XT DISK RECORDER

Technical Reference

Issue 2.7 – Multicam 6.02.04 – NOV 2004

EVS BROADCAST EQUIPMENT

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Overview

Welcome in the EVS range of products and thank you for your interest in the XT Disk Recorder System. We will do our best to satisfy your video production needs and we look forward to continuing working with you.

The present manual is valid for an EVS XT server with the following software versions :

EVS 00.12.12 or higher
Multicam 6.02.04 or higher

Disk Recorder Main specifications

All EVS Disk recorder systems are full digital in PAL (625i), NTSC (525i), 720p or 1080i standards with a “Search while recording live action” function, Clip Management and non-linear on line editing, instant playback. With the internal 10-bit digital keyer-mixer board, two synchronized clips can be displayed simultaneously in split screen mode and target tracking and painting features can be blended with recorded material.

VIDEO

STANDARD DEFINITION

- 4:2:2 SMPTE/CCIR 601 digital 10-bit (SDI)
- NTSC: 525 lines 59.94fps / PAL: 625 lines 50fps
- Inputs: 1 to 6 channels – Full frame Synchronizer on all inputs.
- Outputs: 1 to 6 channels
- Monitoring: PAL/NTSC/SDI with On Screen Display
- Genlock: Black Burst
- Internal 10-bit digital keyer–mixer board

HIGH DEFINITION

- 2x or 4x 1.485 Gb/s SMPTE 292 I/O (HD SDI)
- Line rate: 1080i and 720p, 50 and 59.94fps
- 8- or 10-bit input resolution (auto detect)
- 10-bit output resolution
- Full frame synchronizers on all inputs
- Down-converted video outputs (SDI or CVBS, user-selectable) for SD monitoring with On Screen Display and/or clean PGM SD for simulcasting.
- Optional high definition analog monitoring outpus available (external 1U rack)
- Genlock: Black Burst and Tri-Level Sync

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

CAPACITY

User selectable video bit rate from 8 to 100Mbps (standard definition) or 20 to 250Mbps (high definition)
Internal storage : up to 80 hours @ 30Mbps

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.

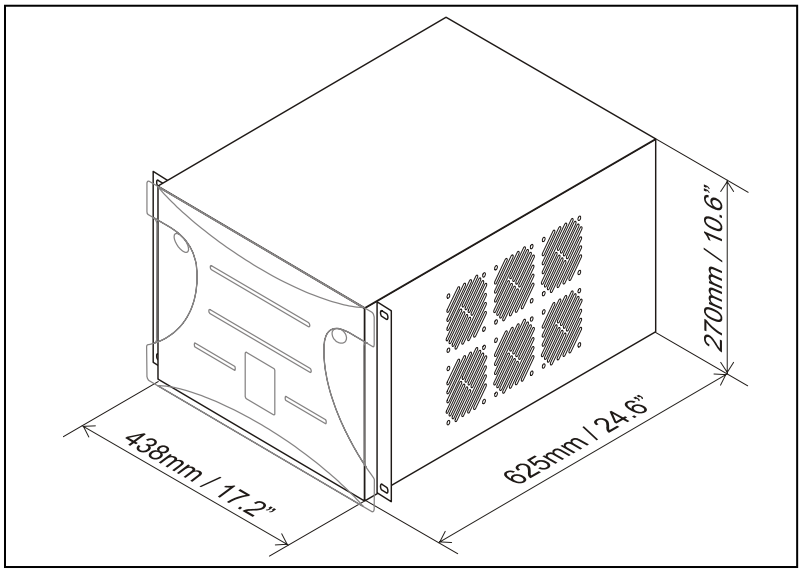
Chapter 1 : Technical Specifications

1.1 Unpacking

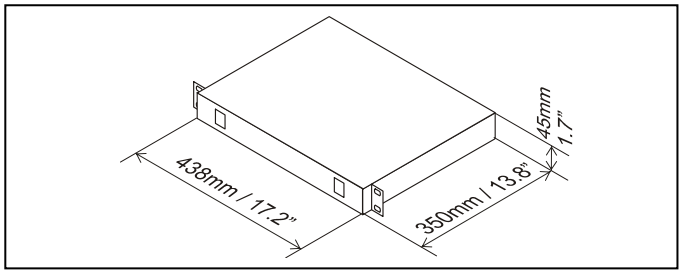
On receipt of the Equipment examine packing for obvious signs of damage. If damaged, do not unpack and inform the carrier immediately. Check thanks to the included packing list if all the items are present and if they show any mechanical damage. If yes, report damage or the missing parts to EVS or their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

1.2 Dimensions

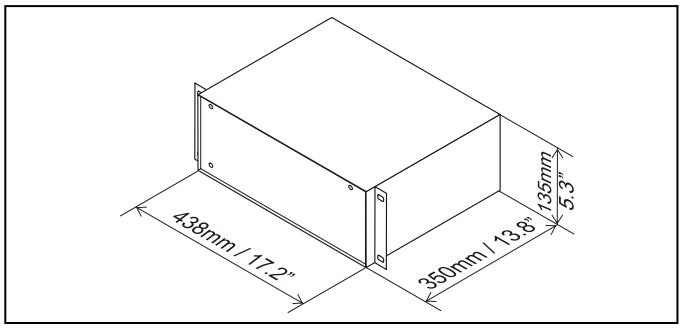
Video disk recorder Main frame 19 inches
Rackmount 6U – Weight: 32.5 Kg/ 71.5 Lbs.



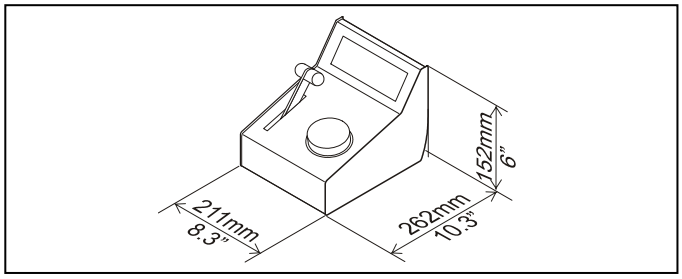
ADA Converter
Rackmount 1U (up to 6 boards) - Weight: 5.3 Kg / 11.6 Lbs.



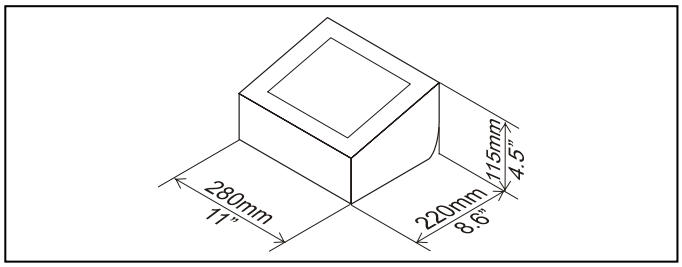
ADA Converter
Rackmount 3U (up to 16 boards) - Weight: 10.8 Kg / 23.9 Lbs.



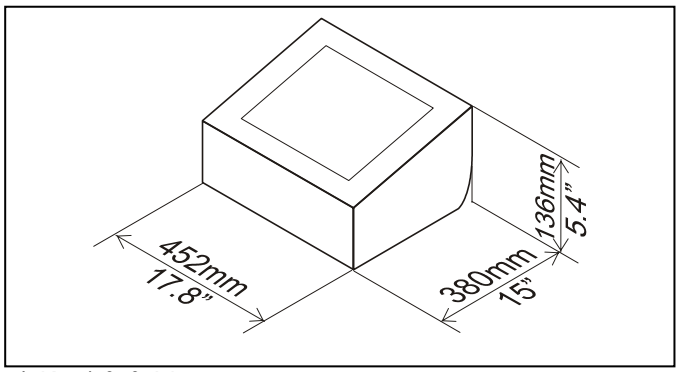
Remote control panel
Weight: 2.9 Kg / 6.3 Lbs.



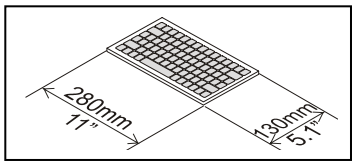
10" Touch Screen Video Monitor
Weight: 3.6 Kg / 7.8 Lbs.

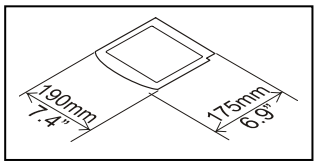


18" Touch Screen Video Monitor
Weight: 11.0 Kg / 23.9 Lbs.



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





1.3 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.

1.4 Operating conditions

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.
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.

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

GROUNDING

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

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.

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

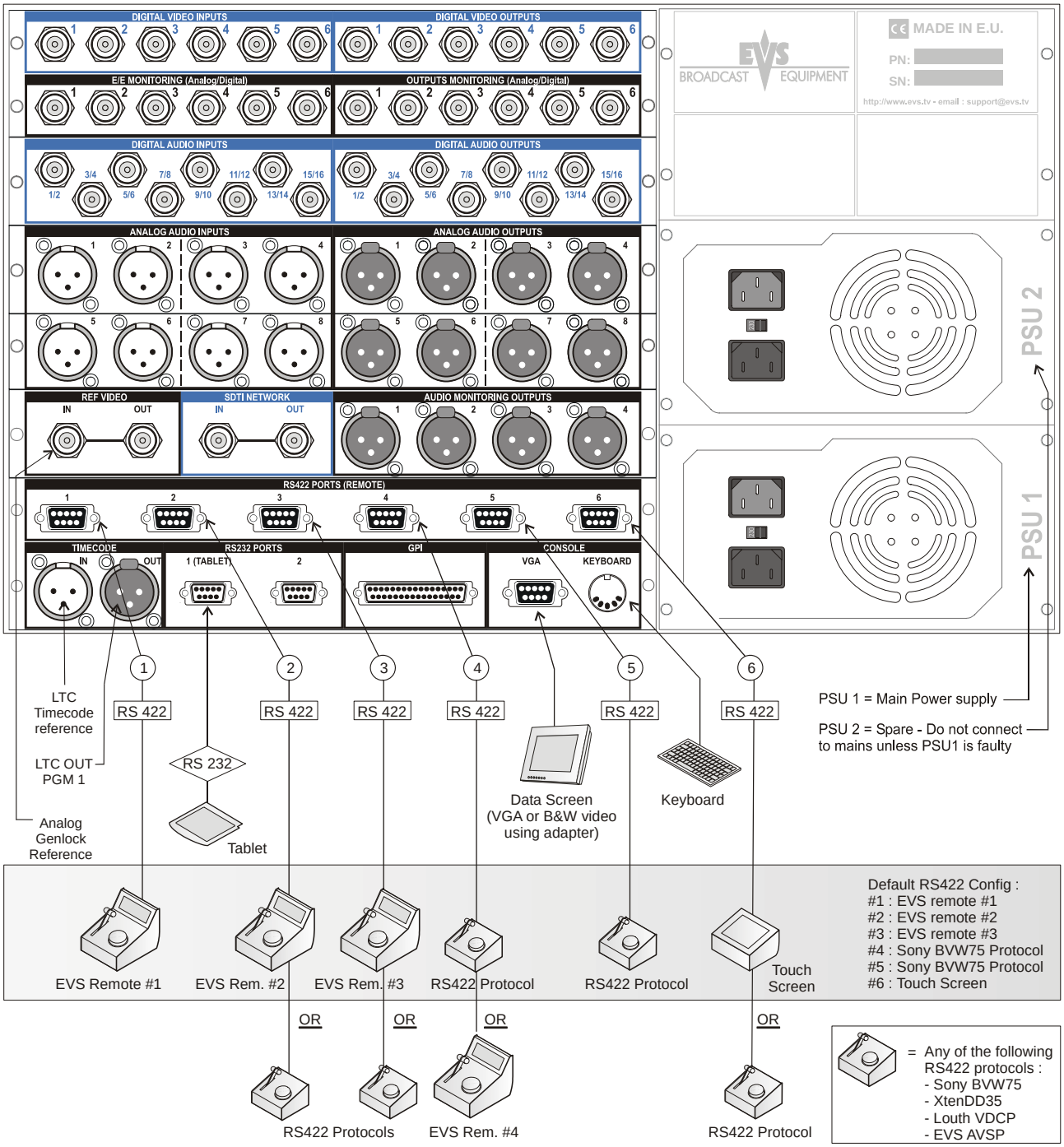
Having regard to the weight of the LSM-XT chassis, support guides are required for this unit into the rack mount. The front ears of the LSM-XT unit are not designed to support its full weight. Applying full weight on these might result in bending the metal plate.

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. All EVS applications and products are Year 2000 compliant.

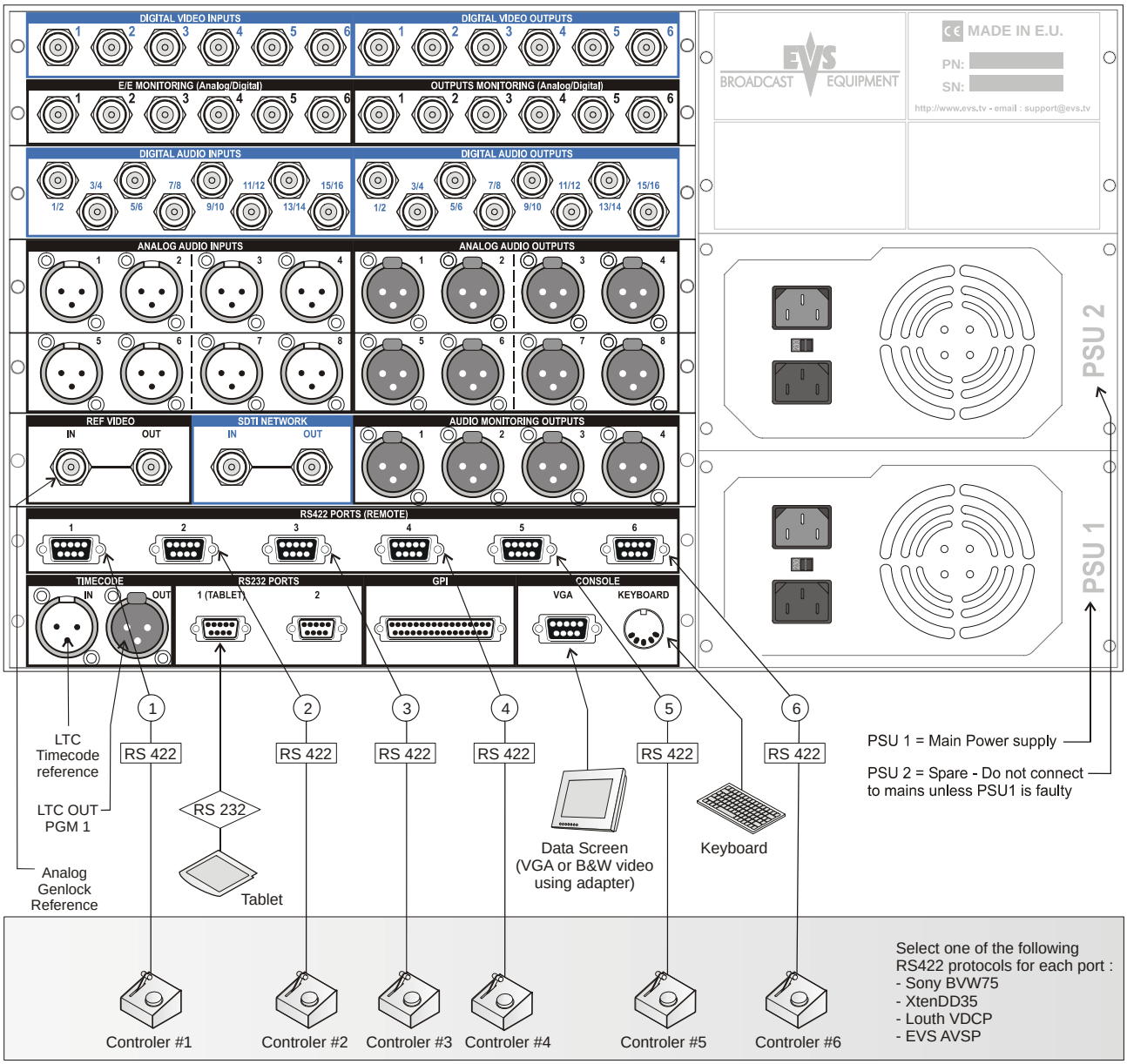
Chapter 2 : Cabling

Mainframe, Multicam mode



Important : Genlock loop must be terminated if not used.

Mainframe, Slave mode



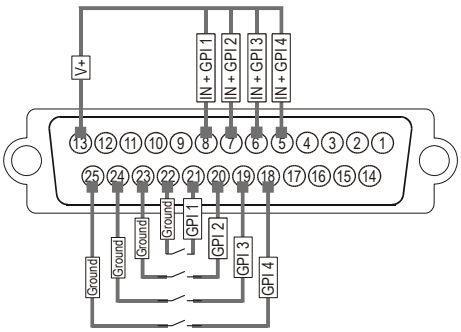
Important : Genlock loop must be terminated if not used.

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.

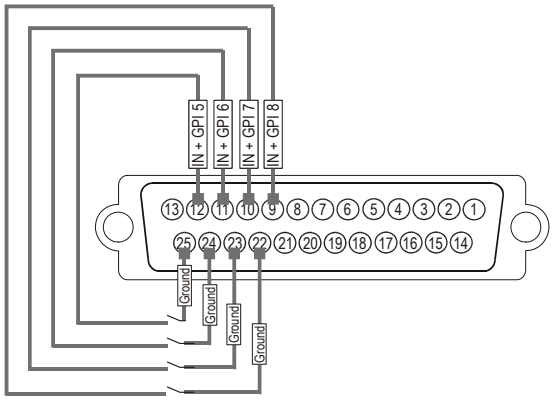
GPI IN CONNECTIONS

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.

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

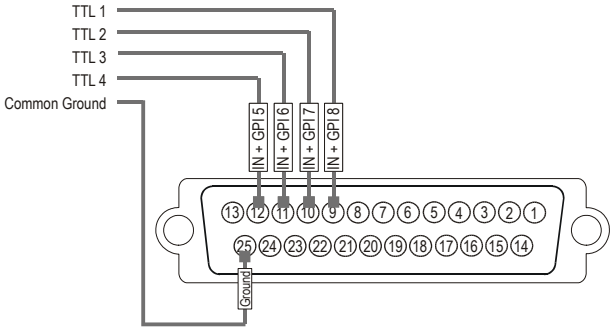


RELAY → TTL INPUTS ON THE XT SERVER (GPI INPUTS 5, 6, 7, 8)



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

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.

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.		

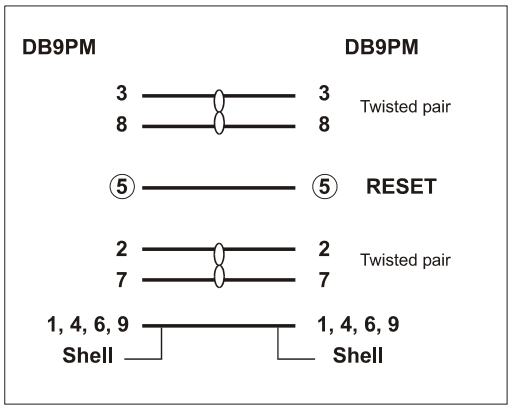
GPIO hardware specification:

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)

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)

Disk recorder unit cabling:

The audio settings in the following table are the default values for the various operating modes. To customize the audio input/output parameters, refer to section 7-2.1 of this manual.

