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## 1U SHELF TYPE VDM-1

### AVDM TYPE MODULE INTENDED TO CONVERT SERIAL INTO E1



## DESCRIPTION

V05 - July 2019

MOVDM11907lv05

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## SAFETY SYMBOLS



**WARNING OR CAUTION:**

This symbol denotes a hazard. Not following the indicated procedure, operation or alike could mean total or partial breakdown of the equipment or even injury to the personnel handling it.



**NOTE:**

Information or important aspects to take into account in a procedure, operation or alike.

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# 1 INTRODUCTION

The VDM-1 shelf made up of an AVDM module is a converter intended for the transmission of a V.24 telecontrol channel (from 50 up to 19200 bit/s) through an SDH channel (2 Mbit/s codirectional G.703 interface).

The VDM-1 is equipped with test devices for a rapid operational check. These devices make it possible to carry out loops and to generate test signals, which allow an ETD to be emulated.

VDM-1 terminals can be fully programmed, monitored and managed from a PC running a standard Web browser, without requiring any additional software. The PC is connected to the VDM-1 equipment via 10/100Base-Tx interface.

The AVDM module can be inserted in an MDD-3 shelf that is six standard units (s.u.) in height and 19" in width, allowing up to 14 AVDM modules to be installed.

## 1.1 CONSTITUTION OF THE EQUIPMENT

The VDM-1 consists of a shelf that is one standard unit (s.u.) in height and 19" in width, prepared for rack mounting.

The AVDM module, incorporated in the shelf, is formed by a single-printed circuit board including the power-supply circuit and all the elements necessary to convert a V.24 port into a 2 Mbit/s G.703 output. The AVDM module has also a web server that integrates all the HTML pages necessary to carry out the equipment management.

The elements for external connection are located at the rear of the shelf. These elements are internally connected to the AVDM module by means of the WVDM back plane.

To simplify the commissioning, the front plate of the VDM-1 includes the following features:

- the optical indication of activity in the TD and RD signals of the V.24 interface and the line G.703 interface,
- the optical indication of the control signals of the V.24 interface,
- loop and test selection,
- the optical indication when a test or loop has been carried out,
- the optical indication of the general alarm, local and remote,
- the reset button of the equipment,
- the connector for the 10/100Base-Tx LAN interface and the optical indication of the state of the network interface.

## 1.2 TECHNICAL CHARACTERISTICS

### 1.2.1 Line interface

Transmission rate	2 Mbit/s. 2 frame slots for rates lower than 9600 bit/s (slots 1 and 2). 3 frame slots for rates equal or higher than 9600 bit/s (slots 1 and 3). <b>NOTE:</b> The 2 Mbit/s frame uses slot 0 for synchronism
Data transmission	Duplex
Internal-oscillator stability	± 25 ppm
Transmission clock	Selectable internal or recovered from received data
Synchronism	Codirectional clock
Output impedance	75 Ω
Input impedance	75 Ω
Maximum line attenuation	6 dB at 1024 kHz
Connector type	BNC (Coaxial type DIN 1.5/5.6)
Frame structure	Selectable from the Management System between multiframe (value by default) or basic frame. The multiframe is in accordance with ITU-T G.704 Recommendation
Electrical characteristics and line coding	In accordance with ITU-T G.703 Recommendation
Phase-fluctuation tolerance	In accordance with ITU-T G.823 Recommendation

### 1.2.2 V.24 data interface

Transmission rate	Programmable between 50 <sup>(1)</sup> , 100, 200, 600, 1200, 2400, 4800, 9600 or 19200 bit/s
Operation mode	In accordance with ITU-T V.24 Recommendation.  Available signals: TD, RD, RTS, CTS, RLSD-carrier detection (CD) and DSR.  Selection of RTS-signal activation: permanently or according to interface
Data format	Binary, serial. Asynchronous.  1, 1.5 or 2 stop bits.  From 5 to 8 data bits.  Parity: even, odd, none, <i>mark</i> or <i>space</i> <sup>(2)</sup>
Impedance levels	In accordance with ITU-T V.28 Recommendation
RTS-CTS delay	Selectable by means of internal microswitches in the following way:  Rates of 50 <sup>(1)</sup> , 100 and 200 bit/s: 0, 30, 60, 90, 120, 150, 180 and 210 ms  Rates of 600, 1200, 2400, 4800, 9600 and 19200 bit/s: 0, 10, 20, 30, 40, 50, 60 and 70 ms  Configurable from the Management System from 0 to 1000 ms, in 1 ms steps
Connector type	25-pin SUB-D in DCE configuration
Protection against electrostatic charges	IEC 870-2-1 level 4

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<sup>(1)</sup> 50 bit/s rate can only be configured from the Management System.

<sup>(2)</sup> *space* parity can only be configured from the Management System.

### 1.2.3 Other characteristics

#### Signalling

By optical indication

- Indication of activity in the TD and RD signals of the V.24 interface and the line G.703 interface.
- State of the control signals of the V.24 interface.
- Carrying out of some type of test.
- Carrying out of line and data loops.
- State of the network interface.
- Local<sup>(3)</sup> and remote<sup>(4)</sup> general alarm.

By relay

- Local<sup>(5)</sup> general alarm.

#### Characteristics of the general alarm signalling relay

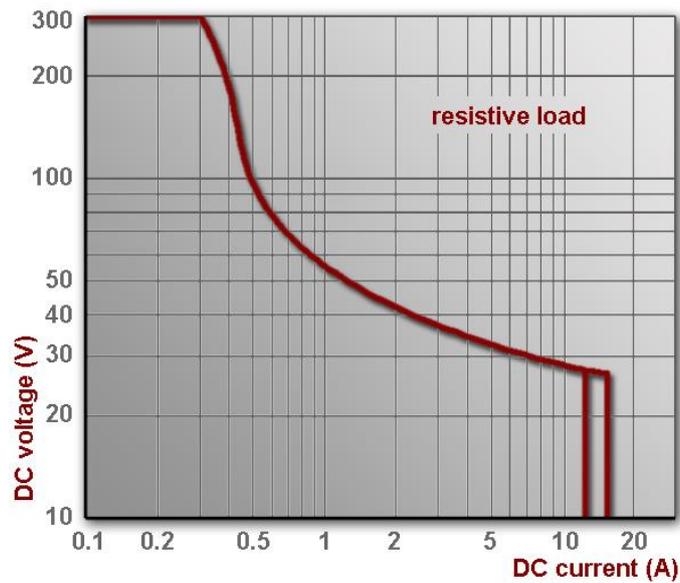
Type	Voltage-free changeover contact
Connector type	Aerial female for 2.5 mm <sup>2</sup> flexible and rigid conductors
Changeover maximum current	3 A
Changeover maximum voltage	250 V <sub>AC</sub> , 150 V <sub>DC</sub>
Changeover maximum power	See Figure 1
Insulation voltage	IEC 870-2-1 class 2
Impulse voltage	IEC 870-2-1 class 2

<sup>(3)</sup> It lights up when one of the following alarms is produced: Built-in autocheck failure, RTC failure, Incorrect identification code (ID), Data link failure, LFA (Loss of Frame Alignment), LOS (Loss Of Signal), AIS (Alarm Indication Signal) and BER>10<sup>-5</sup>.

<sup>(4)</sup> It lights up when one of the following alarms is produced: Built-in autocheck failure, RTC failure, Incorrect identification code (ID), Data link failure, LFA (Loss of Frame Alignment), LOS (Loss Of Signal) and AIS (Alarm Indication Signal). The information comes through the bit of the frame associated with RAI (Remote Alarm Indication).

<sup>(5)</sup> Relay activation conditions are established by programming.

## Max. DC load breaking capacity



**NOTE:** 2A is the maximum current

Figure 1 DC voltage/DC current

### Test devices

- Line loop (local and remote).
- Data loop (local and remote).
- Permanent sending of test signals, logical level "0" or "1" (to port V.24).
- Permanent sending of a fixed 8-bit pattern, configurable by the user. By default, **10100110** (to line).
- Sending of AIS (all "1").

The selection is carried out by means of internal microswitches (except for the last two) or from the Management System

### Receiver blocking

Data reception is blocked due to CD-signal loss, synchronism error or 2 Mbit/s frame failure.

### Capacity of chronological register

1000 alarms and events

**Internal clock**

Frequency stability within specified temperature and voltage ranges  $\pm 25\text{ppm}$

Ageing  $< 5\text{ppm/year}$

**1.2.4 Operating and storage conditions****Temperature and humidity**

From  $-5\text{ }^{\circ}\text{C}$  to  $+55\text{ }^{\circ}\text{C}$  and relative humidity not greater than 95%, in accordance with IEC 721-3-3 class 3K5 (climatogram 3K5).

**Power supply**

Nominal input voltage  $48\text{ V}_{\text{DC}} \pm 20\%$

Connector type Aerial female for  $2.5\text{ mm}^2$  flexible and rigid conductors

Insulation voltage IEC 870-2-1 class 2

Impulse voltage IEC 870-2-1 class 3 (1.2/50  $\mu\text{s}$ )

Fast transient bursts IEC 870-2-1 class 3

Electrostatic discharges IEC 870-2-1 class 3

Damped oscillatory waves IEC 870-2-1 class 2

Protection against polarity inversion Permanent by series diode

**Consumption** 9.6 W

**Protection against overvoltages** By fuse of 1 A/250 V

**Storage conditions** In accordance with IEC 721-3-1, class 1K5

### 1.2.5 Mechanical characteristics

Dimensions	19" (482 mm) in width and one standard unit in height (44 mm). Depth: 334 mm
Weight	3.4 kg
External connection	By connectors at the rear of the equipment.  The LAN interface connector is located on the front plate

### 1.2.6 Management System

#### Terminal management interface

##### 10/100Base-Tx LAN interface

Type of interface	IEEE 802.3 (CSMA/CD)
Connector	8-pin RJ-45 female
Type of cable	UTP-5
Transmission rate	10 or 100 Mbit/s

#### Management computer

Type	Compatible personal computer (PC)
Model	Pentium III 550 MHz processor or higher
RAM memory	512 MBytes
Graphic adapter	1 Mbyte SVGA
Communication	LAN module with 10/100Base-Tx interface
Operating system	Microsoft Windows XP Service Pack 2 version, Microsoft Windows 7 or Microsoft Windows 10
Web browser	Microsoft Internet Explorer v 6.0 or higher
JAVA virtual machine (Sun Microsystems)	Version 1.7 or higher

## 2 FUNCTIONAL DESCRIPTION

This chapter describes the main aspects related to the operating principle of the VDM-1 equipment and explains the available test devices.

### 2.1 OPERATING PRINCIPLE

The operating principle of the VDM-1 is based on making it possible to adapt the V.24 port to a G.703 output of 2 Mbit/s.

As can be seen in the block diagram attached to the end of the manual, the incoming data of the V.24 interface is recorded in a programmable logic and, through a frame synchronizer, is transferred to the line circuits that make up a frame at 2 Mbit/s in accordance with Recommendation G.703 of the ITU T with co-directional clock.

In reception, the process is the same but in reverse. The data received with the levels and coding in accordance with Recommendation G.703/G.704 is transferred to the line circuits and, once decoded by the frame synchronizer, they are delivered to the V.24 interface with the configured speed.

By means of an internal microswitch it is possible to configure certain parameters associated with the V.24 interface such as speed, delay between the RTS and CTS signal and activation of the RTS signal. These parameters can also be configured from the Management System. In this case, the configuration made from the Management System will prevail over the one made through the microswitch, as long as jumper 2 of the J5-J6 setting is not carried out.

