Communication solutions for power utilities

AVDM TYPE MODULE INTENDED TO CONVERT SERIAL INTO E1

FOR 6U SHELF

PRELIMINARY DESCRIPTION

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1 INTRODUCTION

The AVDM 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 AVDM 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.

AVDM modules 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 AVDM module via 10/100Base-Tx interface.

1.1 CONSTITUTION OF THE MODULE

The AVDM module is formed by a single-printed circuit board including the DC/DC converter 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 module management.

In order to simplify the commissioning, the front plate of the AVDM includes the following features:

– the optical indication of the logical signals of the V.24 interface and the line G.703 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 module,

– 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).
	NOTE: The 2 Mbit/s frame uses slot 0 for synchronism
Data transmission	Duplex
Internal-oscillator stability	±25 ppm
Synchronism	Codirectional clock
Output impedance	75 Ω
Input impedance	75 Ω
Maximum line attenuation	6 dB at 1024 kHz
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[1], 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, *mark* or *space* [2]
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[1], 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
Protection against electrostatic charges	IEC 870-2-1 level 4

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[1] 50 bit/s rate can only be configured from the Management System.

[2] *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[3] and remote[4] general alarm.
By relay	- Local[5] general alarm

Characteristics of the
general alarm signalling relay

Type	Voltage-free changeover contact
Changeover maximum current	3 A
Changeover maximum voltage	250 V_{AC}, 150 V_{DC}
Changeover maximum power	See Figure 1
Insulation voltage	IEC 870-2-1 class 2
Impulse voltage	IEC 870-2-1 class 2

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[3] 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>10-5.

[4] 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).

[5] Relay activation conditions are established by programming.

Max. DC load breaking capacity
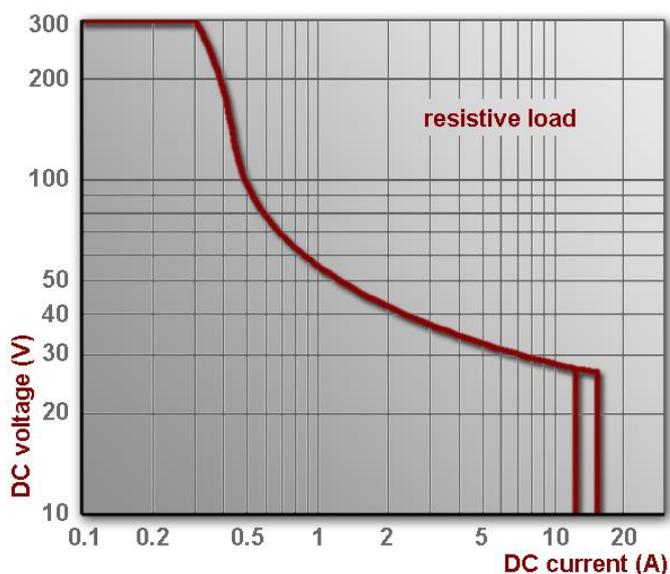
NOTE: 2A is the maximum current

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

1.2.4   Operating and storage conditions

Temperature and humidity

From –5 °C to +55 °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 $V_{DC} \pm 20\%$
Insulation voltage	IEC 870-2-1 class 2
Impulse voltage	IEC 870-2-1 class 3 (1.2/50 μs)
Fast transient bursts	IEC 870-2-1 class 3
Damped oscillatory waves	IEC 870-2-1 class 2

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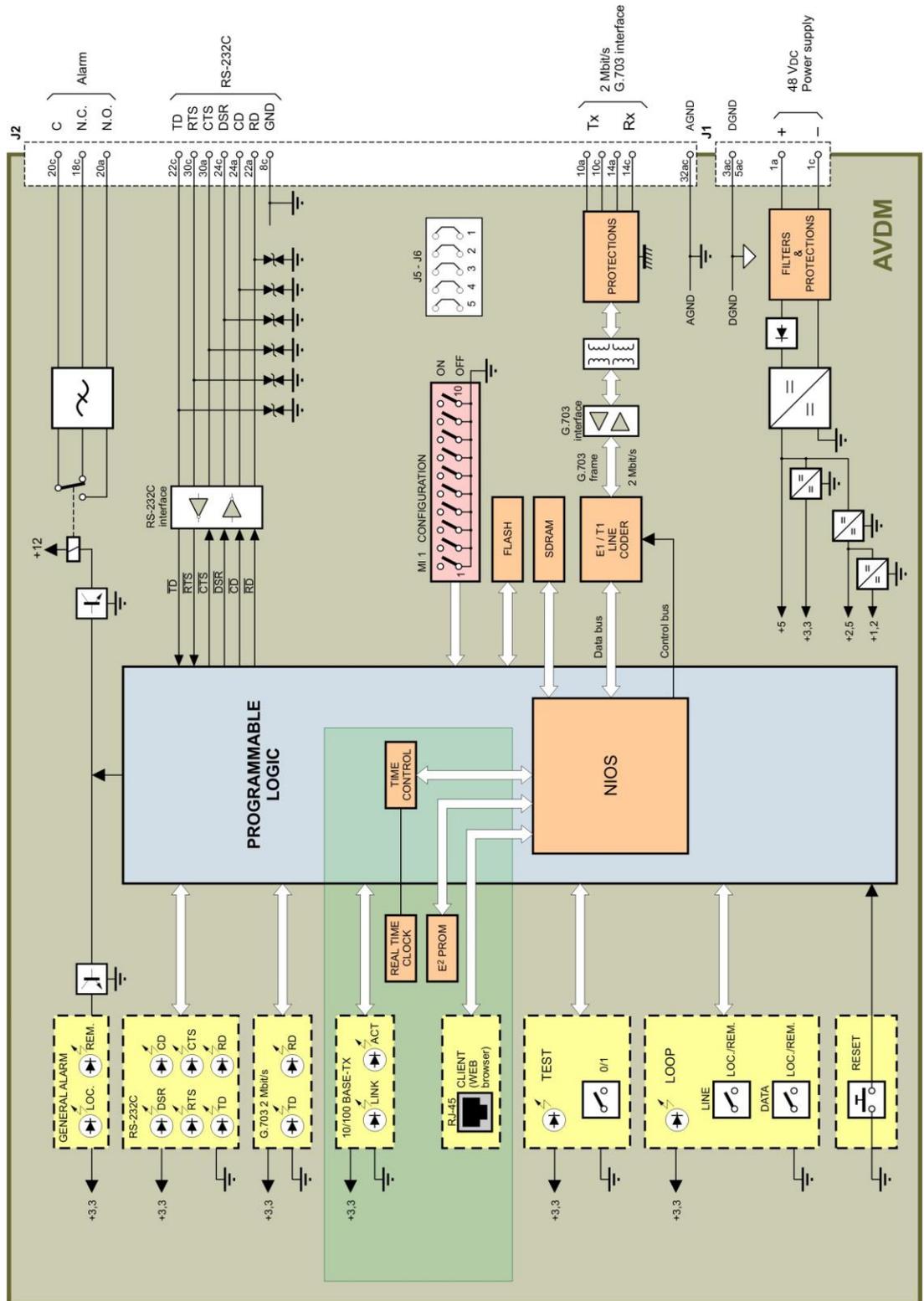
In accordance with IEC 721-3-1, class 1K5

Figure 2 AVDM simplified block diagram

Figure 3   AVDM module front view