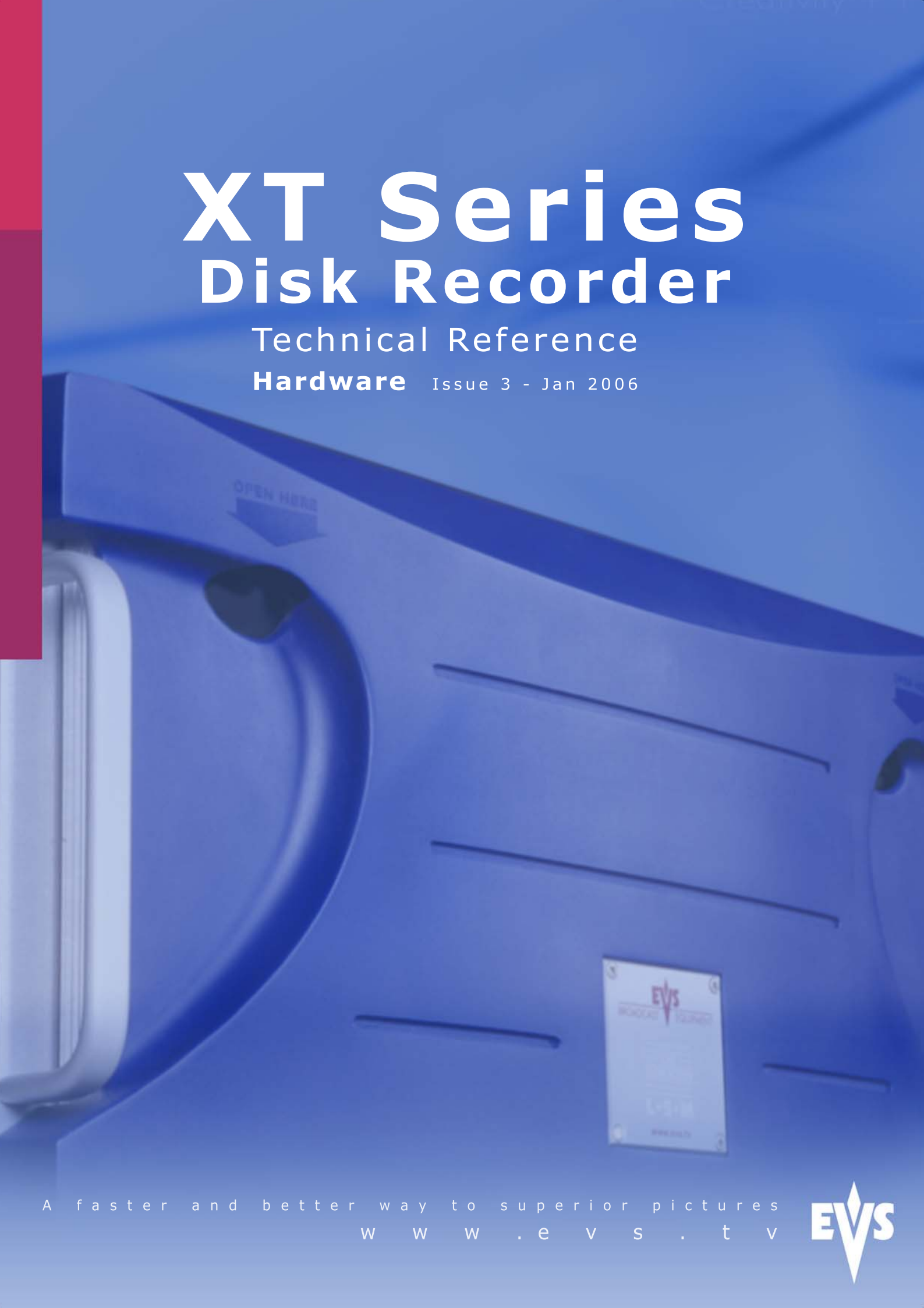
XT Series
Disk Recorder
Technical Reference
Hardware Issue 3 - Jan 2006



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1 Table of contents

2 Overview

Welcome in the EVS range of products and thank you for using an EVS XT Series Server. We will do our best to satisfy your video production needs and we look forward to continuing working with you.

All EVS XT series servers are full digital in PAL (625i), NTSC (525i), 720p or 1080i standards. These multi-channel, disk-based video servers are ideal for a wide range of broadcast applications, from sports and live production to playout and transmission. They can be used with various third party controllers, applications and automation systems using industry-standard protocols : Sony BVW75, Louth VDCP, Odetics, DD35, or EVS' own API (AVSP). XT series servers can also be controlled by EVS applications :

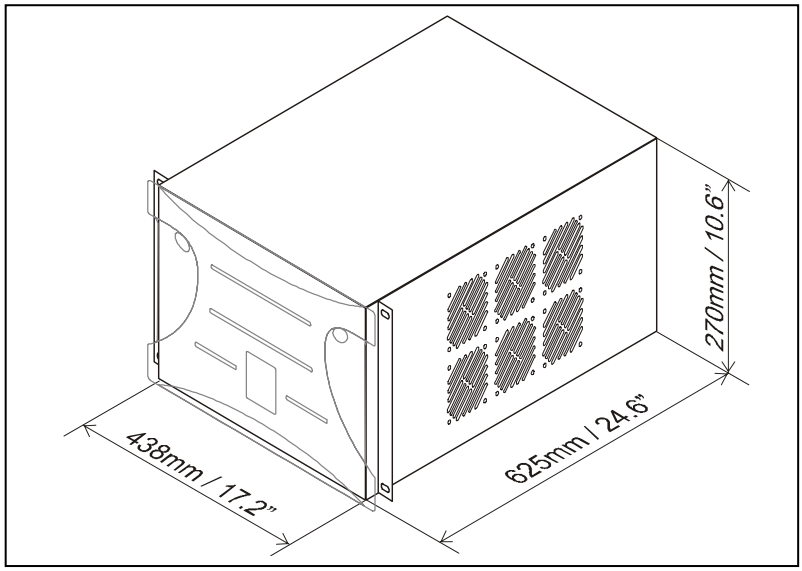
- Live Slow Motion (LSM) for sports production, including replays, highlights editing, and analysis tools like Split Screen to compare 2 synchronized actions side by side, Target Tracking and Painting to highlight a particular detail or provide tactical explanations
- Air Box : a Windows GUI to manage clips and playlists with various advanced functions like loop playback, conditional transitions, etc. Air Box in combination with an XT series server is the ideal companion for live shows or small playout solutions

2.1 Unpacking

On receipt of the Equipment examine packing for obvious signs of damage. If damaged, do not unpack and inform the carrier immediately. Check thanks to the included packing list if all the items are present and if they show any mechanical damage. If yes, report damage or the missing parts to EVS or their appropriate representative.

2.2 Dimensions

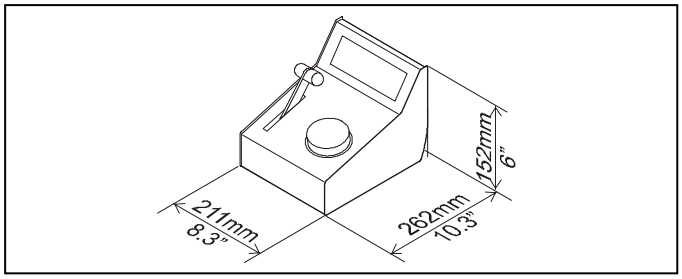
Video disk recorder Main frame 19 inches
Rackmount 6U – Weight: 32.5 Kg/ 71.5 Lbs.



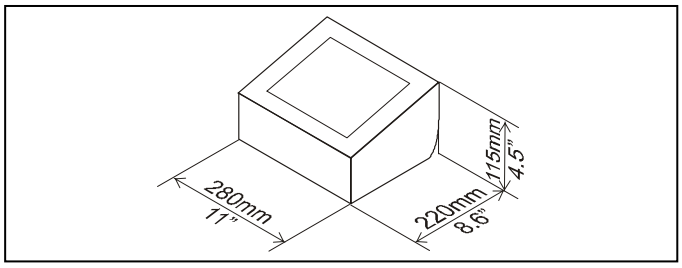
Rackmount 4U : Height : 170 mm

Hot swap power supplies sticks out by 25mm / 1'' (H : 187mm / 7.2' by W : 170mm / 6.65')

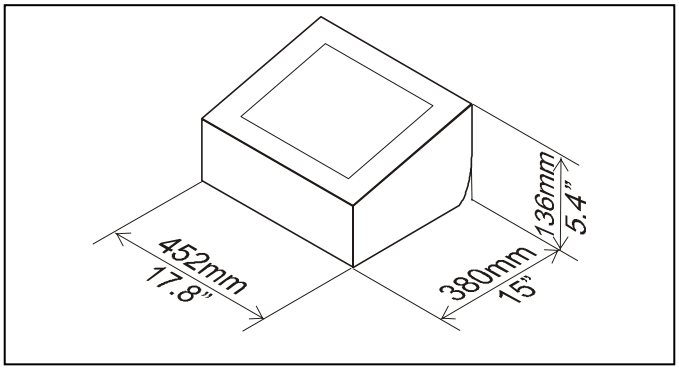
Remote control panel
Weight: 2.9 Kg / 6.3 Lbs.



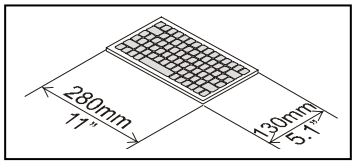
10" Touch Screen Video Monitor
Weight: 3.6 Kg / 7.8 Lbs.

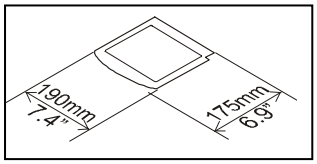


18" Touch Screen Video Monitor
Weight: 11.0 Kg / 23.9 Lbs.



Keyboard - Weight: 0.4 Kg / 0.9 Lbs.
Tablet - Weight: 0.5 Kg / 1.2 Lbs. Ref: Wacom® GD0405R





2.3 Installation

Verify the Disk recorder unit has the correct voltage specifications for your power source prior to applying power.
(selectable 110/230 VAC on the rear panel of the power supply, or autoswitch, depending on the type of power supply unit installed)
Main power switch is located at the front side (lower righ corner) of the unit.

Before turning on the power, open the front door of Video disk recorder unit to check if all boards fit into their guides. If a board is out of its guides, remove carefully the board and replace it in the same slot.

2.4 Operating conditions

2.4.1 POWER SUPPLY

The EVS Disk recorder system operates on 220 VAC +/- 5% or 110 VAC +/- 15% (rear panel selectable), 47-63Hz, 400W (manual switch 110/220VAC) or 510W maximum (autoswitch., depending on the tupe of power supply unit installed.

The EVS Disk recorder unit is connected to PSU1.

Coldswap 2nd Power Supply

A 2nd power supply (cold swap) for the disk recorder unit is available optionally. To connect this 2nd power supply in case of failure of the main one, remove the metal plate in the top right corner of the back panel, and swap the large electrical connector located inside this compartment.

This additional power supply should not be connected to mains when not in use.

Hotswap 2nd Power Supply

A 2nd power supply (hot swap) for the disk recorder unit is available optionally.

This additional power supply should be connected to mains to allow automatic power switching to the second power supply would the first one fail.

The remote panel, the touch screen and the external ADA rack are fitted with an AUTO SWITCH power supply.

2.4.2 GROUNDING

Ensure the Disk recorder unit is properly grounded at all times to avoid electrical shock hazard.

2.4.3 LOCATION

Avoid using the Disk recorder unit in areas having high humidity (operational range : less 90% non-condensing), high temperature (operational range : +5°C to +35°C / 41°F to 95°F), or excessive dust.

2.4.4 VENTILATION & RACK MOUNTING

Adequate ventilation is obviously required for optimum performance. As result of this consideration, ensure no other equipment is located close to

the mainframe .

Remember that fans are used to air cool Equipment to protect from overheating, do not block fans intakes during operations

Having regard to the weight of the LSM-XT chassis, support guides are required for this unit into the rack mount. The front ears of the LSM-XT unit are not designed to support its full weight. Applying full weight on these might result in bending the metal plate.

2.4.5 COMPLIANCE

The EVS Disk recorder systems are in compliance with the Class A norm of the FCC rules and have been verified to comply with the electromagnetic compatibility standards of the European Directive 89/336/EEC particularly standards EN50081-1 and EN50082-2.

2.5 XT Series Servers Main Specifications

2.5.1 VIDEO

	XT Server		XT[2] Server	
	Standard Definition	High Definition	Standard Definition	High Definition
Video Formats	525i 59.94fps (NTSC) 625i 60fps (PAL)	720p 50/59.94fps 1080i 50/59.94fps	525i 59.94fps (NTSC) 625i 60fps (PAL)	720p 50/59.94fps 1080i 50/59.94fps
Digital Interface	10-bit 4:2:2 Serial (SMPTE259M). Full frame synchronizer at input.	10-bit 4:2:2 Serial (SMPTE292M). Full frame synchronizer at input	10-bit 4:2:2 Serial (SMPTE259M). Full frame synchronizer at input. Dual output for PLAY channels.	10-bit 4:2:2 Serial (SMPTE292M). Full frame synchronizer at input. Dual output for PLAY channels.
Number of channels (6RU rack)	2, 4 or 6 channels, reversible REC/PLAY	2 or 4 channels, reversible REC/PLAY	2, 4 or 6 channels, reversible REC/PLAY	2, 4 or 6 channels, reversible REC/PLAY
Number of channels (4RU rack)	Up to 4 channels, Max 2 REC and/or 2 PLAY	2 channels, reversible REC/PLAY	2 or 4 channels, reversible REC/PLAY	2 or 4 channels, reversible REC/PLAY
Monitoring & Downconverters	1 CVBS or SDI (jumper select) per channel, with OSD	4 built-in downconverters per server, CVBS or SDI output (jumper select), clean or with OSD (software select). Optional analog HD monitoring outputs with external 1RU rack.	1 CVBS or SDI (software select) per channel, with OSD	1 built-in downconverter per channel, CVBS or SDI output (software select) with OSD + additional clean SDI output. 1 dedicated HD SDI output with OSD per channel
Reference	Analog Black Burst	Analog Black Burst and HD Tri-Level Sync	Analog Black Burst	Analog Black Burst and HD Tri-Level Sync
Graphics Board	Internal 10-bit digital keyer-mixer board	n.a.	n.a.	n.a.

2.5.2 AUDIO

- 8+8 analogue balanced input & output channels
- up to 16+16 (8 pairs + 8 pairs) AES/EBU or Dolby E input & output channels
- up to 24 channels embedded audio (2 stereo per video)
- 4 additional analogue balanced output channels for monitoring
- all audio connectors on mainframe
- supports up to 4 audio channels (2 stereo) per video channel for all configurations ; up to 8 audio channels (4 AES pairs) per video channel for configurations with max. 2 video inputs and 2 video outputs.