The supply circuit contains the DC/DC converter that generates the internal power-supply voltages from the input voltage, as well as a filter at the input to suppress disturbance caused by fast transient bursts. The inputs and outputs of the interfaces and the alarm signalling relay also have protection elements that prevent disturbances that cause the equipment to malfunction.

## 2.2 GENERAL ALARM

The local general alarm is signalled on the front of the equipment by the LOC GENERAL ALARM LED and, externally, by the connector of the alarm relay located on the back of the shelf.

In normal operation the alarm signalling relay is energized so that, a disappearance of the supply causes the de-energization of the relay, and so, the general alarm.

The remote general alarm is signalled on the front of the equipment by the REM GENERAL ALARM LED.

The local general alarm can occur due to: Built-in autocheck failure, RTC failure, Incorrect identification code (ID), Data link failure, LFA (Loss of Frame Alignment), LOS (Loss OF Signal), AIS (Alarm Indication Signal) and BER>10<sup>-5</sup>.

The remote general alarm is activated with the RAI signal coming from the remote. The remote general alarm may occur due to: Built-in autocheck failure, RTC failure, Incorrect identification code (ID), Data link failure, LFA (Loss of Frame Alignment), LOS (Loss OF Signal) and AIS (Alarm Indication Signal).

## 2.3 TEST DEVICES

The test devices are used to facilitate maintenance, commissioning and fault-finding operations. They are based on the action of the switches on the front plate of the equipment.

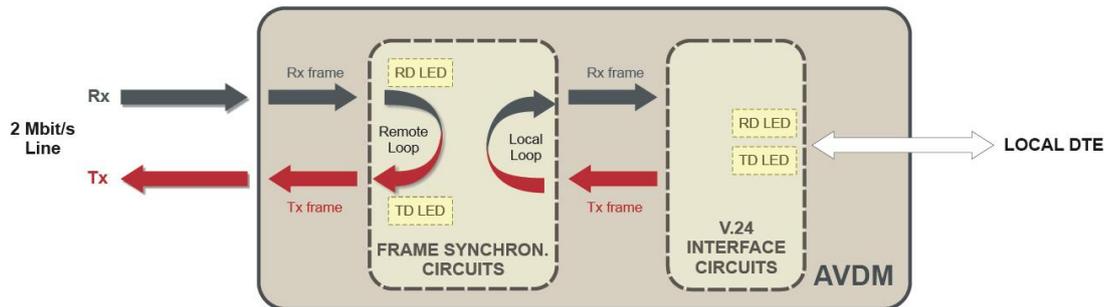
When a loop or the sending of test signals is carried out, at the V.24 interface, the DSR signal is disabled.

### 2.3.1 Line loop

Two types of line loops, local and remote (see Figure 2), can be carried out on the local equipment.

In the local line loop, the internal transmission frame of 2 Mbit/s is looped with the internal reception frame. In the remote line loop, the reception frame of 2 Mbit/s of line is looped with the transmission frame of 2 Mbit/s to line.

## LINE LOOPS



**NOTE:** The remote loop loops the data before the frame synchronizer circuits. The RD LED of line follows the data, but the TD LED does not do so.

Figure 2 Line loop

To make a line loop, first, the LINE switch on the front plate must be placed in the desired position, local or remote. The LOOP LED on the front plate lights up to indicate this situation.

The loop can also be ordered from the Management System.

### 2.3.2 Data loop

Two types of data loops, local and remote (see Figure 3), can be carried out on the local equipment.

In the remote data loop, the TD and RD signals are looped, which checks the V.24 interface (connection between the DTE). In the local data loop, the signal from the remote AVDM (demodulated RD) is looped with the signal to be transmitted (TD to modulate). In this last case, the RTS signal is internally maintained as active. The TD and RD LEDs of the AVDM follow the signals of the remote.

To make a data loop, first, the DATA switch on the front plate must be placed in the desired position, local or remote. The LOOP LED on the front plate lights up to indicate this situation.

The loop can also be ordered from the Management System.

## DATA LOOPS

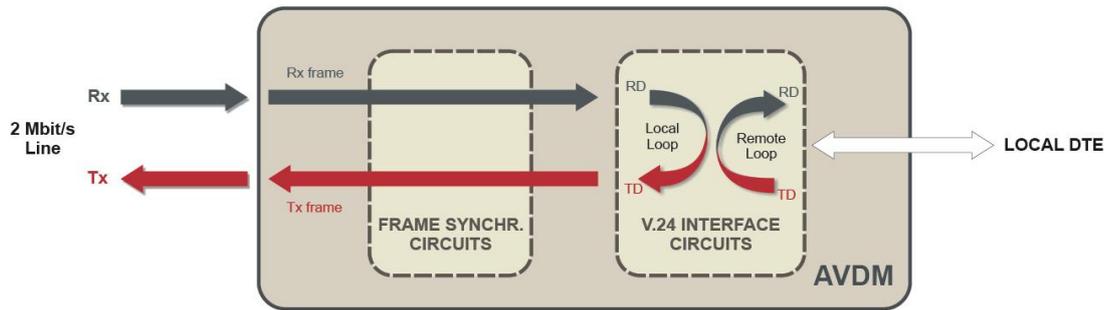


Figure 3 Data loop

### 2.3.3 Continuous sending of test signals

Should no data terminal equipment be available during commissioning to carry out tests on the link, continuous sending of a logical level "0" or "1" to the V.24 interface is possible by acting on the front TEST switch. This situation is indicated on the front plate of the equipment by means of the lighting up of the TEST LED.

These tests can also be ordered from the Management System.

### 2.3.4 Creation of a fixed pattern

This test can only be ordered from the Management System.

It consists of sending the frame with a fixed 8-bit pattern to the remote terminal. By default, the pattern is **10100110**. However, the user will have the possibility to modify it.

The data received will be compared with the transmitted data, showing the corresponding statistics.

### 2.3.5 Sending of AIS (Alarm Indication Signal)

This test can only be ordered from the Management System.

It consists of sending the frame with all the bits to "1" to the remote terminal.

## 3 INSTALLATION

Before installing an equipment, the user should ensure that the conditions in which it will operate are suitable. The operating conditions of the equipment are indicated in section 1.2, *TECHNICAL CHARACTERISTICS*, of this manual.

### 3.1 MECHANICAL AND ELECTRICAL CHARACTERISTICS

The VDM-1 device consists of a 19" shelf that is one standard unit (s.u.) in height, prepared for rack mounting. The shelf features two endplate angles for fixing the shelf to the frame of a cabinet. These endplate angles are located on each side of the shelf and are at the same level as the front plate. A drawing at the end of the manual shows the general dimensions of the shelf in mm as well as the position of the fastening holes.

The general power-supply switch, a 1 A/250 V fuse and the connectors for external connections are found at the back of the shelf.

On the front plate of the shelf are the optical indicators, the switches for test and loop selection, the reset push-button, and the 10/100Base-Tx connector for the LAN interface.

Access to the internal microswitch and configuration jumpers is possible once the AVDM module is removed. To do this, on the front, turn the two quarter-turn fixing screws anti-clockwise. Then by means of the handles pull the module out of the shelf.

Inserting a module in the shelf is achieved by carrying out the extraction process in reverse. Once the module has been inserted, the two quarter-turn fixing screws must then be turned clockwise.

### 3.2 EXTERNAL CONNECTIONS

The VDM-1, at the back part, consists of four connection blocks, one for the power supply, another for the connection of a V.24 interface, a third for the connection of a 2 Mbit/s G.703 interface, and a fourth for the general-alarm signalling relay.

Figure 4 shows the rear view of the shelf where the distribution of the four connection blocks is indicated, as well as their use. The use of the connector pins for the RS-232C interface is detailed in Table 1.

The power-supply and alarm connectors are suitable for 2.5 mm<sup>2</sup> flexible and rigid conductors.

RS-232C connector	J2 connector of AVDM	Use	DTE/DCE
2	22c	TD – Transmitted data	⇒
3	22a	RD – Received data	⇐
4	30c	RTS – Request to send	⇒
5	30a	CTS – Clear to send	⇐
8	24a	CD – Data carrier detect	⇐
6	24c	DSR - Modem ready	⇐
7	8c	Signal ground	-
1	32ac	Protective ground	-

Table 1 Assignment of RS-232C connector pins



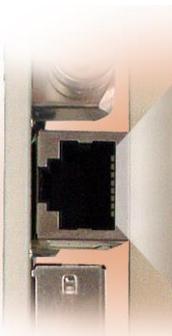
Figure 4 Rear view of the VDM-1

### 3.3 CONNECTION OF THE 10/100BASE-TX LAN INTERFACE

The VDM-1 has a 10/100Base-Tx LAN interface, which allows it to be integrated into any network (LAN) that uses this interface. The connector is on the front of the equipment and is a female 8-pin RJ-45.

The cable used to carry out the connection between the equipment and the computer must be an unshielded twisted 4 pair category five (UTP-5) with 8-pin RJ-45 connectors.

Table 2 shows the use of each one of the pins of the RJ-45 connector, as well as the pair it belongs to according to ANSI/TIA/EIA-568-A standard, in the 10/100Base-Tx LAN interface.



Pin	Pair	Assignment
1	3	TD+
2	3	TD-
3	2	RD+
4	1	Not used
5	1	Not used
6	2	RD-
7	4	Not used
8	4	Not used

Table 2 Signals of the RJ-45 connector in the 10/100Base-Tx LAN interface

The UTP-5 cable is made up of eight copper wires that form the four twisted pairs, covered in different coloured insulating material. Figure 5 shows the colour of the wires that make up each one of the pairs, according to ANSI/TIA/EIA-568-A standard.

If the VDM-1 equipment is connected directly to the computer, a crossover cable must be used, see Figure 6, where pairs 2 and 3 at one end of the cable are reversed at the other. However, should the computer and the VDM-1 equipment are connected to a hub or a switch (connection via IP network), straight-through cables must be used, see Figure 7, where the 4 pairs correspond at both ends of the cable.