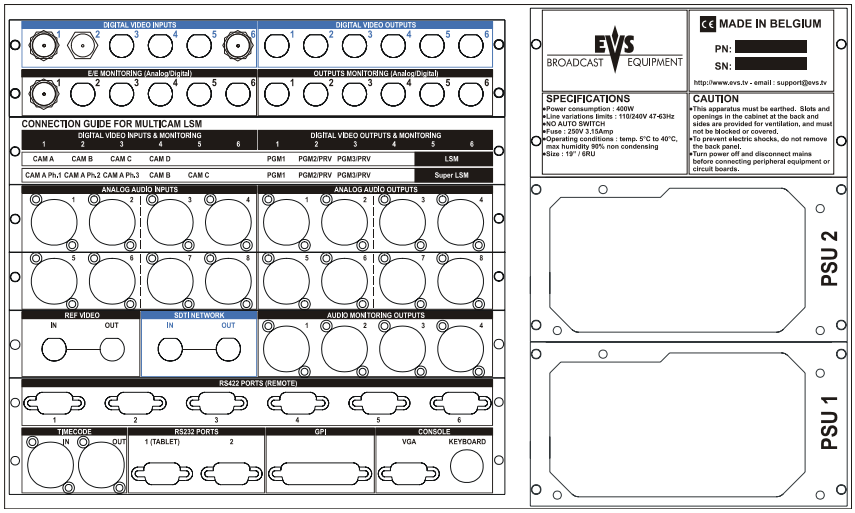
DIGITAL VIDEO INPUTS (REC) & MONITORING						DIGITAL VIDEO OUTPUTS (PLAY) & MONITORING						
1	2	3	4	5	6	1	2	3	4	5	6	
EMBEDDED AUDIO INPUTS						EMBEDDED AUDIO OUTPUTS						
1/2 3/4	5/6 7/8	9/10 11/12	13/14 15/16	17/18 19/20	21/22 23/24	1/2 3/4	5/6 7/8	9/10 11/12	13/14 15/16	17/18 19/20	21/22 23/24	
CAM A	CAM B	CAM C	CAM D	CAM E		PGM1	PGM2 /PRV	PGM3				**LSM**
CAM A Phase 1	CAM A Phase 2	CAM A Phase 3	CAM B	CAM C		PGM1	PGM2 /PRV	PGM3				**Super LSM**
REC 1	REC 2	REC 3	REC 4	REC 5	REC 6	PGM1	PGM2 /PRV	PGM3	PGM4	PGM5	PGM6	**Slave**
ANALOG AUDIO INPUTS						ANALOG AUDIO OUTPUTS						
1+2	3+4	5+6	7+8			1+2	3+4	5+6	7+8			
CAM A/ REC 1	CAM B/ REC 2	CAM C/ REC 3	CAM D/ REC 4			PGM1	PGM2 /PRV	PGM3	AUX CLIP			**ANALOG AUDIO Single Stereo Mode**
CAM A/ REC 1 Stereo 1	CAM B/ REC 2 Stereo 1	CAM A/ REC 1 Stereo 2	CAM B/ REC 2 Stereo 2			PGM1 Stereo 1	PGM2/PRV Stereo 1	PGM1 Stereo 2	PGM2/PRV Stereo 2			**ANALOG AUDIO Dual Stereo Mode**
DIGITAL AUDIO INPUTS								DIGITAL AUDIO OUTPUTS								
1 / 2	3 / 4	5 / 6	7 / 8	9 / 10	11 / 12	13 / 14	15 / 16	1 / 2	3 / 4	5 / 6	7 / 8	9 / 10	11 / 12	13 / 14	15 / 16	
CAM A/ REC 1	CAM B/ REC 2	CAM C/ REC 3	CAM D/ REC 4	CAM E/ REC 5	/ REC 6			PGM1	PGM2 /PRV	PGM3 /PRV	PGM4/ AUX CLIP	PGM5	PGM6		AUX CLIP	**AES/EBU or Dolby E Single Stereo Mode**
CAM A/ REC 1 Stereo 1	CAM B/ REC 2 Stereo 1	CAM C/ REC 3 Stereo 1	CAM D/ REC 4 Stereo 1	CAM A/ REC 1 Stereo 2	CAM B/ REC 2 Stereo 2	CAM C/ REC 3 Stereo 2	CAM D/ REC 4 Stereo 2	PGM1 Stereo 1	PGM2/PRV Stereo 1	PGM3 Stereo 1	PGM4/ AUX CLIP	PGM1 Stereo 2	PGM2 Stereo 2	PGM3 Stereo 1	PGM4/ AUX CLIP	**AES/EBU or Dolby E Dual Stereo Mode**

Audio configurations:

CODA1

Internal Audio Module : Embedded + Analogue Balanced

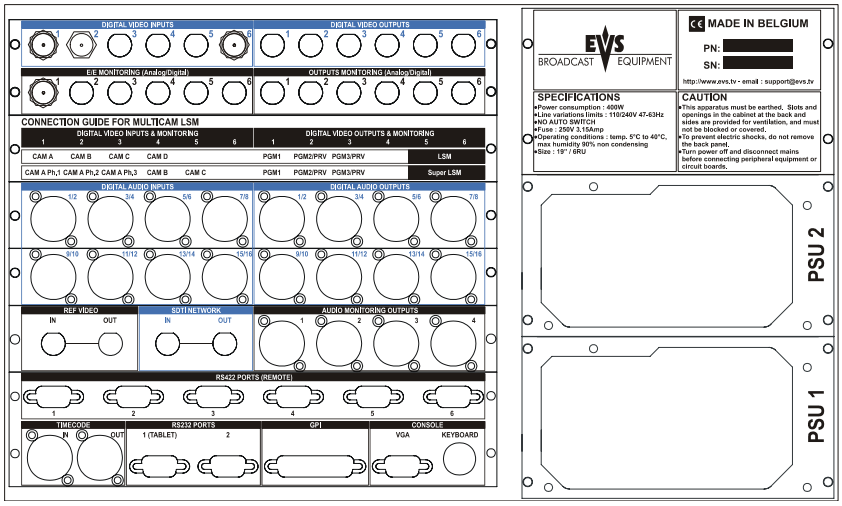
- Embedded Audio 12 stereo inputs + 12 stereo outputs
- Analogue balanced audio 4 stereo inputs + 4 stereo outputs (XLR)
- Audio monitoring : 4 analogue balanced mono outputs (XLR)



CODA2

Internal Audio Module : Embedded + AES/EBU

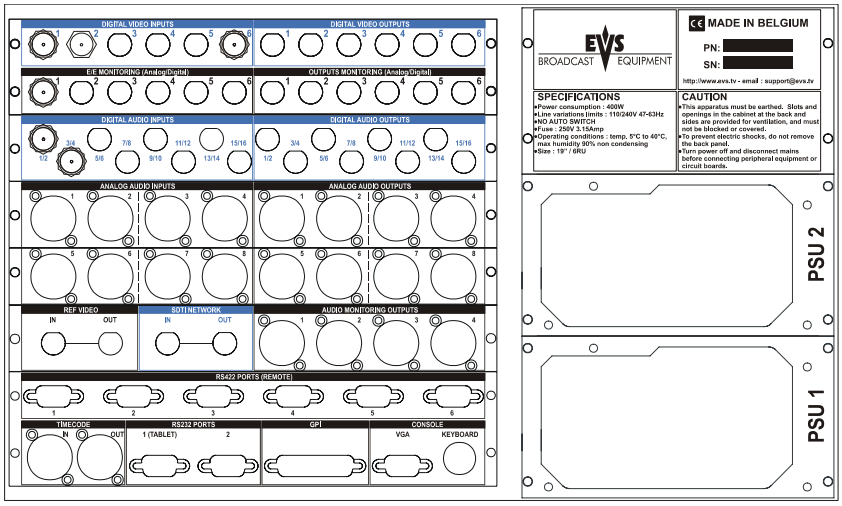
- Embedded Audio 12 stereo inputs + 12 stereo outputs
- AES/EBU Audio 8 stereo inputs + 8 stereo outputs (110 Ohm balanced on XLR)
- Audio monitoring : 4 analogue balanced mono outputs (XLR)



CODA3

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

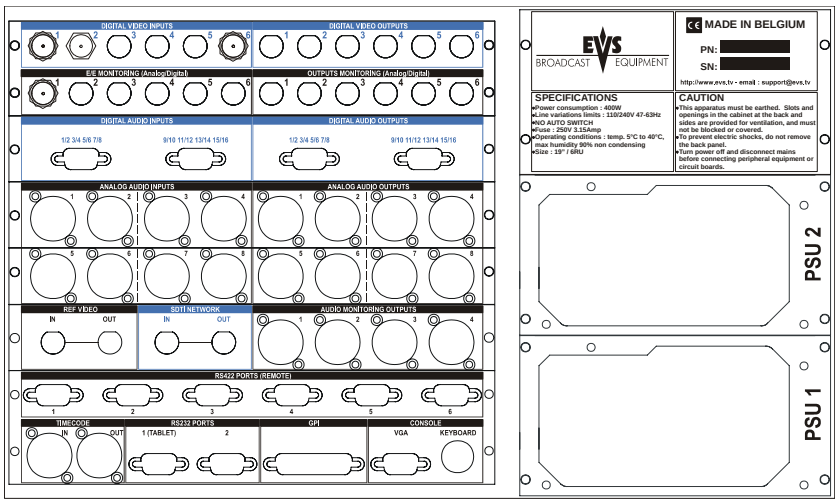
- Embedded Audio 12 stereo inputs + 12 stereo outputs
- AES/EBU Audio 8 stereo inputs + 8 stereo outputs (75 Ohm unbalanced on BNC)
- Analogue Balanced audio 4 stereo inputs + 4 stereo outputs (XLR)
- Audio monitoring : 4 analogue balanced mono outputs (XLR)



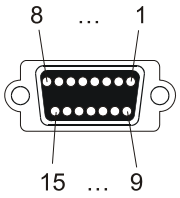
CODA3B

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) :

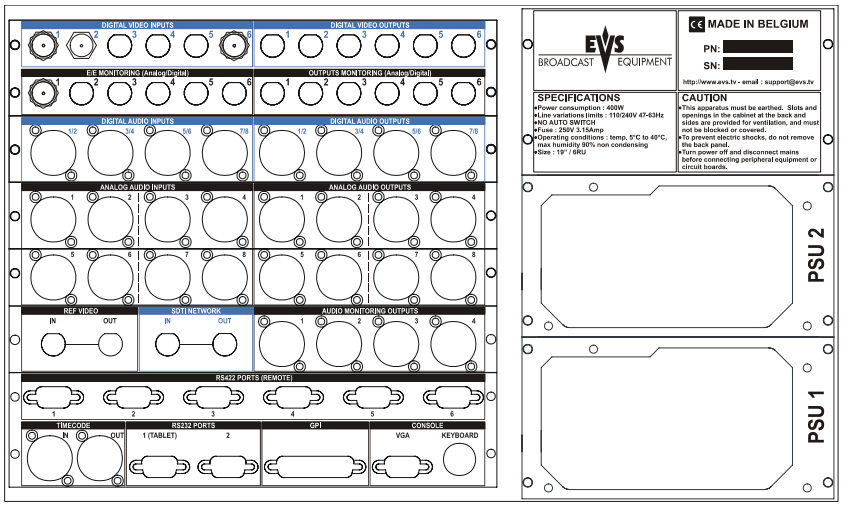


Pin #	Sub-DB15 #1 Inputs 1-8 (mono)	Sub-DB15 #2 Inputs 9-16 (mono)	Sub-DB15 #3 Outputs 1-8 (mono)	Sub-DB15 #4 Outputs 9-16 (mono)
1	GND	GND	GND	GND
2	AES input 1/2 +	AES input 9/10 +	AES output 1/2 +	AES output 9/10 +
3	GND	GND	GND	GND
4	AES input 3/4 +	AES input 11/12 +	AES output 3/4 +	AES output 11/12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

CODA4

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

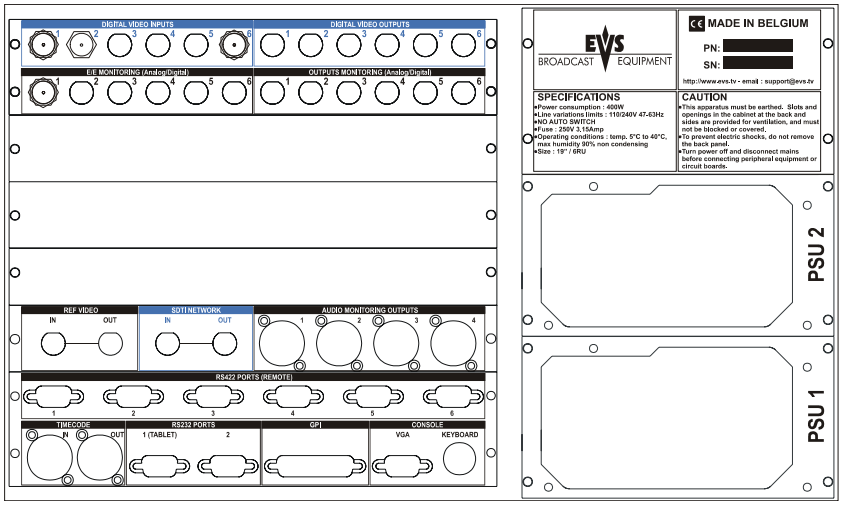
- Embedded Audio 12 stereo inputs + 12 stereo outputs
- AES/EBU Audio 8 stereo inputs + 8 stereo outputs (110 Ohm balanced on XLR)
- Analogue Balanced audio 4 stereo inputs + 4 stereo outputs (XLR)
- Audio monitoring : 4 analogue balanced mono outputs (XLR)



CODA0

Internal Audio Module : Embedded Audio only

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



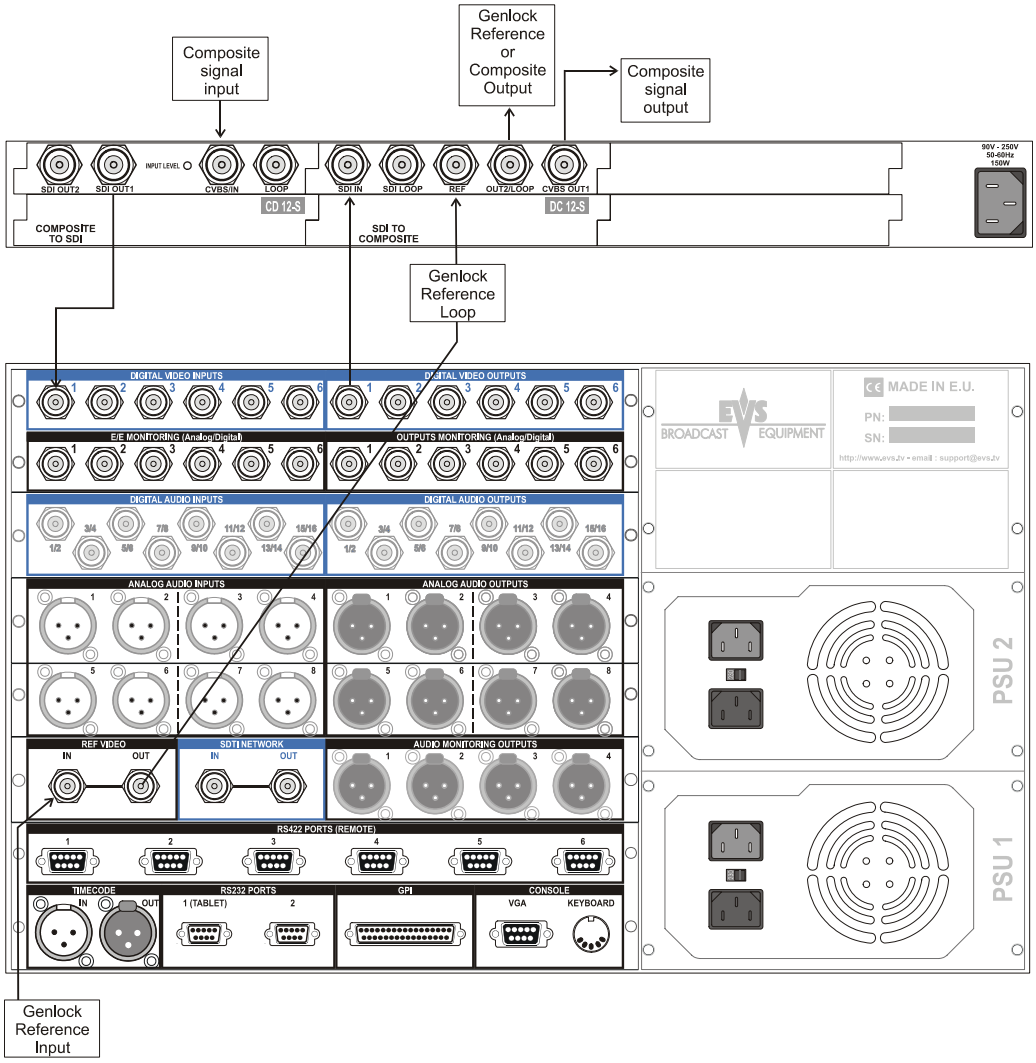
Note: A configuration without internal audio module is also available. In this case, the system inputs/outputs are video only.

