Constitution Menu Tree Structure