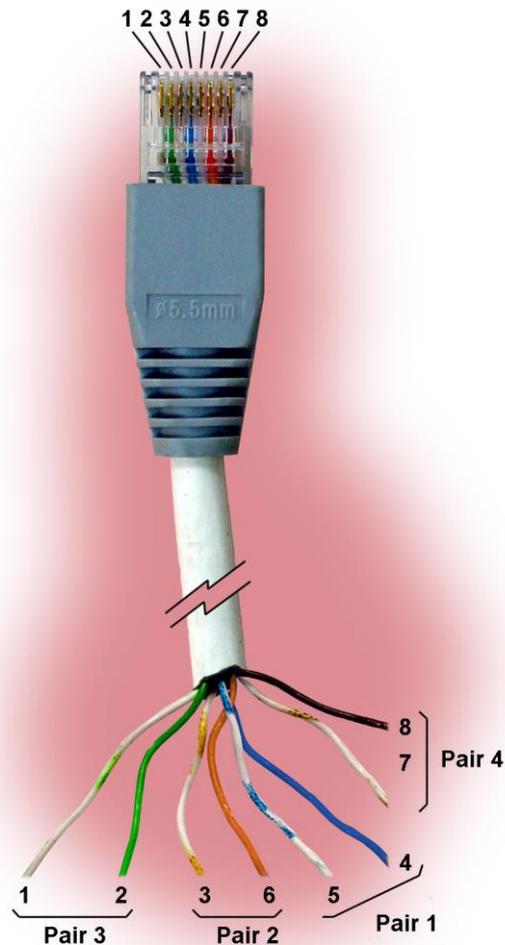


Figure 5 Unshielded twisted pair category five cable (UTP-5) with RJ-45 connector according to ANSI/TIA/EIA-568-A standard

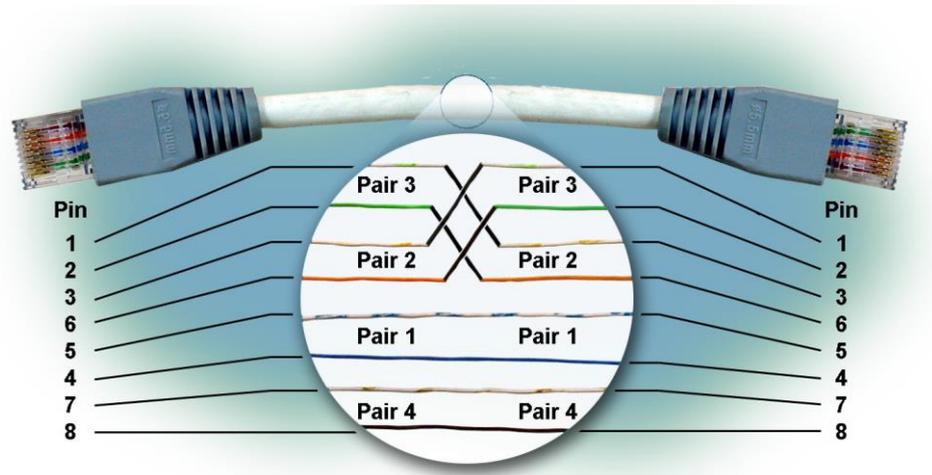


Figure 6 Crossover cable

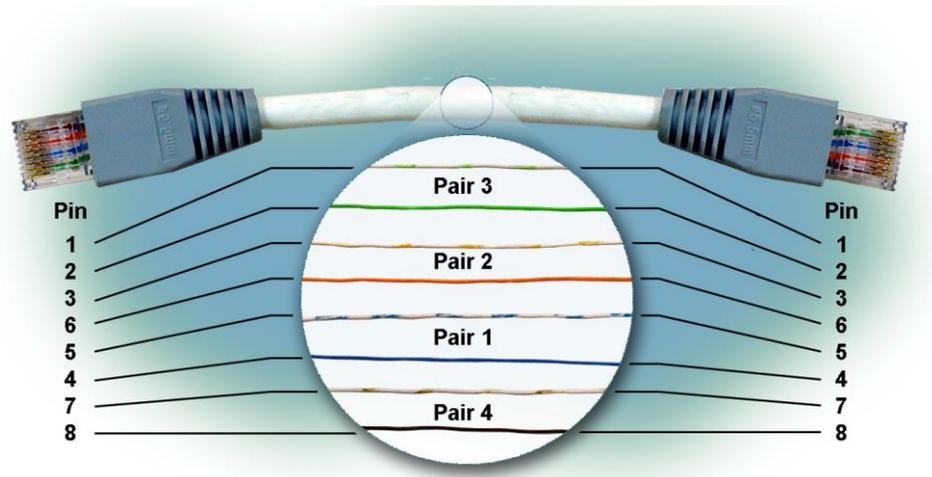


Figure 7 Straight-through cable

## 4 COMMISSIONING

This section deals with the functions of the elements accessible from the front plate as well as the internal microswitches and jumpers.

! When the equipment is powered, all the LEDs of the front plate remain illuminated for about 30 seconds. After the initial self-verification process performed by the process unit, the LOOP LED and the LOC and REM GENERAL ALARM LEDs go off.

### 4.1 FRONT-PLATE ELEMENTS

The front plate of the VDM-1 is shown in Figure 11. All the elements accessible from it are then described from left to right. For this, see detail of the front plate in Figure 8.

**LOC GENERAL ALARM LED**                      Red. The LED illuminates when the local general alarm occurs due to: Built-in autocheck failure, RTC failure, Incorrect identification code (ID), Data link failure, LFA (Loss of Frame Alignment) alarm, LOS (Loss of Signal) alarm, AIS (Alarm Indication Signal) alarm and BER>10<sup>-5</sup> alarm.

**REM GENERAL ALARM LED**                      Red. The LED illuminates when the remote general alarm occurs due to: Built-in autocheck failure, RTC failure, Incorrect identification code (ID), Data link failure, LFA (Loss of Frame Alignment) alarm, LOS (Loss of Signal) alarm and AIS (Alarm Indication Signal) alarm.  
The information comes through the bit of the frame associated with RAI (Remote Alarm Indication).

### **V.24 (RS-232C) interface**

TD/103 LED	Amber. Indicates data input.
RD/104 LED	Amber. Indicates data output.
RTS/105 LED	Amber. Indicates request to transmit and lights up when the signal is in active state.
CTS/106 LED	Amber. Indicates the equipment is ready to transmit and lights up when the signal is in active state.
DSR /107 LED	Amber. Indicates the equipment is working correctly.
CD/109 LED	Amber. Indicates the detection of line signals and lights up when the level of the carrier is above a pre-set level. It goes out in the opposite case.

### **Line G.703 interface**

TD LED	Amber. Indicates activity in the line data input.
RD LED	Amber. Indicates activity in the line data output.

### **LAN interface**

10/100Base-Tx	8-pin RJ-45 type female connector for unshielded twisted pair category five cable (UTP-5).
LINK	Green. Lit indicates that the link has been set correctly for the network interface.
ACT	Amber. It lights up in the case of emission or reception activity in the network interface.

### **Test devices**

TEST LED	Amber. It lights up when a test signal is sent to the V.24 interface.
0/1 switch	It is a three-way switch. Towards position 1 causes the permanent sending of a logical level "1". Towards position 0 causes the permanent sending of a logical level "0".
LOOP LED	Amber. Lights up when a line loop, local or remote, or a data loop, local or remote, is carried out.
LINE switch	It is a three-way switch. Towards position REM selects a remote line loop. Towards position LOC selects a local line loop.
DATA switch	It is a three-way switch. Towards position REM selects a remote data loop. Towards position LOC selects a local data loop.
<b>RESET push-button</b>	This resets the equipment.

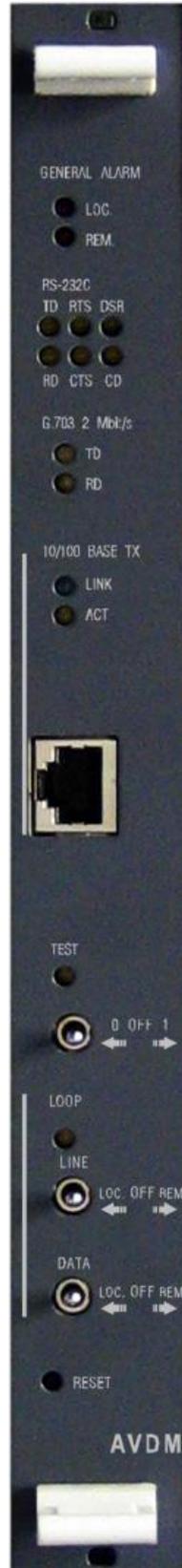


Figure 8 Detail of the front plate of the AVDM module

## 4.2 INTERNAL ELEMENTS

This section describes the function of the internal configuration elements of the AVDM module, see Figure 9.

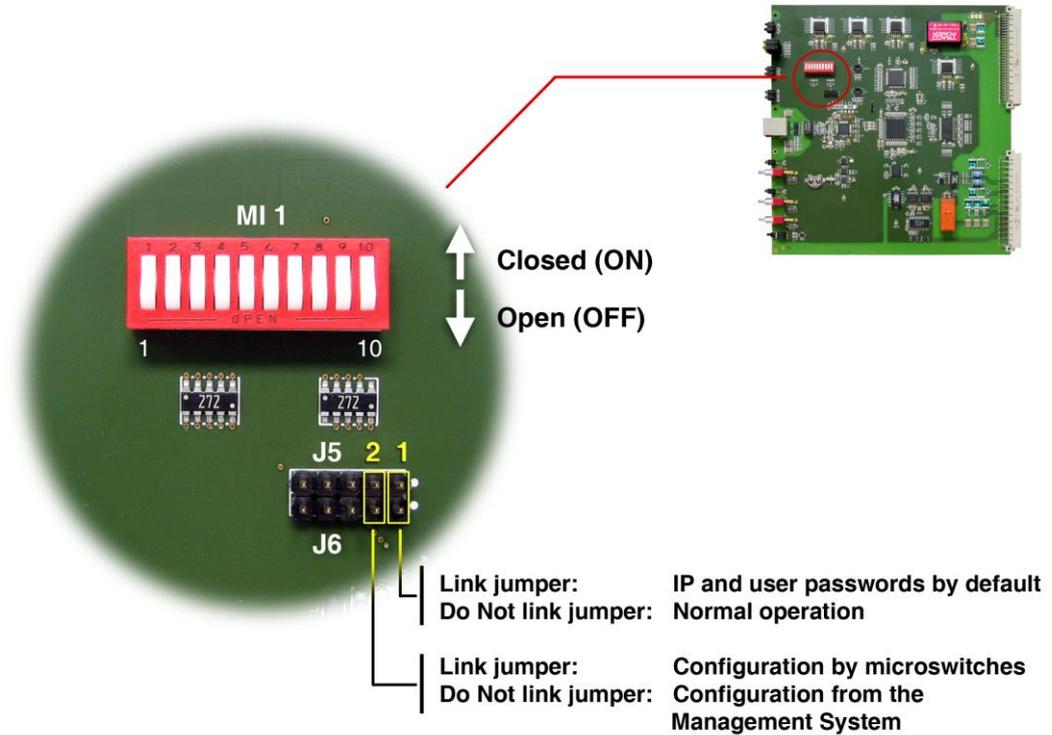


Figure 9 Arrangement of the configuration elements of the AVDM module

### MI1 microswitch

Microswitches 1, 2 and 3: Selection of the transmission speed of the V.24 interface.

Microswitch			Speed (bit/s)
1	2	3	
OFF	OFF	OFF	100
OFF	OFF	ON	200
OFF	ON	OFF	600
OFF	ON	ON	1200
ON	OFF	OFF	2400
ON	OFF	ON	4800
ON	ON	OFF	9600
ON	ON	ON	19200

Table 3 Transmission speed of the V.24 interface

**Microswitches 4 and 5:** Selection of the V.24 data interface parity.

Microswitch		Description
4	5	
OFF	OFF	none
OFF	ON	even
ON	OFF	odd
ON	ON	mark

Table 4 Parity for V.24 data interface

**Microswitch 6:** Selection of RTS-signal activation.  
 OFF Permanent.  
 ON According with the interface.

**Microswitches 7, 8 and 9:** Selection of the delay between the RTS signal and the CTS signal.

Microswitch			RTS-CTS delay (ms)	
7	8	9	100 and 200 bit/s	600 to 19200 bit/s
OFF	OFF	OFF	0	0
OFF	OFF	ON	30	10
OFF	ON	OFF	60	20
OFF	ON	ON	90	30
ON	OFF	OFF	120	40
ON	OFF	ON	150	50
ON	ON	OFF	180	60
ON	ON	ON	210	70

Table 5 Delay between RTS and CTS

**Microswitch 10:** Selection of the type of synchronism in the line interface.  
 OFF Clock recovered from the received data.  
 ON Internal clock.

### J5-J6 settings

**Jumper 1** By carrying out this jumper, the IP address by default as well as the default user passwords are loaded in the terminal.