ADA converters (SD) :

The ADA converter boards are used as a stand alone unit device: boards are mounted horizontally in 1U height rack or vertically in 3U rack and combined according to the requirements of each application:

Board	Model	converts	To
Single	CD12-S	Composite	4:2:2 serial digital
Single	CD 11-S	Composite, Y/C, S-VHS	4:2:2 serial digital
Single	DC12-S	4:2:2 serial digital	Composite
Double	CD30/CD31-DS10	RGB/YUV	4:2:2 serial digital
Double	DC 30 -SD10	4:2:2 serial digital	RGB/YUV
Double	DC 32	4:2:2 serial digital	RGB/YUV, Composite

EXAMPLE OF VIDEO CABLING WITH ADA CONVERTERS:



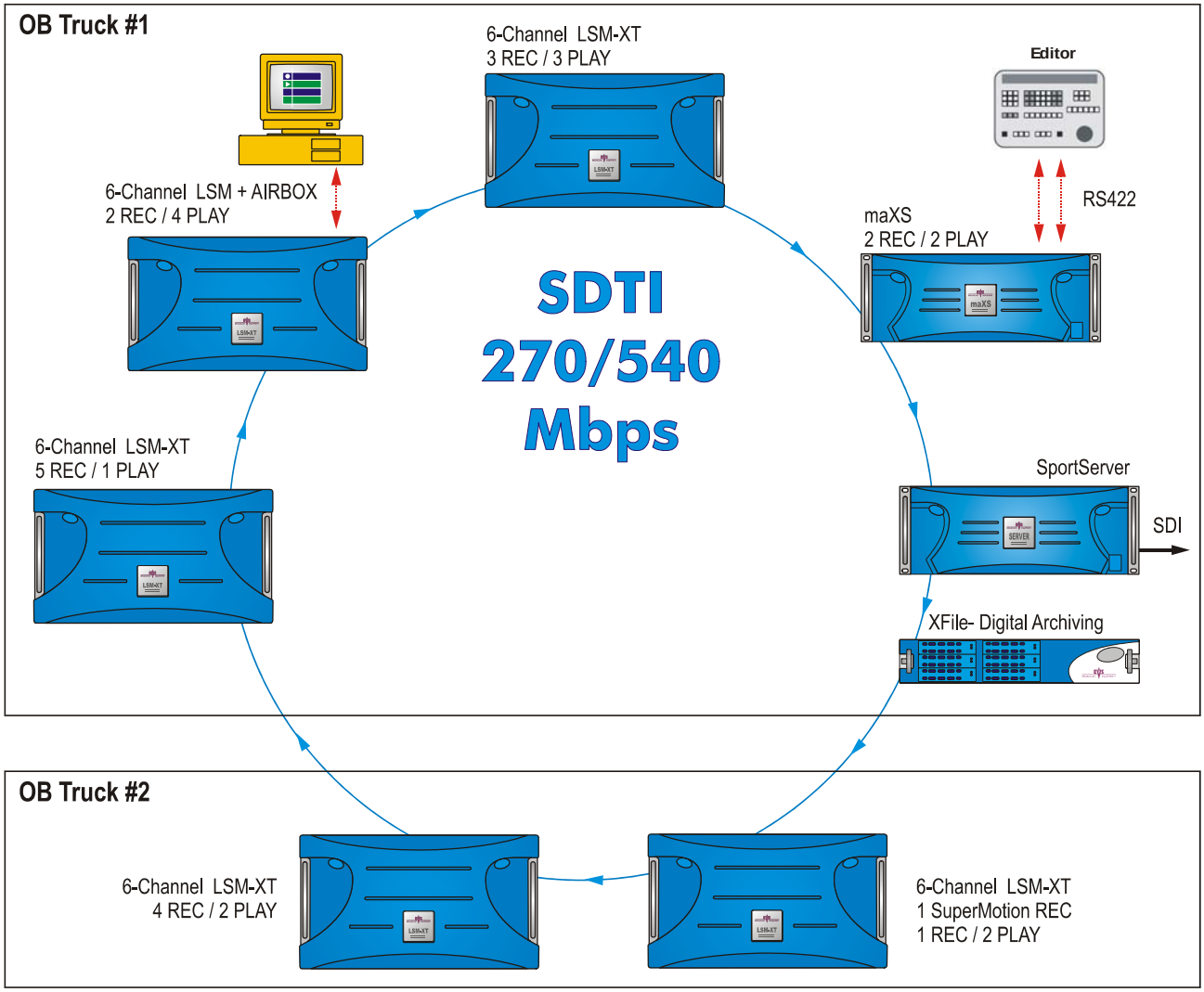
Connecting multiple LSM's on SportNet :

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

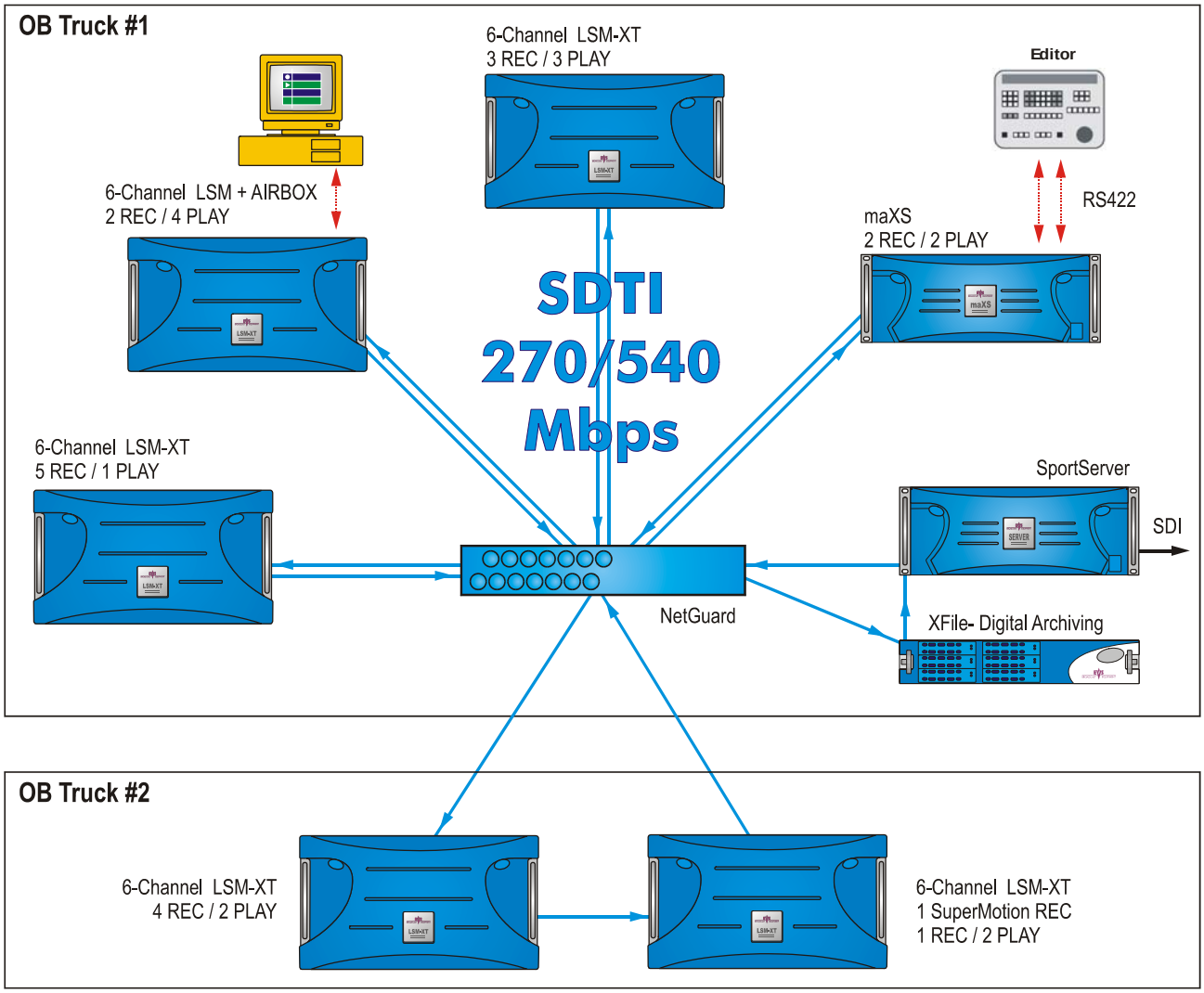
The exchange between systems is operated through the SDTI interface at 270 or 540 Mbps.

The Sportnet 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 LSM acting as the network server can of course be used for standard LSM/video server operation.

CONNECTION DIAGRAM WITHOUT EVS NETGUARD SDTI HUB



CONNECTION DIAGRAM WITH EVS NETGUARD SDTI HUB



REQUIRED CONDITIONS TO SET UP AND RUN SPORTNET

1. All systems on the network must be LSM XTs

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

3. They should all be running compatible software version (6.02.04 or higher). 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 (normally 540Mbps, from Hardware Configuration Menu)
   c. Video standard

5. Network Type must be set to "Server" on 1 (and only 1 !) LSM 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 LSM must be connected with a good quality BNC 75Ohm cable to form a closed loop. Connect the SDTI OUT connector of the first LSM to the SDTI IN connector of the second one, etc until the loop is closed by connecting the SDTI OUT connector of the last LSM 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 NetGuard SDTI hub. Refer to page 23 of this manual for a detailed description.

8. The distance shown in the table below is the maximum cable length between two active EVS servers, or 2 SDTI reclockers, on a SportNet 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 NetGuard 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	@ 540 Mbps	@ 270 Mbps
RG59	100m / 300ft	200m / 600ft
RG11	250m / 750ft	400m / 1200ft
Super HiQ	350m / 1050ft	550m / 1650ft
Fiber	200km(*)	400km(*)

(*) 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. 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.

STARTING SPORTNET

1. When all above conditions are fulfilled, turn on all “Masters” and “Clients” LSMs, and make sure the Multicam application is started on all of them. A message appears because they are looking for the “Server” LSM.

2. Turn on the “Server” LSM and start the Multicam application. The other LSMs 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 LSM.

SPORTNET 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 LSM where the clips are stored. If the LSM “owning” the clips is doing multiple playbacks at the same time, freezes can occur on the remote LSM 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 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 SportNet.

3. If the start-up of the network at 540Mbps 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 LSMs together are not suitable or too long to operate at such a speed. You can set all LSMs to work at 270Mbps and try working in this mode. The number of simultaneous real-time transfers you can achieve at 270Mbps is of course reduced.

4. 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.

NETGUARD NG-7 : SDTI HUB FOR EVS SPORTNET NETWORK

NetGuard is a 7-port SDTI hub for SportNet. It provides information about general network status and status of individual branches of the network, automatically isolates faulty branches in case of unexpected problems, and protect the other sections of the network to guarantee continued operation.

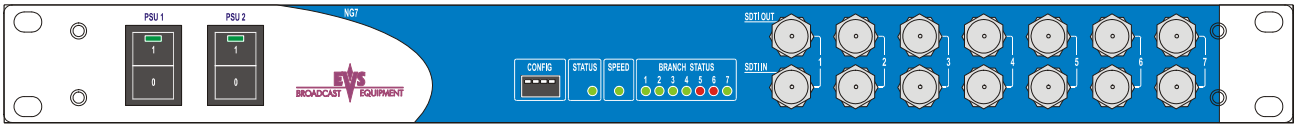
NetGuard is a convenient supervision tool when SportNet includes servers spread over different trucks/studios.

Several NetGuard hubs can be cascaded to provide as many ports as needed (recommended configuration for easy troubleshooting: max. 2 servers per port). Maximum number of servers on the same SDTI network : 29.

Specifications:

- 1RU 19" rackmount
- 110/220V auto-switch redundant power supply

Front panel :



- 7 x SDTI IN + SDTI OUT (BNC connectors) to connect up to 7 network branches. Several video servers can be connected on each branch.

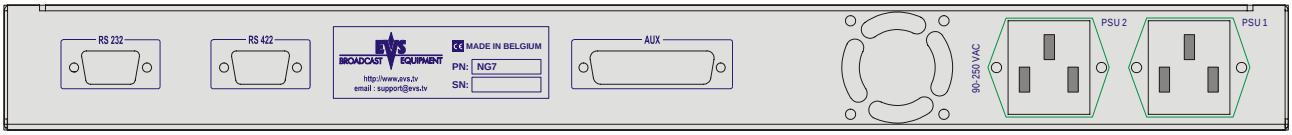
- 1 x Power led
  - off : NG-7 not working
  - flashing green : NG-7 working

- 1 x 540Mbps led
  - off : SportNet operating at 270Mbps
  - green : SportNet operating at 540Mbps
  - red : no network present or illegal signal

- 7 x network branch status led
  - flashing green : branch status OK, some systems are present on that branch and connected to SportNet
  - green : branch status OK, no system connected to the network on that branch[1]
  - flashing red : branch status FAULTY, with an illegal signal on the SDTI IN connector of that branch
  - red : branch status FAULTY, no signal is detected on the SDTI IN connector of that branch. This is the case when connecting the SDTI IN connector of a server (instead of the SDTI OUT connector) to the SDTI IN connector of a NetGuard hub.

- 4 x dip switches :
  - #1 : select primary hub mode (upper position) or secondary hub mode (lower position)
  - #2, 3 : not used
  - #4 : must always be in upper position for normal operation !

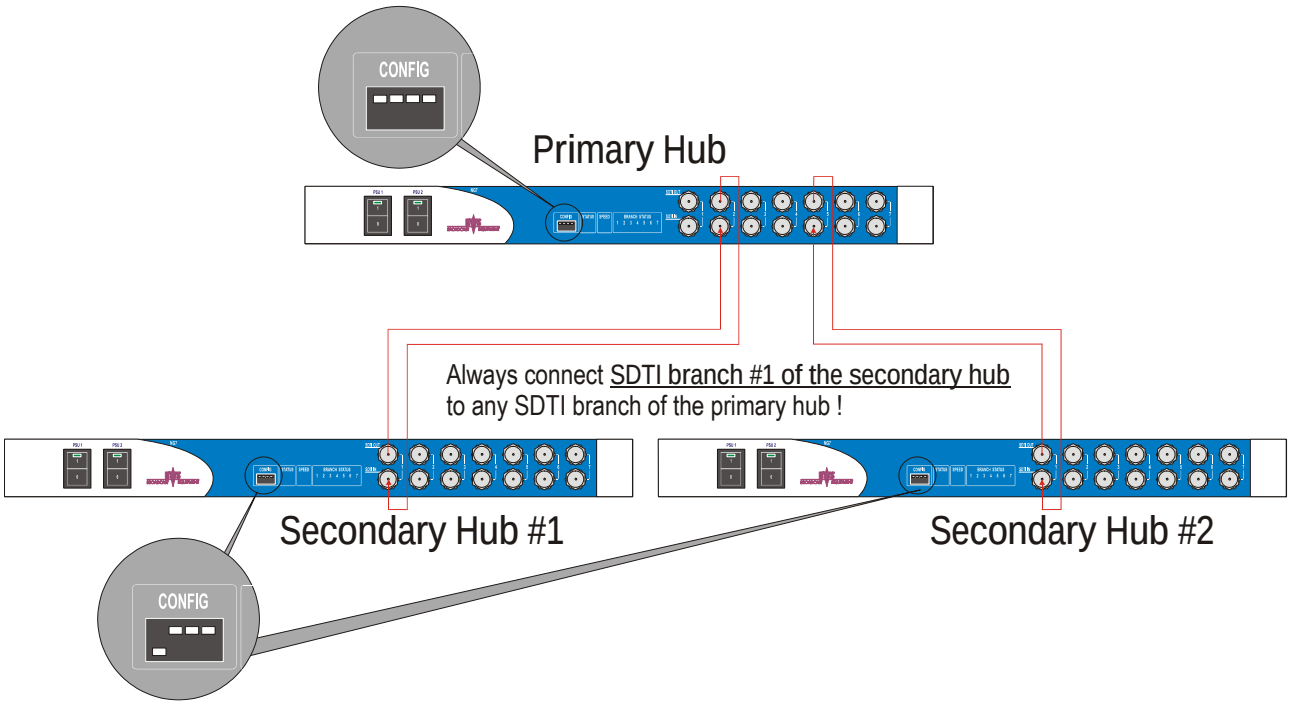
Rear panel :



- 2 x Mains input (IEC connector)
- 1 x programmable GPI relay output (not yet used)
- 1 x DB25 connector with status of all front panel leds.
- 1 x RS232 and 1 x RS422 DB9 connectors (only 1 active at a time, internal jumper to select) for external monitoring/configuration application (not yet used)

Interconnecting NG7 SDTI hubs :

Several hubs can be interconnected. One hub must be configured as primary hub. All other hubs must be configured as secondary hubs. The 1st branch of the secondary hubs must be connected to any branch of the primary hub.



Only 1 level of cascading is allowed (1 primary hub connected to up to 7 secondary hubs).

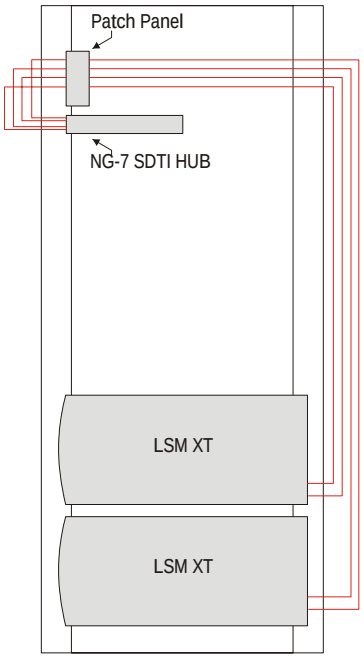
Installing NetGuard in an equipment rack :

(1) Front side mounting: we recommend to gather all SDTI IN/OUT connections from all systems of the production area to a patch panel close to the NetGuard hub. It is then easy to connect the different systems together and to the NetGuard hub.

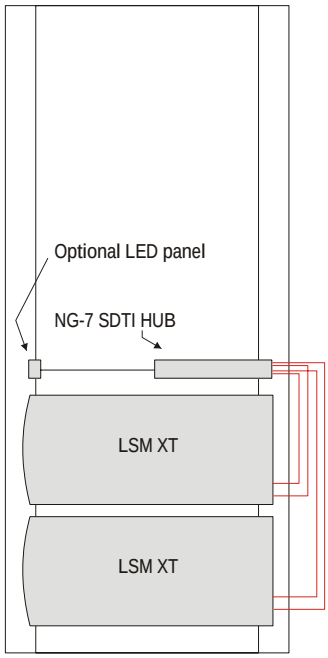
(2) Rear side mounting: the different systems on the network and the NetGuard hub are directly connected without going through a patch panel. This type of mounting is simpler and saves space on the front side of the equipment rack, but offers less flexibility : the engineer has to access the rear side of the rack to modify a connection, and it is also more difficult to modify the network connections inside each branch.

(3) Rear side mounting with front side patch panels: all SDTI IN/OUT connections from all systems as well as all SDTI IN/OUT connectors of the NetGuard hub are gathered on patch panels in front. The SDTI loop is established by interconnectiong properly all systems and the hub on these patch panels.

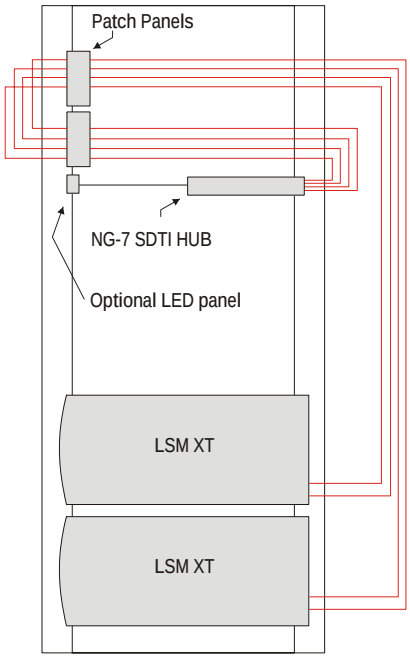
(1) Front side mounting



(2) Rear side mounting

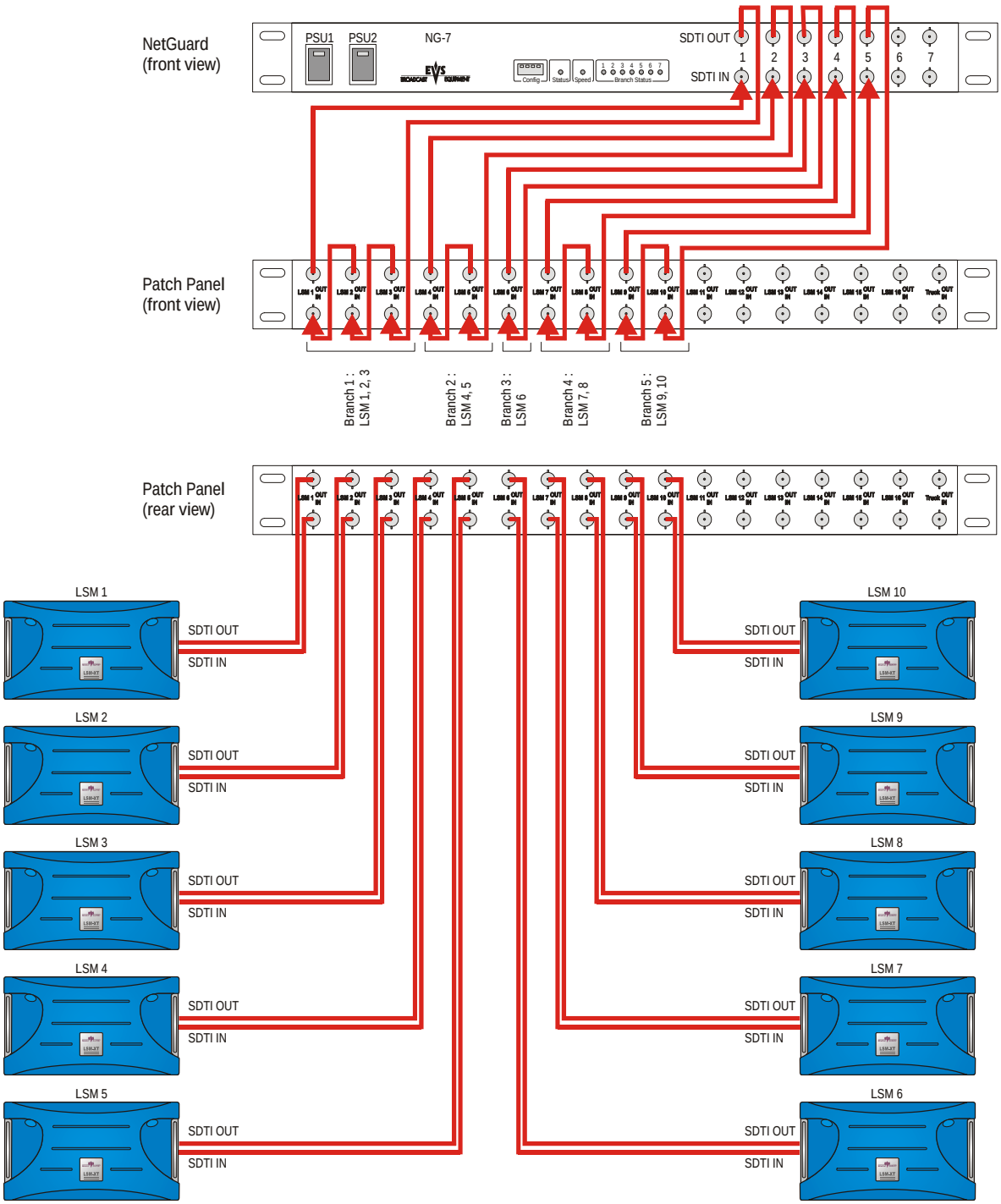


(3) Rear side mounting w/ patch panels



Example of a SportNet network connection with NG-7

The diagram below shows a SDTI network with LSM # 1, 2 and 3 connected on the first branch of NG-7, LSM # 4 and 5 on branch # 2, LSM #6 on branch # 3, LSM # 7 and 8 on branch # 4 and LSM # 9 and 10 on branch # 5.