Audio Processing

- uncompressed audio
- 24 bit processing and storage
- sample rate converter from 25-55 kHz to 48KHz
- audio scrub
- audio mix

2.5.3 VIDEO BITRATE

The EVS XT server uses an intra-frame video encoding technique. The average bitrate of the encoded video stream can be set by the user within the accepted range. 8 to 100Mbps for standard definition, 40 to 250Mbps for high definition. The default values are 30Mbps for standard definition and 100Mbps for high definition.

2.5.4 DISK BLOCK SIZE

Video and audio data are saved on the video raid in fixed-size blocks. Working with large blocks is advised to improve the bandwidth of the disk in order to minimize the disk heads movements. However, large blocks are not recommended in search mode because it takes more time to load them. 512-KB blocks on disks are a good compromise.

All servers connected together on XNet SDTI network must have the same disk block size ! This parameter can be found in the Advanced Parameters section of the Maintenance Menu.

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2.5.5 RECORDING CAPACITY FOR XT SERVERS

The following table shows the record duration for 1 record channel (i.e. 1 video + 2 stereo audio tracks) with a tray of 73GB, 146GB or 300GB disks compared with the different video bitrates. The Operational Disk Size parameter is set to 100%.

The different drive arrangements are:

Module (4 + 1) x 73 GB drives (total 292 GB usable)
Module (4 + 1) x 146 GB drives (total 584 GB usable)
Module (4 + 1) x 300 GB drives (total 1168 GB usable)
Module (8 + 2) x 300 GB drives (total 2336 GB usable)

		Disks Size			
PAL	**Compression + Bitrate**	**5x73GB**	**5x146GB**	**5x300GB**	**10x300GB**
SD	**MJPEG / IMX 30 Mbps**	18h25	37h00	76h09	152h27
	MJPEG / IMX 40 Mbps	13h49	27h45	57h07	114h20
	MJPEG / IMX 50 Mbps	11h31	23h07	47h36	95h16
HD	**MJPEG/MPEG 100 Mbps**	6h08	12h20	25h23	50h49

NTSC	Compression + Bitrate	Disks Size 5x73GB	5x146GB	5x300GB	10x300GB
SD	MJPEG / IMX 30 Mbps	18h33	37h15	76h41	153h30
	MJPEG / IMX 40 Mbps	14h04	28h15	58h10	116h27
	MJPEG / IMX 50 Mbps	11h31	23h07	47h36	95h16
HD	MJPEG/MPEG 100 Mbps	5h45	11h34	23h48	47h38

- A special top cover plate is required to work with 2 disk trays (total 10 disks). This brings the total height of the mainframe to 7RU.
- IMX and MPEG Compression are only available with Multicam 8 or later on XT[2] Servers.

2.5.6 MAXIMUM BIT RATES VALUES

Those maximum values are valid for XT and XT2 servers running Multicam version 08.00.xx or higher. They guarantee a smooth play and a browse at 150% speed on all channels simultaneously.

		2ch	4ch	6ch
XT SD JPEG	PAL	100	100	100
	NTSC	100	100	100
XT2 SD JPEG	PAL	100	100	100
	NTSC	100	100	100
XT HD JPEG EVS	PAL	210	120	n.a.
	NTSC	210	120	n.a.
XT2 HD JPEG EVS	PAL	230	200	140
	NTSC	250	200	140
XT2 HD JPEG Std half resolution	PAL	245	200	140
	NTSC	245	200	140
XT2 HD JPEG Std full resolution	PAL	225	180	130
	NTSC	225	180	130

2.5.7 RAID LEVEL: 3

The Video Raid uses striping process across 5 disk drives. The video and audio data is striped over the first 4 drives while the parity information is saved on the fifth drive. If one drive is damaged, the Video Raid can use the

parity information to recover the missing information, so that operation can continue seamlessly without bandwidth loss.

2.5.8 INTERPOLATION

The playing back of smooth slow motion pictures carries specific issues : since some fields must be repeated at regular interval to provide the video at the playback speed required by the operator, parity violation appears regularly on the output video signal. This issue is specific to interlaced formats (525i, 625i and 1080i) and does not concern progressive formats (720p).

If O and E represent respectively the odd and even fields of a standard video signal (50/60 Hz), we have:

The original video signal :

O E O E O E O E O E O E O E O E

The output video signal at 50% speed :

O **O** **E** E O **O** **E** E O **O** **E** E O **O** **E** E

The output video signal at 33% speed :

O **O** O E **E** E O **O** O E **E** E O **O** O E

The output video signal at 25% speed :

O **O** O **O** **E** E **E** E O **O** O **O** **E** E **E** E

Fields with parity violation are shown in bold, underlined letters. As it appears from the above table, whatever the playback speed (with the exception of the normal 100% playback speed), a number of fields violate the normal parity of the output signal. This parity violation induces a 1-line shift of the field, resulting in a vertical jitter of the picture. The jitter frequency depends upon the chosen playback speed.

To avoid this phenomenon and provide a stable output picture, EVS developed 2 types of line interpolator: 2-line and 4-line interpolators. The interpolation process can be enabled or disabled by the operator on all EVS slow motion systems.

2.5.8.1 2-LINE INTERPOLATOR

The 2-line interpolator actually generates a new field, when the original field is in parity violation. Each line of this new field is calculated by a weighted average of the 2 neighbouring lines. This process solves the problem of parity violation and vertical jitter, but the drawback is a reduction of the vertical resolution on the interpolated fields, that appear unfocused. Another by-side effect is the alternation of original fields (perfectly focused) and interpolated fields (unfocused), resulting in a "pumping" video signal.

2.5.8.2 4-LINE INTERPOLATOR

The 4-line interpolator uses a more sophisticated calculation based on the 4 neighbouring lines. By using suitable coefficients for the weight of each

line in the resulting calculation, we apply this interpolation to all fields. The final result is a permanently, slightly unfocused picture. The advantage is a stable output signal with no jitter and no "pumping", but the vertical bandwidth is even more reduced.

The interpolator is of course always disabled at 100% playback speed, because there is no parity violation.

EVS use the same techniques with the Super Slow Motion disk recorder, working with all models of Super Motion cameras (150/180 Hz). The only difference between the processing of Super Motion and normal scan (50/60 Hz) signals is that the interpolator is always disabled at 33% playback speed, because the Super Motion signal do not cause parity violation at this particular speed.

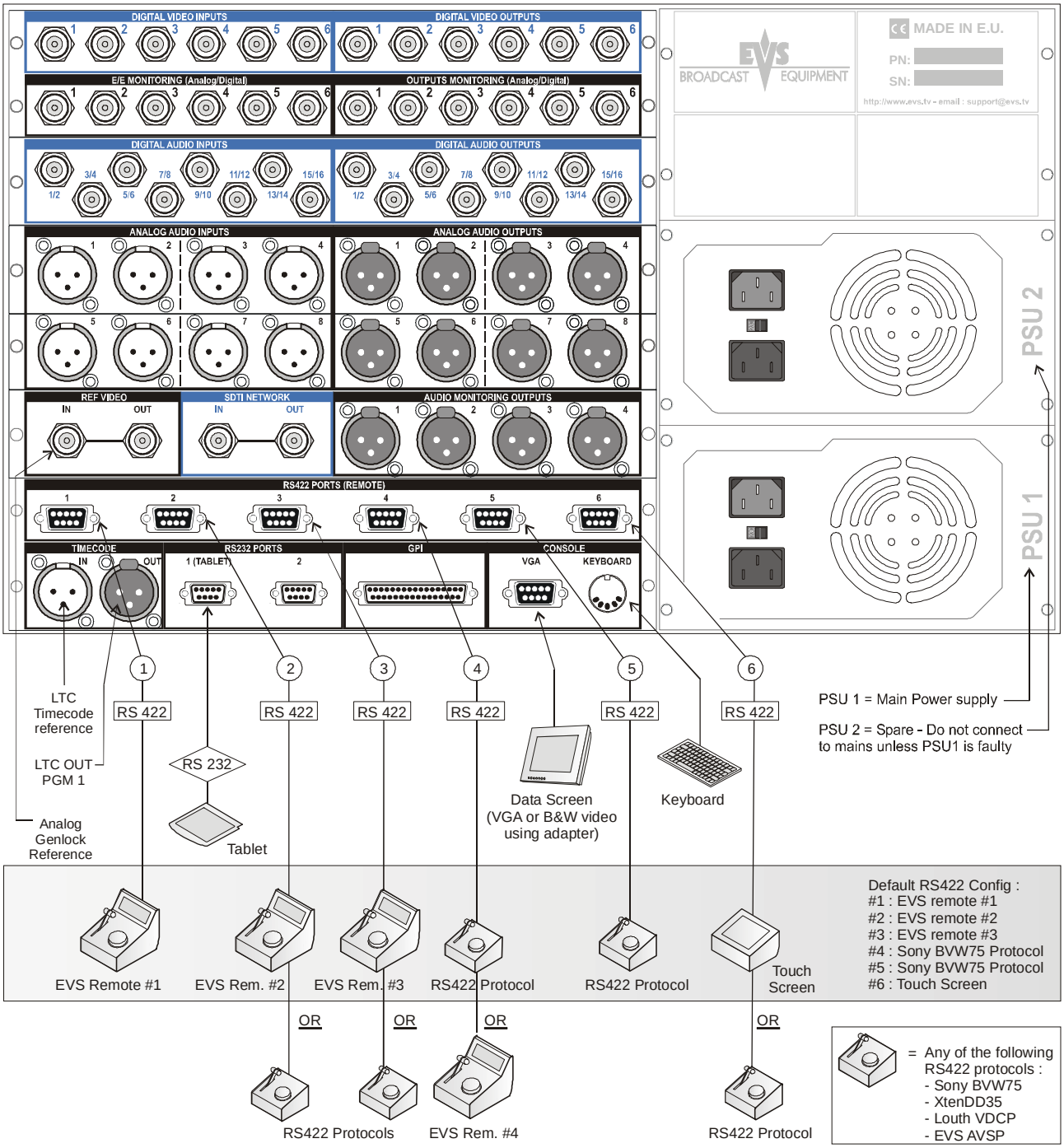
Whatever the choice, the resulting picture is thus always a compromise between stability and resolution. With EVS systems, the operator always has got the choice between any of the 3 above described techniques : no interpolation, 2-line interpolation or 4-line interpolation. Even if the operator chooses to use the interpolation, this process will be automatically disabled when not necessary (100% playback for 50/60 Hz signal, 33% and 100% playback for 150/180 Hz signal).

Note: All professional VTR's use line interpolation in PlayVar mode to avoid vertical jitters.

Default value is interpolator off for all configurations except SuperLSM configuration in which 4-line interpolator mode is enabled.

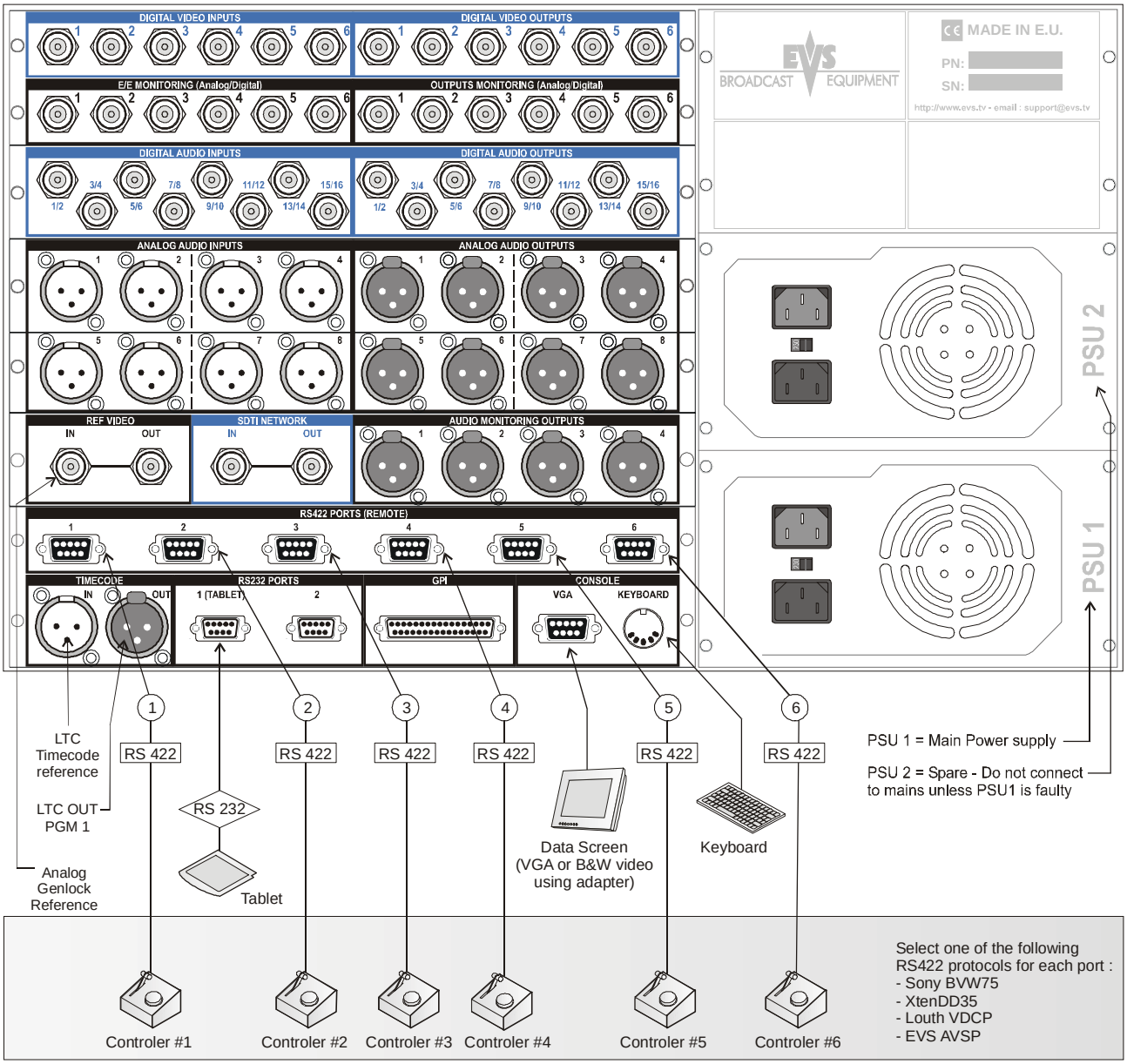
3 Cabling

3.1 XT 6U Back Plane, Muticam mode



Important : Genlock loop must be terminated if not used.

