

HORUS 08**DIGITAL VIDEO MULTIPLEX TRANSMISSION
OVER OPTICAL FIBER**

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DIGITAL LINK OF VIDEO MULTIPLEX OVER OPTICAL FIBER

1. DESCRIPTION

1.1 PRESENTATION

HORUS 08 assume digital transmission of 8 analog videos on one singlemode fiber, per optical wavelength. Equipment is video compression free, so data rate transmission is roughly 2 Gb/s. A simple optical wavelength multiplexing at 1310 nm and 1550 nm reaches transmission capacity of 16 video on one optical fiber.

As an option, bi-directional data transmission RS 232, RS 422 or RS 485, up to 115.2 kb/s and IP channel could be added.

HORUS system composition:

- One HORUS 08 E, for video transmission and data transceiver.
- and HORUS 08 R, for video reception and data transceiver.

HORUS 08 is presented in a 19 inches 1 U chassis (44,4 millimeters high) and 340 mm de depth.

Main power supply is included in each equipment. As an option, redundant hotswap PSU can be supplied.

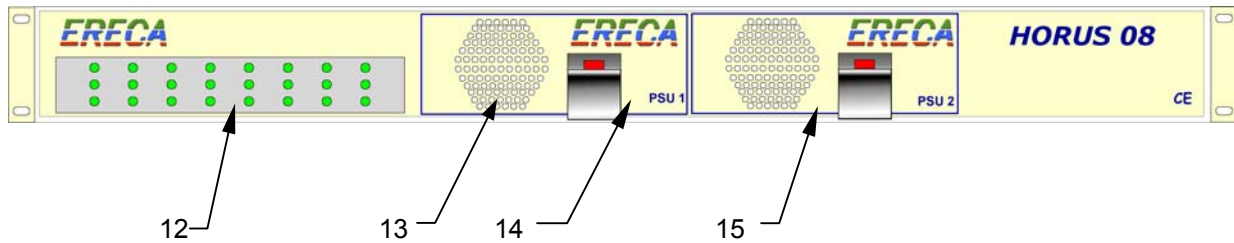
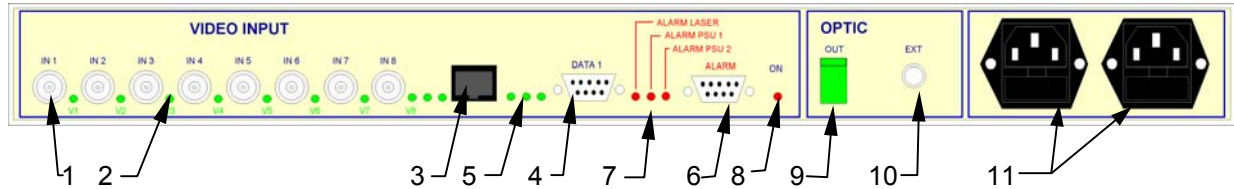
Linked are done through following connectors:

- connectors BNC, for video
- connector SUB – D HD 15 pins for data
- connector RJ 45 for IP link
- connector SUB – D HD 15 pins for alarms.
- connector SC/APC 8° for optical link.

VIDEO, OPTIC, DATA and ALARMS are on the same side as MAIN power plug. Chassis bracket are reversible allowing face or back cabling.

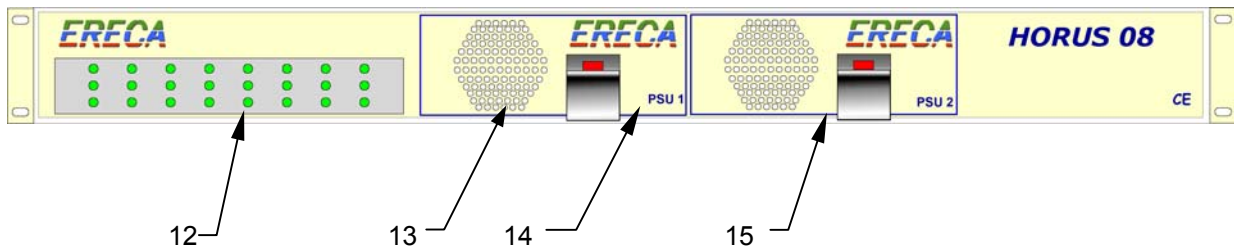
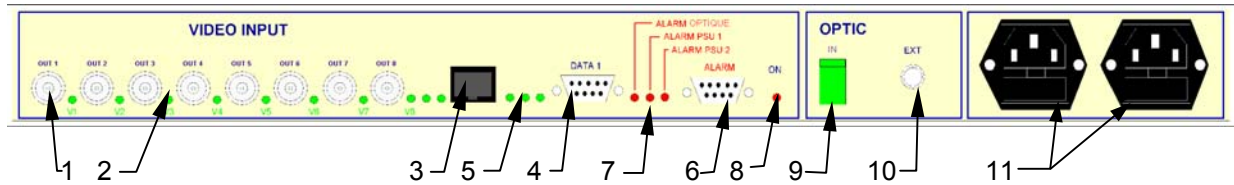
LED display for video presence, data information and alarms are on both side of the equipment.