Chapter 3 : Video Bitrate and Recording Capacity

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.

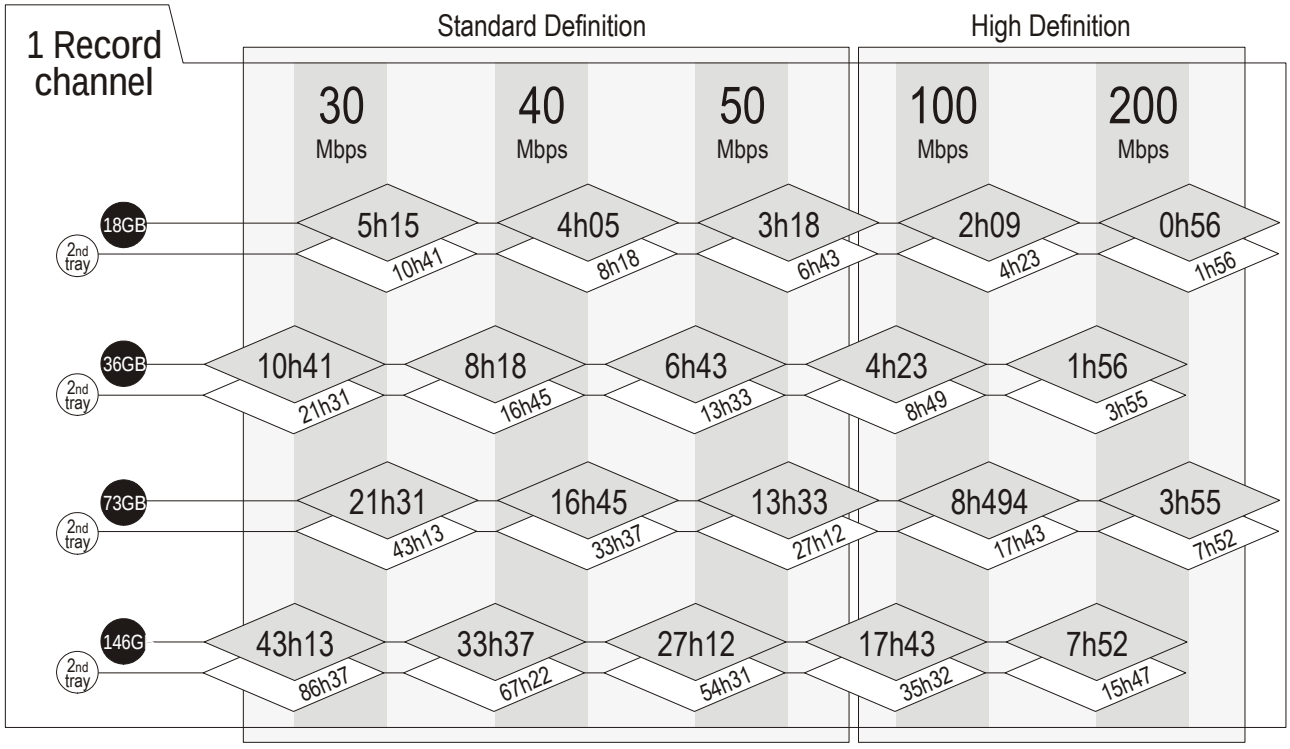
Disk Block size

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 SportNet SDTI network must have the same disk block size ! This parameter can be found in the Advanced Parameters section of the Maintenance Menu.

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 18GB, 36GB, 73GB or 146GB disks compared with the different video bitrates. The Operational Disk Size parameter is set to 100%.



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.

Chapter 4 : 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-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.

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.

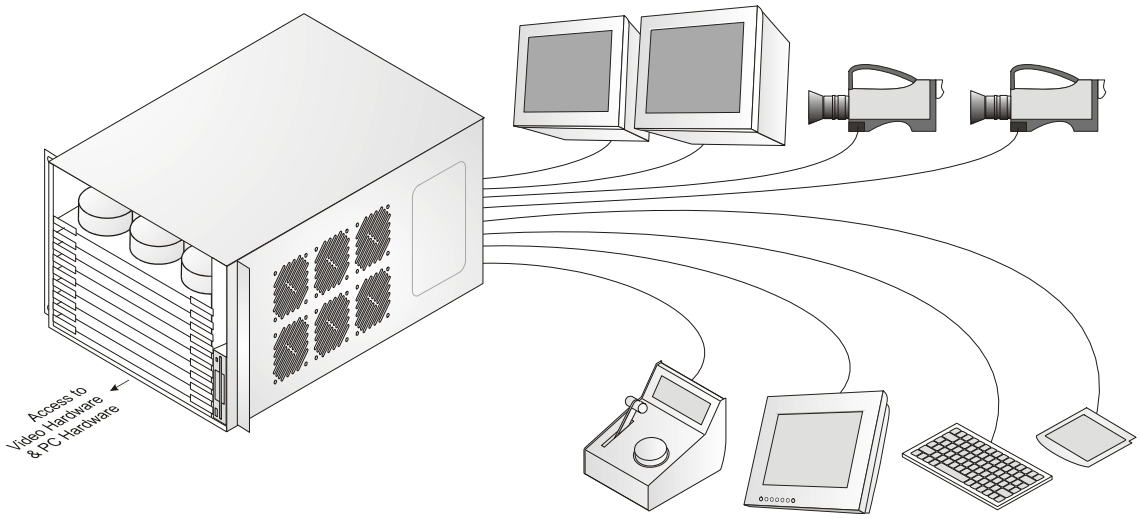
Whatever the choice, the resulting picture is thus always a compromise between stability and resolution. With EVS systems, the operator always has got the choice between any of the 3 above described techniques : no interpolation, 2-line interpolation or 4-line interpolation. Even if the operator chooses 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.

Chapter 5 : Hardware description

Physical Specifications

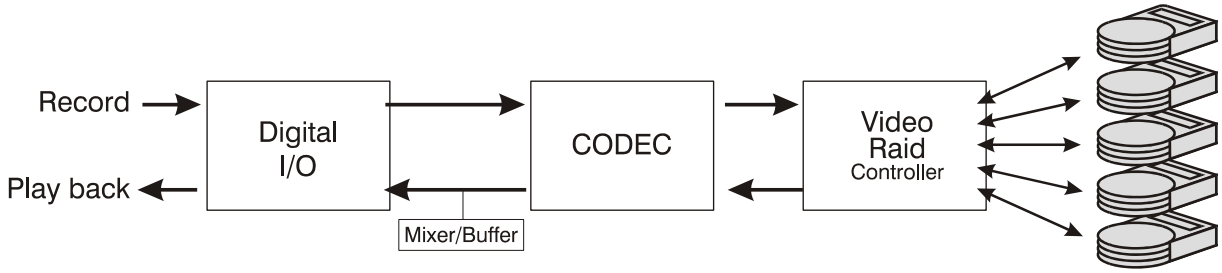


The EVS Disk Recorder is housed in a 19 " rack frame with extended depth and 6 rack unit (266 mm) height.
It contains all the EVS developed boards: namely, the digital video encoding/decoding board and audio processing board (CODEC's), the VIDEO RAID board (save/re-call the digital video and audio data to/from hard disks) with 5 separate standard SCSI-2 busses, a Keyer / Mixer / Frame Buffer board and the Digital I/OE board (CCIR601).

The unit is controlled by an internally installed IBM compatible PC motherboard with its own separate floppy, IDE hard drive, VGA graphic output and keyboard.

The user interface is made through the keyboard and different menus rolling on the VGA monitor; one, two, three or four dedicated remote control panels with lever, jog-knob and LCD display; and tablet or touch screen for specials effects.

EVS boards:



The boards installed in the EVS Disk Recorder unit are:

1. I/OE board with 4:2:2 CCIR601 10-bit inputs (x2), outputs (x2) and 4 onboard monitoring outputs (PAL/NTSC/SDI) which provide T/C and other information readout on rear BNC video monitoring outputs.

2. VIDEO CODEC board – fitted with up to 6 modules in order to provide up to 6 channels - with parallel CCIR601 input/output and software set quantization quality.

3. AUDIO CODEC board – handles analogue balanced, AES/EBU and Embedded audio. Audio is recorded 24-bit uncompressed.

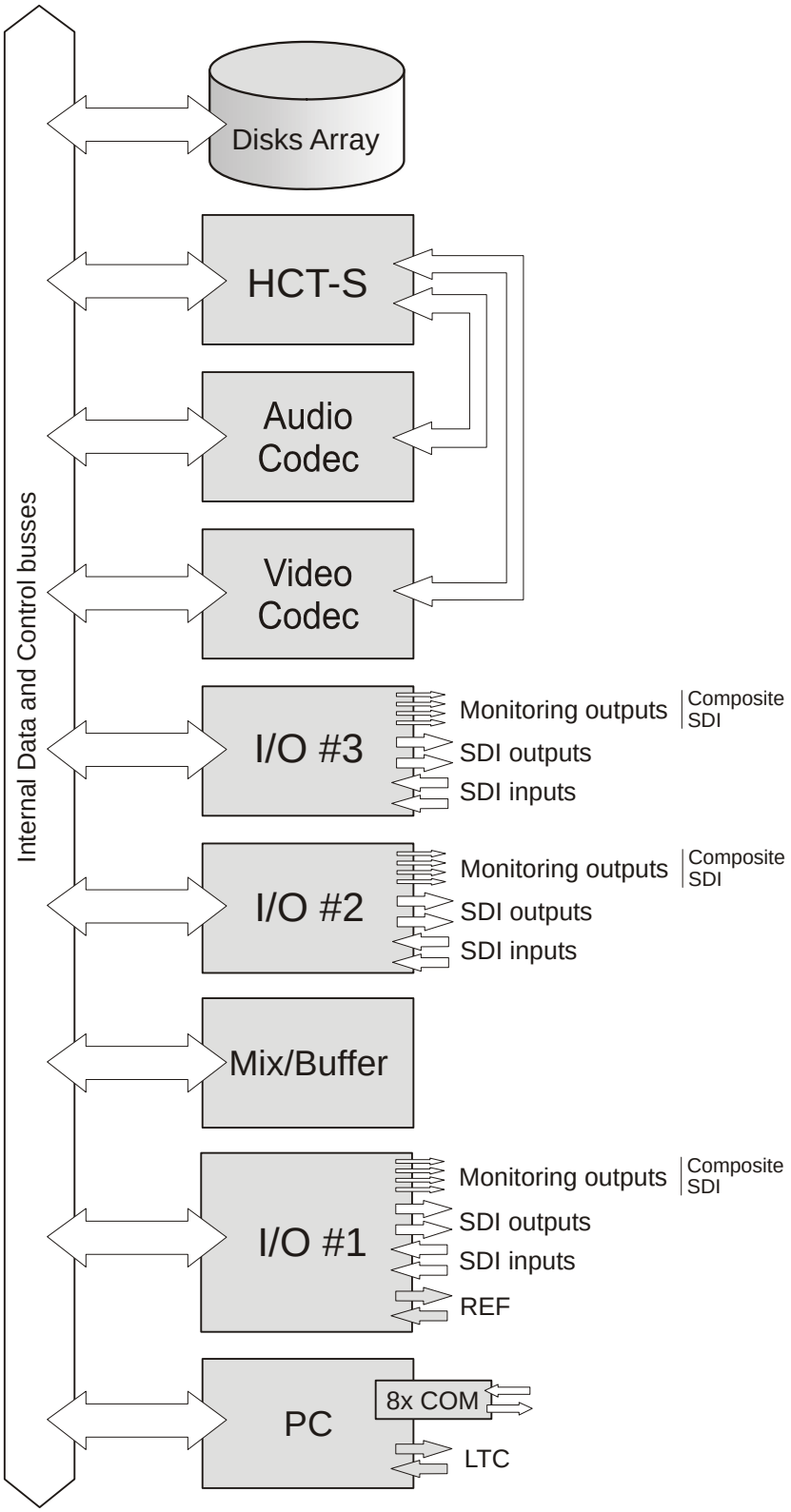
4. RAID controller board (HCTS) – offers very high capacities and fast data transfer rates with RAID 3 redundancy.

5. Digital mixer/buffer board offers graphics and keying functions for target tracking and painting options.

6. PC board controls the operation of the Disk Recorder unit. The PC module is composed by one mounting PC board with serial ports,1 LTC reader and 1 LTC generator, and controlled by the motherboard.

All those EVS proprietary boards are plugged horizontally into a proprietary bus-board (backplane) with 96-pin DIN connectors.

BLOCK DIAGRAM



Multi-access - Drives capacity

The basic EVS disk recorder is a 2-channel unit with one recording channel and one independent play or search channel, built with one AUDIO CODEC board and one VIDEO CODEC board, one for handling AUDIO channels, and the second one to proceed with the VIDEO encoding and decoding.

The maximum channel configuration is 6-channel. In this configuration, up to 5 record channels and/or up to 4 playback channels are available in LSM configurations, and up to 6 record channels and/or up to 6 playback channels in "Slave" configurations (under control of RS422 protocols such as Sony BVW75, ExtenDD35, Louth VDCP or EVS AVSP).

The different drive arrangements are:

Module (4 + 1) x 18.2 GB drives (total 73 GB usable)
Module (8 + 2) x 18.2 GB drives (total 146 GB usable)

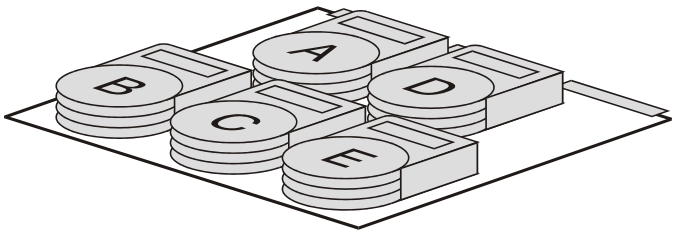
Module (4 + 1) x 36.4 GB drives (total 146 GB usable)
Module (8 + 2) x 36.4 GB drives (total 292 GB usable)

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

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

Refer to the table on page 27 for exact recording capacities.

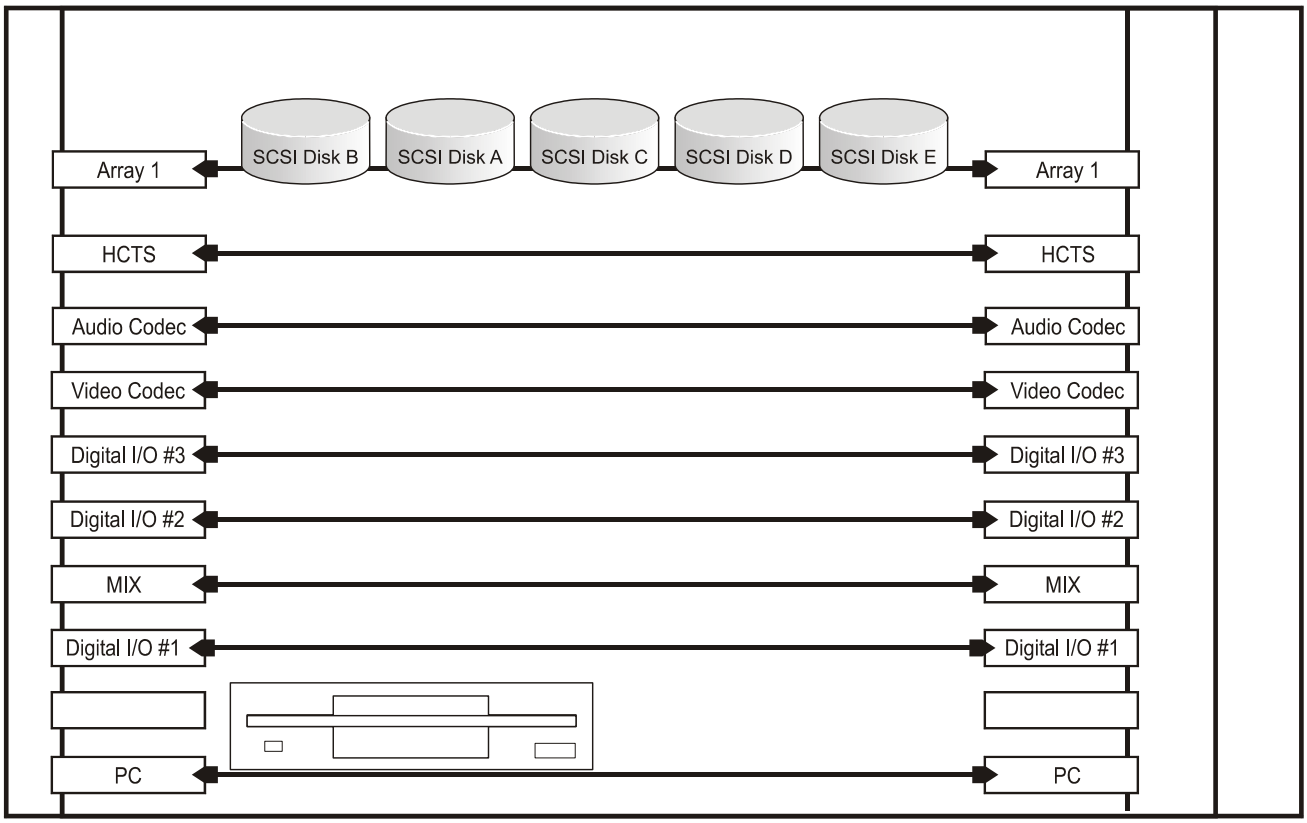
Comment: The Video Raid uses striping process across 5 disk drives. The video and audio data are striped over the first 4 drives (A, B, C, D) while the parity information is saved on the fifth drive (E). If one drive (A, B, C or D) is damaged, the Video Raid can use the parity information to recover the missing information. This process is automatic and do not alter the performance of the disk recorder unit. Refer to section 7-2.14 (page 81) for maintenance of faulty disk drives.