**Carried out:** IP and default user passwords (see Table 6).

**NOT carried out:** Normal operation.

Administrator login	Basic login	Administrator password	Basic password	IP address
admin	basic	admin	basic	172.16.30.26

Table 6 Default values activated when carrying out jumper 1 (J5-J6)

**Jumper 2** Selection of the configuration mode of the VDM-1 device.

**Carried out:** Configuration by means of microswitches.

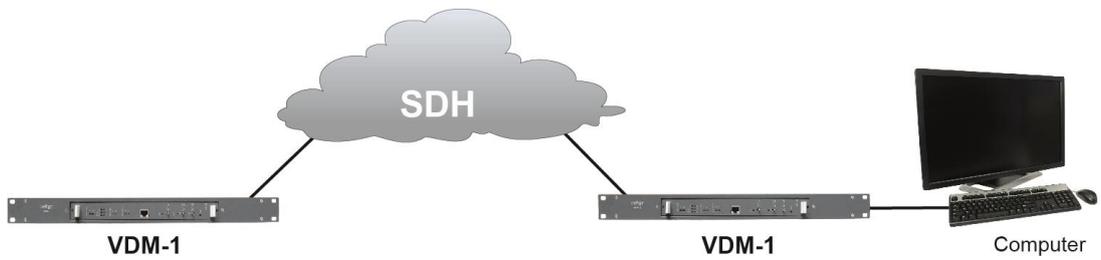
**NOT carried out:** Configuration by means of the parameters of the Management System.

## 5 SYSTEM MANAGEMENT

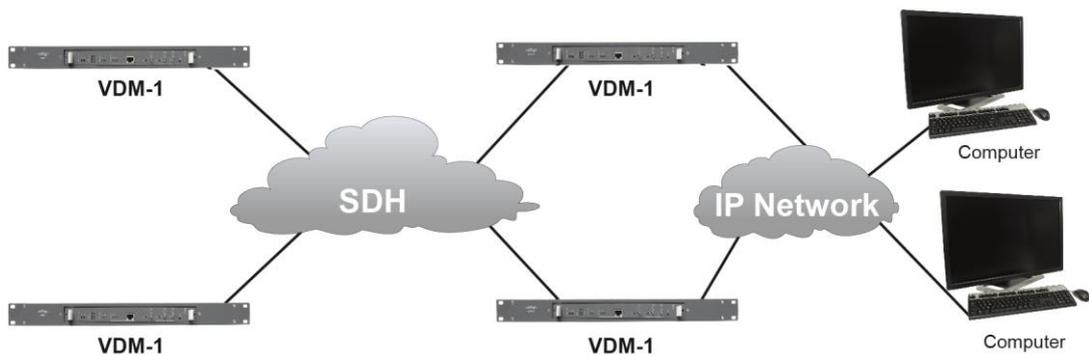
VDM-1 device uses integrated Web management that allows connection to LAN. The AVDM module includes a web server containing all the pages necessary for the system programming and monitoring, being unnecessary for any software to be supplied with the device.

The connection between the PC and the VDM-1 device can be direct or by means of an IP network (LAN or WAN). In the last case all the computers connected to the IP network can manage any VDM-1 device connected to the said IP network.

The two types of connection mentioned above are shown in Figure 10a) and Figure 10b).



a) Direct connection



b) Connection via IP network

Figure 10 Possibilities of connection between the PC and the VDM-1 device

## 5.1 ACCESS CONTROL

Access to the Web Management of the VDM-1 device requires a user password, which comprises a user identification and a password.

There are two different user profiles, one basic and the other administrator. Each one has different management capacities so that whereas the administrator user can modify and supervise any parameter of the terminal, the basic user can only retrieve or supervise the parameters of the terminal and is unable to alter its operation at any time.

By default, the system has two created profiles, one basic and the other administrator, whose user identifications and passwords can be seen in Table 7.

	User identification	Password
Basic User	basic	basic
Administrator User	admin	admin

Table 7 Default user passwords of the system

## 5.2 MAIN MANAGEMENT MENUS

The Web Management of the VDM-1 device only requires a standard web browser. The user can access the home page of the Management System by entering the IP address of the web server integrated in the VDM-1 into the browser and allowing the installation of a file (**ZIVCommunications.cer**). Once the home page is displayed, the system asks for authorisation by the user password.

Five main menus appear in the home page. The first menu, *Files*, controls the flow of information entering and leaving the Management System. The second, *Updatings*, allows the management and control software of the AVDM module to be upgraded, as well as the firmware of this module. The third, *Configuration*, allows the operative parameters of the device to be configured. The fourth, *Monitoring*, allows supervision of the device to be carried out, whilst the fifth, *Alignment*, contains guidelines on alignment and maintenance. These menus are described in more detail in the following sections.

### 5.2.1 Files menu

This menu gives access to the reading functions of the disk or device and writing functions to disk or in the device.

### 5.2.2 Updatings menu

This menu allows the management and control software of the AVDM module to be upgraded by an administrator user (*admin*), as well as the firmware of this module.

### 5.2.3 Configuration menu

This menu allows all the parameters related to network management to be programmed, and to specify the VDM-1 configuration, that is, its identification and configuration.

#### Identification

It is possible to program a numeric identification and a description of up to 49 characters on the VDM-1 device.

#### Server

This submenu gives access to the options that specify: the user password to the web server and the basic parameters of network management (IP address, subnet mask and default gateway), which must be compatible with those of the management computer.

#### Equipment

This submenu allows the operating parameters related to the line interface (E1) and data interface (V.24) to be configured. It also allows the local alarms that will activate the general-alarm signalling relay to be specified, as well as set some alarms and/or events that are desired to be registered or not in the chronological register.

#### **5.2.4 Monitoring menu**

It allows the status of the device to be monitored.

Data supplied by the monitoring system regarding the device is: System alarms, Chronological register, V.24 interface status and G.821 statistics in G.703 interface.

The appearance and disappearance of the alarms is stored in a register with the indication of the date, with day, month and year, and the time, in minutes, seconds and milliseconds in which they have occurred.

Events related to the service of the equipment, such as the switching of the device and the modification of the programming are also stored in the same register. The register has a maximum capacity; when the limit is reached the events or alarms introduced at the beginning of the register are eliminated.

This menu also contains a programming option that allows the display filter of some alarms and/or events to be specified.

#### **5.2.5 Alignment menu**

The alignment menu is provided to facilitate commissioning operations and system maintenance. The menu allows the internal clock of the device to be set, as well as carry out loops and tests, force a reset of the device, force the reset of the counters associated with the number of activations of certain alarms, force the reset of the counters associated with the V.24 interface and force the reset of the counters associated with the G.821 statistics.