PRESENTATION : HORUS 08 TRANSMITTER



- | | | |
|----|--------------|---|
| 1 | IN | BNC - video input |
| 2 | V | GREEN LED – video presence |
| 3 | IP | RJ 45 – IP link connector |
| 4 | DATA | SUB - D HD 15 – serial data connector |
| 5 | R / T | GREEN LED – data function (R = receiver T = transmitter) |
| 6 | ALARM | SUB - D HD 15- alarm connector (Contact Closure or serial output) |
| 7 | ALARM | RED LED – laser diode faulty |
| 8 | PSU ON | GREEN LED – Main power presence indication |
| 9 | OUT | SC/APC - SC/APC 8° optical connector |
| 10 | EXT | Optical path extension (16 video multiplexer on one fiber) |
| 11 | 230V | MAIN POWER SOCKET CEE 22 (IEC 320 C 14) |
| 12 | TRANSFER | LED information transfer |
| 13 | FAN | |
| 14 | POWER SUPPLY | Redundant power supply option PSU. n°1 |
| 15 | POWER SUPPLY | Redundant power supply option PSU. n°2 |

PRESENTATION HORUS 08 RECEIVER



- | | | |
|----|--------------|---|
| 1 | OUT | BNC - video output |
| 2 | V | GREEN LED – video presence |
| 3 | IP | RJ 45 – IP connector |
| 4 | DATA | SUB - D HD 15 – serial data connector |
| 5 | R / T | GREEN LED – data function (R = receiver T = transmitter) |
| 6 | ALARM | SUB - D HD 15 – alarm connector (Closure contact or serial data output) |
| 7 | ALARM | RED LED – low optical reception |
| 8 | PSU ON | GREEN LED – Main power presence indication |
| 9 | IN | SC/APC - SC/APC 8° optical connector |
| 10 | EXT | Optical path extension (16 video multiplexer on one fiber) |
| 11 | 230V | MAIN POWER SOCKET CEE 22 (IEC 320 C 14) |
| 12 | TRANSFER | LED information transfer |
| 13 | FAN | |
| 14 | POWER SUPPLY | Redundant power supply option PSU. N°1 |
| 15 | POWER SUPPLY | Redundant power supply option PSU. n°2 |

1.2 FUNCTION

HORUS 08 equipments are capable to transmit 8 black and white or colors video channels.

Analog video signal are converted to digital and transmitted on optical fiber without compression.

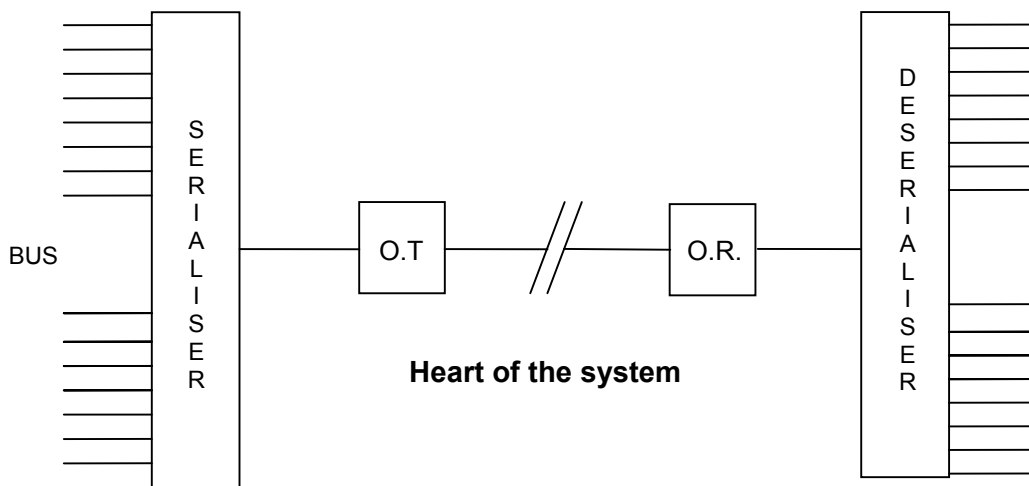
1.3 ADVANTAGES

Digital signal transmission adds a lot of advantages like:

- Constant signal to noise ratio independently of distance and channels number.
- Neither harmonic nor shifting frequencies.
- No crossing channels.
- Easy to install and to set.
- Size reduction.
- Digital components are use for cost reduction and manufacturing reproduction.

2. SIGNAL TREATMENT

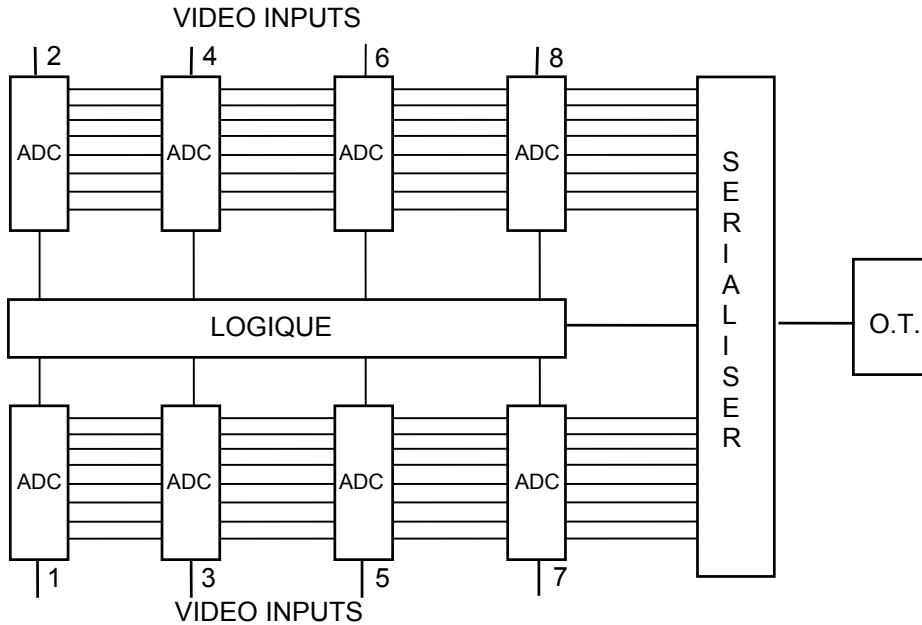
2.1 TRANSMISSION PRINCIPLE



The system heart transmits at a high speed parallel words on the optical fiber.