Standard Definition
Video Hardware Presentation

This diagram describes the location of the electronic boards developed by EVS for its Video Disk Recorder.

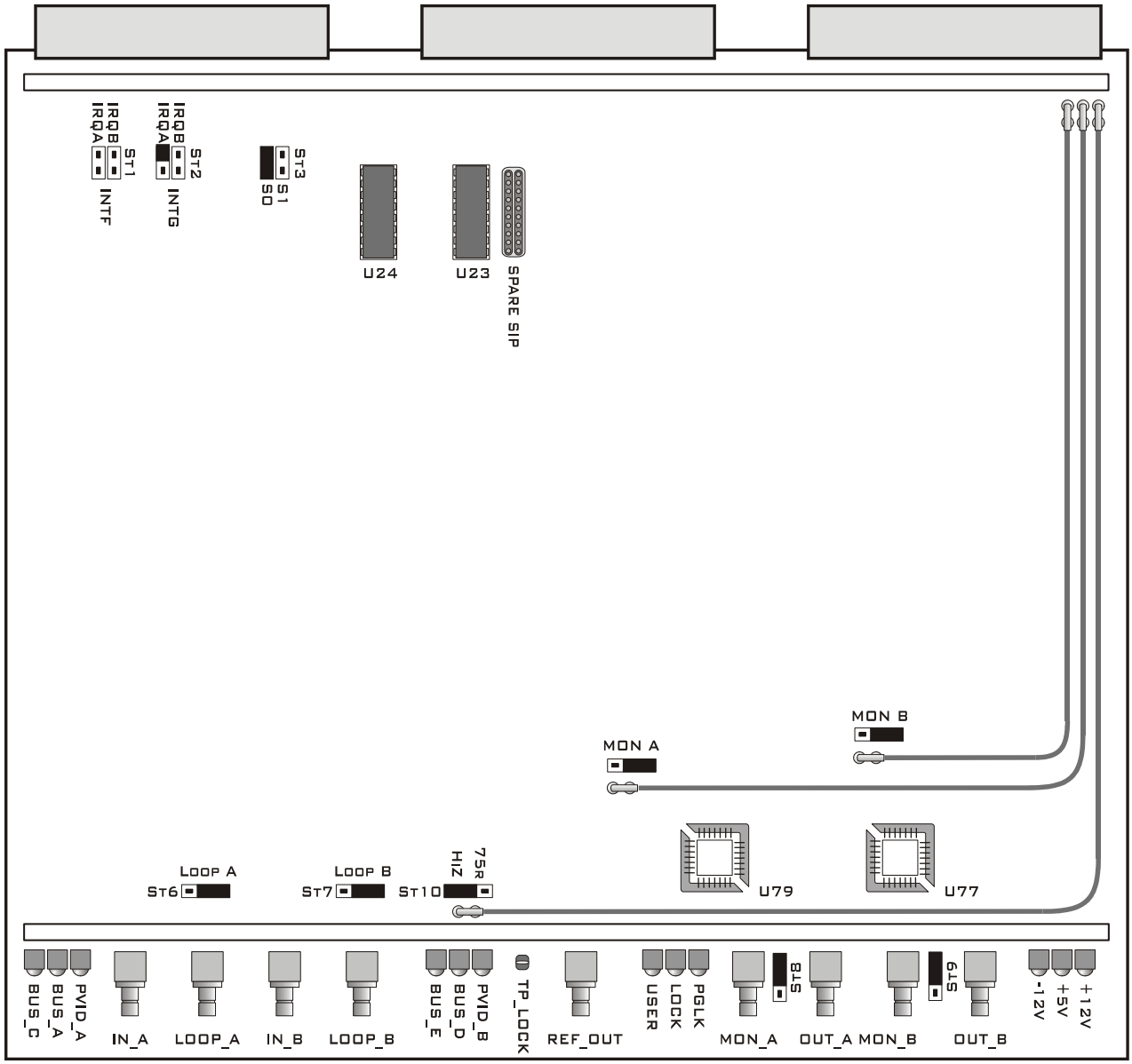
Important note: Each board has a fixed location. Connecting boards in wrong positions will prevent proper operation and might cause hardware damage if power is applied too long.



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.



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.

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

BOARD CONFIGURATION:

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.

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.

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. 75 Ohm Termination:

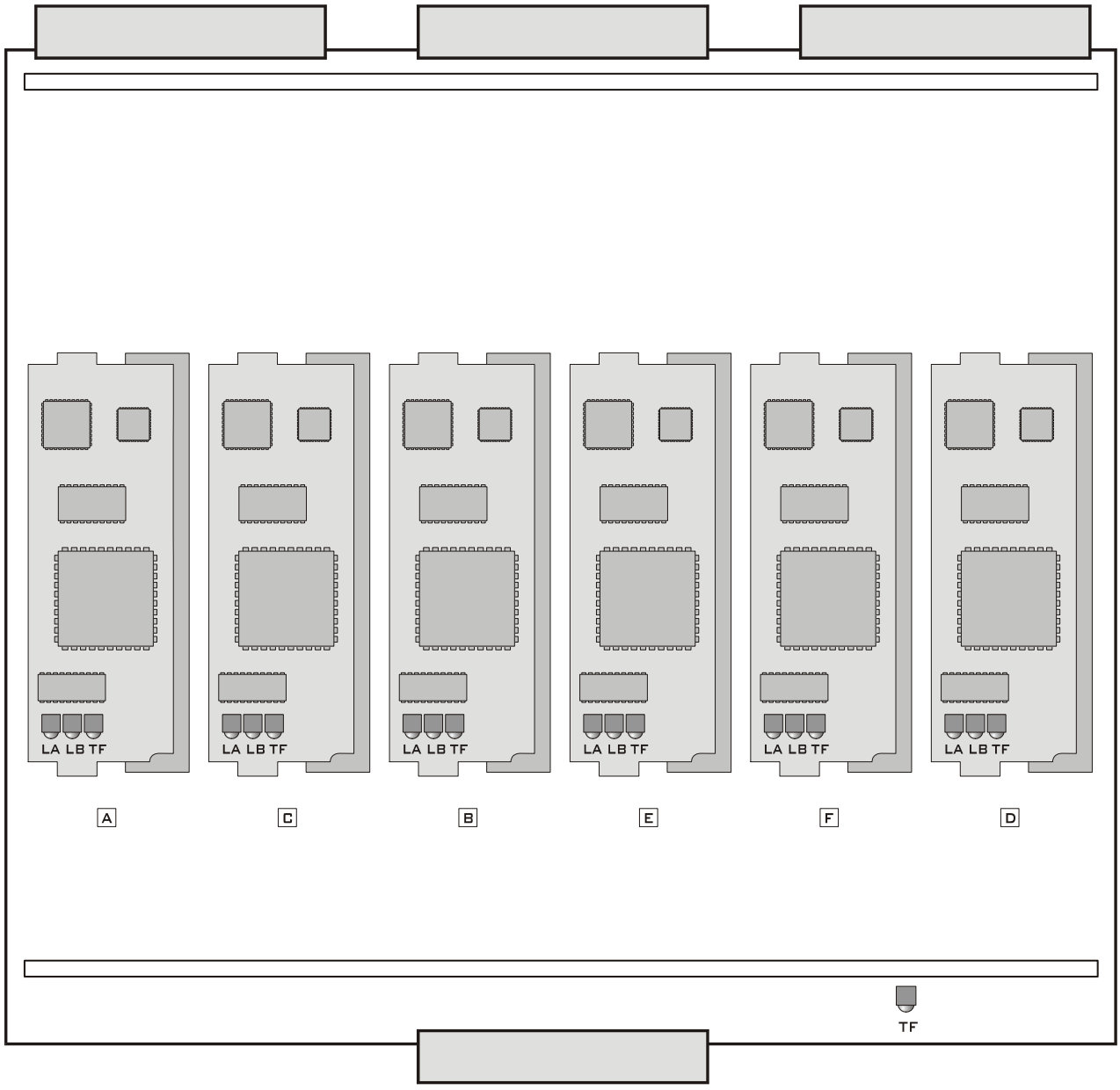
ST10 jumper has to be set on HIZ position

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.

VIDEO CODEC BOARD

(VIDEO RAID CODEC 6)

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

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.

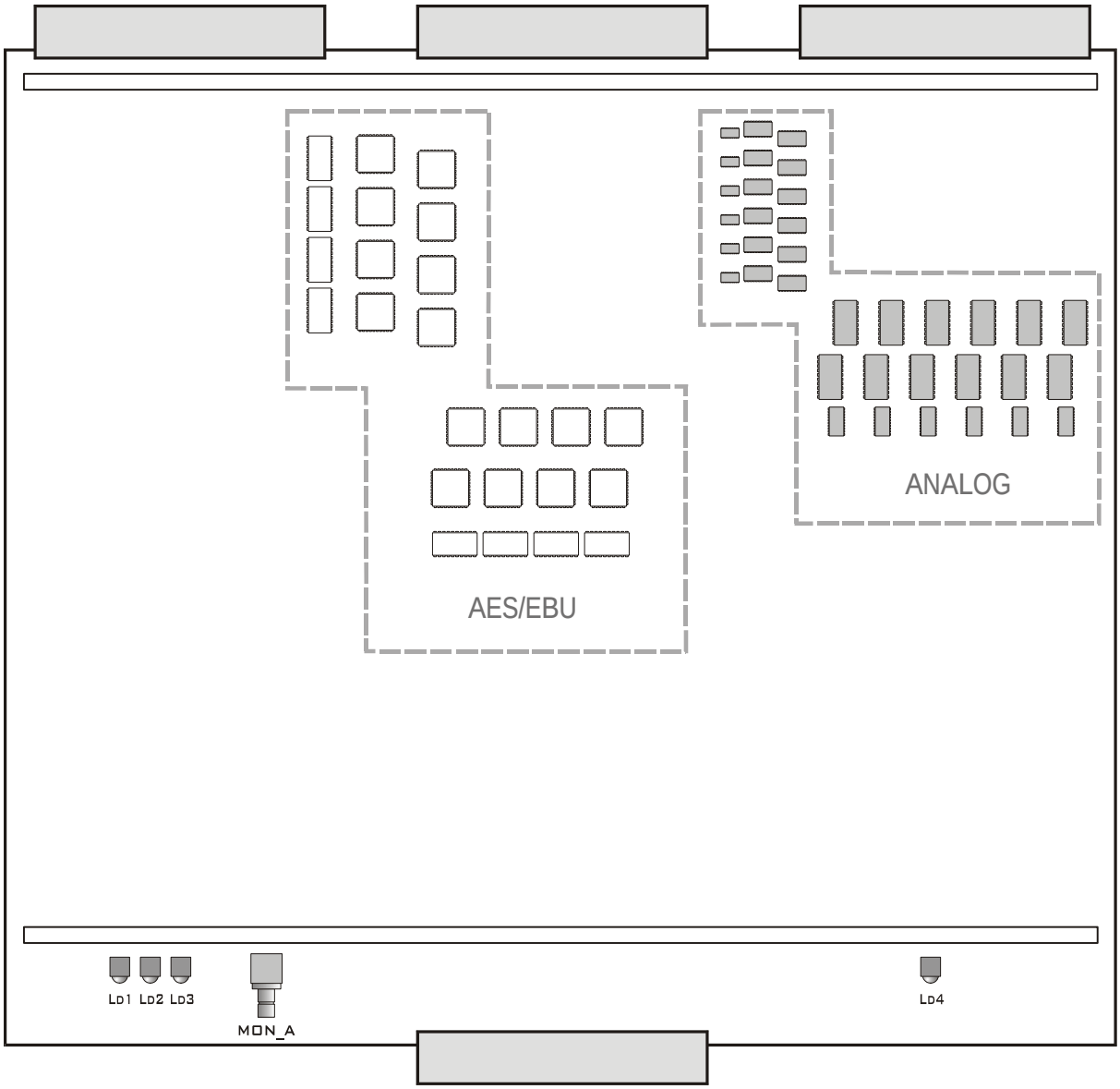
BOARD CONFIGURATION:

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

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.



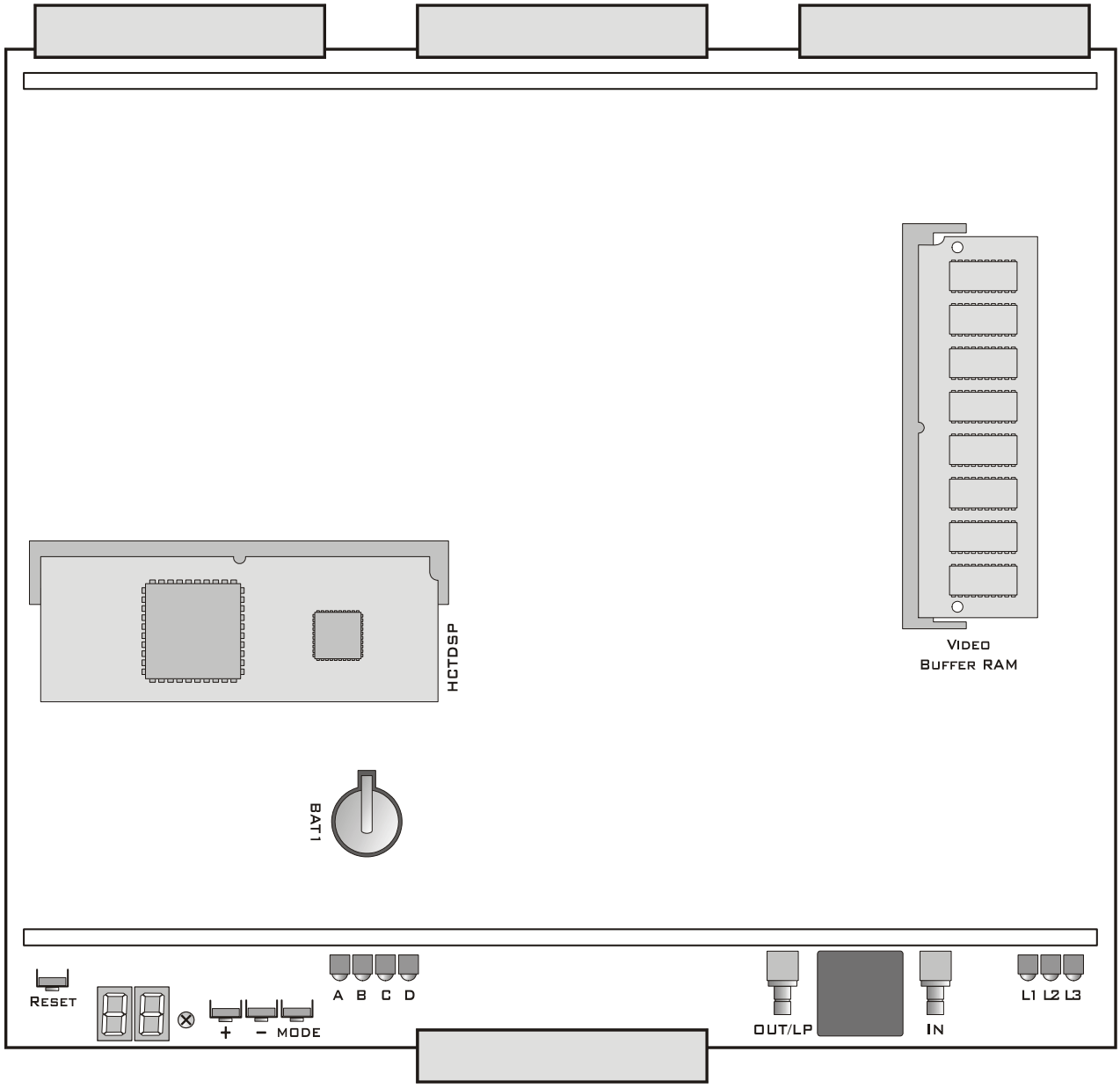
LED'S INFORMATION AND CONNECTOR:

Internal EVS information only

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.

7-SEGMENT DISPLAY:

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

Left	Right	
0	0	OK
0	1	Communication RAM error
0	2	SDRAM Error
0	3	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.

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	
-	-	-	-	At start-up
-	-	-	ON	Testing communication RAM
-	-	ON	-	Clearing communication RAM
-	-	ON	ON	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

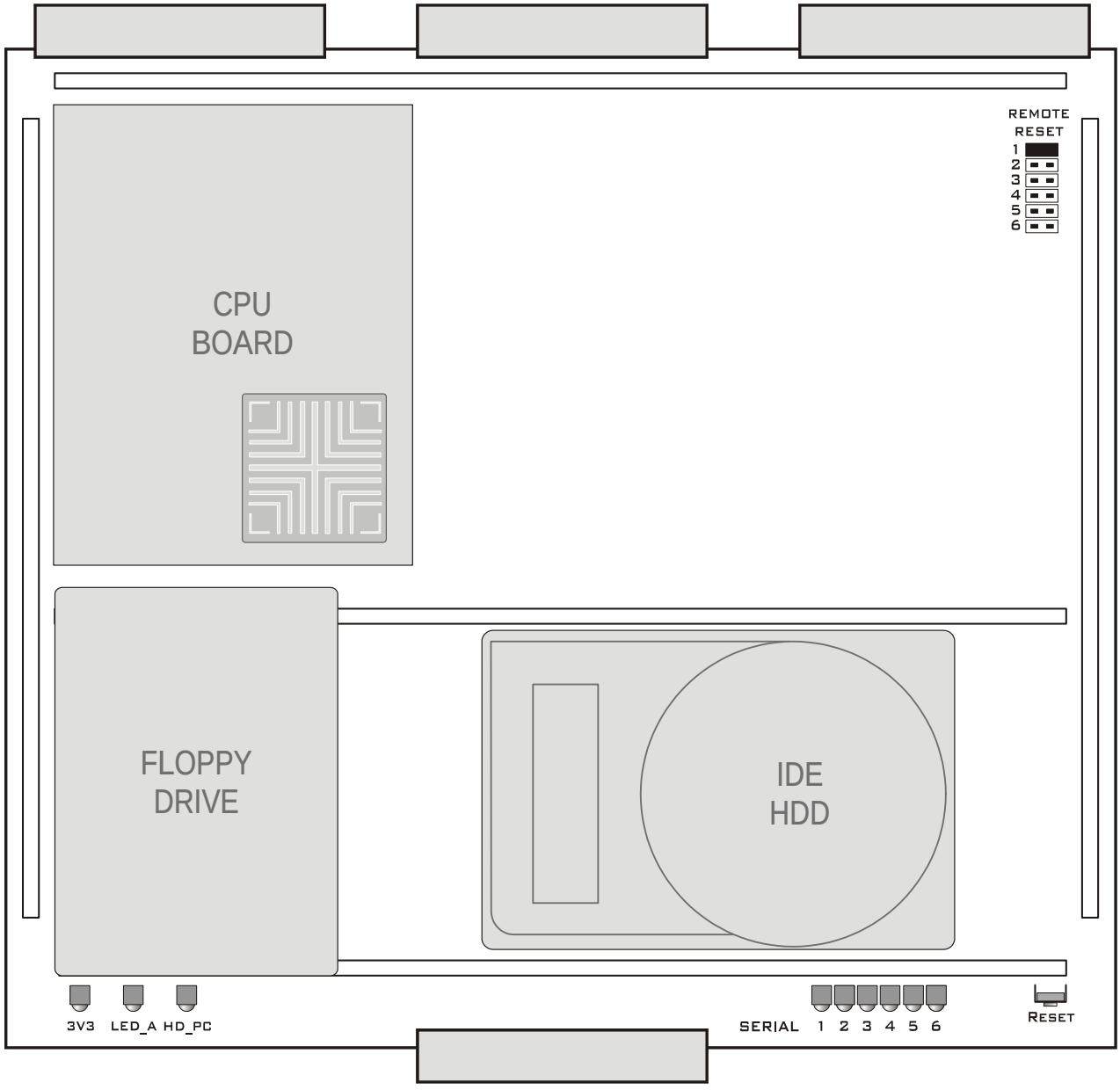
SDTI CONNECTORS:

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) LSM on the SDTI network must operate in Hardware Master mode. Refer to the SDTI Network section for details.