Figure 11 VDM-1 front view

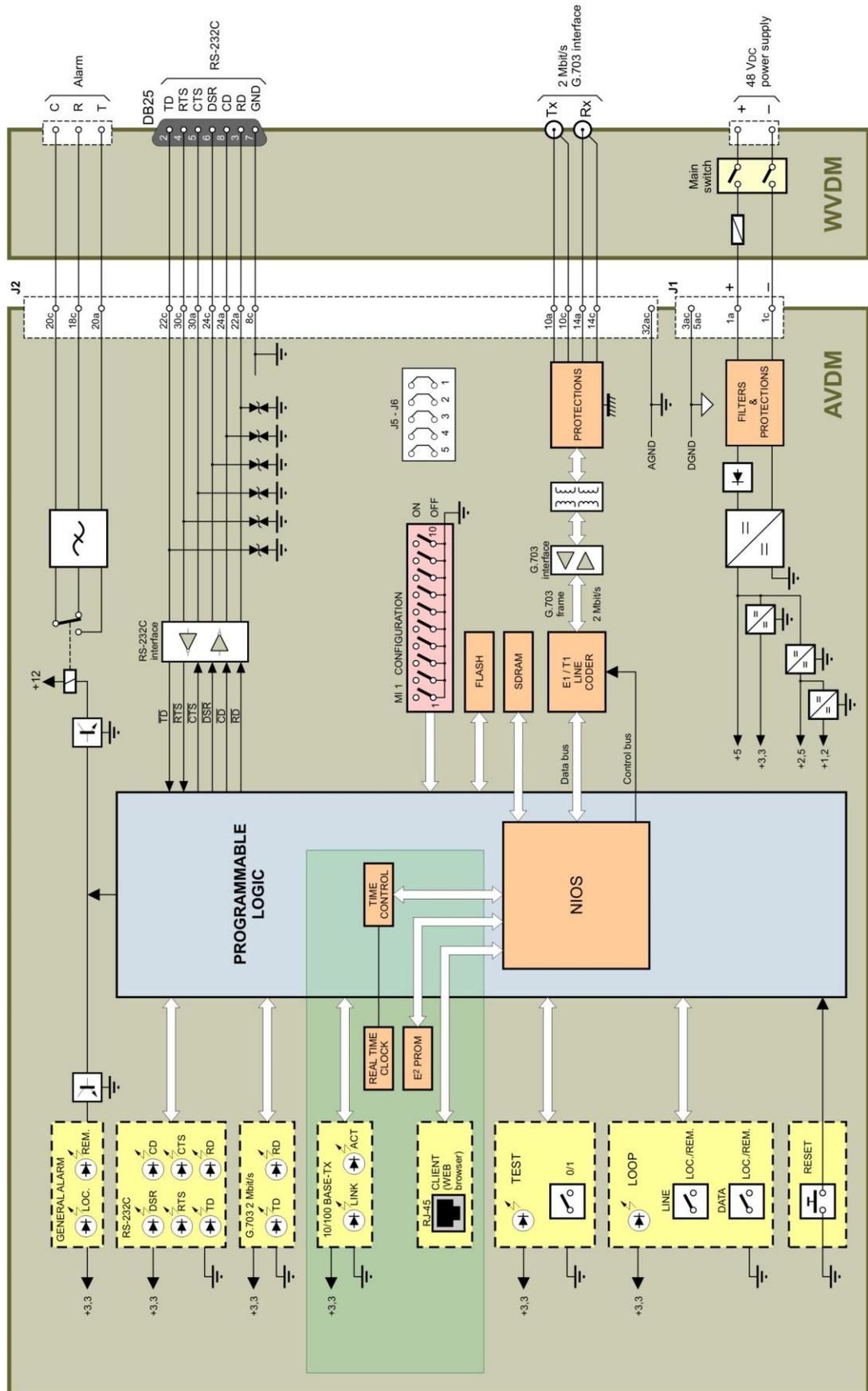


Figure 12 VDM-1 simplified block diagram

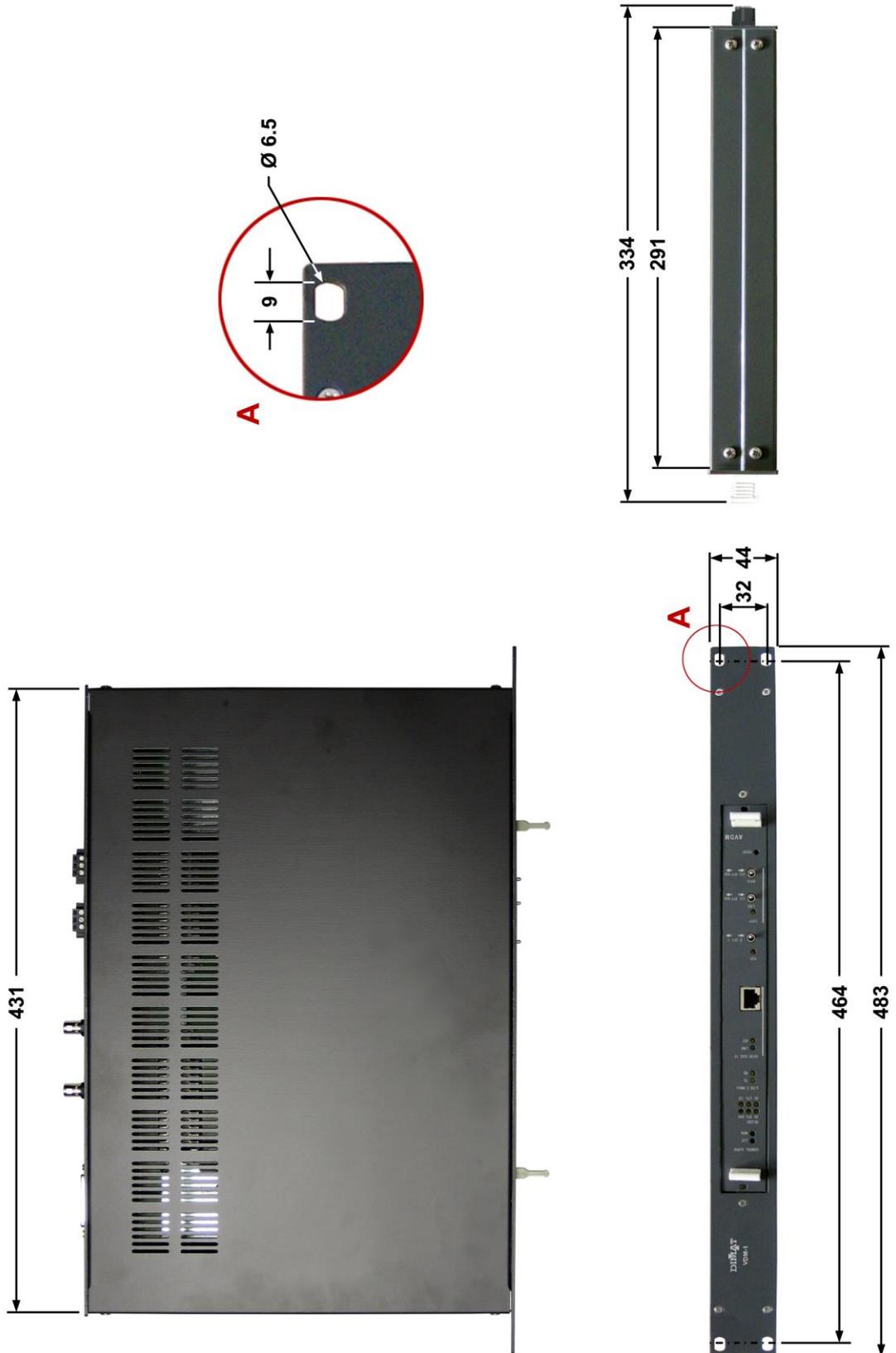


Figure 13 VDM-1 overall dimensions

## **APPENDIX A**

# **VDM-1 MANAGEMENT SYSTEM DESCRIPTION**

**Web version 1.6**

## APPENDIX A

### VDM-1 MANAGEMENT SYSTEM DESCRIPTION

#### Web version 1.6

#### A.1 INTRODUCTION

The Web Management allows the VDM-1 device to be configured and monitored from a web browser. Access to all the parameters that can be programmed and monitored is carried out by means of menus which unfolds in options or in submenus that contains options.

#### A.2 USER INTERFACE

After entering the IP address of the web server integrated in the VDM-1 device into the browser, a security warning is displayed requesting the acceptance of the installation of a file (*ZIVCommunications.cer*), see Figure 14. Without the installation of the file, it is not possible to access the management of the equipment.



Figure 14 Security warning dialog box

If you want the security warning not to be shown again in the future, before executing the file, you must select the "Always trust the contents of this editor" box.

Once the home page is displayed, see Figure 15, it is necessary to introduce the user authentication data (user and password) and then press the *START CommandButton*. Then the home page shows the management menu corresponding to the introduced user profile.

The main menu is to be found on the left side of the screen, whilst the right side is for the display of programming and monitoring pages stored on the web server of the VDM-1 device. The page with the photo of the terminal disappears when any of the options of the menu involving the display of any management page is selected.



Figure 15 Home page

### A.2.1 Main menu

The main menu is presented on the left of the screen and has, for the admin profile, five fold down options that are always visible, see Figure 16.

The five fold down options, in descending order, are: *Files*, *Updatings*, *Configuration*, *Monitoring* and *Alignment*.

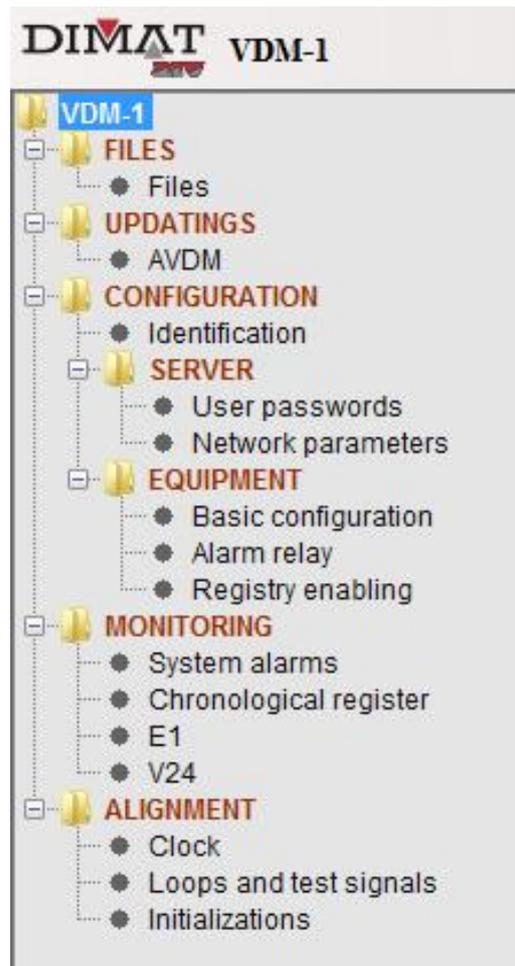


Figure 16 Options of the main menu

When any one of the options is pressed, a submenu unfolds where more fold down options appear and/or links to the management pages of the VDM-1 device. The fold down options and links to the management pages are both different in appearance and operation.

**Fold down option**

**Appearance:** Brown text preceded by the sign '+' and the icon of a closed folder.

**Operation:** To select an option just click on the sign '+' or double-click on the folder icon or on the name of the option. Once the option is selected, the corresponding submenu unfolds, the sign '+' becomes '-', and the icon of the closed folder changes to that of an open folder to indicate that the submenu has unfolded.

**Link to management page**

**Appearance:** Black text preceded by black dot.

**Operation:** When selecting the link (just click on the text or black dot) no submenu unfolds and the corresponding management page is accessed.

**A.2.2 Management pages**

When selecting any of the links to management pages, the browser will display a web page. These pages allow data of the terminal to be displayed and, if the user has an administrator profile, to program data in the terminal. To carry out these actions, the pages have controls for this purpose. In a management page, the following controls may be found:

- **TextBox:** The *TextBox* control is the most common control on a web page. It looks like a text box and enables users to display and/or enter any numerical or alphanumerical value from the keyboard.



- **ListBox:** The *ListBox* control looks like a text box, but limited to a fold down list of elements of which the user, with the mouse, can choose one.



- **CommandButton:** The *CommandButton* control looks like a button that, depending on the action that is carried out when clicking it with the mouse, is of a different colour.



In the VDM-1 management pages, the most usual *CommandButton* controls are:

OPEN: When pressed, disk data is obtained.

SAVE: When pressed, data is programmed on disk.

RETRIEVE: When pressed, data is obtained from a terminal.

PROGRAM: When pressed, data is programmed in the terminal.

VIEW: When pressed, screens with information appear.

- **CheckBox:** The *CheckBox* control is a box that shows a mark when it is activated; this mark disappears if the control is de-activated. It is activated and de-activated by using the mouse to click on it and allows the user to select an option of True/False or Yes/No.



- The controls type *TextBox*, *ListBox* or *CheckBox* allow the user to display and enter data, except when they are only informative, in which case they will appear lighter.

When the amount of information to be displayed in a page is so great that the parameters cannot be shown, the scroll bars appear, horizontal and/or vertical, that allow the page to be moved about in order to access them all.

### A.2.3 Messages

When handling the web application, messages may appear to indicate the result of the actions carried out or ask for confirmation of the commands received.

They appear in standard windows of Windows and require the user to select the option he wants to carry out from among of the possibilities presented with the mouse.

### A.2.4 Leaving the web management

There are two options for leaving the Web Management:

- To close the Internet Explorer browser by selecting *Close* in the *File* option of the main menu, or by clicking the X button located in the upper right-hand corner of the window of the browser.
- To enter a new address in the ADDRESS field of the browser screen.

In any of these cases, on leaving the Web Management, the application asks if the configuration must be saved.

It is advisable to save the data on the disk or the terminal before leaving, as any unsaved modification will be lost.

## A.3 FILES MENU

This option of the main menu has a unique option with the same name which gives access to the disk or terminal reading functions and writing on the disk or on the terminal.

The page that is displayed when selecting this option contains two sections that are described below.

### Disk

This section allows data to be acquired relative to the programming of the device stored on disk, and to save the data relative to the programming of the device in a file. There are two *CommandButtons*, OPEN and SAVE, for these operations.

When the OPEN *CommandButton* is pressed, which is next to the RETRIEVE DATA FROM DISK text, an *Open file* window of Windows opens in which the disk unit and the directory where the file one wishes to read is to be found must be selected. Once the file has been selected, and by pressing ACCEPT in the Windows window, a window appears that reports the evolution of the acquisition process. The data read may be consulted and modified in the *Configuration* menu.

On pressing the SAVE *CommandButton*, next to the text SAVE DATA ON DISK, a *Save file* window is opened in Windows, where it is necessary to choose the disk unit and the directory where one wishes to save the file and give it a name.

If the name is the same as that of an already existing file, a warning window appears asking if one wishes to overwrite it. If the answer is no, it is necessary to introduce a new name. While the file is being saved, the percentage evolution of the process is shown in a window.

### Terminal

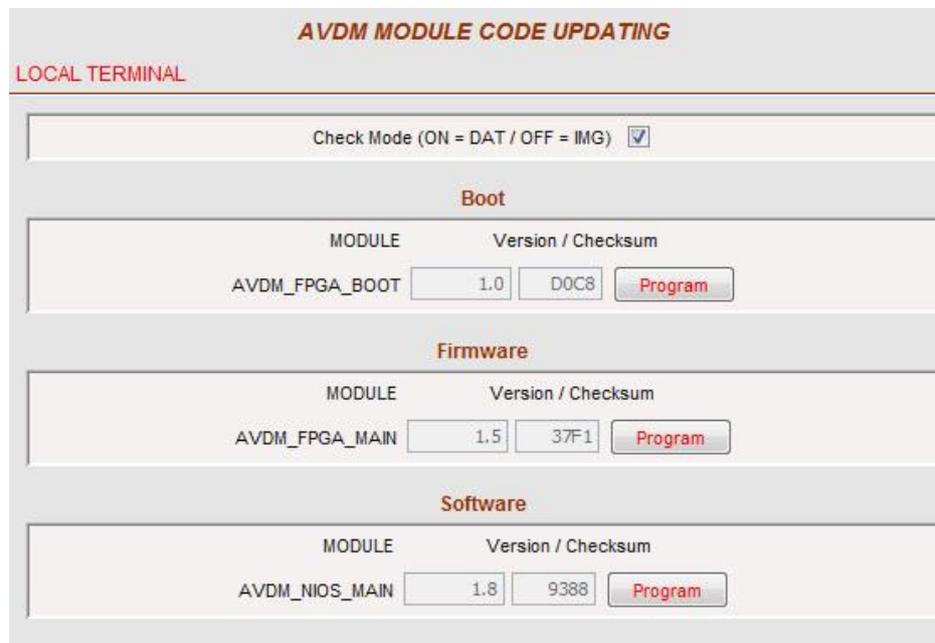
This section establishes communication with the device to acquire its configuration data or load it with that programmed. These options are carried out by two *CommandButtons*, RETRIEVE and PROGRAM.