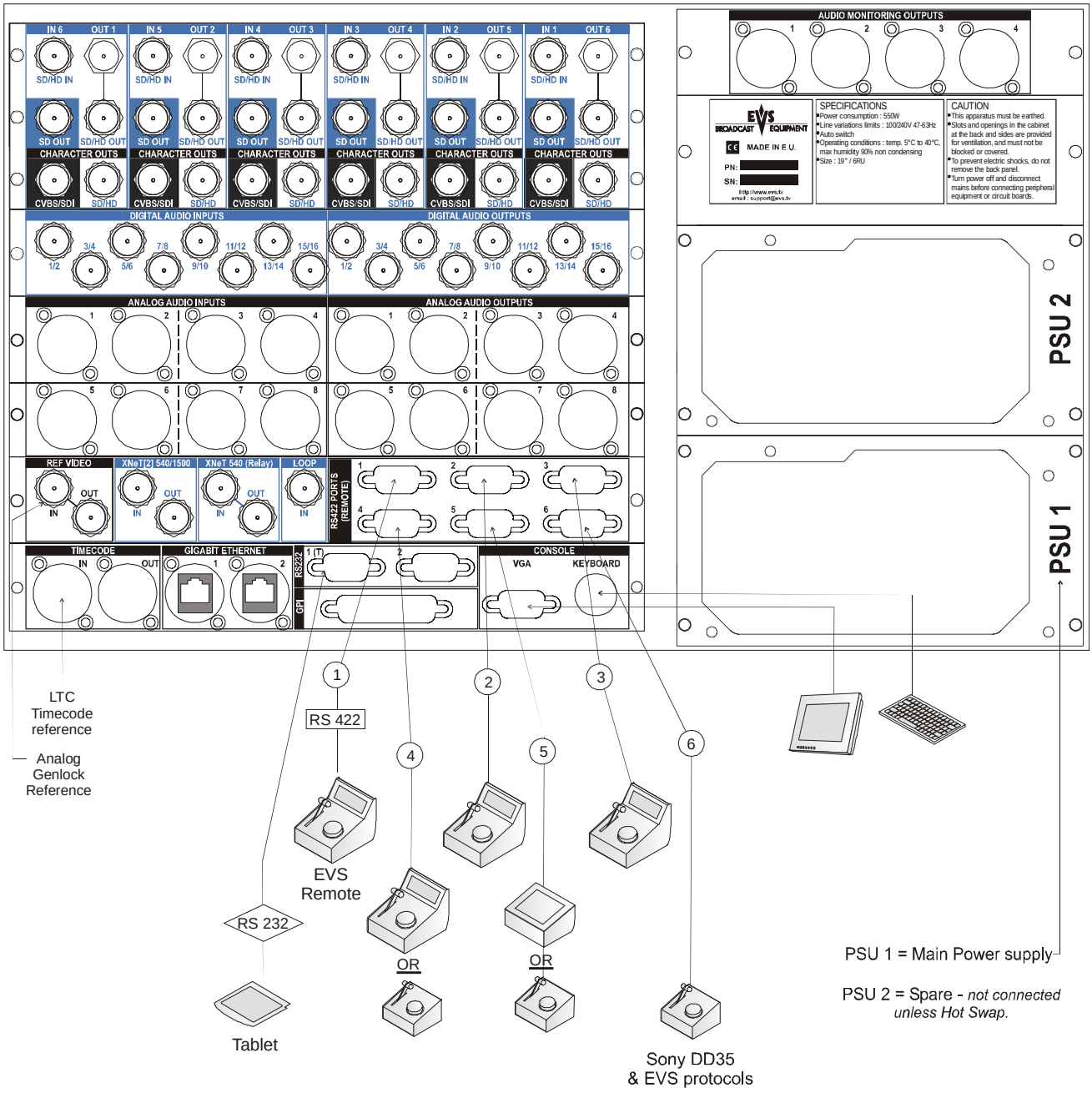
3.2 XT 6U Back Plane, Slave mode



Important : Genlock loop must be terminated if not used.

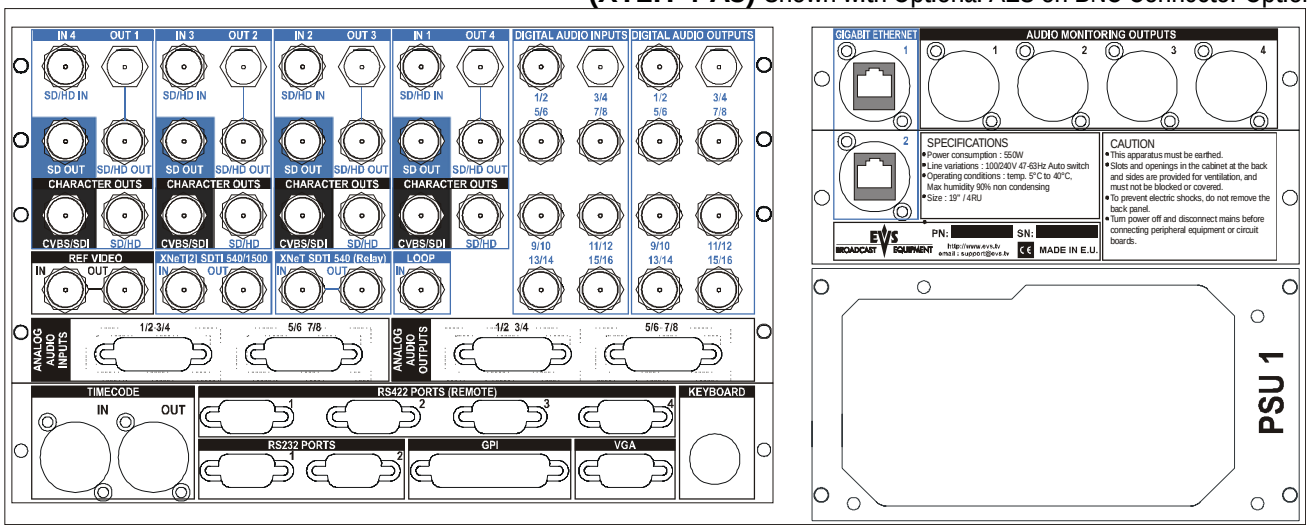
Note for HD systems : the cabling instructions and diagrams are similar for SD and HD systems. The only difference is that HD and HD/SD compatible systems are limited to max. 4 SDI/HD-SDI inputs and 4 SDI/HD-SDI outputs.

3.3 XT[2] 6U Back Plane, Multicam Mode

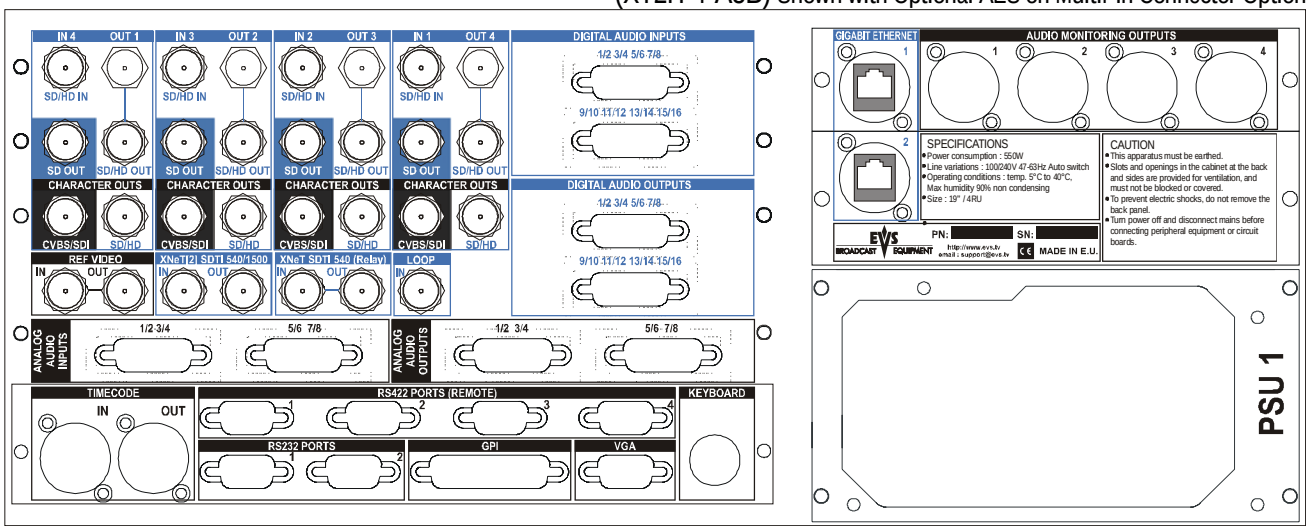


3.4 XT[2] 4U Back Plane

(XT2H-4-A3) Shown with Optional AES on BNC Connector Option



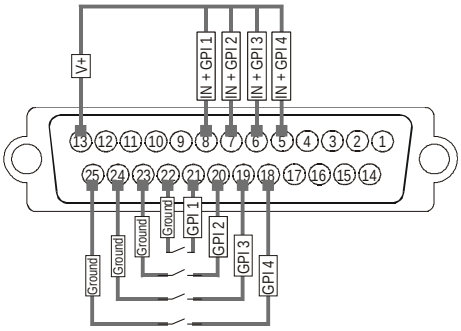
(XT2H-4-A3B) Shown with Optional AES on MultiPin Connector Option



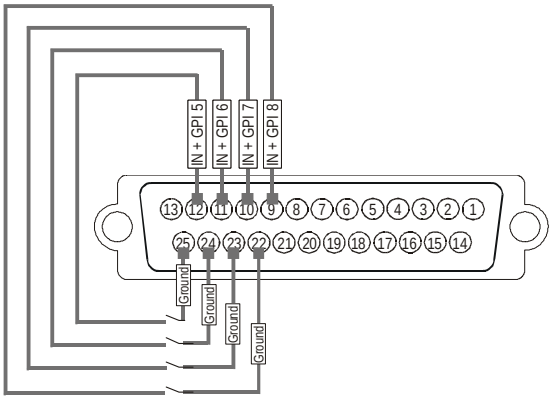
3.5 GPI IN Connections

On XT servers, GPI triggers are available from Multicam version 5.03.25 or higher. Refer to the User's Manual of the Multicam or Air Box for GPI allocation.

3.5.1 RELAY → OPTO INPUTS ON THE XT SERVER (GPI INPUTS 1, 2, 3, 4)

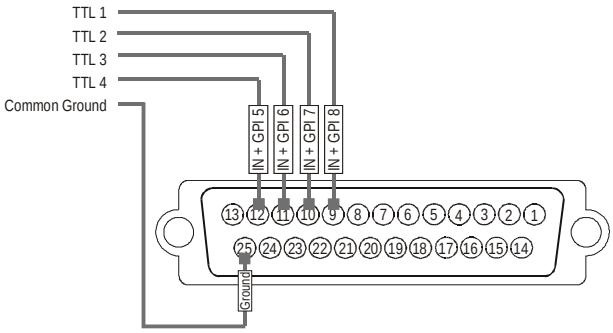


3.5.2 RELAY → TTL INPUTS ON THE XT SERVER (GPI INPUTS 5, 6, 7, 8)



The relay must be connected between the ground and the corresponding TTL input on the DB25.

3.5.3 TTL → TTL INPUTS ON THE XT SERVER (GPI INPUTS 5, 6, 7, 8)



Each TTL input on the DB25 is directly connected to the pin of the TTL connector on the device triggering the GPI. The ground must be common between the DB25 connector of the XT and the external device.

3.5.4 MTPC GPIO CONNECTOR 15/10/02

GPIO Connector: SUB-D 25-pins Male

1	Relay 3	14	Relay 3
2	Relay 2	15	Relay 2
3	Relay 1	16	Relay 1
4	Relay 0	17	Relay 0
5	IN+ opto 3	18	IN- opto 3
6	IN+ opto 2	19	IN- opto 2
7	IN+ opto 1	20	IN- opto 1
8	IN+ opto 0	21	IN- opto 0
9	I/O TTL 3	22	GND (Return I/O 3)
10	I/O TTL 2	23	GND (Return I/O 2)
11	I/O TTL 1	24	GND (Return I/O 1)
12	I/O TTL 0	25	GND (Return I/O 0)
13	+ 5V 50mA max.		

GPIO hardware specification:

4 X Relay isolated output:
- normally open contact (power off -> open)
- maximum 1A
- maximum 50 Volts
- typical life time: 100.000.000 switching

4 X Opto isolated input:
- The input consists in an opto diode (VF @ 1.1 Volt) in series with a

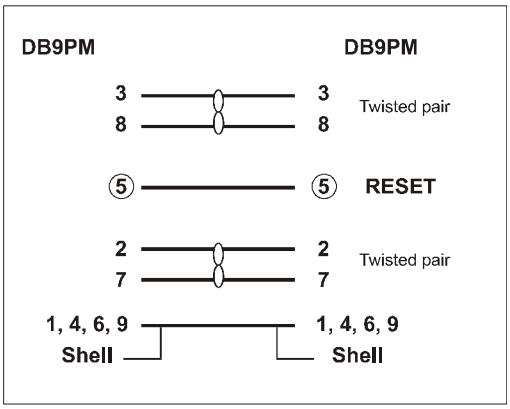
470 ohm resistor).

- Typical switching point @ 1.4 mA, for secure operation:
  i=0 to 0.5 mA -> opto OFF
  i=2.5 to 30 mA -> opto ON
  imax= 30 mA
- Direct connection to a TTL/CMOS signal possible (Pin opto - to GND and pin opto + to the TTL/CMOS signal.
  Typical switching point @ 1.6 Volts, for secure operation:
  Vin< 0.8 Volts -> opto OFF
  Vin> 2.2 Volts @ 2 mA -> opto ON
  Vin max (without external resistor) = 15 Volts

4 X CMOS input/output:

- each pin can be individually configured as an output or an input.
- internal 4K7 pull up to +5V.
- low level Vi<1.5 Volt (U12=74HC245)
- high level Vi>3.5 Volt (U12=74HC245)
- optionnal TTL compatible level (U12=74HCT245)

3.6 RS422 connector of the Remote control panel



The RS 422 cable of the Remote control panel must be wired PIN TO PIN following the above diagram. Use shielded cable to avoid electromagnetic interference on long distances.