The analog signal are transmitted after digitizing.

2.2 HORUS 08 TRANSMITTER



2.2.1 Function principle

HORUS 08 transmitter operates as follow:

- * **Treatment, filtering and digitizing on 10 bits of input signals.**

Video signal level is automatically adapted to the input range of the Analog to Digital Converter (ADC).

A synchronization word is inserted without perturbation of the video transmission, and sent to the receiver in order to maintain the link synchronized and to affect each data to its respective Digital to Analog Converter (DAC).

*** Optical transmission**

The optical transmitter is equipped of DFB (Distributed Feed Back) laser diode producing a very narrow spectral beam, typically 0,1 nm for 1550 nm wavelength.

This DFB laser diode choice allows skipping the problem of chromatic dispersion.

On line data rate is 2 Gigabits per second.

2.2.2 Display

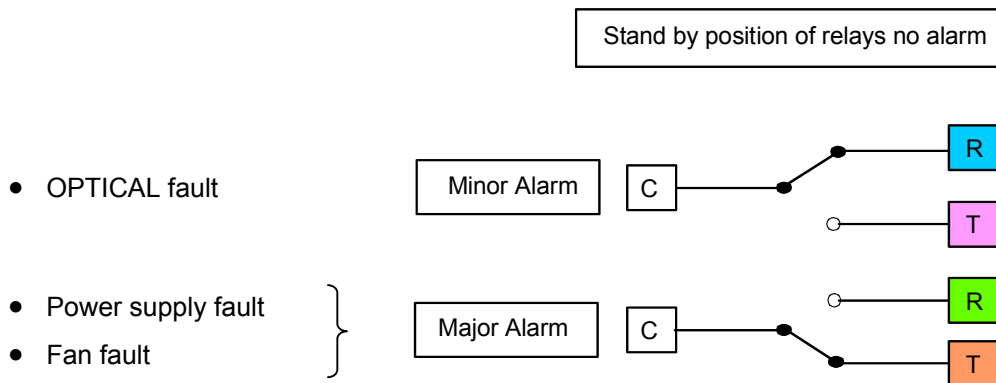
LEDs on both face display:

- Video presence (VIDEO) : Green LED
- OPTICAL fault (ALARM) : Red LED
- Power supply ON: Green LED
- Data Activity: Green LED

2.2.3 Alarms

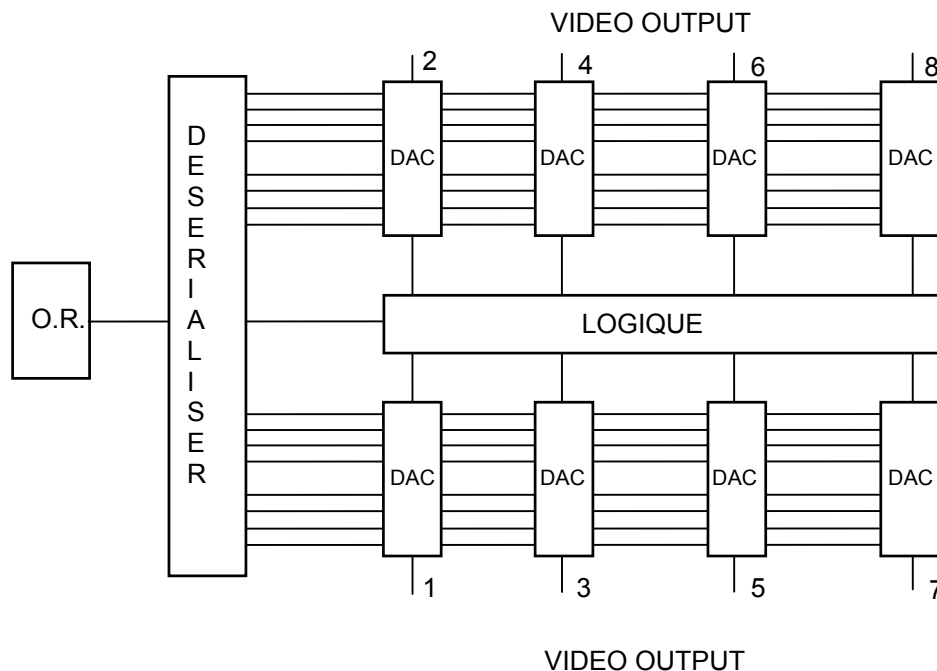
Alarm informations are available on SUB – D HD 15 pins connector, by two relays and serial protocol RS 232 or 485.

Minor alarm relay is optical fault
 Major alarm relay is power supply and fan fault.