The RETRIEVE *CommandButton*, which is next to the text RETRIEVE DATA FROM TERMINAL, allows the acquisition of all its configuration data. If communication is not achieved with the terminal, a communications failure warning is given.

The PROGRAM *CommandButton*, which is next to the text SAVE DATA IN TERMINAL, enables a user, with an ADMINISTRATOR profile, to load the programmed configuration in the terminal. If the user wishes to modify some parameters only, it is better to do so parameter by parameter to ensure that other values are not modified accidentally. The programming held by the device cannot be retrieved unless it has previously been kept in a file.

## A.4 UPDATINGS MENU

From the screen associated with the AVDM option, the management and control software of the AVDM module can be upgraded, as well as upgrade the firmware of this module.



AVDM MODULE CODE UPDATING		
LOCAL TERMINAL		
Check Mode (ON = DAT / OFF = IMG) <input checked="" type="checkbox"/>		
Boot		
MODULE	Version / Checksum	
AVDM_FPGA_BOOT	1.0 D0C8	<input type="button" value="Program"/>
Firmware		
MODULE	Version / Checksum	
AVDM_FPGA_MAIN	1.5 37F1	<input type="button" value="Program"/>
Software		
MODULE	Version / Checksum	
AVDM_NIOS_MAIN	1.8 9388	<input type="button" value="Program"/>

Figure 17 *Updatings menu*

### Management software upgrade

The screen associated with the AVDM option allows the user with ADMINISTRATOR profile, when a new version of the current pages is developed, upgrade the web pages stored in the server of the VDM-1 device.

The file corresponding to the web pages is called **Software**. Once a new version of this file is obtained, it is loaded in the server of the VDM-1 device by means of the associated PROGRAM *CommandButton*. When pressed, an *Upload* window of Windows appears where the disk unit and directory containing the Management and control software file must be selected.

Once the file upgrade is complete, the following operations must be carried out:

1. VDM-1 terminal reset.  
To do so, press ACCEPT in the warning window that appears.
2. Close the Microsoft Internet Explorer.
3. Open the Microsoft Internet Explorer and delete the cache memory of the management computer, from the *Tools* menu (*Internet options*) of the Microsoft Internet Explorer, and the cache memory of the *Java* virtual machine, by means of the *Start* button of Windows (*Java Plug-in* of the *Control panel*).

### **Control software and firmware upgrade of the AVDM module**

The screen associated with the AVDM option also allows the upgrade of the control software and firmware of the AVDM module.

This upgrading must be carried out according to the instructions of the ZIV technical department.

The new version of each file, **Boot** and/or **Firmware**, is loaded in the server of the VDM-1 device, by means of the associated PROGRAM *CommandButton*. When pressed, an *Upload* window of Windows appears where the disk unit and directory containing the file in question must be selected. It is not necessary to carry out a reset after each upgrading. The terminal reset must only be carried out at the end of the process if the terminal has not done it by itself.

## **A.5 CONFIGURATION MENU**

The *Configuration* option of the main menu is used to program the parameters related to the network management, as well as to define the terminal own programming.

This option has an option, *Identification*, and two submenus, *Server and Equipment*, which are described below.

### A.5.1 Identification

Two *TextBoxes*, CODE and COMMENT, appear in this option that allow to program a numeric identification (four numbers) and a description of up to 49 characters, respectively, in the terminal. The VDM-1 leaves the factory with its serial number programmed in the CODE *TextBox*, although the user can program any other numeric value that he considers appropriate.

### A.5.2 Server

This submenu gives access to all the management pages related to the configuration and maintenance of the web server.

#### User passwords

This option of the submenu only appears if the user connecting the web server of the VDM-1 device has an ADMINISTRATOR user profile.

The *User passwords* option, as the name indicates, allows the default user passwords of the system to be modified for both basic users and administrator users.

The *User passwords* page it is made up of three *TextBoxes* for each profile (administrator and basic), which hold the user identification, the password and the confirmation of the password and a *CommandButton*, for each profile, to program the new user profile in the server.

Once a user password has been modified, it will not be effective until the web server is reinitiated.

#### Network parameters

This option should be used, by an ADMINISTRATOR user profile, if any modification is made to the working environment and it is necessary to upgrade any of the network parameters.

This page also allows the MAC address of the AVDM module to be displayed.

The parameters configured in the terminal are acquired by pressing the RETRIEVE *CommandButton*.

Any element of a local area network is identified by a single coded number called the MAC address (medium access address). This address is used to create the frames that are used in the communication between the different elements of the network. In the *TextBox* labelled as MAC ADDRESS this value of the AVDM module is indicated.

The ETHERNET PARAMETERS must be entered in the three *TextBoxes* labelled as IP ADDRESS, SUBNET MASK and GATEWAY.

By default, the IP ADDRESS of the device is 172.16.30.26 and the mask is 255.255.0.0. When the IP address by default is modified, it is advisable to store the new address in some type of register as, should the new address be forgotten, it is not possible to access the web server.

If the new IP address is forgotten, by carrying out jumper 1 of the internal setting (J5-J6) of the AVDM module, the IP address by default (172.16.30.26) as well as the default user passwords of the system are loaded again in the terminal.

The parameters configured on the screen are transferred to the terminal by pressing the PROGRAM *CommandButton*.

### A.5.3 Equipment

This submenu gives access to the management pages related to the configuration of the equipment itself.

#### Basic configuration

The page associated with the *Basic configuration* option is divided into three sections whose configuration can be acquired from the terminal with the RETRIEVE *CommandButton*. The programming of the configured parameters become effective by pressing, by an ADMINISTRATOR user profile, the PROGRAM *CommandButton*.

The first section, E1 INTERFACE, allows the operating characteristics of the codirectional type G.703-line interface of 2 Mbit/s to be specified.

The first *ListBox* control of this section allows the structure of the frame to be specified. Valid values are: *E1 Framing with CRC 4 Multi-Frame Alignment* or *Basic E1 Framing*. The default option is *E1 Framing with CRC 4 Multi-Frame Alignment*.

The second *ListBox* control allows the transmission clock to be set. Valid values are: *Internal clock* or *Clock recovered from Rx*.

The second section, V.24 INTERFACE, allows the operating characteristics of the V.24 telecontrol channel to be specified.

The first *ListBox* control of this section allows the transmission rate to be configured. Valid values are: 50, 100, 200, 600, 1200, 2400, 4800, 9600 and 19200 bit/s.

The second *ListBox* control allows the parity to be set. Valid values are: *none*, *even*, *odd*, *Mark* and *Space*.

The third *ListBox* control allows the number of stop bits to be set. Valid values are: 1, 1.5 or 2.

The fourth *ListBox* control allows the number of data bits to be set. Valid values are: 5, 6, 7 and 8.

The fifth *ListBox* control allows the mode of the RTS signal to be set. Valid values are: permanently (*fixed on*) or according to the interface (*DTE*).

The sixth *TextBox* control allows the delay between the RTS and CTS signals to be configured. Any value between 0 and 1000 ms, in steps of 1 ms can be entered.

The third section, IDENTIFICATION CODES, allows the origin of the information received by the terminal to be configured.

The selection of the *Id code enable CheckBox* means the display of the identification codes. The codes are not displayed on the screen by deselecting this *CheckBox*.

In the *TextBox* labelled as TRANSMISSION IDENTIFIER, it is necessary to introduce the code that will be used to identify the information generated by the terminal. In the *TextBox* labelled as RECEPTION IDENTIFIER, it is necessary to introduce the code that the terminal must identify to obtain the information from.

### **Alarm relay**

The page associated with the *Alarm relay* option allows to configure, by an ADMINISTRATOR user profile, the local alarms that will activate the general-alarm signalling relay of the terminal.

As is shown in Figure 19, the selection is carried out with *CheckBox* type controls.

**INTERFACE AND IDENTIFICATION CODE PROGRAMMING**

LOCAL TERMINAL REMOTE TERMINAL

---

**E1 Interface**

Framing mode: E1 Framing with CRC4 Multi-Frame Alignment  
 TX Clk Mode: Clock recovered from RX

**V24 Interface**

Baud Rate: 9600  
 Parity: None  
 Stop Bits: 1  
 Word Length: 8  
 RTS Mode: Fixed ON  
 RTS-CTS Delay: 0 ms

**Identification codes**

Id code enable:   
 Transmission identifier: 0      Reception identifier: 1  
 Id code alarm blocks V.24 interface:

Figure 18 Basic configuration option

**CONFIGURATION OF ALARM RELAY**

LOCAL TERMINAL REMOTE TERMINAL

---

System Check   
 RTC failure   
 Identifier Code Error   
 HDLC Data Link Error   
 Loss of Frame Alignment Alarm (LFA)   
 Loss Of Signal Alarm (LOS)   
 Alarm Indication Signal (AIS)   
 Remote Alarm Indication (RAI)   
 Bit Error Rate Alarm (BER)

Figure 19 Alarm relay option

## Registry enabling

The page associated with the *Registry enabling* option, allows to configure, by an ADMINISTRATOR user profile, which alarms and/or events are desired to be registered or not in the chronological register of the terminal. As is shown in Figure 20, the selection of alarms and/or events is carried out by means of *CheckBox* type controls.

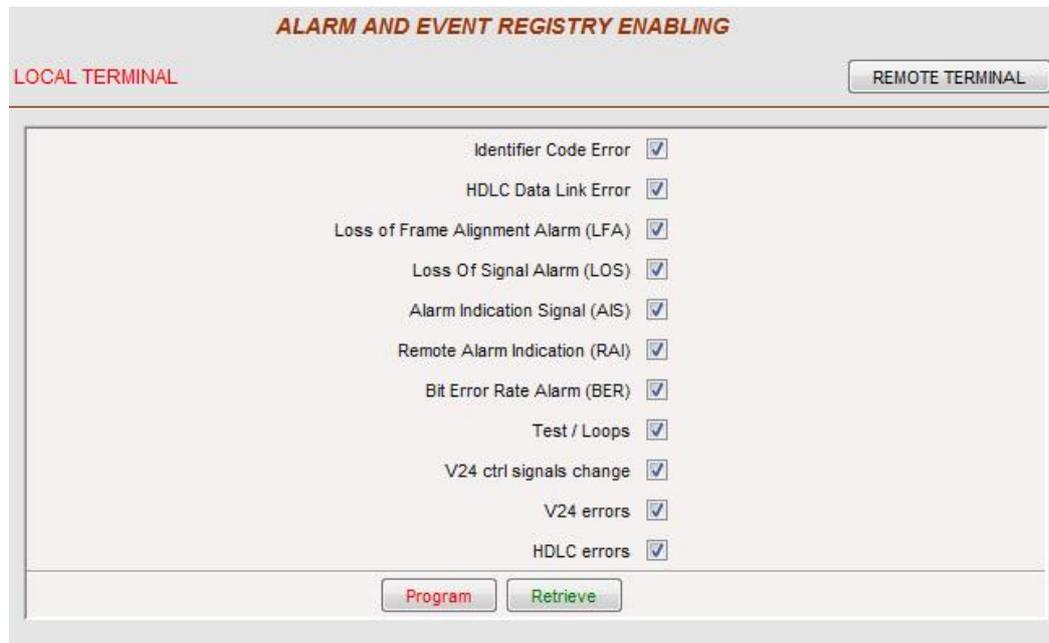


Figure 20 *Registry enabling* option

## A.6 MONITORING MENU

The *Monitoring* option of the main menu allows the terminal to be monitored by means of its four options.