Important note: The Reset command from the Remote is sent through the Pin n°5 of RS422 connector. This function should be disabled when the controller on RS422 #1 is not an EVS controller (refer to the PC board description on page 55 of this manual)

3.7 Audio configurations:

3.7.1 CODA1

Internal Audio Module : Embedded + Analogue Balanced

- Embedded Audio 12 stereo inputs + 12 stereo outputs
- Analogue balanced audio 4 stereo inputs + 4 stereo outputs (XLR)
- Audio monitoring : 4 analogue balanced mono outputs (XLR)

3.7.2 CODA2

Internal Audio Module : Embedded + AES/EBU

- Embedded Audio 12 stereo inputs + 12 stereo outputs
- AES/EBU Audio 8 stereo inputs + 8 stereo outputs (110 Ohm balanced on XLR)
- Audio monitoring : 4 analogue balanced mono outputs (XLR)

3.7.3 CODA3

Internal Audio Module : Embedded + AES/EBU + Analogue Balanced

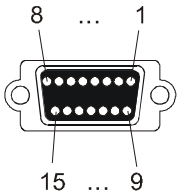
- Embedded Audio 12 stereo inputs + 12 stereo outputs
- AES/EBU Audio 8 stereo inputs + 8 stereo outputs (75 Ohm unbalanced on BNC)
- Analogue Balanced audio 4 stereo inputs + 4 stereo outputs (XLR)
- Audio monitoring : 4 analogue balanced mono outputs (XLR)

3.7.4 CODA3B

Internal Audio Module : Embedded + AES/EBU + Analogue Balanced

- Embedded Audio 12 stereo inputs + 12 stereo outputs
- AES/EBU Audio 8 stereo inputs + 8 stereo outputs (110 Ohm balanced on SUB-DB15, breakout cable with 4 XLR IN/OUT available optionally)
- Analogue Balanced audio 4 stereo inputs + 4 stereo outputs (XLR)
- Audio monitoring : 4 analogue balanced mono outputs (XLR)

- Pinout for SUB- DB15 digital audio (AES/EBU 110 Ohm balanced) :



Pin #	Sub-DB15 #1 Inputs 1-8 (mono)	Sub-DB15 #2 Inputs 9-16 (mono)	Sub-DB15 #3 Outputs 1-8 (mono)	Sub-DB15 #4 Outputs 9-16 (mono)
1	GND	GND	GND	GND
2	AES input 1/2 +	AES input 9/10 +	AES output 1/2 +	AES output 9/10 +
3	GND	GND	GND	GND
4	AES input 3/4 +	AES input 11/12 +	AES output 3/4 +	AES output 11/12 +
5	GND	GND	GND	GND
6	AES input 5/6 +	AES input 13/14 +	AES output 5/6 +	AES output 13/14 +
7	GND	GND	GND	GND
8	AES input 7/8 +	AES input 15/16 +	AES output 7/8 +	AES output 15/16 +
9	AES input 1/2 -	AES input 9/10 -	AES output 1/2 -	AES output 9/10 -
10	GND	GND	GND	GND
11	AES input 3/4 -	AES input 11/12 -	AES output 3/4 -	AES output 11/12 -
12	GND	GND	GND	GND
13	AES input 5/6 -	AES input 13/14 -	AES output 5/6 -	AES output 13/14 -
14	GND	GND	GND	GND
15	AES input 7/8 -	AES input 15/16 -	AES output 7/8 -	AES output 15/16 -

3.7.5 CODA4

Internal Audio Module : Embedded + AES/EBU + Analogue Balanced

- Embedded Audio 12 stereo inputs + 12 stereo outputs
- AES/EBU Audio 4 stereo inputs + 4 stereo outputs (110 Ohm balanced on XLR)
- Analogue Balanced audio 4 stereo inputs + 4 stereo outputs (XLR)
- Audio monitoring : 4 analogue balanced mono outputs (XLR)

3.7.6 CODA0

Internal Audio Module : Embedded Audio only

- Embedded Audio 12 stereo inputs + 12 stereo outputs
- Audio monitoring : 4 analogue balanced mono outputs (XLR)

Note: A configuration without internal audio module is also available. In this case, the system inputs/outputs are video only.

3.8 Connecting multiple XT's on XNet :

The XNet network is composed by several XT systems all connected with a 75-Ohm coaxial cable (BNC).

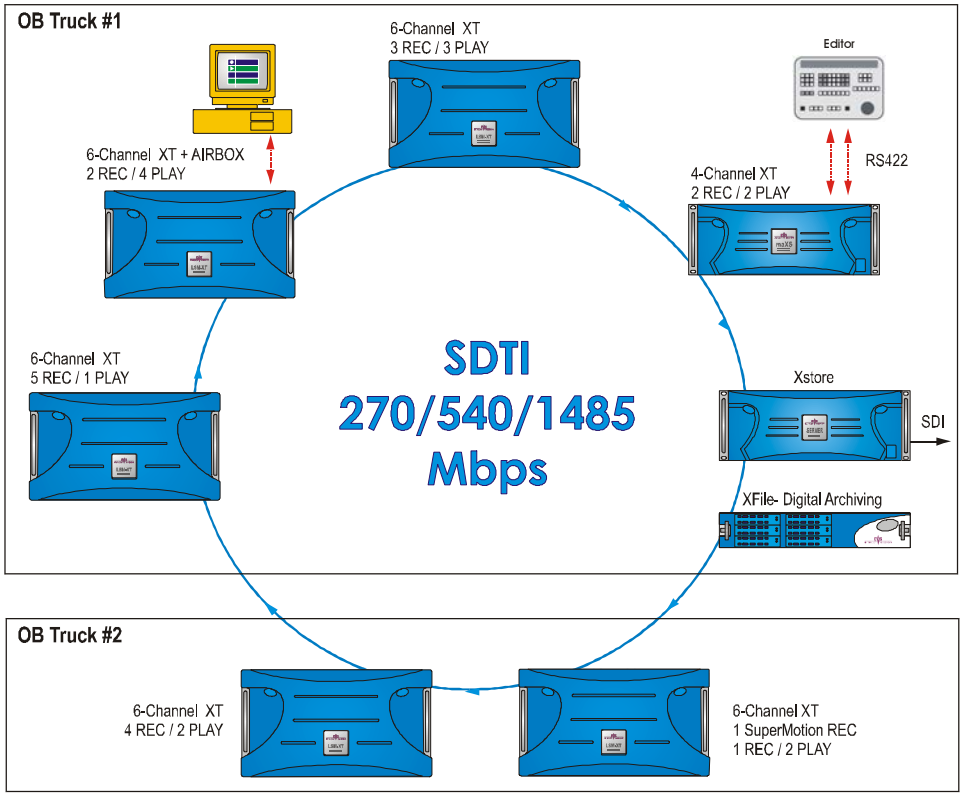
The exchange between systems is operated through the SDTI interface at 270, 540 or 1485 Mbps.

On XT[2] servers there are two pairs of SDTI connectors :
- the Relay ones can be used at 270 and 540 Mbps
- the Non-Relay connectors can be used at 270, 540 and 1485 Mbps.

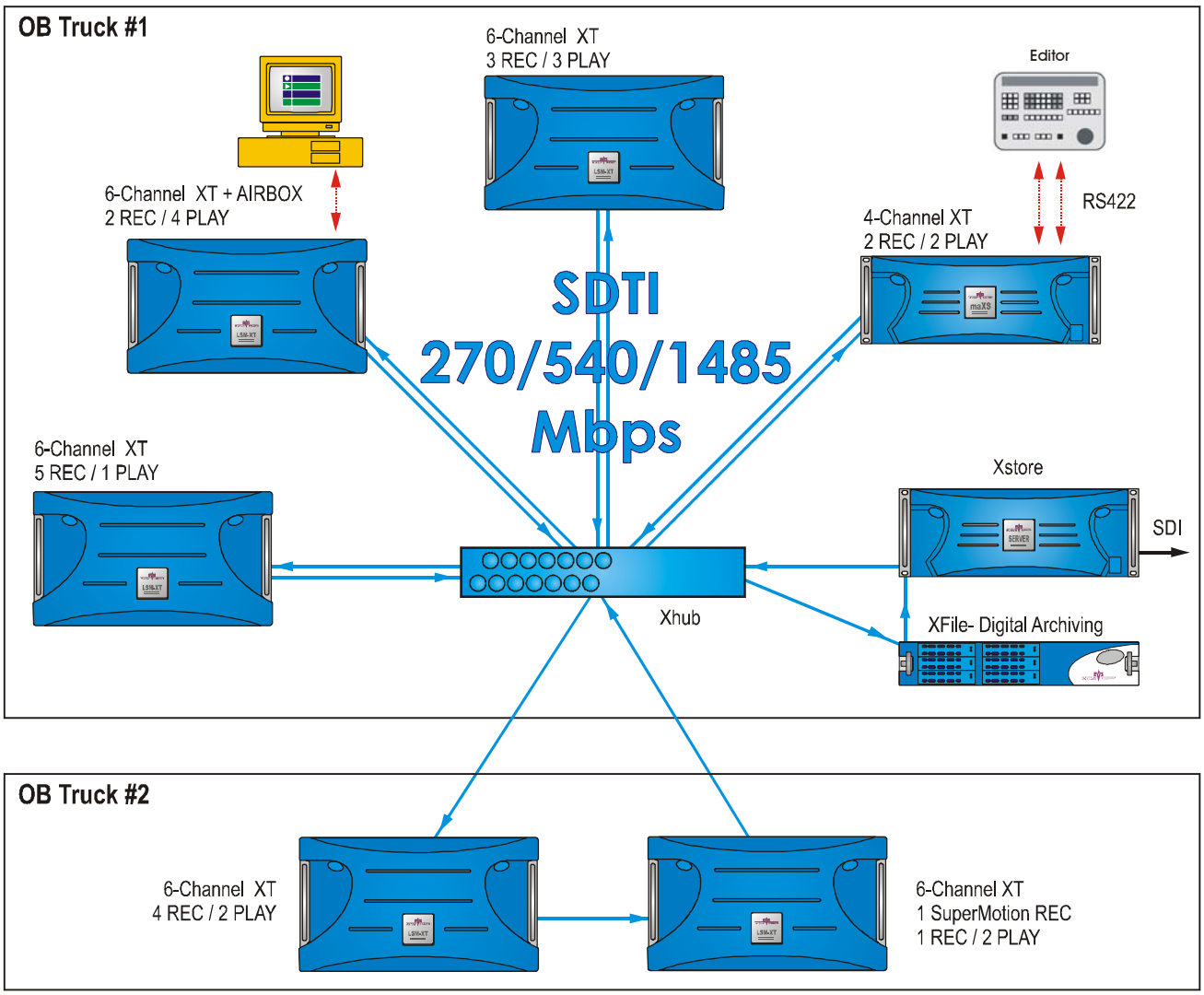
When connected on the SDTI network through Relay connectors, the SDTI loop is always established, even if the XT is not powered on. If connected through Non-Relay connectors, the SDTI loop is closed only when the Multicam software is started. It is therefore recommended to use XHub when using Non-Relay connectors to avoid network interruptions.

The XNet requires a network server dedicated to the management of the Database shared among all LSM-XTs. This is assigned to one of the LSM-XT systems on the network. The XT acting as the network server can of course be used for standard LSM/video server operation.

3.8.1 CONNECTION DIAGRAM WITHOUT EVS XHUB SDTI HUB



3.8.2 CONNECTION DIAGRAM WITH EVS XHUB SDTI HUB



3.8.3 REQUIRED CONDITIONS TO SET UP AND RUN XNET

1. All systems on the network must be XT Series Servers, XFiles, XStores or Xhubs.

2. The SDTI advanced (for network client, master or server modes) option code must be validated in the options list.

3. They should all be running compatible software version. A warning message is displayed when trying to connect an XT system with a software version that is not compatible with the network server.

4. The following parameters must be similar on all systems :
    a. Disk Blok Size (512K, from Advanced Parameters Menu)

b. SDTI Speed (usually 540Mbps or 1485Mbps, from Hardware Configuration Menu)

5. Network Type must be set to “Server” on 1 (and only 1 !) XT on the network. The others must be set to either “Master” (to share clips and view others’ clips) or “Client” (to share clips only).

6. A different network number must be specified for each XT system that you want to connect on the network. If the same network number is assigned to 2 different systems, the second one will not be able to connect and a warning message will be displayed.

7. All XT’s must be connected with a good quality BNC 75Ohm cable to form a closed loop. Connect the SDTI OUT connector of the first XT to the SDTI IN connector of the second one, etc until the loop is closed by connecting the SDTI OUT connector of the last XT to the SDTI IN connector of the first one. The SDTI loop must be closed at all times during network operation. If for any reason the loop is open, all network communication will be interrupted and all systems will automatically switch to stand alone mode. When the loop is closed again, network operation will resume automatically. This problem can be avoided or limited using EVS XHub SDTI hub.

8. The distance shown in the table below is the maximum cable length between two active EVS servers, or 2 SDTI reclockers, on a XNet SDTI network, using a single piece of cable between 2 servers or 2 reclockers. Intermediate connectors, patch panels, etc., might degrade these figures. Depending on the number of servers connected on the network, the location of the master server, the presence or not of a XHub SDTI hub, the actual maximum values may be higher than indicated. If longer distances between servers are required, SDTI to Fiber converters can be used, allowing distances over thousands of meters if necessary. EVS has validated the folowing SDI-Fibre converters :
   a. Stratos Lightwave Media Converter TX/RX VMC-T-H-2/VMC-R-H-2 (www.stratoslightwave.com)
   b. Telecast TX/RX292 (www.telecast-fiber.com)
   c. Network Electronics SDI-EO-13T (electrical to optical) / SDI-OE-S (optical to electrical) (www.network-electronics.com)
   d. Network Electronics HD-EO-13T (electrical to optical / HD-OE (optical to eleltrical)
   e. BlueBell BB320T (TX) and BB320R (RX) (www.bluebell.tv)

Cable type	@ 1485 Mbps	@ 540 Mbps	@ 270 Mbps
RG59	45m / 148ft	100m / 328ft	200m / 656ft
RG6	90m / 484ft	180m / 590ft	300m / 984ft
RG11	120m / 393ft	250m / 820ft	400m / 1312ft
Super HiQ	150m / 492ft	350m / 1148ft	550m / 1804ft
Fiber	80km(*)	200km(*)	400km(*)

(*) 80km/200km/400km is the total length of the return path, i.e. the actual distances between the 2 servers connected via the fiber link

is half of this value, i.e. 40 km @ 1485Mbps, 100 km @ 540Mbps or 200km @ 270Mbps.

Note : When using reclockers, the total delay induced by these reclockers between 2 active servers on the network must no exceed 15µs.

3.8.4 STARTING XNET

1. When all above conditions are fulfilled, turn on all "Masters" and "Clients" XTs, and make sure the Multicam application is started on all of them. A message appears because they are looking for the "Server" XT.
2. Turn on the "Server" XT and start the Multicam application. The other XTs should see the "Server" arriving on the network and will connect automatically. Connection takes a few seconds (usually between 2 and 5 sec) for each XT.

3.8.5 XNET PERFORMANCES & TROUBLESHOOTING

1. With the default settings, 10 real-time transfers can be achieved on the network with standard definition pictures in normal conditions, and 3 real-time transfers with super motion pictures. Copy of a clip between 2 servers on the network can be made up to 5 times faster than real time, depending on network occupancy.

   With high definition pictures, these numbers are reduced to 3 to 4 real-time transfers and copy clip 2 times faster than real time.

   These performances are also limited by the disk bandwidth available from the XT where the clips are stored. If the XT "owning" the clips is doing multiple playbacks at the same time, freezes can occur on the remote XT using those clips. Priority levels have been implemented to maximize network bandwidth efficiency : PLAY requests have a higher priority than SEARCH/BROWSE requests, that in turn have a higher priority than COPY requests. Note that "Live" (E2E) mode on a remote record train has the same priority level as a SEARCH/BROWSE request.
2. Note that when working at 1485Mbps or 540Mbps, only passive SDI routing equipment may be used. Even if the network is set to run at 270Mbps, the use of active SDI equipment should be avoided, because they could cause additional line delays and prevent the proper operation of XNet.
3. If the start-up of the network at a specific speed does not work properly and all machines are apparently configured properly and the Multicam is actually started on all of them, this can be due to the fact that the selected cables to connect all XTs together are not suitable or too long to operate at such a speed. You can decrease the speed of the SDTI network on all machines and try working in this mode. The number of simultaneous real-time transfers you can achieve is of course reduced.