PC 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 !

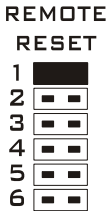
A component of the Frame Buffer/Mixer board (FBM) has also been modified to comply with the new memory management of MTPC board rev. A1/R2. Use only FBM rev. A3 with MTPC rev. A1 or A1/R. Use only FBM rev. A3/R2 with MTPC rev. A1/R2.

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

LED'S INFORMATION:

Internal EVS information

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.

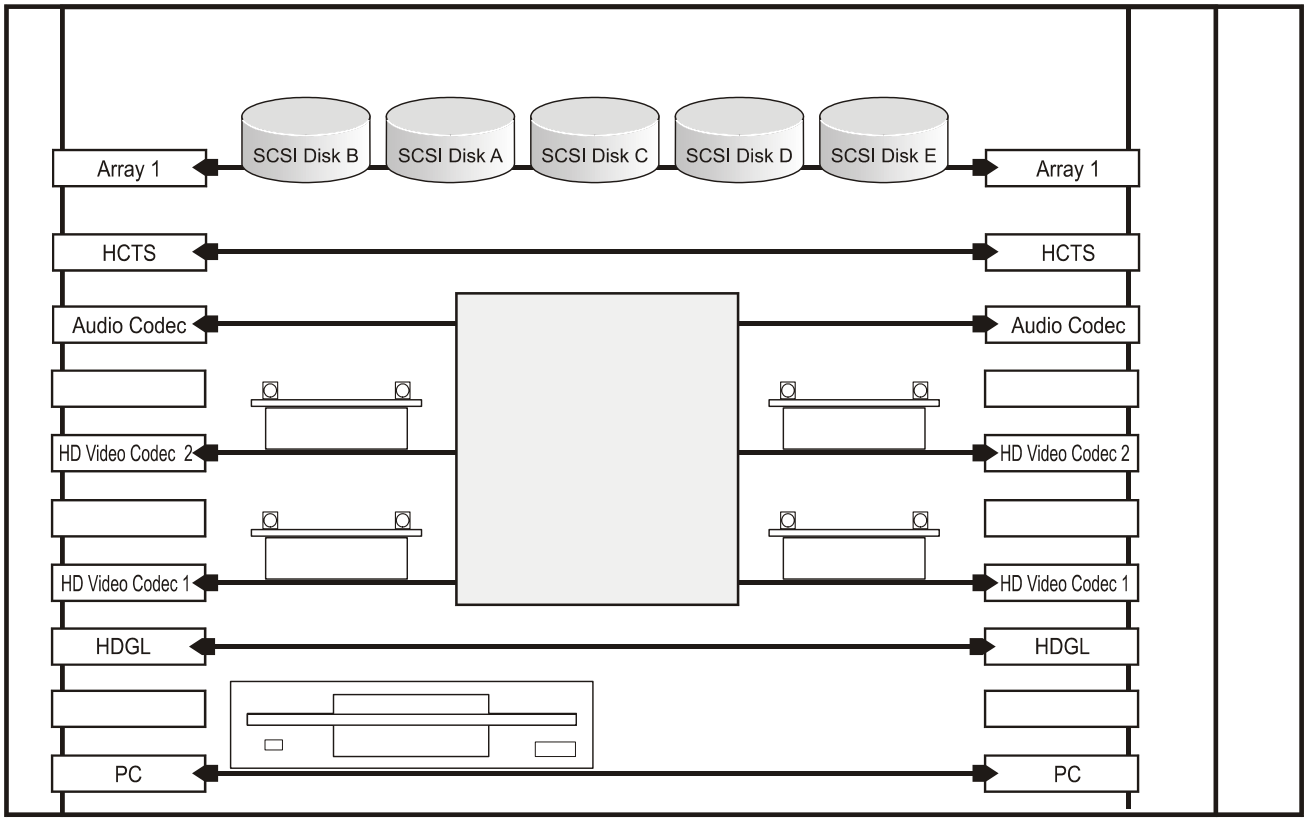
Warning : This jumper should be removed if the device connected to the RS422 port is NOT an EVS controller. Maximum voltage on pin 5 of an RS422 port of the XT server should not exceed 5 Volt when the corresponding jumper is engaged. Applying a higher voltage on pin 5 when the corresponding jumper is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

High Definition
Video Hardware Presentation

Standard HD XT Server are compatible with 1080i and 720p formats, 50.00 and 59.94Hz. A hardware option allows them to be compatible with SD standards (625i 50.00Hz and 525i 59.94Hz). The server is then refered to as "HD/SD compatible". On all systems, the selection of the video standard is done by software.

The following diagram describes the location of the electronic boards developed by EVS for its HD-LSM.

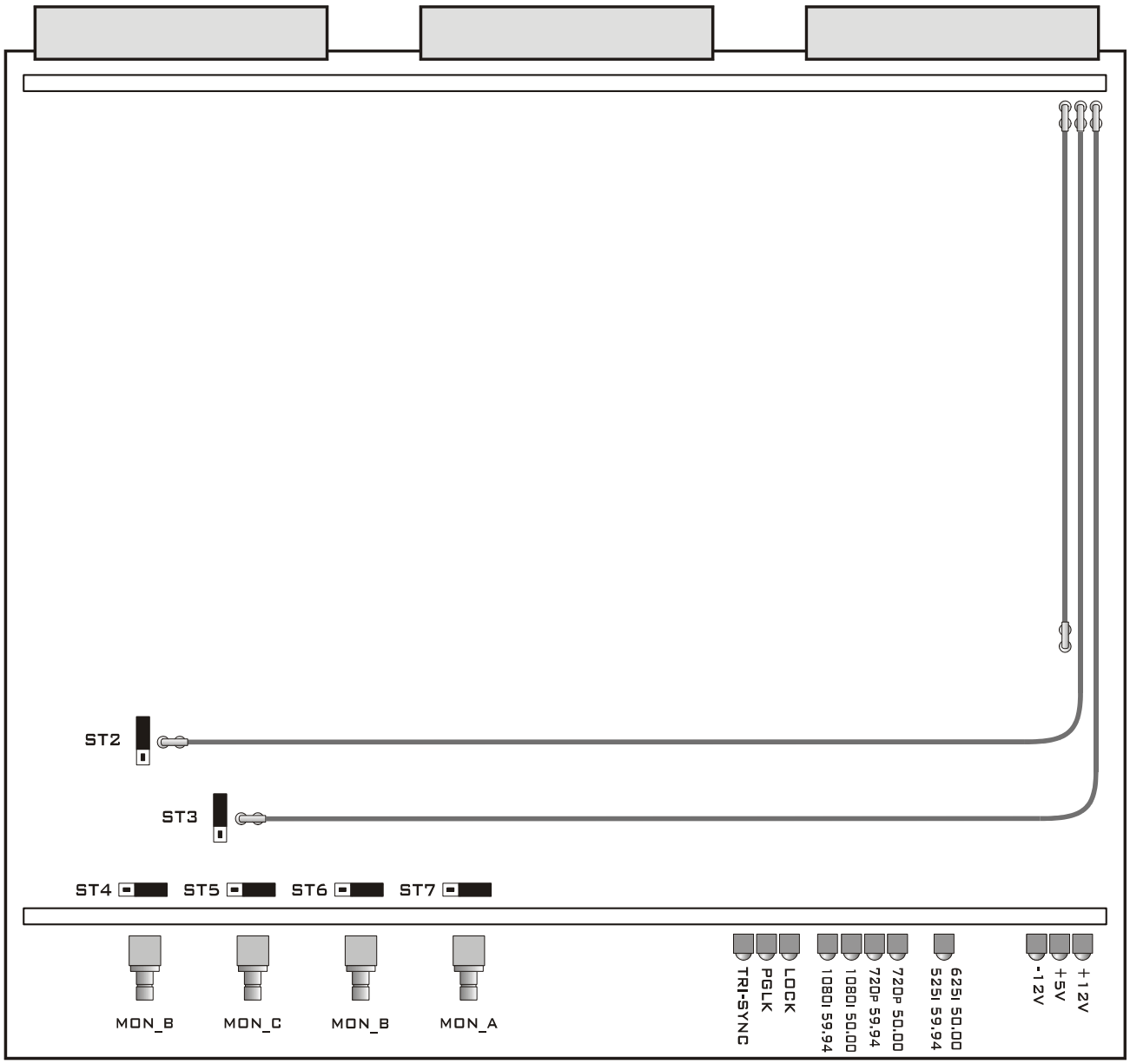
Important note: Each board has a fixed location. Connecting boards in wrong positions will prevent proper operation and might cause hardware damage if power is applied too long.



HCTS, AUDIO CODEC and PC boards, previously described, are common to both systems (SD and HD) Only HGDL and HD VIDEO CODEC boards are specific to HD-LSM systems.

HDGL BOARD

The HDGL board manages the video reference and the monitoring outputs of the HD LSM.
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).



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

CONNECTORS:

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

BOARD CONFIGURATION:

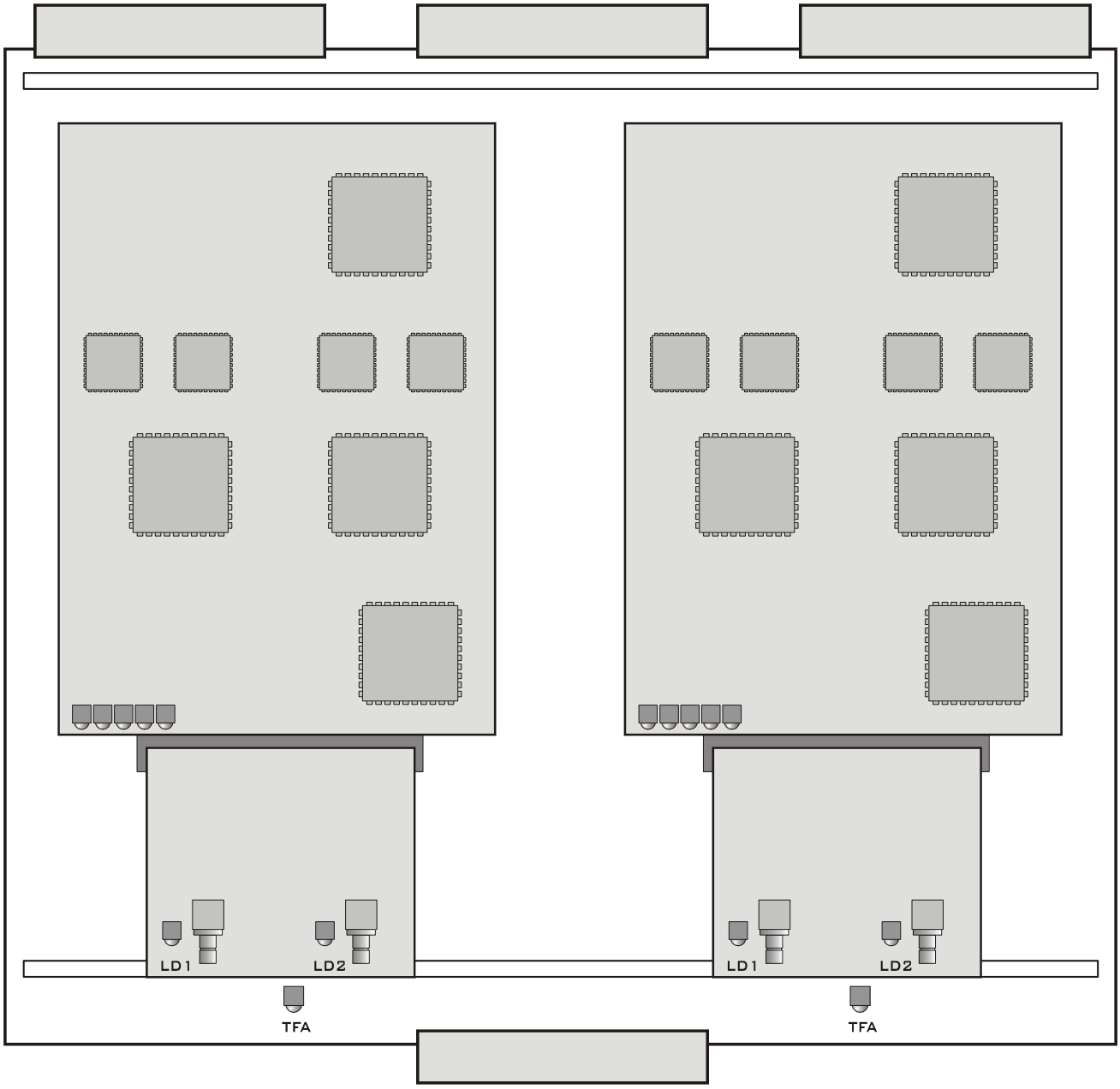
Moving the ST2 and ST3 jumpers allows you to select analogue or digital monitoring from the "Outputs Monitoring" BNC connectors on the rear panel (down-converted monitoring/clean output of PGM1 and PGM2/PRV).

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).

HD VIDEO CODEC BOARD

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.



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.

BOARD CONFIGURATION:

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

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)

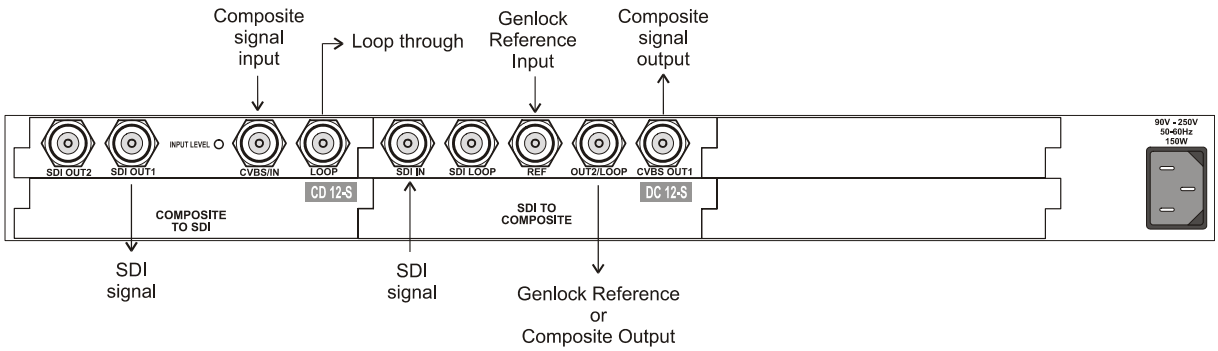
Lower HD Video Codec (#1)

Chapter 6: ADA converters

Standard Definition

The digital video inputs and outputs on the BNC connectors on the rear of the mainframe are standard CCIR601/656, 10-bit Serial Digital Interface, and 270 MHz. Separate analogue PAL/NTSC encoders are installed on the I/O board to provide monitoring outputs.

EVS has a range of cards, which perform conversion between analogue composite PAL/NTSC or analogue component and SDI serial digital component. These can be mounted in 1RU (up to 6 boards) or 3RU (up to 16 boards) frames. The cards are fitted with adjustments for video timing and TV standard (625 line/50Hz PAL or 525 line/59.94Hz NTSC) is set by push buttons.



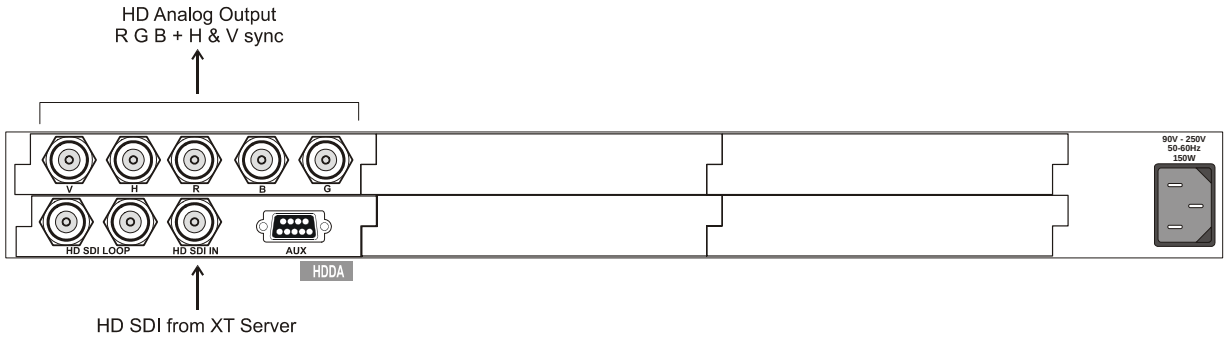
Note: Loop must be terminated if not used

In some configuration, the second signal output could be assigned as a Genlock Reference output. Please refer to the ADA manual for jumpers' settings.

High Definition

EVS' High Definition XT servers have clean PGM HD-SDI outputs, as well as downconverted outputs (SDI/CVBS switchable) for monitoring or HD/SD simulcast installed on the rear panel of the mainframe.

For those who want high definition monitoring outputs, an external module is required with HDDA boards. Each HDDA board takes an HD-SDI feed and convert it to a high definition RGB signal, with or without OSD information for monitoring.



Chapter 7 : EVS software

Version 00.12.12

Introduction

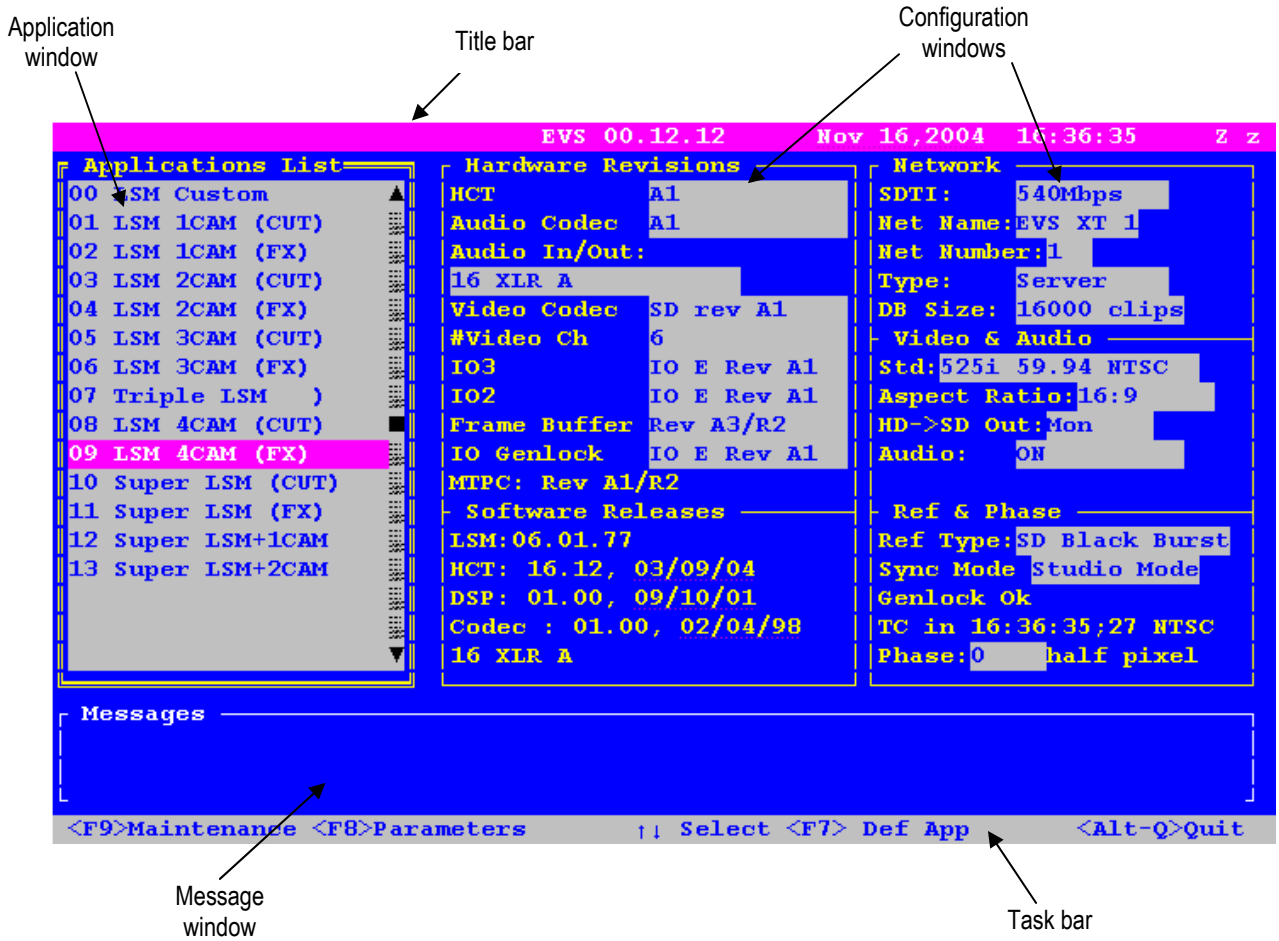
The EVS software is used for configuration and maintenance operations. It is also used to select which application to run, since EVS disk recorders have the ability to run various dedicated applications (Video Server, Slow Motion, ...).