### A.6.1 System alarms

When this option is accessed a display page appears showing the state of the terminal alarms, see Figure 21.

The page is also provided with a MONITORING STATE indicator. When the indicator is green it means that the data of the screen is correct.

On the page, each alarm has a control in the form of a LED which is shown in red in an alarm situation. Certain alarms have a counter of number of activations.

The alarms that can be shown in the page are as follows:

- **System Check.** This alarm is caused by failure in any device of the AVDM module. When this alarm activates, the LOC GENERAL ALARM LED lights up.
- **RTC failure.** This alarm is generated by failure in the real-time clock of the AVDM module. When this alarm activates, the LOC GENERAL ALARM LED lights up.
- **Identifier Code Error.** This alarm is generated when the identification code received does not coincide with the reception identifier programmed. When this alarm activates, the LOC GENERAL ALARM LED lights up.
- **HDLC Data Link Error.** This alarm is generated when an error is detected in the CRC of the 2 Mbit/s reception frame. When this alarm activates, the LOC GENERAL ALARM LED lights up.
- **Loss of Frame Alignment Alarm (LFA).** This alarm is generated when the local synchronism of the 2 Mbit/s frame is lost for a certain time. In this situation, bit "A" is activated in the transmission frame to indicate the failure to the remote terminal. When this alarm activates, the LOC GENERAL ALARM LED lights up and CD signal deactivates.
- **Loss Of Signal Alarm (LOS).** This alarm is generated when the condition of ten consecutive "0" has been detected in the 2 Mbit/s reception frame. When this alarm activates, the LOC GENERAL ALARM LED lights up.
- **Alarm Indication Signal (AIS).** This alarm is generated when the condition all with "1" has been detected in the 2 Mbit/s reception frame. When this alarm activates, the LOC GENERAL ALARM LED lights up.
- **Remote Alarm Indication (RAI).** This alarm is generated when the "A" bit is detected active in three consecutive reception frames and there is no loss of local synchronism. When this alarm activates, the REM GENERAL ALARM LED lights up.  
The deactivation of this alarm occurs when three consecutive reception frames are detected without the "A" bit active and there is local synchronism.
- **Bit Error Rate Alarm (BER).** This alarm activates when the error rate evaluated by the system is higher than  $10^{-5}$ . When this alarm activates, the LOC GENERAL ALARM LED lights up.

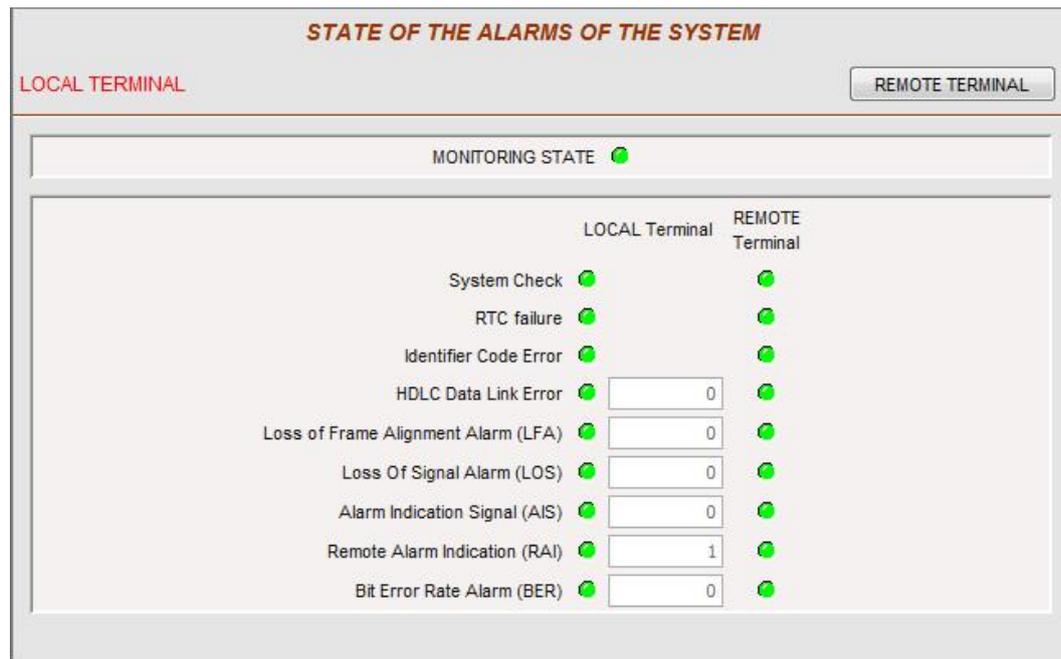


Figure 21 System alarms option

### A.6.2 Chronological register

The operation one wishes to carry out, that is to say, consult (retrieve), deletion (delete) or generating a file (save) can be selected by means of the corresponding *FUNCTION CommandButton*.

Before consulting the register, different parameters must first be indicated. By means of the *TYPE CheckBox* controls, it must be indicated whether one wishes to monitor alarms, events, or both. In the *ListBox* labelled as SELECTION, it must be indicated whether one wishes to consult the whole register or specifically by date and hour or chronologically beginning with the last.

When by date and hour is selected, various *TextBox* type controls appear on the screen for the introduction of the initial date and hour and the final date and hour. In the *DATE TextBox*, data must be introduced as day, month and year in full and, in the *TIME TextBox*, data must be introduced as hour, minutes and seconds.

When by number of elements is selected, a *TextBox* type control appears on the screen for the introduction of the number of registers.

In the *ListBox* labelled as DATE/TIME, it is possible to select whether the information is displayed in LOCAL time or UTC time.

Once all the monitoring parameters have been indicated, the register is downloaded by means of the *RETRIEVE CommandButton*. A short description is given of each alarm and event and the date and hour they were generated (UTC or LOCAL depending on selection).

In the list area of registers a *TextBox* shows the total number of registers, and below this, the list of all the events and/or alarms that fulfill all the selection criteria indicated. If this list is longer than the space available a scroll bar appears that allows all the registers to be examined.

By means of the *SAVE CommandButton* a text file is generated that contains all the elements of the chronological register. When pressed, a *Save file* window is opened in Windows, where it is necessary to select the disk unit and the directory where the file will be saved and give it a name. This can be any file name valid for Windows. This file can be displayed and printed from any word processor.

To delete the contents of the register, the *DELETE CommandButton* must be pressed.

**CHRONOLOGICAL REGISTER**

LOCAL TERMINAL REMOTE TERMINAL

---

**Configuration**

TYPE                      SELECTION                      DATE/TIME

Alarms     All registers                      UTC

Events

---

**Function**

---

**List**

Number of registers    1018

No.	Alarm/Event	Date	Time	ms.	UTC
1	(ACTIVATION) CTS SIGNAL CHANGE	02/07/2019	09:58:35	834	UTC
2	(ACTIVATION) DSR SIGNAL CHANGE	02/07/2019	09:58:35	532	UTC
3	(DISAPPEARS) E1 LOSS OF SIGNAL (LOS)	02/07/2019	09:58:35	530	UTC
4	(ACTIVATION) DCD SIGNAL CHANGE	02/07/2019	09:58:35	530	UTC
5	(DISAPPEARS) E1 LOSS OF FRAME ALIGNMENT (LFA)	02/07/2019	09:58:35	530	UTC
6	(DISAPPEARS) E1 REMOTE ALARM INDICATION (RAI)	02/07/2019	09:58:35	527	UTC
7	(APPEARS) E1 REMOTE ALARM INDICATION (RAI)	02/07/2019	09:58:35	525	UTC
8	SYSTEM INITIALIZATION	02/07/2019	09:58:35	032	UTC
9	RESET	02/07/2019	09:58:11	966	UTC
10	(APPEARS) DEVICE ERROR (RTC)	02/07/2019	08:11:38	000	UTC
11	RTC CLOCK UPDATING	02/07/2019	08:11:00	009	UTC
12	(ACTIVATION) CTS SIGNAL CHANGE	01/01/1970	00:00:01	783	UTC
13	(DISAPPEARS) E1 LOSS OF SIGNAL (LOS)	01/01/1970	00:00:01	610	UTC
14	(ACTIVATION) DCD SIGNAL CHANGE	01/01/1970	00:00:01	610	UTC
15	(DISAPPEARS) E1 LOSS OF FRAME ALIGNMENT (LFA)	01/01/1970	00:00:01	609	UTC
16	(DISAPPEARS) E1 REMOTE ALARM INDICATION (RAI)	01/01/1970	00:00:01	607	UTC
17	(APPEARS) E1 REMOTE ALARM INDICATION (RAI)	01/01/1970	00:00:01	605	UTC
18	(ACTIVATION) DSR SIGNAL CHANGE	01/01/1970	00:00:00	532	UTC
19	SYSTEM INITIALIZATION	01/01/1970	00:00:00	026	UTC

Figure 22 Chronological register option

### A.6.3 G.703 interface

This option gives access to a page that indicates an evaluation relative to the quality of the link of 2 Mbit/s link based on Recommendation G.821.

After selecting the option, several read-only *TextBoxes* appear.

The first one, BIT ERROR RATE (BER), shows the relationship between the received erroneous bits and the total of bits received since the last reset. The calculation is initialized when there is a statistic reset, from the corresponding option of the *Alignment menu*, or in case of terminal reset. The calculation is carried out at the multiframe level.

E1 STATISTICS

LOCAL TERMINAL
REMOTE TERMINAL

---

MONITORING STATE ●

STATISTICS

Rx Level	<input type="text" value="&gt; -2.5 dB"/>		
Bit Error Rate (BER)	<input type="text" value="0.000E+00"/>		
Errored Seconds (ES)	<input type="text" value="0"/>	-	<input type="text" value="0.00000"/> %
Severe Errored Seconds (SES)	<input type="text" value="0"/>	-	<input type="text" value="0.00000"/> %
Available Seconds (AS)	<input type="text" value="16523"/>	-	<input type="text" value="100.00000"/> %
Unavailable Seconds (US)	<input type="text" value="0"/>	-	<input type="text" value="0.00000"/> %
Total number of seconds	<input type="text" value="16523"/> s.		

E1 ALARMS

Alarm	State	Activations
HDLC Data Link	●	<input type="text" value="0"/>
E1 primary rate Loss of Frame Alignment (LFA)	●	<input type="text" value="0"/>
E1 primary rate Loss Of Signal (LOS)	●	<input type="text" value="0"/>
E1 primary rate receive Alarm Indication Signal (AIS)	●	<input type="text" value="0"/>
E1 primary rate Remote Alarm Indication (RAI)	●	<input type="text" value="1"/>
E1 Bit Error Rate (BER)	●	<input type="text" value="0"/>

Figure 23 G.703 interface option

The second one, ERRORED SECONDS (ES), shows the total of seconds with errors in which the connection was available since the last reset. Errors can be due to erroneous bits, LOS (Loss Of Signal) alarm or AIS (Alarm Indication Signal) signal. The calculation is initialized when there is a statistic reset, from the corresponding option of the *Alignment menu*, or in case of terminal reset. The calculation is carried out at the multiframe level.