4. While working at 1485 Mbps, if the connection can not be established, please make sure at all equipments are set to the same speed and connected to the non-relay connectors. All equipments should be started if not connected to an XHub.

5. It is recommended to use XHub if the network speed is set to 1485 Mbps.

6. Once the network has been established, if the system acting as the network server is disconnected or shut down, another system will automatically be assigned to act as a new network server. The switch is automatic and seamless. The next machine to be automatically assigned as new network server is the one with the highest serial number in the SDTI network.

4 Hardware description

4.1 Boards and Slot Configurations

The EVS Disk Recorder contains all the EVS developed boards. Several boards configurations are available.

4.1.1 6U FRAME

Slot #	XT SD	XT HD or HD/SD	XT[2] SD, HD or HD/SD
9	Disk Array	Disk Array	Disk Array
8	HCT-S / HCT-X (*)	HCT-S / HCT-X (*)	HCT-X
7	CODA (Audio Codec)	CODA (Audio Codec)	CODA (Audio Codec)
6	CODEC6 (Video Codec)	COHD/COHU #2	(empty)
5	IO-E #3		COHX (SD, HD or SD/HD) #3
4	IO-E #2	COHD/COHU #1	COHX (SD, HD or SD/HD) #2
3	Frame Buffer		(empty)
2	IO-E Genlock	HDGL Genlock	COHX (SD, HD or SD/HD) #1 Genlock
1	MTPC	MTPC	MTPC

4.1.2 4U FRAME

Slot #	XT SD	XT HD or HD/SD	XT[2] SD, HD or HD/SD
6	Disk Array	Disk Array	Disk Array
5	HCT-S / HCT-X (*)	HCT-S / HCT-X (*)	HCT-X
4	CODA (Audio Codec)	CODA (Audio Codec)	CODA (Audio Codec)
3	CODEC6 (Video Codec)	COHD/COHU #1	COHX (SD, HD or SD/HD) #2
2	IO-E Genlock	HDGL Genlock	COHX (SD, HD or SD/HD) #1 Genlock
1	MTPC	MTPC	MTPC

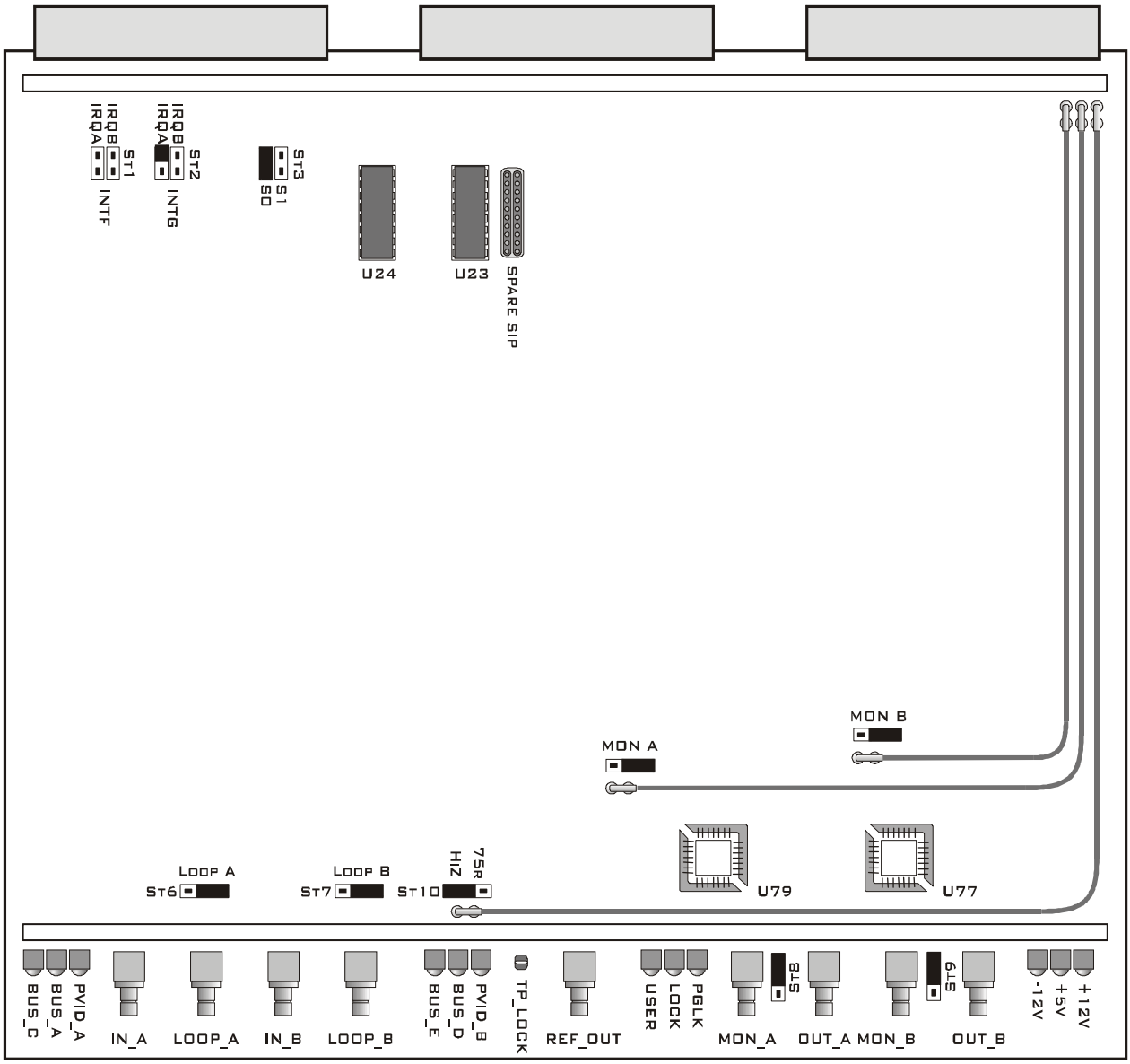
(*) HCT-S board always goes together with the « old » disk mounting board (without electronic components). HCT-X always goes together with the new disk mounting board that includes the electronic module with the RAID controller.

4.2 Video and Reference Boards

4.2.1 DIGITAL I/O E

The Digital I/O E boards manage the video inputs and outputs, and send/receive the video information to/from the VIDEO CODEC board. It is also used to multiplex/de-multiplex video and audio data when embedded audio standard is selected.

One digital I/O E board has two digital inputs, two digital outputs and 4 onboard monitoring PAL/NTSC/SDI outputs. Up to 3 digital I/O E boards can be installed into the LSM-XT chassis, depending on the number of video inputs and outputs required.



4.2.1.1 LED'S INFORMATION:

Bus_A/C/D/E:	shows whether the video input A is sent to bus A or C and the video input B is sent to bus D or E
PVID_ A/B:	shows the video signal is present on input A/B
USER:	
LOCK:	shows the unit is actually locked on the Reference signal.
PGLCK:	shows the presence of the reference signal
-12V, +5V, +12V:	show all voltages are OK.

4.2.1.2 CONNECTORS:

IN_A/B:	Serial Digital video inputs
LOOP_A/B:	Loop through (CVBS or SDI) of digital input A/B for E/E monitoring
REF_OUT:	Genlock output
MON_A/B:	*Optional:* Serial digital monitoring outputs (requires chips U79 and U77)
OUT_A/B:	Serial Digital video outputs

4.2.1.3 BOARD CONFIGURATION:

4.2.1.3.1 Adding an second and third Digital i/O E board

Make sure the system is turned off and mains is disconnected before moving/modifying any component !

Before adding a second and a third I/OE boards into the LSM-XT chassis, remove the INTG jumper (ST2) of IRQ A position from the second and third I/OE boards. But do not remove the INTG jumper from the first I/OE board.

Then refer to this diagram to change jumper position (ST3) on each I/OE board.

The three digital I/O boards have different jumper configurations depending on the location inside the mainframe.

4.2.1.3.2 Digital / Analogue monitoring:

Moving the MON_A and MON_B jumpers allows you to select analogue or digital monitoring from the Monitoring outputs BNC connectors on the rear panel.

MON A / B: 
The corresponding monitoring output from the rear panel is analogue.

Adding chips to U79 and U77 first,
then move MON A /B jumper to this position: 
The monitoring outputs from the rear panel are digital.

4.2.1.3.3 Digital / Analogue signal loop:

Moving the LOOP_A and LOOP_B jumpers allows to select analogue or digital input loop (IN1, IN2, IN3, IN4, IN5, IN6) from the BNC connectors of the rear panel:

LOOP A / B: 
The signal loop from the rear panel is analogue.

LOOP A / B: 
The signal loop from the rear panel is digital.

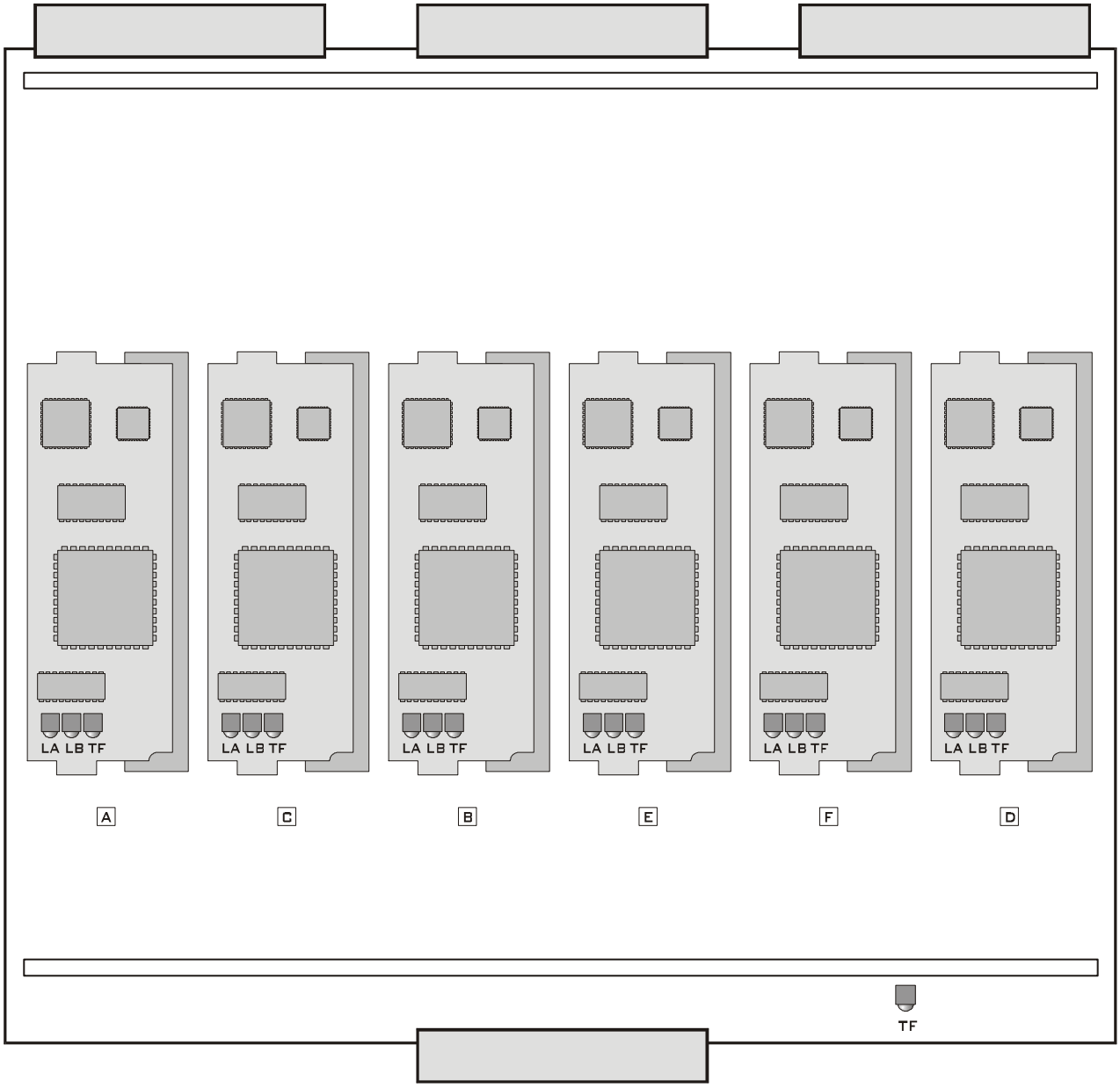
4.2.1.3.4 75 Ohm Termination:

ST10 jumper has to be set on HIZ position

Important note: In all configurations, SPARE SIP resistor has to be removed. First releases of LSM-XT were delivered with this resistor, the next releases are delivered without the SPARE SIP resistor.

4.2.2 VIDEO CODEC 6 BOARD

The VIDEO CODEC board is the video interface between the I/O E board and the HCTS board. It manages the encoding and decoding processes. One VIDEO CODEC board can handle simultaneously from 2 to 6 video channels, either record or playback channels, and proceeds with the video encoding and decoding in 4:2:2 format. VIDEO CODEC and AUDIO CODEC boards are tied to the HCTS board with one bus connector on the front side.



One CODEC module provides one video channel. Up to 6 modules can be plugged onto the VIDEO CODEC board, so the maximum configuration is 6-channel.

The table below summarizes the assignment of CODEC channels on the

CODEC6 board.

	A COD0	C COD4	B COD2	E COD3	F COD5	D COD1
2 Play + 0 Rec	Play 1					Play 2
1 Play + 1 Rec	Play 1					Rec 1
0 Play + 2 Rec	Rec 2					Rec 1
3 Play + 0 Rec	Play 1			Play 3		Play 2
2 Play + 1 Rec	Play 1			Play 2		Rec 1
1 Play + 2 Rec	Rec 2			Play 1		Rec 1
0 Play + 3 Rec	Rec 2			Rec 3		Rec 1
4 Play + 0 Rec	Play 1		Play 3	Play 2		Play 4
3 Play + 1 Rec	Play 1		Play 3	Play 2		Rec 1
2 Play + 2 Rec	Play 1		Rec 2	Play 2		Rec 1
1 Play + 3 Rec	Play 1		Rec 2	Rec 3		Rec 1
0 Play + 4 Rec	Rec 4		Rec 2	Rec 3		Rec 1
5 Play + 0 Rec	Play 1		Play 3	Play 4	Play 5	Play 2
4 Play + 1 Rec	Play 1		Play 2	Play 3	Play 4	Rec 1
3 Play + 2 Rec	Play 1		Rec 2	Play 2	Play 3	Rec 1
2 Play + 3 Rec	Play 1		Rec 2	Rec 3	Play 2	Rec 1
1 Play + 4 Rec	Rec 4		Rec 2	Rec 3	Play 1	Rec 1
0 Play + 5 Rec	Rec 4		Rec 2	Rec 3	Rec 5	Rec 1
6 Play + 0 Rec	Play 1	Play 5	Play 3	Play 4	Play 6	Play 2
5 Play + 1 Rec	Play 1	Play 4	Play 2	Play 3	Play 5	Rec 1
4 Play + 2 Rec	Play 1	Play 3	Rec 2	Play 2	Play 4	Rec 1
3 Play + 3 Rec	Play 1	Play 3	Rec 2	Rec 3	Play 2	Rec 1
2 Play + 4 Rec	Play 1	Rec 4	Rec 2	Rec 3	Play 2	Rec 1
1 Play + 5 Rec	Play 1	Rec 4	Rec 2	Rec 3	Rec 5	Rec 1
0 Play + 6 Rec	Rec 6	Rec 4	Rec 2	Rec 3	Rec 5	Rec 1

-

4.2.2.1 LED'S INFORMATION:

LA: flashes when the DSP program is running.