Connector layout see 2.3.4

2.3 HORUS 08 RECEIVER



2.3.1 Function principle

HORUS 08 receiver operates as following:

* Optical receiver

An optical receiver 1,8 GHz bandwidth assumes optical conversion of the signal to electrical.

The photodiode is PIN InGaAs type.

At the optical input the automatic gain control circuitry allows to accept an optical power between - 3 dBm and -23 dBm.

* De serialization - De encoding

Words are recovered sequentially, decoded and applied to the output bus.

Logic remote control activate sequentially the 4 couples of Digital to Analog Converters.

* Analog signal restoration

Digital to Analog Converters restores the 8 video channels at the output.

Output filters assume interpolation between sampling and sampling frequency clearance.

2.3.2 Display

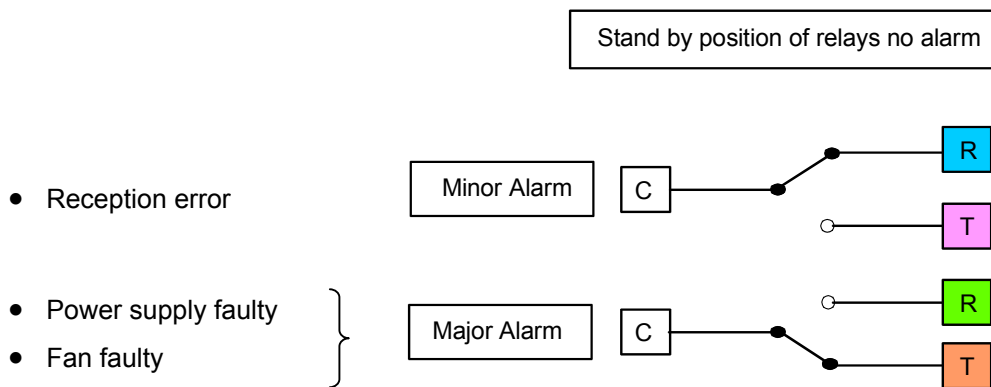
LEDs on both face display:

- Video presence (VIDEO): LED green
- Reception error (ALARM): LED red
- Power supply ON: Green LED
- Data Activity: Green LED

2.3.3 Alarms

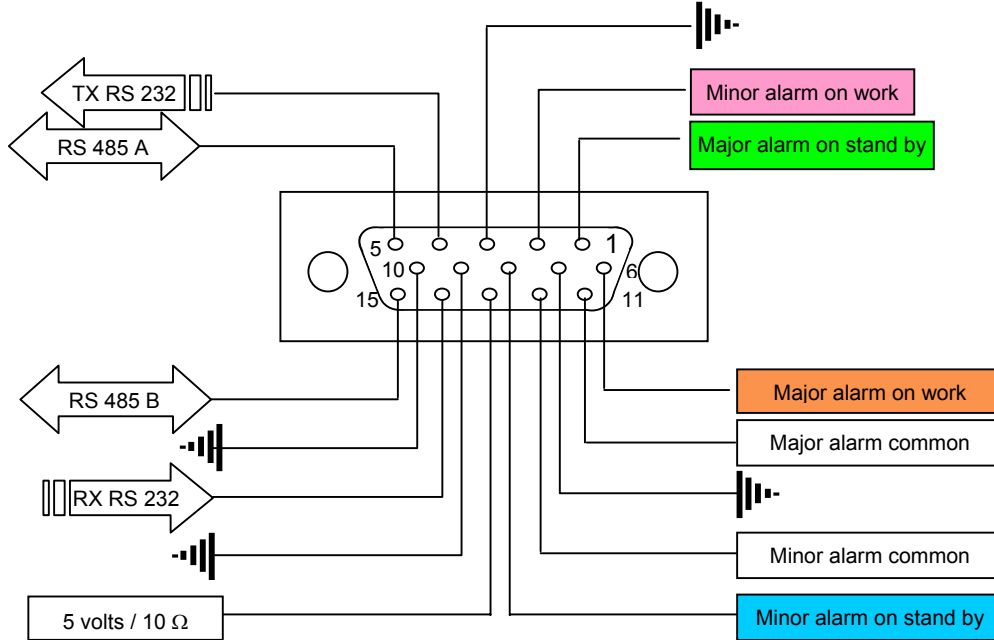
Alarm informations are also available on SUB – D HD 15 contacts connector by two relays and consultable with a serial protocol RS 232 or 485.

Minor alarm relay is optical fault
Major alarm relay is power supply and fan fault.



2.3.4 Alarm connector layout

Alarm informations available on Sub D 9 high density (15 female contacts) are assigned as following:

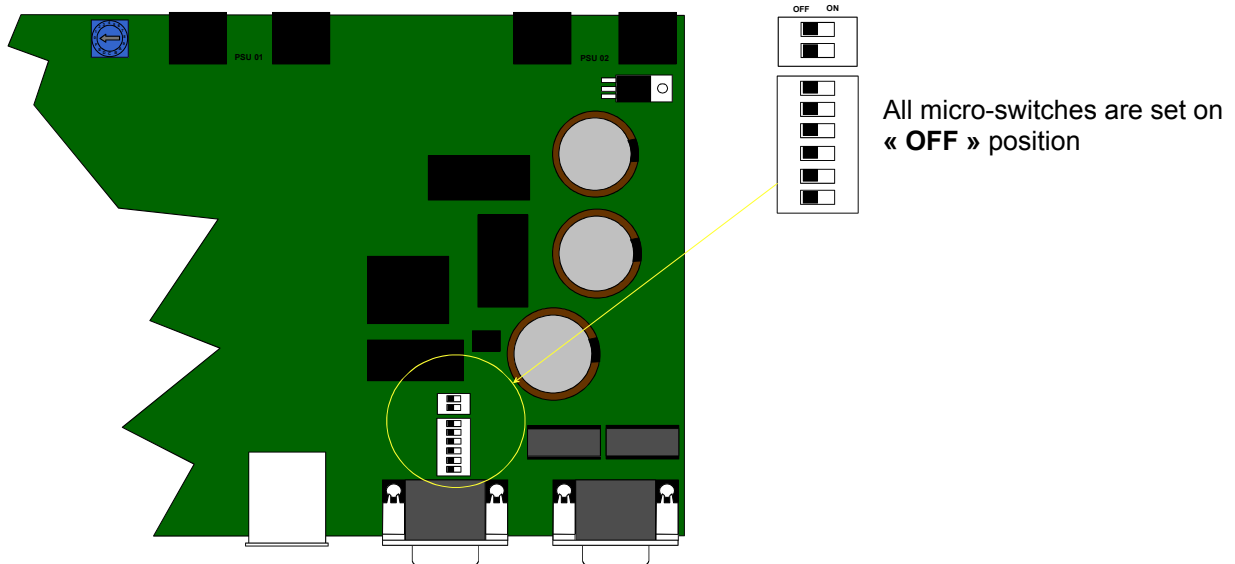


2.3.5 Serial port operation

To consult the alarm using serial port, it's necessary to realize an external software containing the protocol described in the appendix.

Communication interface setting is done by micro switches on the motherboard as shown on the drawing below.

2.3.5.1 RS 232 configuration

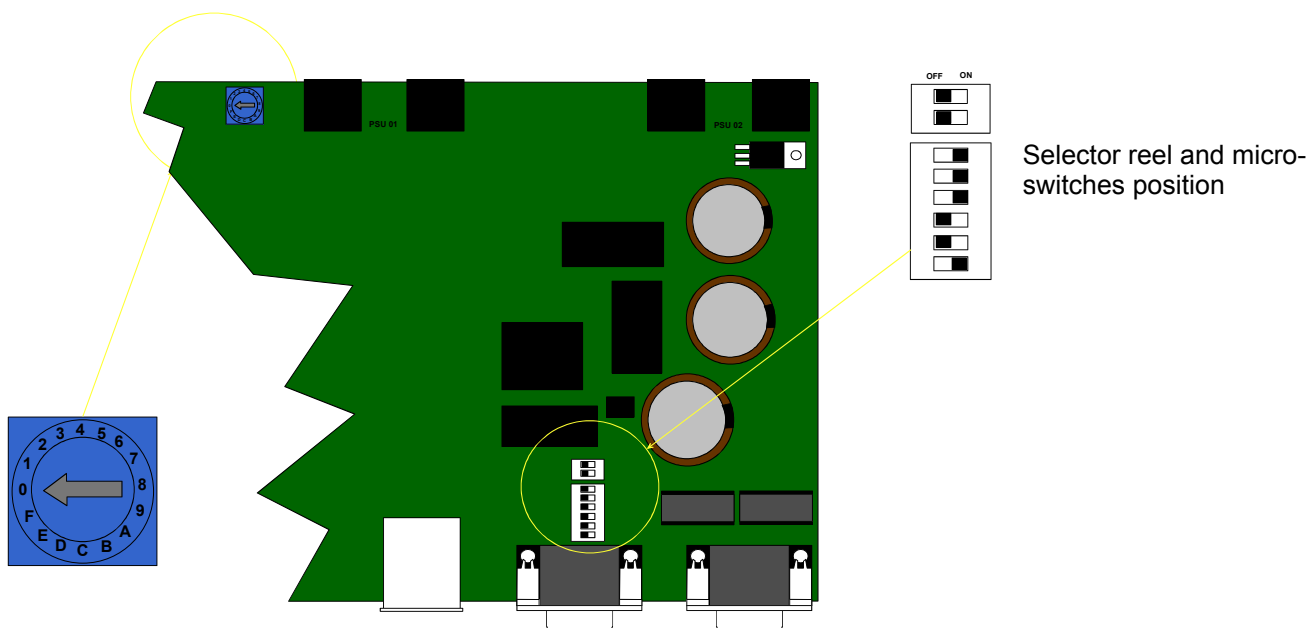


2.3.5.2 RS 485/422 configuration

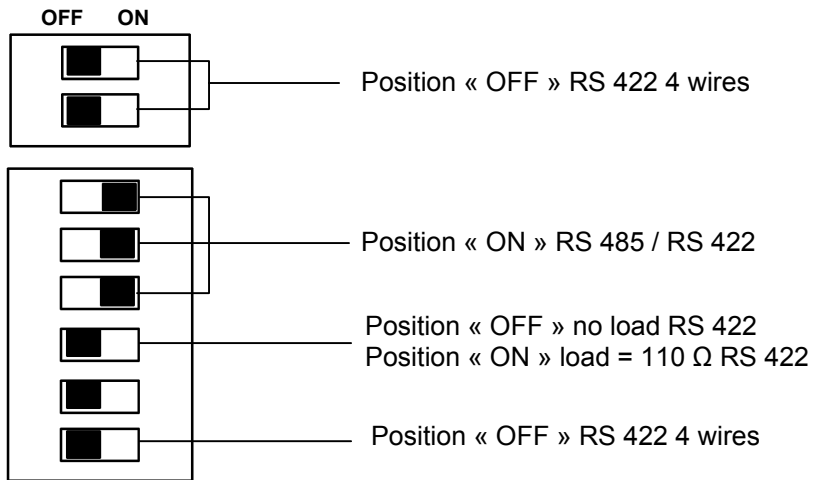
The blue reel sets the dwell time for RS 485 application.