The third one, SEVERE ERRORED SECONDS (SES), shows the total of seconds with a lot of errors in which the connection was available since the last reset. Errors can be due to detection of a  $BER \geq 1 \times 10^{-3}$ , LOS (Loss Of Signal) alarm or AIS (Alarm Indication Signal) signal. The calculation is initialized when there is a statistic reset, from the corresponding option of the *Alignment menu*, or in case of terminal reset. The calculation is carried out at the multiframe level.

The fourth one, AVAILABLE SECONDS (AS), shows the number of seconds in which, according to the criteria of Recommendation G.821, the connection was available since the last statistic reset or the reset of the terminal.

The fifth one, UNAVAILABLE SECONDS (US), shows the number of seconds in which the connection was not available since the last statistic reset or the reset of the terminal.

The sixth one, TOTAL NUMBER OF SECONDS, shows the number of seconds elapsed since the last statistic reset or the reset of the terminal.

The screen also shows the reception level, as well as the alarms associated with the interface.

Each alarm has a control associated in the form of a LED which is shown in red in an alarm situation. The alarms also have a counter of number of activations.

The monitoring of data will be correct as long as the indicator on the page labelled as MONITORING STATE is displayed in green. If communication with the terminal is lost, this indicator will be displayed in red indicating the monitoring failure.

#### **A.6.4 V.24 interface**

This option allows the status of the signal of the V.24 interface to be monitored, as well as the emission and reception data flow of this interface.

Each signal (RTS, CTS, DTR, DSR, DCD and RI) has a control associated in the form of a LED, which is displayed in amber when the signal is being activated. Each signal also has a counter of number of activations.

The TD and RD signals have a byte counter.

By means of the corresponding counters, the screen also shows the number of parity errors, as well as the number of V.24 erroneous frames.

The monitoring of data will be correct as long as the indicator on the page labelled as MONITORING STATE is displayed in green. If communication with the terminal is lost, this indicator will be displayed in red indicating the monitoring failure.

The ELAPSED TIME *TextBox* shows the time elapsed since the last reset of the terminal.

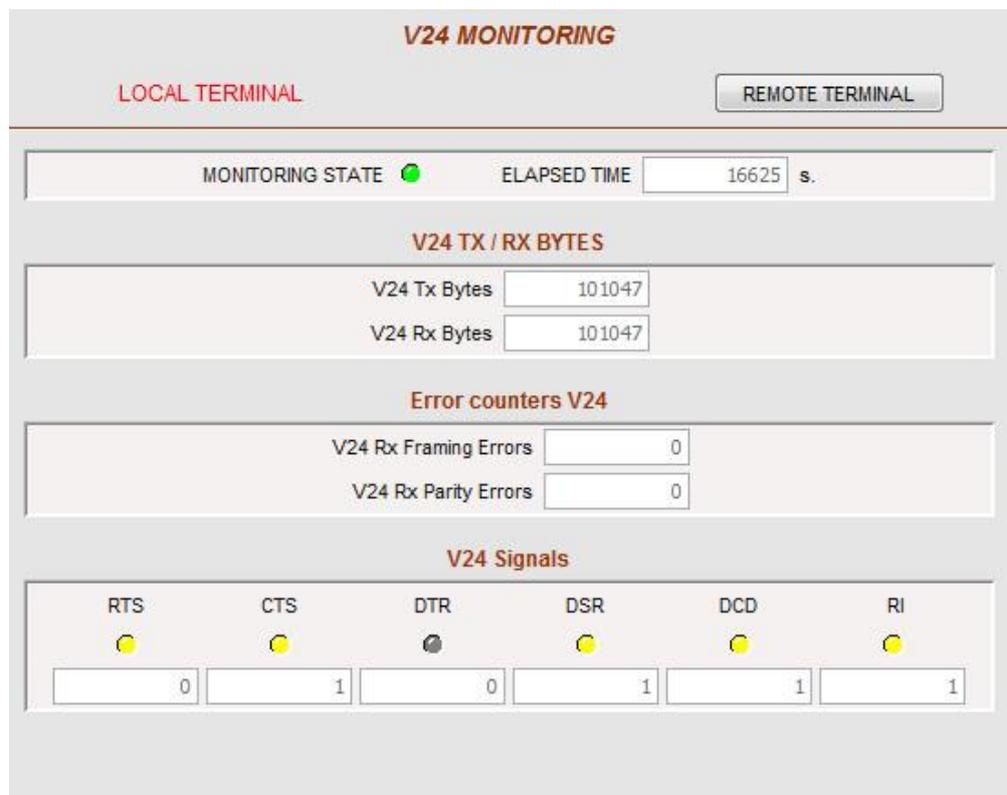


Figure 24 V.24 interface option

## A.7 ALIGNMENT MENU

The *Alignment* option of the main menu has the purpose, through its three options, of making commissioning of the terminal easier for the user.

### A.7.1 Clock

This option allows a user, with an ADMINISTRATOR profile, to modify the date and hour values of the internal clock of the terminal.

To modify the date and hour values of the internal clock of the terminal, the time reference one desires, UTC Time or *LOCAL Time*, must be selected in the *ListBox* labelled as UPDATE. Both references can be displayed in the *TextBoxes* associated with CURRENT DATA.

CURRENT DATA will always be monitored correctly when the indicator on the page labelled as MONITORING STATE is green. If communication is lost with the terminal, the indicator is red showing monitoring failure.

Once the time reference has been set, the date data must be introduced in the DATE *TextBox* as day, month and year in full, together with the hour data in hour, minutes and seconds in the HOUR *TextBox*. Data is programmed in the terminal by means of the associated PROGRAM *CommandButton*.

### A.7.2 Loops and test signals

This option allows loops and tests to be programmed in the equipment. As can be seen in Figure 25, the associated page is divided into four sections whose programming becomes effective by pressing, if the user has an ADMINISTRATOR profile, the corresponding PROGRAM *CommandButton*.

The operation of the loops and the tests is described in section 2.3, *Test devices*. This section only describes how to program them.

The first section, E1 LOOP, contains the controls that allow carrying out the line loop. To order the line loop, LOCAL or REMOTE must be selected in the *ListBox* labelled as TYPE and then, once the time in the *ListBox* labelled as DURATION has been selected, press the PROGRAM LOOP *CommandButton*.

The second section, V24 LOOP, contains the controls that allow carrying out the data loop. To order the data loop, LOCAL or REMOTE must be selected in the *ListBox* labelled as TYPE and then, once the time in the *ListBox* labelled as DURATION has been selected, press the PROGRAM LOOP *CommandButton*.

The duration of the line loop and the data loop can be 10 s, 30 s, 1 min or 10 min or be established as permanent.

The third section, V24 TEST SIGNAL ACTIVATION, contains the controls that allow carrying out the tests consisting of sending "1" (Space), "0" (Mark) or *Pattern* according to the selection made. To order a test it is only necessary to select it in the *ListBox* labelled as TYPE and then press the PROGRAM TEST *CommandButton*.

If the user selects the *Pattern* test, a field appears in which an 8-bit pattern can be generated and transmitted to the remote. By default, the pattern **10100110** will be displayed. When programming the test, the test duration will be shown, as well as the statistics of BER and Bytes Tx and Bytes Rx. By programming the deactivation of the test, the statistics will be frozen. By programming a new test, the statistics will be initialized or in case of reset of the terminal.

The fourth section, E1 AIS SIGNAL TRANSMISSION, contains the TRANSMIT AIS *CommandButton* which, once pressed, makes effective the sending of the frame with the AIS-signal bit active to the line.

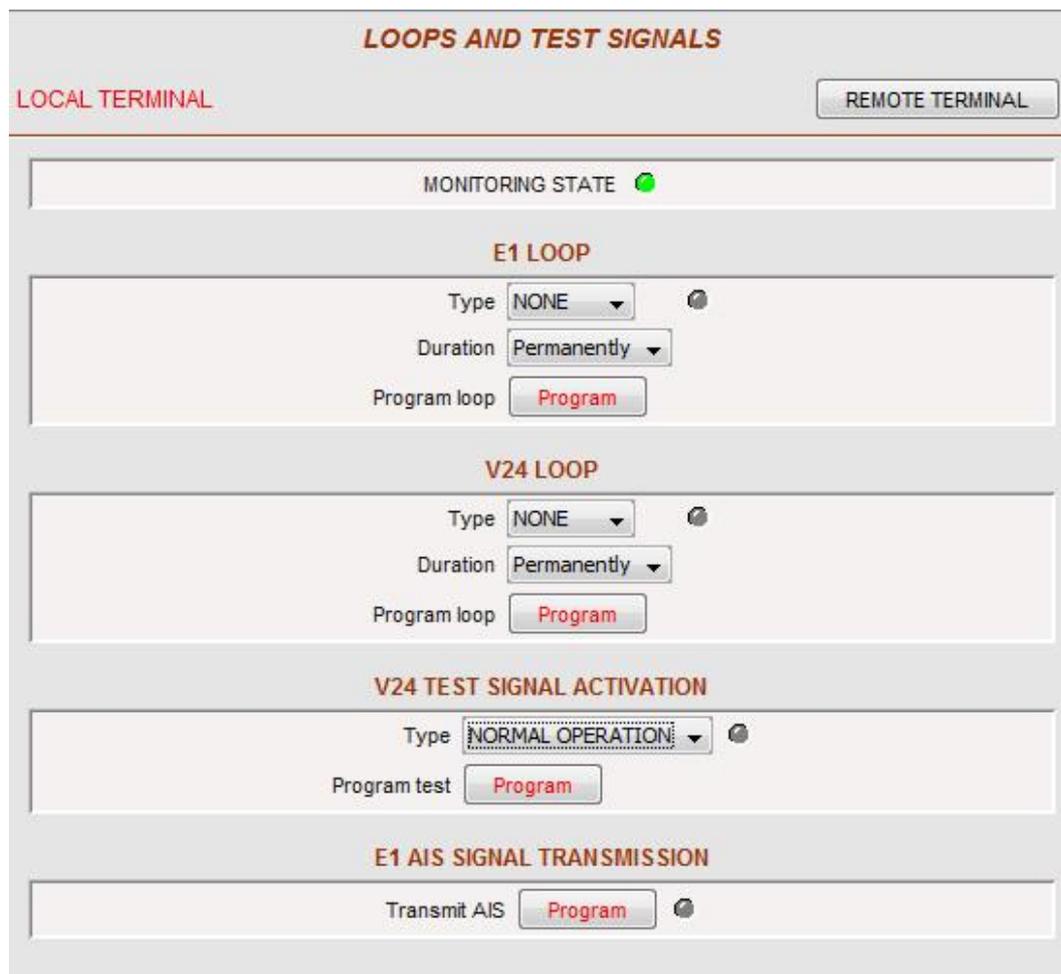


Figure 25 Loops and test signals option

### A.7.3 Initializations

This option allows the user with an ADMINISTRATOR profile to force a reset of the equipment, as well as to set the counters of the number of activations of the following alarms to zero: Data link failure, LFA (Loss of Frame Alignment) alarm, LOS (Loss OF Signal) alarm, AIS (Alarm Indication Signal) alarm, RAI (Remote Alarm Indication) alarm and BER>10-5 alarm.

The counters of these alarms can be displayed from the screen associated with the *System alarms* option of the *Monitoring* menu.

It also allows the counters associated with the V.24 interface and those associated with the G.821 statistic to be set to zero.

Counters associated with the V.24 interface can be monitored from the *V.24* option of the *Monitoring* menu.

Counters associated with the G.821 statistic can be monitored from the *E1* option of the *Monitoring* menu.