LB: lights when the channel is in use, either in record or in playback mode.

TF: flashes while data transfer is in process between the CODECs and the HCTS boards

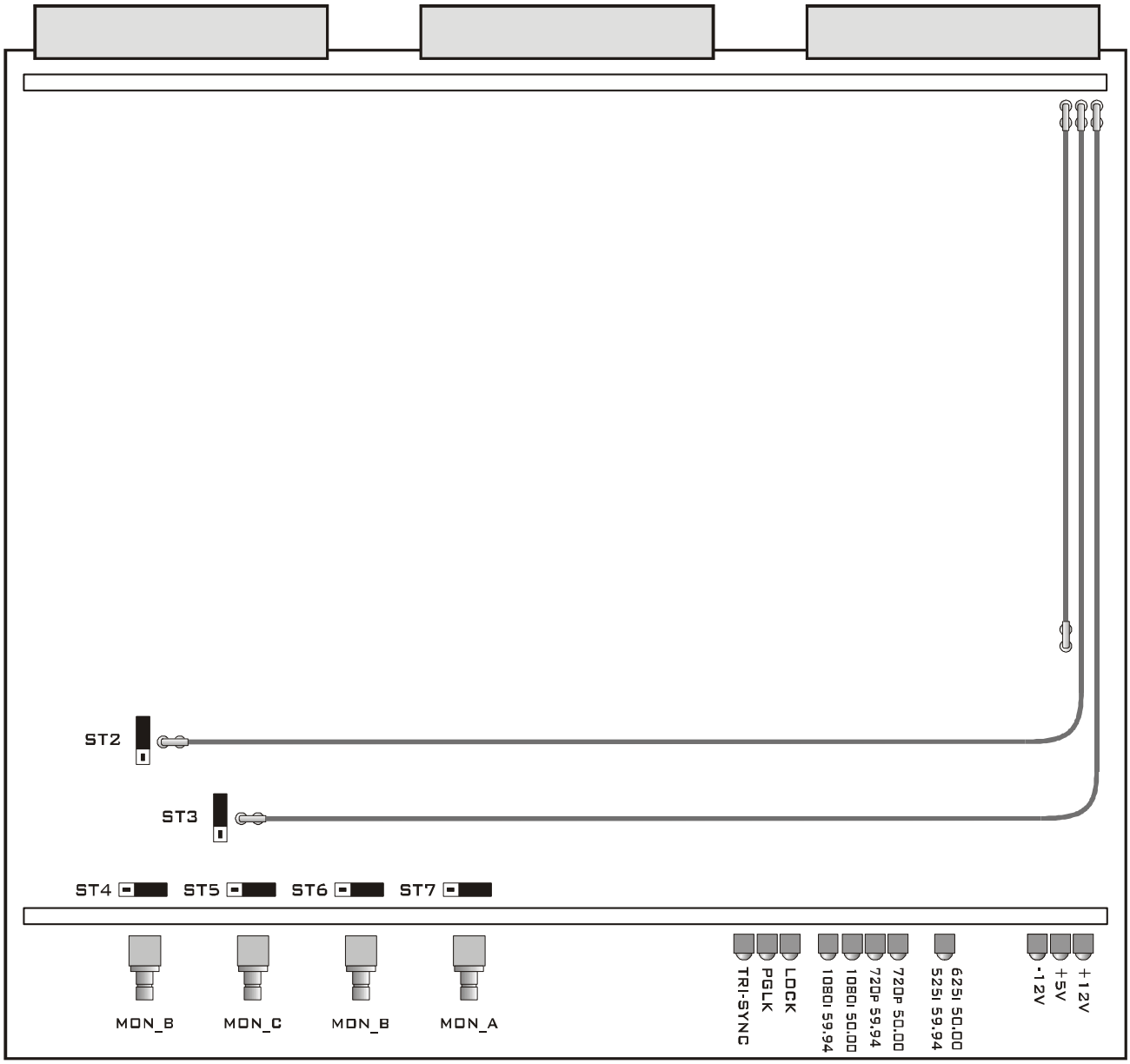
One TF LED is also available from the front of the CODEC board. This LED summarizes the activity of all TF LED's present on each CODEC module.

4.2.2.2 BOARD CONFIGURATION:

No modifications are required for this specific board.
Do not modify the jumpers positions.

4.2.3 HDGL BOARD

The HDGL board manages the video reference and the monitoring outputs of the HD XT.
The HD output signals are down-converted to standard definition for monitoring and/or HD/SD simulcasting and are SDI/CVBS switchable.
Two types of Genlock Reference are available: SD BlackBurst and HD Tri-level sync (software configureable, refer to EVS Menu section of this manual).



4.2.3.1 LED'S INFORMATION:

-12V, +5V, +12V: show all voltages are OK.

625i 50.00/525i 59.94, 720p 50.00, 720p 59.94, 1080i 50.00, 1080i 59.94: show the video standard in use.

	625i 50.00 / 525i 59.94 Led	720p 50.00 Led	720p 59.94 Led	1080i 50.00 Led	1080i 59.94 Led
625i 50.00Hz	ON	ON		ON	
525i 59.94Hz	ON		ON		ON
720p 50.00Hz		ON			
720p 59.94Hz			ON		
1080i 50.00Hz				ON	
1080i 59.94Hz					ON

LOCK: shows the unit is actually locked on the reference signal.
PGLCK: shows the presence of the reference signal
TRI-SYNC shows the unit is locked on the tri-level sync

4.2.3.2 CONNECTORS:

MON_A/B/C/D: SDI or CVBS monitoring outputs. See jumpers' positions

4.2.3.3 BOARD CONFIGURATION:

Moving the ST2 and ST3 jumpers allows you to select analogue or digital monitoring from the "Outputs Monitoring" BNC connectors on the rear panel (down-converted monitoring/clean output of PGM1 and PGM2/PRV).

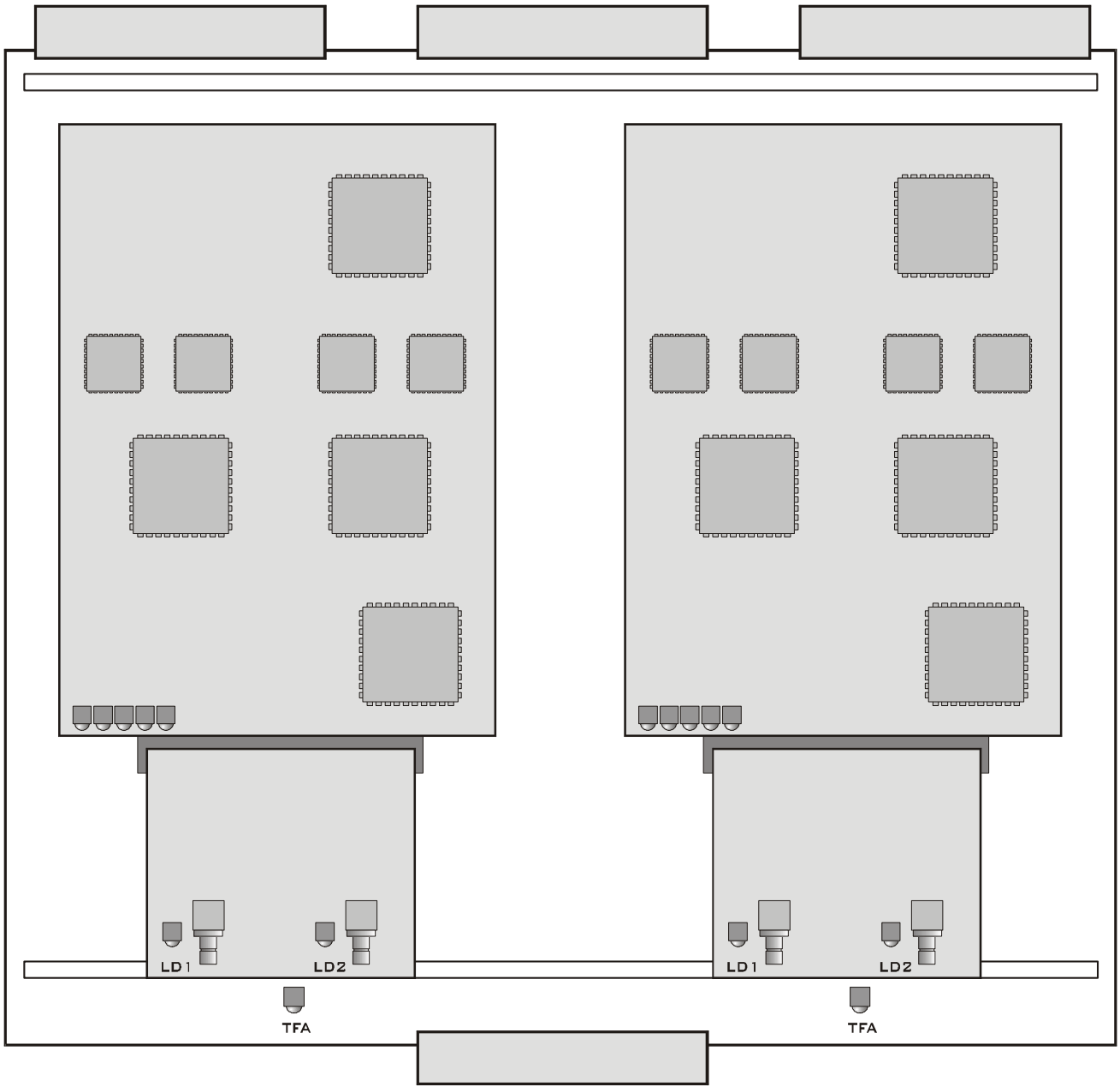
Moving the ST4, ST5, ST6 and ST7 jumpers allows you to select analogue or digital monitoring from the "E/E Monitoring" BNC connectors on the rear panel (down-converted monitoring of inputs 1, 2, 3, 4).

4.2.4 HD VIDEO CODEC BOARD (COHD AND COHU)

COHD boards only allow HD configurations. COHU allow SD and HD.

The HD Video Codec board manages the HD video inputs and outputs as well as the encoding and decoding processes. It is also the video interface with the HCTS raid controller board

The HD Video Codec board takes up 2 slots in the mainframe, and handles 2 HD video channels (either inputs or outputs). This is similar for HD/SD compatible systems.



4.2.4.1 LED'S INFORMATION:

LD1, LD2: lights when the channel is in use, either in record or in playback mode.

TFA: flashes while data transfer is in process between the CODEC and the HCTS boards.

4.2.4.2 BOARD CONFIGURATION:

Do not modify the jumpers positions. Please call EVS for support.

4.2.4.3 CHANNEL ASSIGNMENT:

2-ch HD or HD/SD compatible XT server :

Lower HD Video Codec (#1)

4-ch HD or HD/SD compatible XT server :

Upper HD Video Codec (#2)

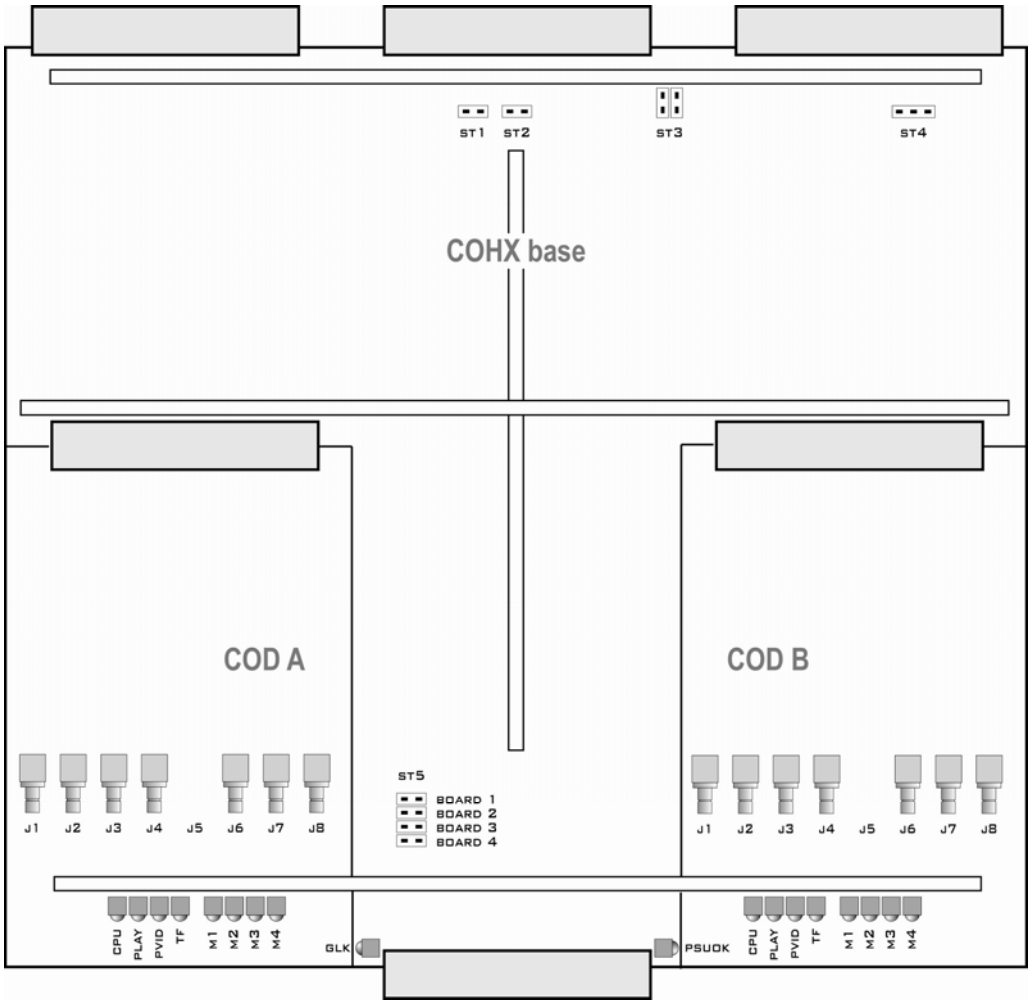
Lower HD Video Codec (#1)

4.2.5 COHX BOARD

The COHX board is divided in 3 parts : COHX base (center front and back), COD A module (front left), and COD B module (front right).

COD A and COD B modules are the actual CODEC modules, each of them being able to be configured by software either as a encoder (for a record channel) or as a decoder (for a play channel). There are 3 hardware versions of COD modules : SD only, HD only, or HD/SD. They are clearly identified by the sticker at the front of the board.