The two or four wires operation is selected with the first block of 2 micro-switches.

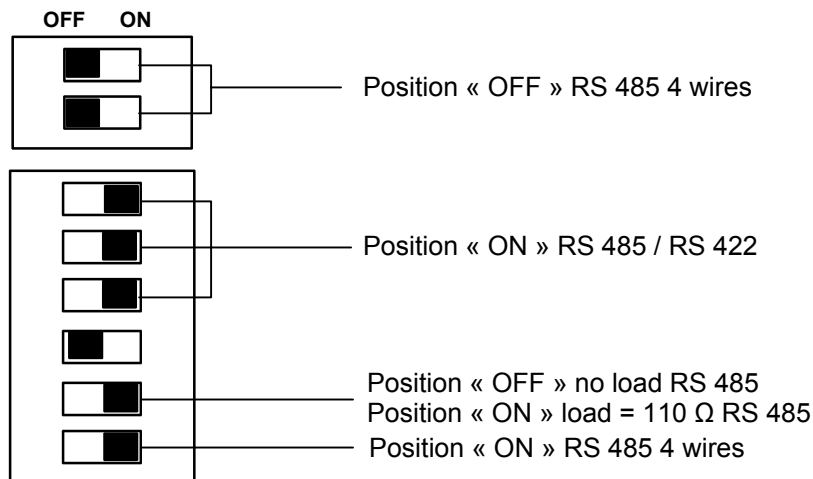
The second micro-switches block allows RS 485/422 mode and fitting RS 422 or RS 485 110 Ω load or not and finally 4 wires RS 422 or RS 485.