When turning on the EVS mainframe, the first step is the PC boot sequence, followed by the boot of the video I/O boards, and finally the EVS software is started.

If a default application has been previously selected, this application will start automatically after a few seconds if no key is hit.

If a default application hasn't been defined or if the space bar is hit, the system will remain in the EVS main menu (see snapshot next page) and wait for the operator's next command.

1. EVS Main Menu :



1.1 EVS SCREEN LAYOUT:

Title bar: the first line of the VGA screen is the title bar. It contains the EVS software revision and current date and time.

Task bar: the last line of the VGA screen is the task bar. It contains a summary of the keyboard controls available.

Application window: this window contains the list of all applications installed on the system.

Configuration windows: the windows show the hardware configuration of the system.

Message window: messages are displayed in this space to provide more information on the current selection.

1.2 TIPS TO MOVE INSIDE THE EVS SOFTWARE:

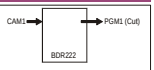
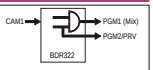
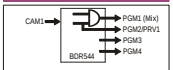
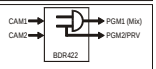
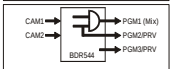
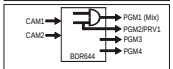
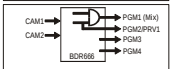
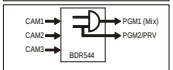
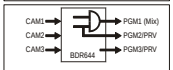
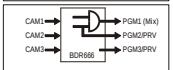
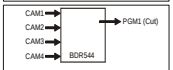
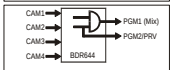
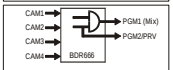
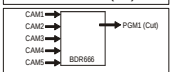
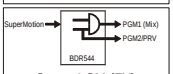
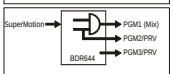
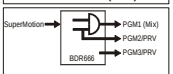
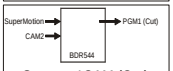
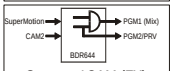
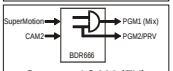
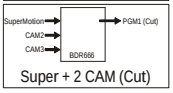
- The active window is always shown with a double frame.
- Use <↑>, <↓> and <TAB> keys to change the selection inside the active window.
- Use <SPACE BAR> to toggle between pre- defined values.
- Use <ENTER> to select an item or to confirm an entry.
- Use <ESC> to go back to the previous menu or to cancel an entry.

1.3 STARTING AN APPLICATION

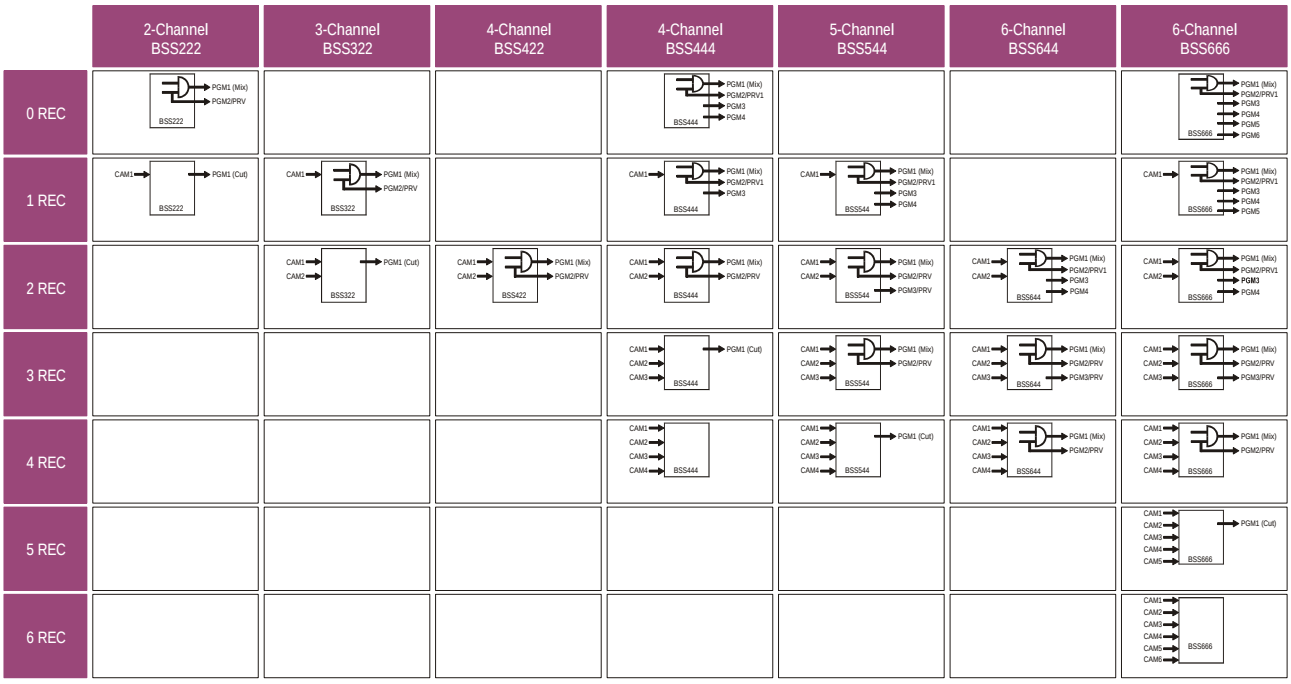
Select the appropiate application from the Applications list, then press ENTER to confirm the selection.

Configurations available on SD systems :

EVS XT *SD* LSM : Configurations

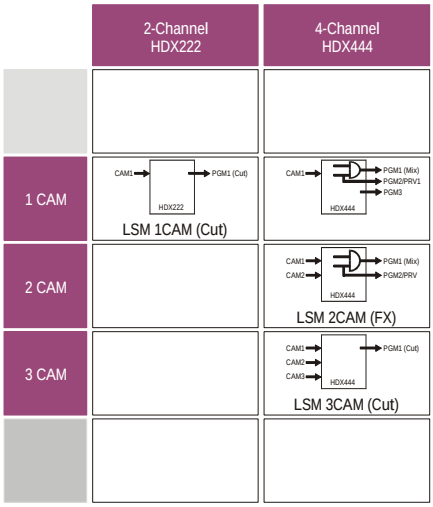
	2-Channel BDR222	3-Channel BDR322	4-Channel BDR422	5-Channel BDR544	6-Channel BDR644	6-Channel BDR666
1 CAM	 LSM 1CAM (Cut)	 LSM 1CAM (FX)				
2 CAM		 LSM 2CAM (Cut)	 LSM 2CAM (FX)			
3 CAM				 LSM 3CAM (FX)		
4 CAM				 LSM 4CAM (Cut)	 LSM 4CAM (FX)	 LSM 4CAM (FX)
5 CAM						 LSM 5CAM (Cut)
Super LSM				 Super LSM (FX)		
Super LSM + 1 CAM				 Super + 1CAM (Cut)	 Super + 1CAM (FX)	 Super + 1CAM (FX)
Super LSM + 2 CAM						 Super + 2 CAM (Cut)

EVS XT *SD* Servers : Configurations

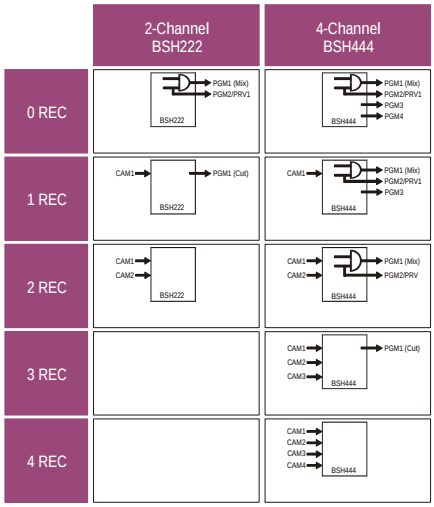


Configurations available on HD and HD/SD compatible systems :

EVS XT *HD* LSM : Configurations



EVS XT *HD* Servers : Configurations



Clips compatibility :

Clips are compatible across all Multicam configurations including Super LSM.

Record trains are also compatible as long as the number of record channels (cameras) is not increased in LSM mode.

Ex.: SuperLSM → 2CAM (Fx): Record trains are lost.
4CAM (Fx) → 3CAM (Cut) : Record trains are compatible.

Record trains are always kept in Slave mode (all modes except LSM), even when the number of record trains is increased.

1.4 COMMANDS AVAILABLE FROM THE MAIN MENU:

- The <↑> and <↓> keys of the keyboard can be used to select an application. The purple line shows the current selection. The black line shows the default application.

- The <ENTER> key is used to start the selected application.

- Press <F7> to make the application currently selected the new default application. The default application is automatically started every time the EVS program is entered. When the application currently selected is already the default application, pressing <F7> will disable the default application and the system will remain in the EVS Main Menu every time the EVS software is entered.

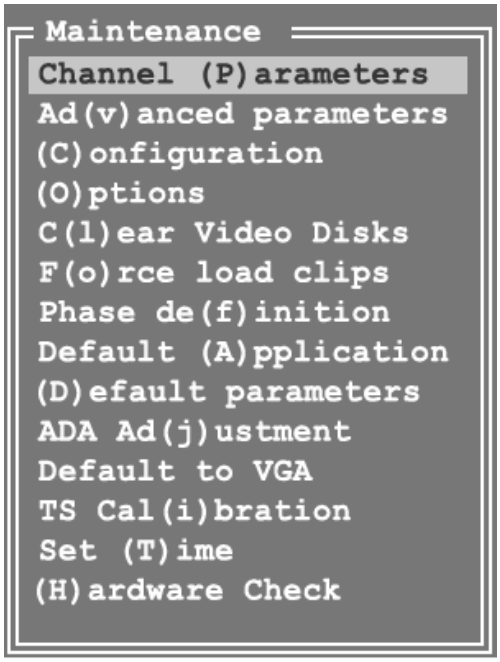
- Press <F8> to open immediately the Channel Parameters window related to the selected application. Press <ALT + Q> to come back to main menu.

- Press <F9> to enter the Maintenance Menu.

- To exit the EVS software and go back to the DOS prompt, press simultaneously <ALT + Q> and confirm with <ENTER>. To restart the EVS software from the DOS, simply type RUN.

2. Maintenance Menu :

The Maintenance Menu contains various options to configure and check the system. These options are described in details in the next sections.



To select an option, use the <↑> and <↓> keys of the keyboard to highlight the corresponding line and press <ENTER> or press the key corresponding to the character between brackets.

To go back to the Application window, press <ESC> on the keyboard.

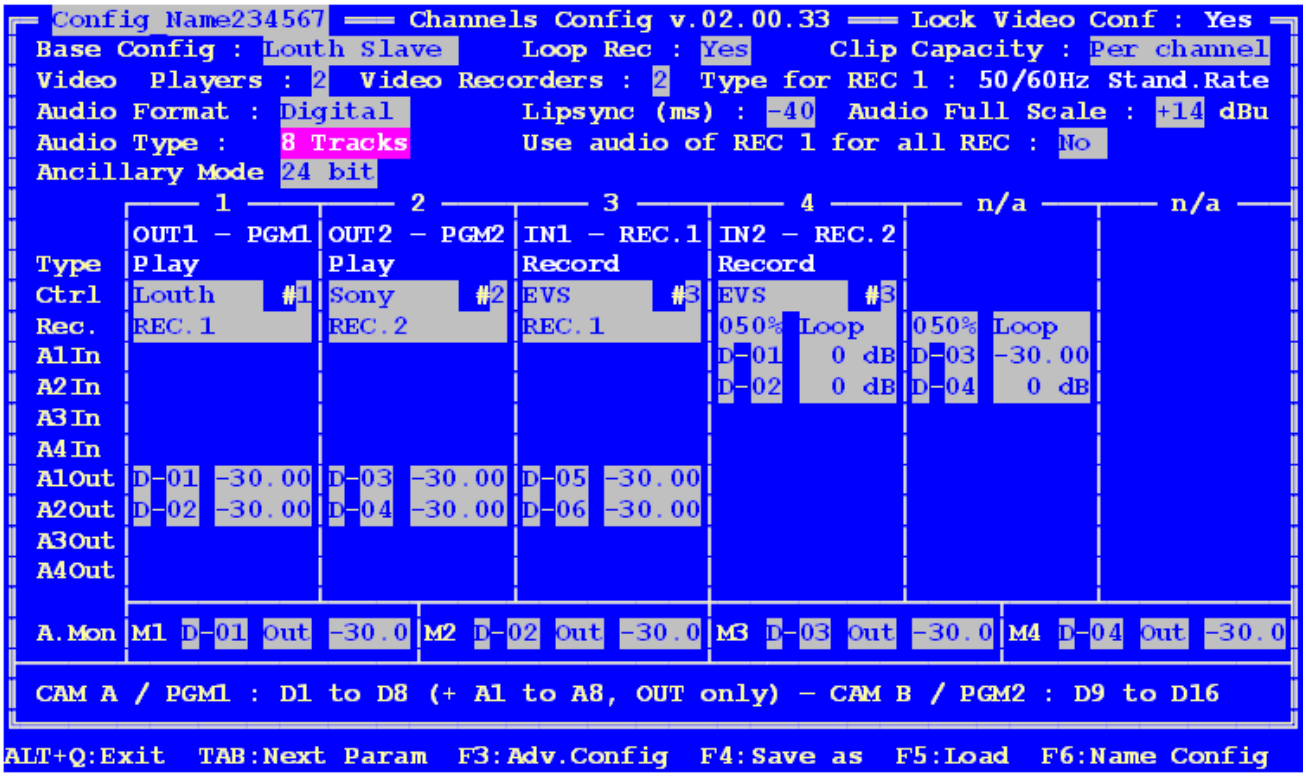
Note : the “ADA Adjustment” option appears only if a frame buffer/mixer board of rev. A3 (and not A3/R2) is installed.

2.1 VIDEO & AUDIO CHANNEL PARAMETERS

Important note: Most parameters are factory preset, and should not be modified without advice of qualified EVS staff. Improper values for some parameters will prevent the proper operation of the system.
Please refer to the parameters' charts for correct values.
(See 3.9 Default parameters)

Every application has its own set of parameters. While selecting Parameters, the application list appears to select an application first, then V/A Channels Parameters window appears.

Parameters are used to define video & audio channels, type and configuration of recorders, audio format and audio-video synchronization parameter.



AUDIO & VIDEO PARAMETERS OVERVIEW:

Modifying the value of a parameter in the Audio & Video Channel Parameters : Always press ENTER after changing the value of a parameter to validate the new choice ! Check the channels table in the center of the screen ot make sure that the changes are reflected there.

Lock Video configuration:

Yes / No

This item enables/disables the access to the modifications of the next three items: Video Players, Video Recorders and Type for REC1.

The video configuration is locked if Option Code 4 (Authorize video configuration chages) is not active in the Options List (cfr page 75 of this manual).

Base configuration:

LSM / maXS 2-ch / maXS 4-ch / 2-ch VTR / EVS Slave / Sony Slave / XtenDD35 Slave / Odetics Slave / Video Delay.

The different configurations appear according to the licence codes that have been enabled.

Loop Rec:

Always forced to YES. Enables/disables the endless loop recording. This function is applies to all record channels.

Clip Capacity:

Global / Per Channel

This parameter selects the recording mode. In Global mode, the clip capacity is shared through the different record trains, so the remaining the split of recording capacity of between record trains remains equal (example : with 3 record trains, creating a clip of 30 min on REC1 will take 10 min of recording capacity to each record train). In Per Channel mode, the clip capacity is only saved on its record train (example : with 3 record trains, creating a clip of 30 min on REC1 will take 30 min of recording capacity to the 1st record train, but will not affect the recording capacity of the other two record trains).

The default value depends on the basic configuration:

LSM	maXS (2/4-ch)	2-ch VTR	EVS Slave	Sony Slave	XtenDD35 Slave	Louth Slave	Odetics Slave	Video Delay
Global (locked)	Global (locked)	Per Channel	Per Channel	Per Channel	Per Channel	Per Channel	Per Channel	Global (locked)

Video players:

Range: [1...6]

selects the number of PLAY channels of the application and the associated audio channels.

Video recorders:

Range: [1...6]

selects the number of RECORD channels of the application. The partition of the disk storage between these channels, and the associated audio channels are automatically updated.

Type for REC1:
defines the type of recorder for the 1st record channel.
Three types of record are available:

- Standard rate 50/60 Hz
- SLSM Alternate Parity – EVS mode
- SLSM Identical Parity

Audio format:
Range: [Analog or Digital or Dolby E or Embedded]
Selects the AUDIO format.

Note:
When Audio Format is set to Digital (AES/EBU) or Embedded, the analog audio outputs (if installed on the server) are automatically activated and can be used for additionnal monitoring. When Audio Format is set to Embedded, the digital audio (AES/EBU) outputs (if installed on the server) are also active. Refer to the connection table on page 13 of this manual for correspondence between the embedded and digital audio channel numbering.

Audio Type:
Range: [1 Track, 2 Tracks, 4 Tracks, 8 Tracks]
Selects the type of AUDIO.

Note: AES or Dolby E = stereo or dual stereo
Embedded = dual stereo
8 Tracks available in AES/EBU only, for configurations with max. 2 video inputs and/or 2 video outputs.

Lipsync:
Range : -22ms to +17ms
Lipsync parameter is the delay (in ms) between video and audio signals. A positive value means video is ahead of audio. A negative value means audio ahead of video.
This parameter is also available from the SETUP menu of the remote when the Multicam application is started. Changing the Lipsync value in the SETUP menu will update it in the EVS menu and vice versa.
CTRL+↑/↓ changes the value per 1 msec step. The operator can also enter directly a value with the keyboard.
Default: 0

Note:
This adjustment is done during the RECORD process. A new Lipsync value will apply for the next recorded pictures only.