There are 2 versions of the COHX base : one with genlock, one without genlock. The genlock model can easily be identified by the presence of 3 quartz synthetizer at the back of the board, on the right-hand side, and by the presence of the GLK and PSU OK leds on either side of the DIN connector at the center front of the board. Note that a COHX board with genlock must be installed as COHX #1 in first position (slot 2) in an XT[2] system (6U or 4U). A COHX board with genlock can never be installed in any other slot, and thus can not be used instead of COHX #2 or #3. Doing so will result in conflicting electrical signals inside the system.



4.2.5.1 JUMPERS ON THE COHX BASE MODULE

ST1, ST2 : these 2 jumpers must be installed on the last COHX board of the server (i.e. on COHX #1, 2 or 3 if there are respectively 1, 2 or 3 COHX board installed in the server)

ST3 (SPARE) : « parking » for jumpers for ST1 and ST2 when these are not used

ST4 (only on COHX with genlock) : must be set to HiZ (or not installed). Note that the Genlock Loop connector on the back panel of the XT[2] server must always be terminated with a 75 Ohm load if it is not used.

ST5 : defines the position of the board inside the server. Must be set to « 1 » for a COHX with genlock, and to « 2 » or « 3 » for a COHX board without genlock, depending on its position in the server.

4.2.5.2 LEDS ON THE COHX BASE MODULE WITH GENLOCK

GLK :
Off when the genlock module is not initialized.
Blinks green when the genlock module is properly initialized, but not valid genlock signal is detected.
On, steady green when the module is initialized and a valid genlock signal is detected.
Red (steady or intermittent) : genlock problem. The led lights red every time a resync is needed.

PSU OK :
On (green) when all voltages are present and in the allowed range, otherwise the led is off.

4.2.5.3 LEDS ON THE COD A AND COD B MODULES (FROM LEFT TO RIGHT)

CPU : blinks (green) to indicate CPU activity. If this led is permanently on (green) or off, it means there is a problem with the processor of the COD module.

PLAY : on (green) when the COD module is set by the software in play mode. Off when it is set in record mode.

PVID : on (green) when a valid video signal has been detected on the J8 connector (SD/HD SDI input), whether the COD module is in play or record mode.

TF (transfer) : flashes green while data transfers occur between the COD module and the HCT-X board.

M1, M2, M3, M4 : not yet used.

4.2.5.4 CONNECTORS ON THE COD A AND COD B MODULES

Connector	SD mode	HD mode	Connector label on rear panel
J1	SDI/CVBS (*) monitoring output (SD)	SDI/CVBS(*) monitoring output (SD, down-converted)	Character Outs, CVBS/SDI
J2	SDI monitoring output (SD)	SDI monitoring output (SD, down-converted)	Not connected
J3	Loop-through for the SDI input signal (SD)	SDI program output (SD, down-converted)	SD Out
J4	SDI monitoring output (SD)	HD SDI monitoring output (HD)	Character Outs, SD/HD
J5	Not installed	Not installed	n.a.
J6	SDI program output (SD)	HD SDI program output (HD)	SD/HD Out
J7	SDI program output (SD, identical to J6)	HD SDI program output (HD, identical to J6)	SD/HD Out
J8	SDI input (SD)	HD SDI input (HD)	SD/HD In
J9	Alternate SDI input (SD, for hardware loop)	Alternate HD SDI input (HD, for hardware loop)	Used for loop in

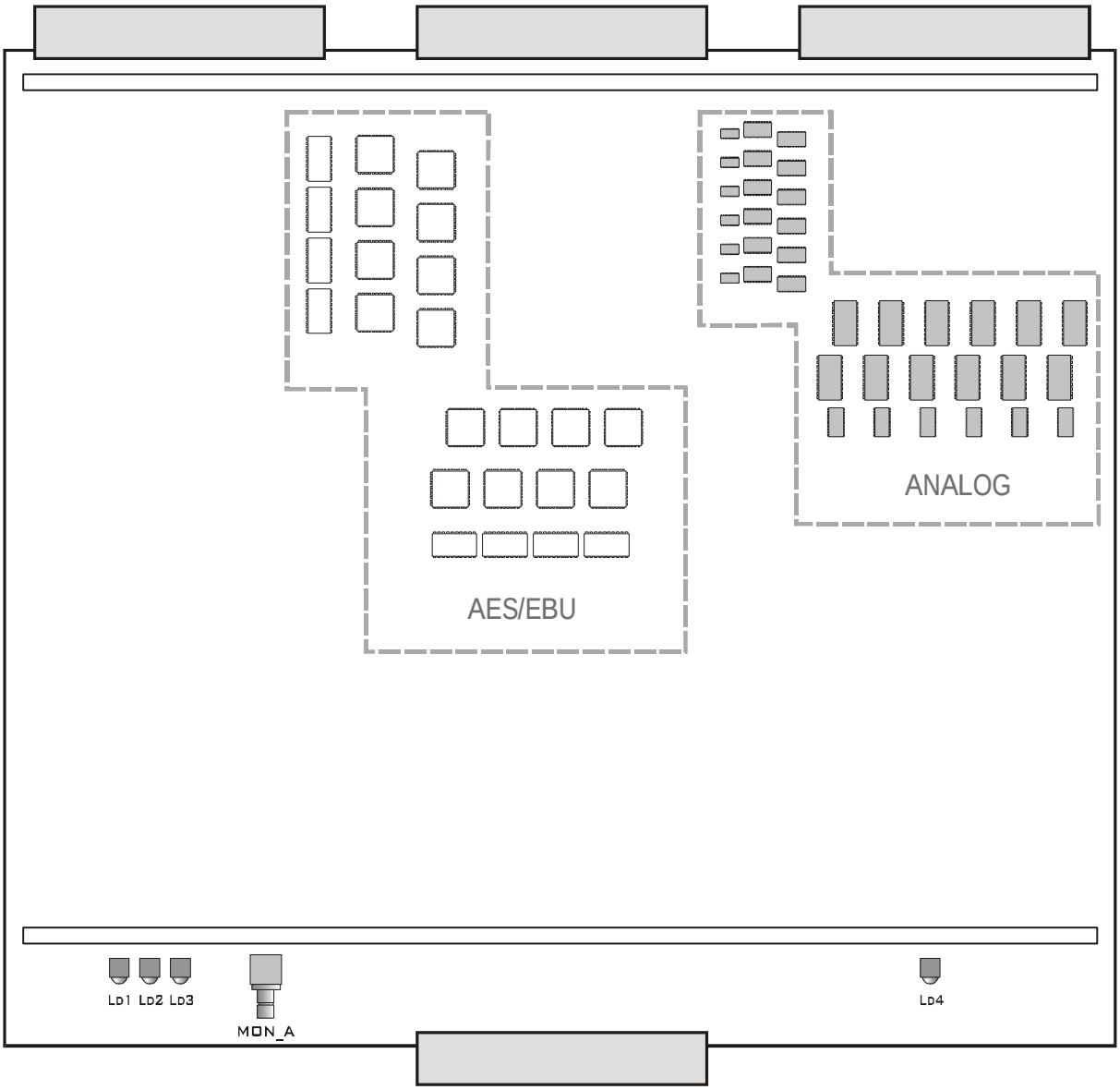
(*) the switch between SDI and CVBS on J1 is done by a software setting in the EVS Configuration Menu

Note : Only front backplanes labelled BKP7 are compatible with COHX boards (4 slots for 4U frames, and 7 slots for 6U frames). The BKP7 backplanes (compatible with COHX boards) have 3 rows of soldering per slot, while the backplanes compatible with IO-E, COHD or COHU boards have 2 rows of soldering per slot. Note that the top slot of BKP7 backplanes must always be connected to the HCT-X board.

4.3 AUDIO CODEC board

(VIDEO RAID CODA)

The AUDIO CODEC board is the audio interface between the I/O E board and the HCTS board. VIDEO CODEC and AUDIO CODEC board are tied to the HCTS board with one Bus connector on the front side. Different audio configurations are available with the audio CODEC board. See Audio configurations in chapter 2 for details.



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4.3.1.1 LED'S INFORMATION AND CONNECTOR:

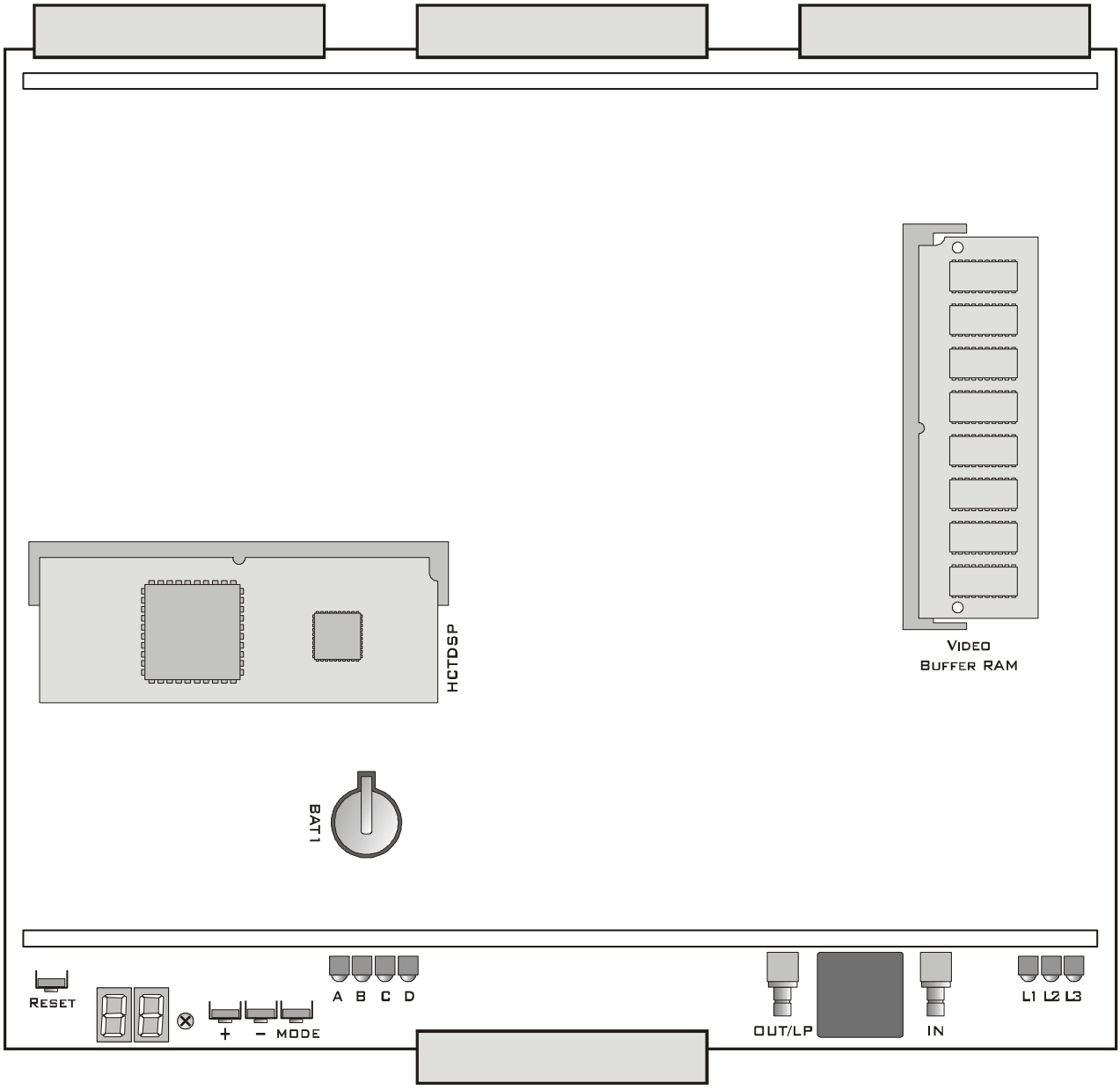
Internal EVS information only

4.4 Raid Controller Boards

4.4.1 HCTS BOARD

(VIDEO RAID HCTS)

The HCTS board is a RAID controller that receives data from the CODEC boards in Record mode and sends data for storage to SCSI disks.
In Playback mode, the HCTS recalls the data from the disks and transfers it to the CODEC boards. The HCTS board manages both VIDEO CODEC and AUDIO CODEC boards.



Note: The RESET button resets the board itself and initialises the RAM Video Buffer.

4.4.1.1 7-SEGMENT DISPLAY:

This display notices the stages and errors of the system boot processing.

Left	Right		
0	0	4.4.1.1.1.1	OK
0	1	Communication RAM error	
0	2	SDRAM Error	
0	3	4.4.1.1.1.2	Restarted by watchdog

If an error 01, 02 or 03 occurs, the nearby LED lights RED

Note: The MODE buttons modify internal EVS parameters. Do not modify.