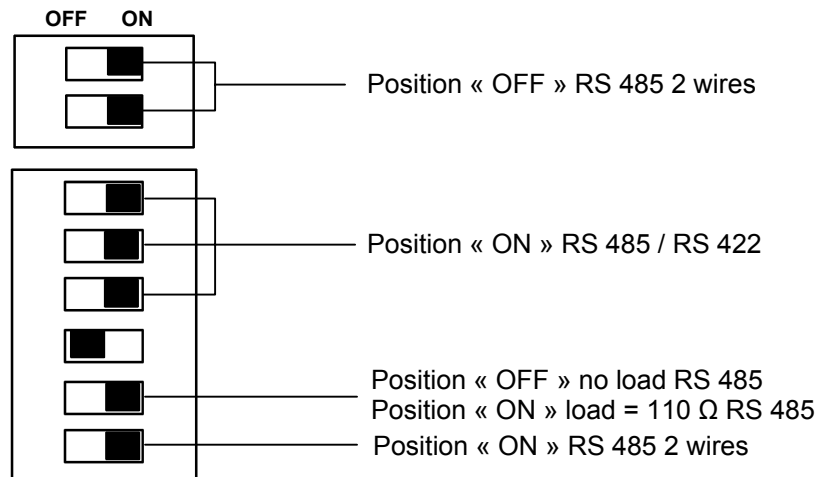
RS 422



RS 485 4 wires

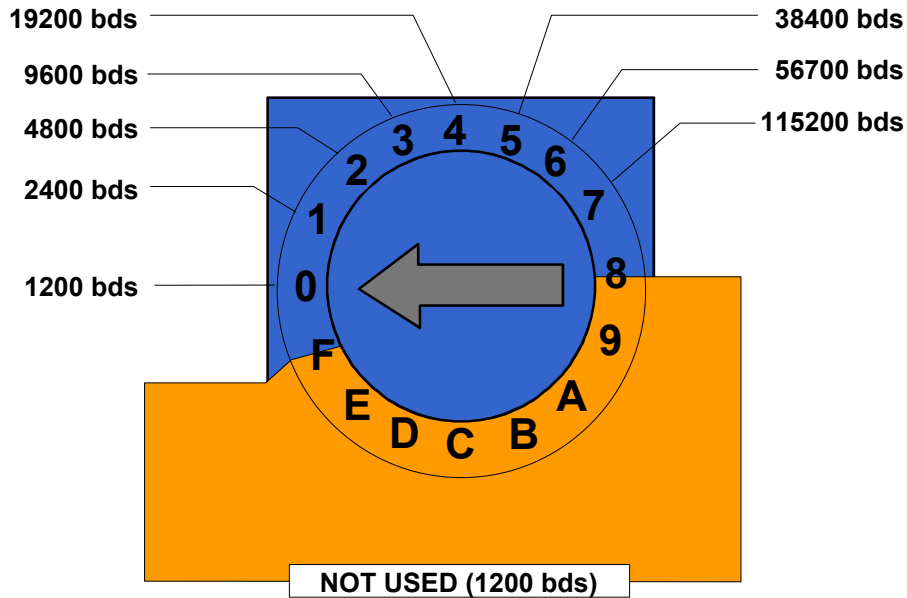


RS 485 2 wires



To select data rate

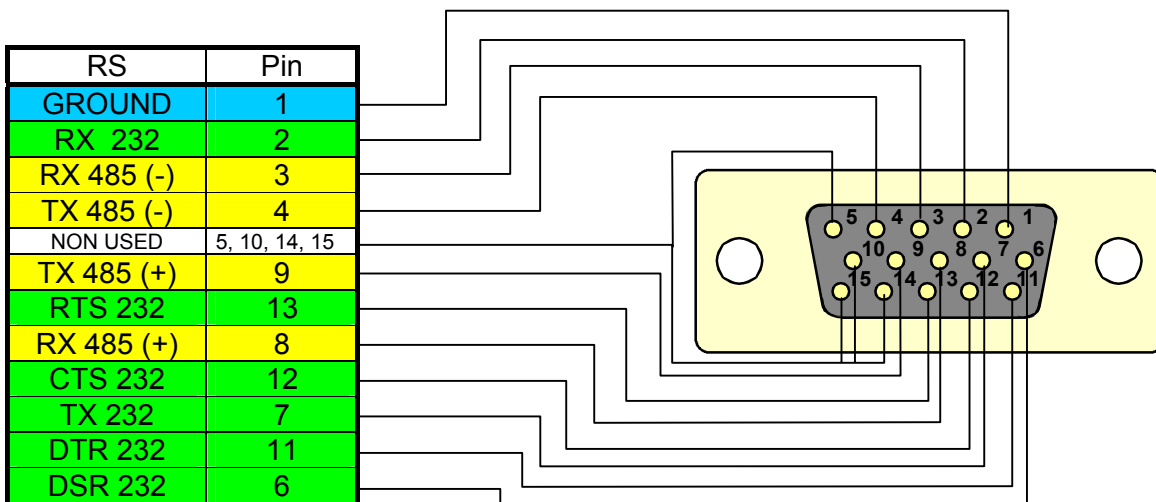
RS 485 dwell time, It's very important to set the data rate of the application.



If any difficulty with the configuration please consult ERECA.

2.3.6 Layout of the serial port connector

SUB-D E15 HD female



3. CARACTERISTIQUES

- **Video**

Channel number	: 8 for each λ
In/Output level	: 1 Vpp +/- 3 dB
In/Output impedance	: 75 Ω
Connector	: BNC
Transmission gain	: 0 dB
Bandwidth	: > 5,8 MHz at 0,2 dB (7 MHz at 3 dB)
Differential gain	: < 1%
Differential phase	: < 1°
Group delay	: < 5 ns
Signal to noise	: > 67 dB (CCIR 567) 64 dB (CCIR 569)

- **Optical**

Optical power	: 0 dBm or - 10 dBm
Wavelength	: 1300 nm or 1550 nm
Components	: laser diode "DFB"
Connector	: SC/APC 8°
Sensitivity	: - 23 dBm
Component	: PIN FET InGaAS

- **Display**

Video presence	: Green LED
Laser faulty	: Red LED
Received error	: Red LED
Data activity	: Green LED

- **Alarms**

Information	: Serial signal + 2 contacts closure
Connector	: SUB - D 9HD 15 female contacts

- **Data**

Port number	1
Data type	RS 232 or 422 or 485
Rate	0 to 115 200 bauds
Selection	Jumper on the mother board
Direction	video direction as standard
Bi-directional	as option
Connector	Sub D9 HD 15 female contacts

- **IP (as option)**

Channel number	1
Connector	RJ 45 socket
Data rate	10/100 Mbytes

- **Main supply**

Main		: 230 V AC +/- 10% 48/62 Hz
Consumption	Transmitter	: 17 VA
	Receiver	: 17 VA
Main socket		: CEE 22 (IEC 320 C 14)
Fuse 5x20		: 2 x 2 A delay

- **Mechanical**

Transmitter/Receiver	: rack 19", 1U, 340 mm
Weight	: 2,6 Kg

- **Environmental**

Operating temperature	: -20°C to + 70°C
Storage temperature	: -30°C to + 70°C
Humidity	: 95 % non condensing



OPTIONS HORUS 08

4. OPTION BIDIRECTIONNAL DATA

HORUS 08 system can integrate 1 bidirectionnal data channel; HORUS 08 E transmitter and HORUS 08 R receiver are equipped with complementary optical sub-system which allow to receive and transmit data in the opposite direction of the video.

It can be organized by different bidirectionnal configurations with 2 optical fibers or only 1 fiber.

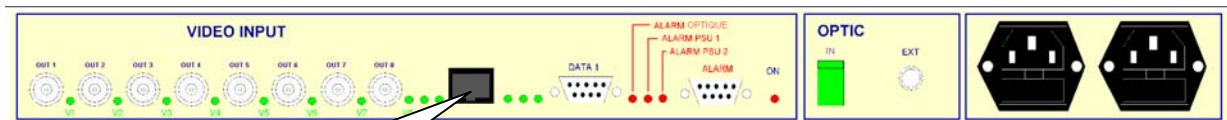
Data channel is selectable into RS 232, 422 or 485 by right positioning of micro switches on the board.

The RS 485 Impedance switching can be managed internally or externally through the CTS port.

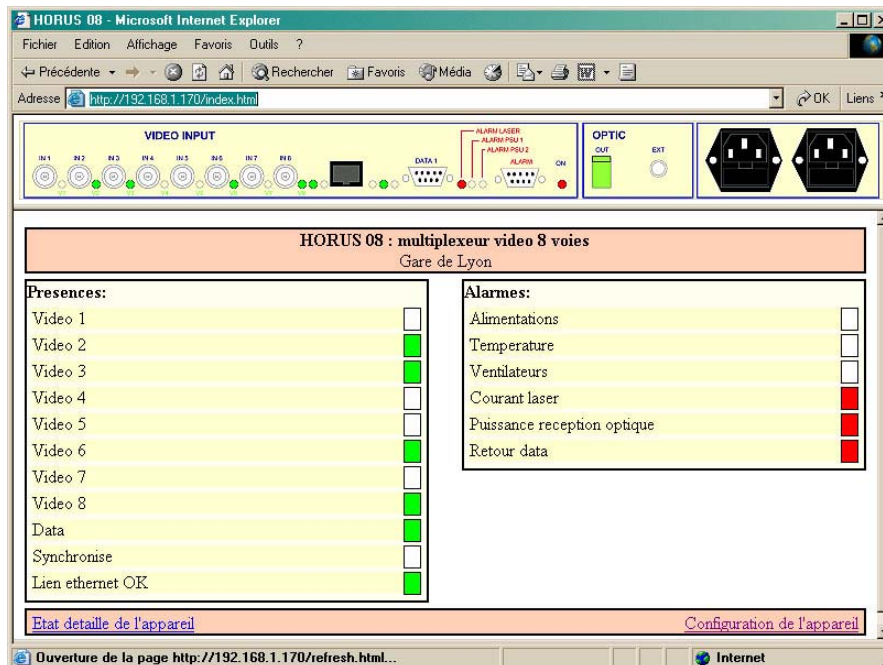
5. IP LINK

This option allows the transmission of an Ethernet channel 10/100 on parallel with the video path, an internal network switch allows through the same network the supervision of the equipment with ERECA-NET™ protocol.

For any ERECA system equipped with ERECA-NET it is possible to supervise the transmission trough the Ethernet and a simple « Browser » (I.E., Netscape.....)



Ethernet link transmission and supervision



6. SNMP AGENT

Based on the experience of previous "Broadcast" developments ERECA expands its MIB to the CCTV product range to allow a global supervision for wide area network.
The agent is directly fitted in the equipment, ERECA supplies the MIB to the User.

SNMP used is V1 version.

The MIB informs on the status of the equipment.

The agent is configurable via SNMP. It permits 1 Manager and 1 address to send "Traps".

A «trap» of start and a «trap» of stop signalize each event.

MIB setting elements are:

IP address of the equipment

Manager address

"Trap" destination address

Hour update.

Free field for identification (alphanumeric format)

To date events, hour of the agent must be update by the manager following the "*coldStart trap*" generated at the powered of the equipment.

Note: The agent software can be updated via the IP link with meaning of a "package software" supplied by ERECA on request.

SNMP : **S**imple **N**etwork **M**anagement **P**rotocol

MIB : **M**anagement **I**nformation **B**ase

TRAP : Event notification message generate under the SNMP V1 format to an Email address.

ColdStart trap : Message sends at the agent initialization.

IP : **I**nternet **P**rotocol

7. OPTICAL MULTIPLEXING

For application witch required more than 8 video channels on one optical fiber, HORUS 08 equipment can be optically multiplexed.

7.1 CASE OF 16 VIDEO CHANNEL TRANSMISSION:

One equipment transmits the signal of 8 video digitally multiplexed at 1310 nm wavelength and the second one is using 1550 nm wavelength to transmit its multiplex.

In regard to the dynamic range to achieve transmitter are coupled on the same fiber trough a simple optical coupler or with an optical multiplexer filter, a demultiplexer is used at receiver side.

Optical dynamic range at 1310 nm is 11 or 21 dB with optical coupler reduction.

Use of demultiplexer at receiver is obliged to assume wavelength separation.

In this case bi-directional serial and Ethernet data can't be optically transmit by the equipment.

7.2 CASE OF 32 TO 128 VIDEO CHANNEL TRANSMISSION:

So the video signal is transmit on different wavelength in accordance with the standard **ITU-T G.694.2**.

The CWDM at 1550 nm multiplexing technique allows 16 HORUS 08 equipments on parallel on only one optical fiber.

Equipments transmit video signal with selected wavelength laser diode, in accordance with ITU standard.

4, 8 or 16 channel filter concentrates optical signal on a single fiber, a complementary wavelength filter before receiver realize reverse operation. In this case an extra 19" 1U chassis will contain the filter. In this case bi-directional serial and Ethernet data can't be optically transmitted by the equipment.

8. "CE" CERTIFICATE

" CE " CONFORMITY STATEMENT

ERECA sa

**75, rue d'Orgemont
95210 SAINT GRATIEN**

We declares that **HORUS 08** family products satisfied to disposal of Conceal Directives:

n° 89/336/CEE of 1989 May 3rd modified by the directives 92/31/CEE of 1992 May 5th, and n° 93/68/CEE of 1993 July 22nd.

n° 73/23/CEE of 1973 February 19th modified by the directive n° 93/68/CEE of 1993 July 22nd.

And is conformed to the following standards:

EN 50081-1
EN 50081-2
EN 50082-1
EN 50082-2
EN 55022

The product can received "**CE**" label at the date of 2004/02/15th

SAINT GRATIEN 2004 February 20th
Quality insurance department