4.4.1.2 LED'S INFORMATION:

While the program is loading, LED's A, B, C and D give the following information about RAM SIMM's testing process:

A	B	C	D	
-	-	-	-	4.4.1.2.1.1 At start-up
-	-	-	ON	Testing communication RAM
-	-	ON	-	Clearing communication RAM
-	-	ON	ON	4.4.1.2.1.2 Polling basic user commands
-	ON	-	-	Testing the first 256KB SDRAM
-	ON	-	ON	256KB SDRAM is OK
ON	ON	ON	-	Communication RAM error
ON	ON	-	ON	SDRAM error

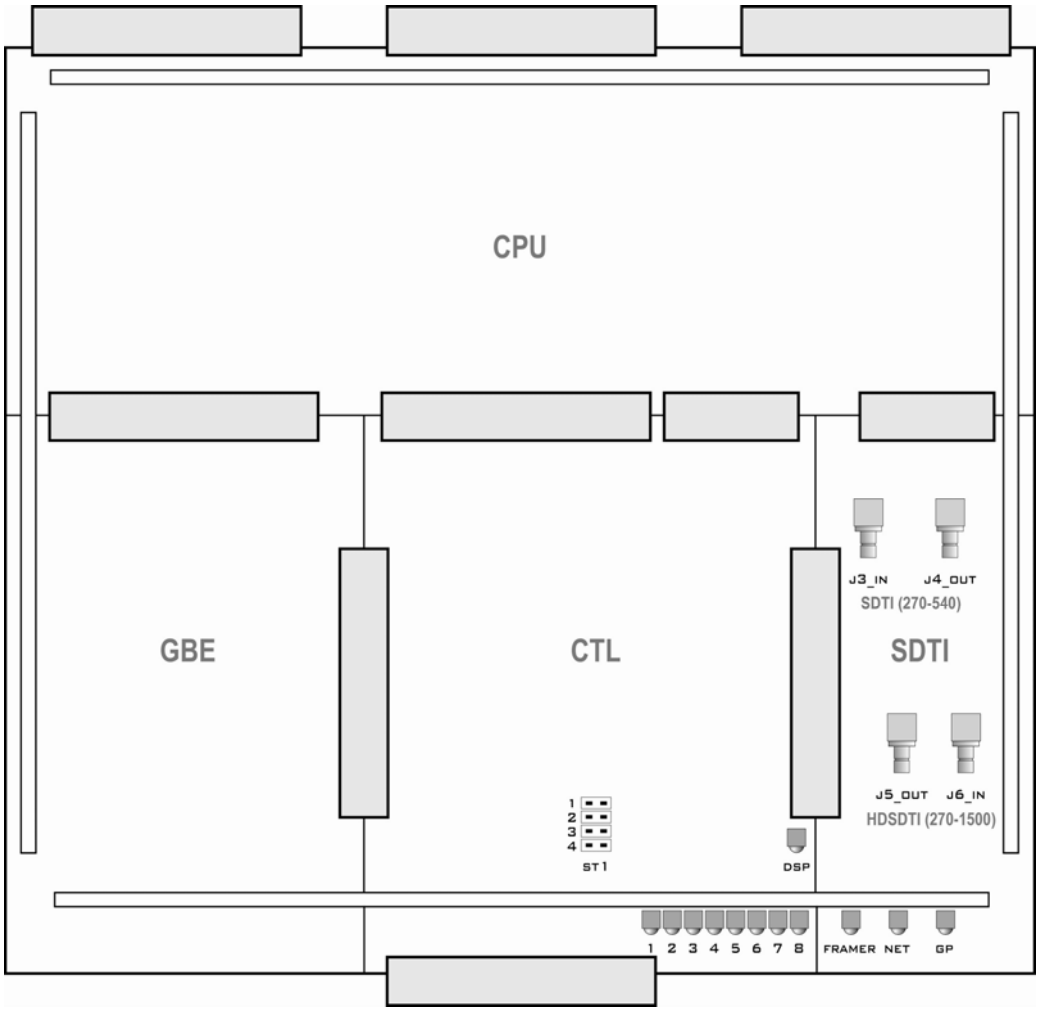
4.4.1.3 SDTI CONNECTORS:

IN: SDTI input
OUT/LP: SDTI output

When the LSM-XT is connected to the SDTI network, if L1 LED is ON, the system is in HARDWARE MASTER mode ("SERVER" in EVS Configuration Menu), and if L1 LED is OFF, the system is in HARDWARE SLAVE mode ("CLIENT" or "MASTER" in EVS Configuration Menu). The other two LEDs are not in use at the moment. 1 (and only 1) XT on the SDTI network must operate in Hardware Master mode. Refer to the SDTI Network section for details.

4.4.2 HCTX BOARD

The HCTX board is actually divided in 4 parts (3 in front, 1 in the back). Front left : spare module, reserved for future Gigabit Ethernet option ; Front center : controller module ; front right : Xnet[2] module (SDTI) ; back : CPU module



4.4.2.1 JUMPERS

ST1-1 on controller module (front center) : jumper must be installed on ST1-1 only when the HCT-X board is used with previous video codec boards (SD CODEC6, COHD, COHU). This jumper is automatically detected by the software application, and an error message is generated if it is not properly set

ST1-2, ST1-3 and ST1-4 on controller module are not used. No jumper must be installed on these

ST1 on CPU module (rear corner, left) : for EVS internal tests only (used to reset the board). Never install that jumper, or the board will be in a

permanent reset state !

4.4.2.2 LEDS

Leds on the Xnet[2] module (SDTI), from left to right :

FRAMER : on (green) when the signal on the Xnet or Xnet[2] IN connector is a valid EVS SDTI signal.

NET : on (green) when the Xnet SDTI network is actually established (SDTI loop closed, correct speed, etc)

GP : not used

Leds on the controller module (center), from left to right :

Led 1 : lights red when an error occurs while booting the HCT-X board

Led 2 to 8 : display the boot sequence of the HCT-X board (cfr note below)

DSP led : blinks green to show DSP activity

Note : when booting the HCT-X board, leds 1 to 8 will light according to the following sequence :
Hardware reset → all leds on (1 : red ; 2 to 7 : green)
Setup of CPU basic registers → led 2 on (green)
Check of CPU/PC DPRAM
→ if error : led 1 on (red) + led 8 on (green)
→ otherwise, led 3 on (green) if check is successful
Polling for PC commands → led 4 on (green)
Switching to enhanced mode → led 5 on (green)
Executing PC commands until execution requests end → led 6 on (green)
Jump to SDRAM and execute microcode

4.4.2.3 CONNECTORS

On the Xnet[2] module (SDTI) :

J3 : IN connector for Xnet (SDTI network 270/540Mbps with relay)

J4 : OUT connector for Xnet (SDTI network 270/540Mbps with relay)

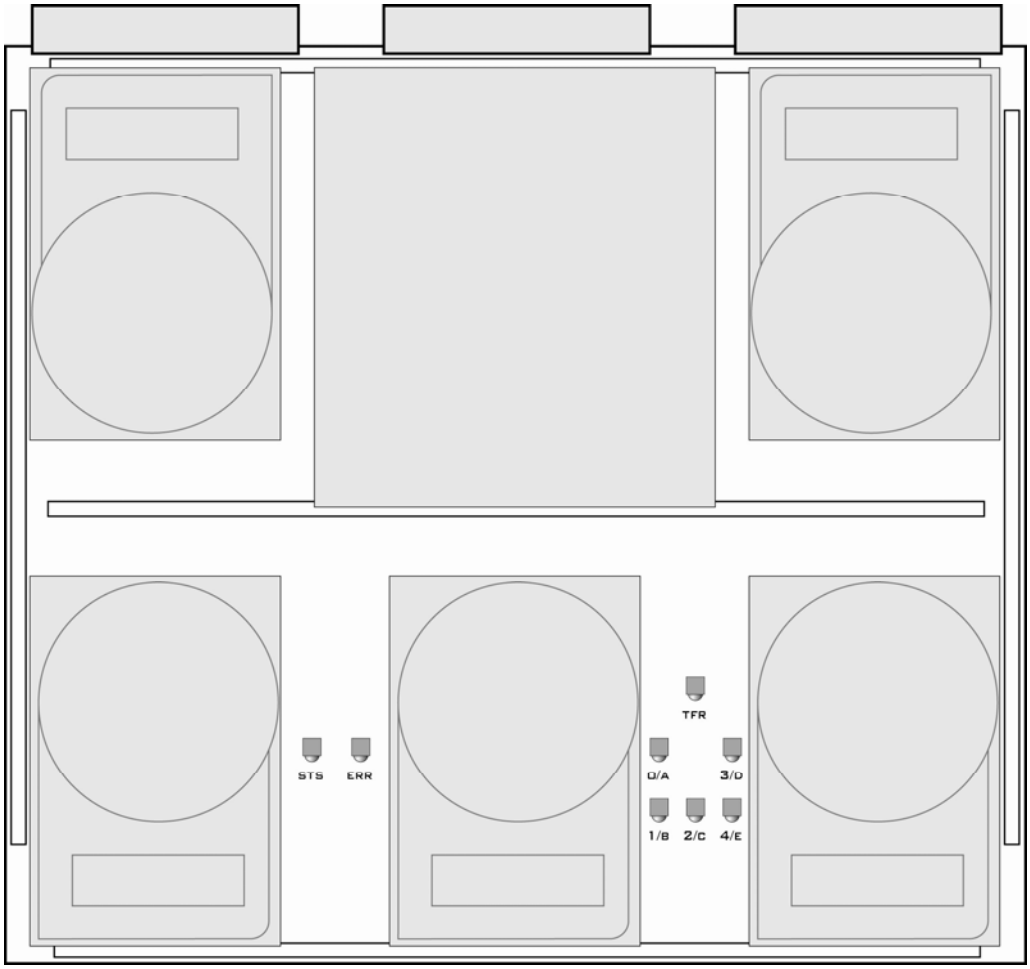
J5 : OUT connector for Xnet[2] (SDTI network 270/540/1485Mbps without relay)

J6 : IN connector for Xnet[2] (SDTI network 270/540/1485Mbps without relay)

Note : J3 must be used with J4, and J5 must be used with J6. Never use J3 with J5 or J4 with J6 !

4.4.3 RTCL BOARD ON DISK ARRAY (WITH HCTX)

Disk Arrays on systems with HCTX Boards have a controller on the disk array board.



4.4.3.1 LEDS

0/A – 1/B – 2/C – 3/D – 4/E (between the 2nd and 3rd disk from left in front) :
these LEDs match the position of the disks on the board, i.e :

0/A	RCTL	3/D
1/B	2/C	4/E

- off : the corresponding disk is not started (not spinning)
- on, fast blinking (green) : the corresponding disk is starting (spinning)
- on, steady (green) : the corresponding disk is started and used in the RAID array
- on, slowly blinking (green) : the corresponding disk is started but not used in the RAID array

TF (just behind the 5 disks leds) :
on (green) when data are transferred between the RAID array and the HCT-

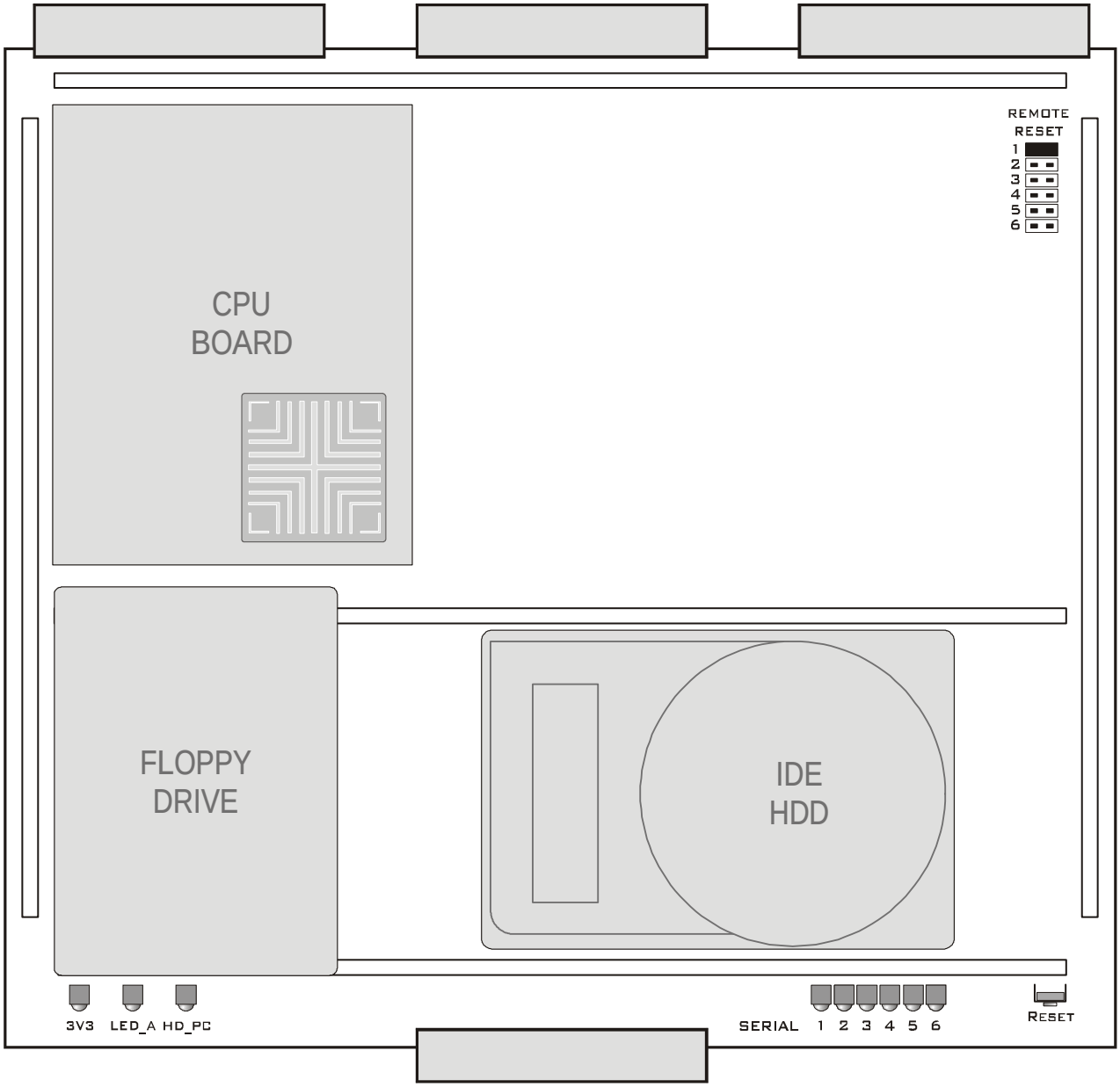
X board. If the led is nearly permanently on, it means that data are transferred almost all the time between the RAID array and the HCT-X board, thus being close to the max. bandwidth of the system.

STS (between the 1st and 2nd disk from left in front) :
on (green) when RCTL RAID controller is properly booted.

ERR (next to STS) :
lights red when errors occur during the data transfer between the RAID controller and the disks.

4.5 MTPC Board

The function of the PC board is mainly the control of the Video hardware via the software and to interface the peripheral equipment (i.e. remote controller) with the Video hardware.



In standard configuration the PC hardware is composed by:

- One mounting PC board with serial ports and LTC reader and generator and controlled by the motherboard
- IDE System Hard disk: the IDE disk drive is used for storing the EVS software and the DOS operating system. Neither audio nor video data is saved on this disk. The capacity of this drive may vary depending on market availability, but the system partition is always set to 1GB.

The remaining capacity of this drive is not used.

- 8/32MB SDRAM modified. The SDRAM used has been modified to suit the system requirements. Please contact EVS support for RAMs upgrade. Do not use standard PC RAM modules.

Important notes :

The MTPC board exist in 3 different revisions : rev. A1, rev. A1/R and rev. A1/R2. The memory management is not compatible between rev. A1 or A1/R and rev. A1/R2. The SDRAM and the code inside one of the programmable components are different between A1 or A1/R and A1/R2. Do not use the SDRAM of an MTPC board rev. A1 or A1/R on an MTPC board rev. A1/R2, or the opposite !

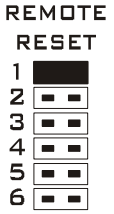
A component of the Frame Buffer/Mixer board (FBM) has also been modified to comply with the new memory management of MTPC board rev. A1/R2. Use only FBM rev. A3 with MTPC rev. A1 or A1/R. Use only FBM rev. A3/R2 with MTPC rev. A1/R2.

Field upgrade and factory upgrades are available for these boards. Contact EVS for details.

4.5.1.1 LED'S INFORMATION:

Internal EVS information

4.5.1.2 BOARD CONFIGURATION:



REMOTE RESET jumpers are available to designate the remote(s) from which the RESET command can be sent.

This command resets the whole system : PC and video hardware.

In standard configuration only Remote one (on RS422 port 1) is allowed to reset the system.

Warning : This jumper should be removed if the device connected to the RS422 port is NOT an EVS controller. Maximum voltage on pin 5 of an RS422 port of the XT server should not exceed 5 Volt when the corresponding jumper is engaged. Applying a higher voltage on pin 5 when the corresponding jumper is engaged will result in permanent electronical damage to the board.

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