Use Audio of REC 1 for all REC:
Range: [Yes or No]
All audio channels associated to REC1 (CAM A) will be automaticcally used for all other RECORD channels.

Channels:
Channels input/output and name are automatically defined according to the parameters entered in the fields: Base configuration, Video Players, Video Recorders and Type of Rec.
The play channels are allocated first (starting with OUT1), then the record channels are allocated (starting with IN1)

Note: To modify the parameters included in the "Channels' area", press <F3> to enter the Advanced Configuration mode

Type:
Range: [Rec, Play, SLSM Rec, SLSM Rec. 1, SLSM Rec. 2, SLSM Rec. 3]
This parameter is automatically set according to the settings of the previous ones, and defines the type of channel and depends on the values of Video Players, Video Recorders and Type of REC1.

CTRL :
Range: [LSM, maXS, EVS Protocol, Sony, XtenDD35, Louth, Odetics]
This parameter defines which system or protocol controls the current channel. This parameter is automatically set and not editable when the Base Configuration is set to LSM, maXS or Video Delay.

Port:
Range: [1 ... 6]
1-6 defines the RS422 port number that controls each channel. These fields are not available with LSM, maXS and Video Delay configurations.

REC.:
For a PLAY channel, this parameter defines which record train is the default source.
For a RECORD channel, two parameters are available:

Recording Capacity: (% Disk) Percentage of disk space allocated to each channel. Total of all values must not exceed 100%.

Loop/No Loop: depends on the value of Loop Rec, previously described. Always forced to "Loop" with the current version.

A1 - A2 - A3 – A4 IN :
1st/2nd/3rd/4th mono audio input of the current channel.

A1 - A2 - A3 – A4 OUT :
1st/2nd/3rd/4th mono audio output of the current channel.

Audio format :
Range: [A, D, E] (Analog, Digital or Dolby E, Embedded).
The available values depend on the type of audio connectors defined in EVS hardware configuration:

None	16 XLR Analog	16 XLR Digital	16 XLR Analog + 8 XLR Digital 16 XLR Analog + 16 BNC Digital 16 XLR Analog + 4 DB15 Digital
E	E - A	E - D	E - A – D

Audio Channel :
Range: [1 ... 24]
This parameter selects the audio channel among the selected audio format. The values depend on the audio format and available connectors:

	Analog (A)	Digital (D)	Embedded (E)
Embedded only	n/a	n/a	1 – 24
16 XLR Analog	1 – 8	n/a	1 – 24
16 XLR Digital	n/a	1 – 16	1 – 24
16 XLR Analog + 8 XLR Digital	1 – 8	1 – 8	1 – 24
16 XLR Analog + 16 BNC Digital or 16 XLR Analog + 4 DB15 Digital	1 – 8	1 – 16	1 – 24

Note: the AES/EBU or Dolby E inputs and outputs share the same internal audio channels with embedded audio inputs and outputs.

Therefore, when an embedded input is assigned to a record channel, it means that the corresponding AES/EBU input can not be used. Or the opposite.

On the output side, it means that when an embedded output is assigned to a play channel, the same audio will be automatically present on the corresponding AES/EBU output.

The following table shows the correspondance between AES/EBU or Dolby E and embedded audio channels

Embedded Audio inputs/outputs	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16
AES/EBU or Dolby E inputs/outputs	1-2	9-10	3-4	11-12	5-6	13-14	7-8	15-16

Audio gain :
Range: [from -90dB to +23.5dB]
This parameter allows the operator to adjust the audio gain for each audio track. The adjustments are done by pressing CTRL+↓/↑ (±0.75dB steps) or SHIFT+↓/↑ (±6dB steps).

Audio monitoring :
This parameter defines the audio monitoring outputs, selects the type of audio and allows to adjust the audio gain for each channel.

TO MODIFY A/V CHANNEL PARAMETERS :

1. Press <F9> to open the Maintenance menu.
2. Select the 'Channel Parameters' item and press <ENTER>
3. Select the Application to configure and press <ENTER>
4. The Audio Video Channel Parameters window appears. Use the <TAB> key to move from one box to the next one. Some information about the current parameter is displayed in the INFO area.
5. Press <TAB> or the arrow keys (←,→,↑,↓) to move across the different parameters in the window.

6. When the desired field is selected, modify the parameter to its new value with <SPACE BAR> or by entering its numeric value and then press <ENTER> to validate.

7. Press <F3> to enter the Advanced Parameters.

8. Press <F4> to save the current configuration. A dialog Box appears to enter a name.

9. Press <F5> to load the list of configurations previously saved.

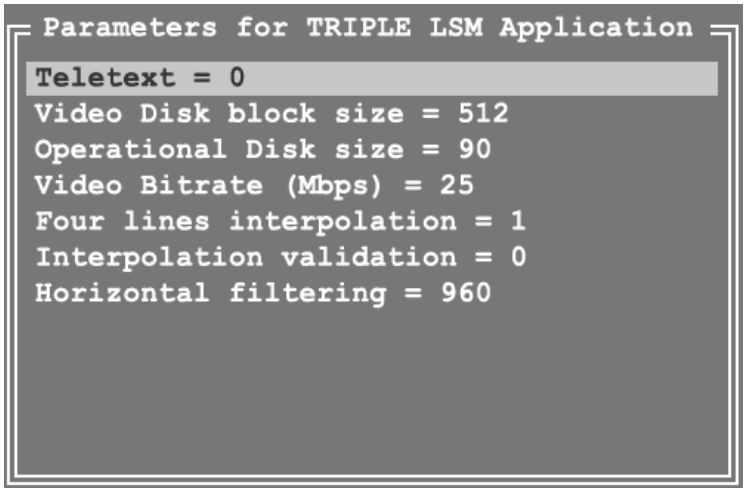
10. Press <ALT + Q> to exit the A/V Channel parameters window.

OR:

1. From the 'Application List', select the application to configure and press <F8>
2. Then continue from Step 4.

2. 2 ADVANCED PARAMETERS:

Important note: Most parameters are factory preset, and should not be modified without advice of qualified EVS staff. Improper values for some parameters will prevent the proper operation of the system.
Please refer to the parameters' charts for correct values.
(See 3.9 Default parameters)



Teletext:
Range: [0 or 1].
625i PAL systems only. Enable (1) or disable (0) the record and playback of VBI information (teletext, VITC). Authorized VBI lines : 15-22.
In 525i NTSC, the first recorded line is always 16 in the even field and 278 in the odd field

Video Disk block size:
Range: [64...1024].
defines the size (in KB) of data blocks to be recorded to or read from the disks.

Important note: The default value is 512Kb and should not be modified. When working with EVS SportNet SDTI network, this parameter musts be identical on all XT servers connected to the network. Changing the value of this parameter will always require a “Clear Video Disks” from EVS Maintenance Menu.

Operational disk size:
Range: [0...100].
percentage of the disks actually used to store the data. Restricting access to the centre part of the drives increases the performance of the system but decreases capacity.

SD Video bitrate:
Range: [8...100 Mbps]
is the bitrate of the encoded video stream that the system must reach in standard definition. Default value : 30 Mbps

HD Video bitrate:
Range: [20...250 Mbps]
is the bitrate of the encoded video stream that the system must reach in high definition. Default value : 100 Mbps.

Note: The dynamic bitrate management system modifies compression tables for each recorded field to keep the bitrate of the encoded stream as close as possible to the target. A higher bitrate means better picture quality and less storage capacity but a higher bandwidth is required. Improper values can lead to exceed disks performance, causing frozen pictures during playback.

Four lines interpolation:
Range: [0 or 1].
selects between 2-line and 4-line interpolation process. Select 0 for 2-line interpolation and 1 for 4-line interpolation. Refer to the next parameter for details.

Interpolation validation:
Range: [0 or 1].
enables or disables the interpolation process. Select 0 to disable the interpolation process, or 1 to enable the interpolation process selected by the 'Four lines interpolation' parameter. The interpolation process is aimed at reducing the vertical jitter of the pictures that is present during slow-motion replays.
This vertical jitter is actually caused by a violation of the frame parity when playing back the pictures at less than 100 % speed.

The process consists in re-building new frames to produce a more transparent result. These frames have to be interpolated - i.e. calculated

by making suitably weighted averages of adjacent lines. There are 2 interpolation modes: the 2-line interpolator and the 4-line interpolator. Disadvantage of this method is that it reduces the vertical resolution. This is particularly true with the 4-line interpolator.

The user can choose between 3 modes:

- no interpolation: maximize the vertical bandwidth of the picture but a vertical jitter appears in “SloMo”. [set 'Interpolation validation' to 0, whatever the value of 'Four lines interpolation']
- 2-line interpolator: reduce the vertical jitter but the vertical bandwidth is reduced. [set 'Four lines interpolation' to 0 and 'Interpolation validation' to 1]
- 4-line interpolator: the picture is perfectly steady but the vertical bandwidth is even more reduced. [set 'Four lines interpolation' to 1 and 'Interpolation validation' to 1]


All VTRs use interpolation in PLAY VAR mode.

More details about this interpolation process can be found in Chapter 4 of this manual.

Horizontal filtering (HD LSM Only):
Value: [960, 1024, 1066,1152, 1200, 1280, 1372, 1440, 1536].

If ‘Video Standard’ is set to SD 50 Hz PAL, SD 59.94 NTSC or SD 59.94 NTSC J : the value can not be modified. The line ‘Not in Use = 960’ replaces ‘Horizontal filtering’ in the Advanced Parameters window.

If ‘Video Standard’ is set to HD 1080i 59.94 or HD 1080i 59.94 J, the values are 960, 1152, 1200, 1280, 1372, 1440.

If ‘Video Standard’ is set to HD 1080i 50Hz or HD 1080i 50 1250L, the possible values are 960, 1152, 1200, 1280, 1372, 1440, 1536.

If ‘Video Standard’ is set to HD 720p 59.94 or HD 720p 59.94 J, the possible values are 768, 960, 1024.

TO MODIFY ADVANCED PARAMETERS :

1. Press <F9> to open the Maintenance menu.
2. Select the ‘Advanced Parameters’ item and press <ENTER>
3. Use the <↑> and <↓> keys to select the parameter to modify and press <ENTER>
4. Enter the desired value, then press <ENTER>

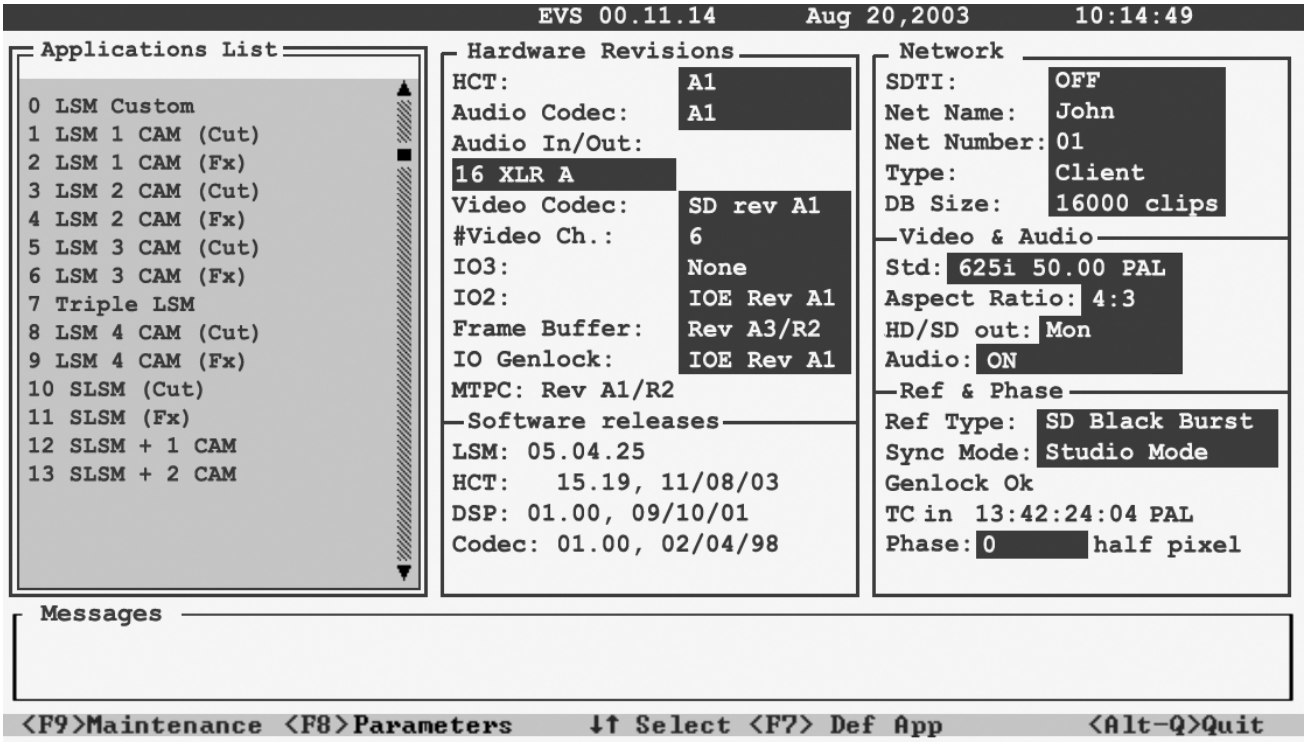
5. When all parameters are set, press <ESC>

6. A confirmation message is displayed, press <ENTER>

2.3 CONFIGURATION

This function is used to set the hardware configuration of the system (boards release numbers, port settings,...).

Important notice: The configuration is factory preset, and should not be modified without advice of qualified EVS staff. Improper values for some parameters will prevent the proper operation of the system.



To enter the configuration window, press <F9> to open the Maintenance menu, select 'Configuration' and press <ENTER>. A double frame appears around the Configuration window, and the cursor blinks next to the 'HCT' label.

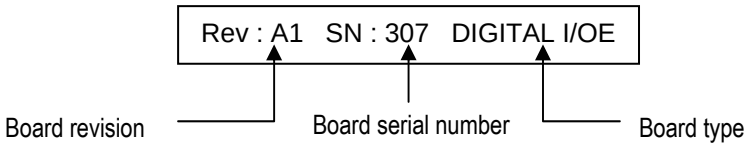
TO MODIFY AN ITEM IN THE CONFIGURATION WINDOW :

1. Use <↑>, <↓> or <TAB> keys to select the desired item.
2. Press <SPACE BAR> several times until the correct value appears.
3. Select another item to modify or press <ESC> to go back to the Maintenance Menu.

CONFIGURATION ITEMS OVERVIEW :

Hardware Revisions area

The order of the boards in this list is the same as inside the mainframe, from top to bottom. The revision of a board located in the front part of the mainframe is always written on a white label on the left front end of the board



HCT:
revision of the HCTS board (Video Raid controller). The HCT board is located immediately underneath the disk tray and is present on all systems.

AUDIO CODEC:
revision of the AUDIO CODEC board (immediately underneath the HCTS board).

AUDIO IN/OUT:
Defines the AUDIO inputs and outputs connectors available from the rear panel. Pre-defined items are available:

- 16 XLR Analog,
- 16 XLR Digital,
- 16 XLR Analog + 8 XLR Digital,
- 16 XLR Analog + 16 BNC Digital
- 16 XLR Analog + 4 DB15 Digital
- None

VIDEO CODEC:
Type (SD, HD or HD/SD) and revision of the VIDEO CODEC board (located underneath the AUDIO CODEC board). This board is present on all systems.

#VIDEO CHANNELS:
Range: [1 ... 6]
defines the number of video channels in operation. This parameter can not be modified if Option Code 4 (Authorize video configuration changes) is not present.

IO3:
revision of the third digital I/OE board. Not present on all systems.

IO2:
revision of the second digital I/OE board. Not present on all systems.

Frame Buffer:
revision of the Keyer / Mixer board (located between Digital I/O2 and Digital I/O1). This board is optional and is not present on all systems.

IO Genlock:
Range: [I/O-E rev. A1 for SD or HDGL rev. A1 for HD].
revision of the digital I/OE board. This board is present on all systems.
Video standards are available according to the type of I/O genlock board.

MTPC:
Revision of Mounting PC board (detected automatically). This board is present on all systems.

Software releases Area:

LSM: displays the version number of Multicam software installed.

HCT: displays the version number and release date of HCT microcode installed.

DSP: displays the version number and the release date of DSP microcode installed.

CODEC: displays the version number and the release date of CODEC microcode installed.

Network area:

SDTI :
(off / 270Mbps / 540Mbps)
Enables the SDTI option and select the bandwith of the network.

 Note 1: The bandwidth must be identical on all LSM-XTs connected to the Sportnet. If one system is configured with a different bandwith, it will block the entire network.

 Note 2: The Disk Block Size parameter and the video standard must be the same on all LSM-XTs connected to SportNet SDTI network.

Net Name :
The Net name defines the machine name on the network. This name is user-defined but cannot exceed 8 characters. Entering a Network Name is not mandatory because the server is really recognized by its network number and not its name, but it is recommended for operator to easily identify all LSMs connected to Sportnet.

Net Number:
Range: [1 ... 29]
The Net number defines the machine number on the network. This number is user-defined and must be different for all servers connected to the network. When entering a new number if this number is already assigned to another machine, an error message will notice the user.

Type :
Range: [Client, Master, Server]
Defines the privileges of the XT server on the SDTI network. One and only one XT server on the network must be set to SERVER type. If no server is defined, Sportnet will not be activated. If more than one server is defined, only the first one to connect will be the actual server.
Other XT servers on the network can be set either to MASTER type if they need to access clips from other LSMs, or to CLIENT type if their clips must be available on the network but they don't need to call clips from other LSMs.

	Allowed to access the content of all XT servers on the network	Can be accessed by other XT servers on the network
SERVER	Yes	Yes
MASTER	Yes	Yes
CLIENT	No	Yes

DB Size :
Range: [6000 clips, 16000 clips]
If the LSM is equipped with the latest revision of MTPC (A1/R2), the size of the clips database for an entire SportNet network can be increased to 16,000 clips. For older revisions of MTPC (A1 or A1/R), the network database is limited to 6,000 clips. This parameter must be identical on all LSMs on the network. If an LSM is starded with the wrong database size, a warning message will appear and the system will not be able to connect to the network as long as this parameter is not changed.


Note : this parameter defines the size of the network database, i.e. the maximum number of clips that can be created for the entire SDTI network. The maximum number of clips that can be saved locally on a server is determined by the size of the CPU RAM of the HCTS board : 2048 clips with 64MB CPU RAM on the HCTS, 4096 clips with 128MB CPU RAM on the HCTS. The RAM size of the HCTS board is automatically detected when starting the Multicam application.

Video & Audio area:

Std:
Selects the video standard:

- 625i 50.00 PAL *(default for SD)*
- 525i 59.94 NTSC
- 525i 59.94 NTSC Japan
- 1080i 50.00 PAL
- 1080i 59.94 NTSC *(default for HD)*
- 1080i 59.94 NTSC Japan
- 720p 50.00 PAL
- 720p 59.94 NTSC
- 720p 59.94 NTSC Japan

Aspect Ratio :
In High Definition, selects the format of the image for the downconverted outputs of the HD-LSM (not used for SD LSM)

- 4:3 L Box → letterbox *(default)*, the entire width of the 16:9 original picture is shown, but there are black panels horizontally above and below the picture
- 4:3 Crop → the sides of the 16:9 picture are cut off but the 4:3 frame is filled
- 16:9 → anamorphic, *widescreen mode.*

In Standard Definition, defines the aspect ratio of the incoming video feeds to adjust the aspect ratio of the graphics when drawing circles in Target Tracking and Painting modes.

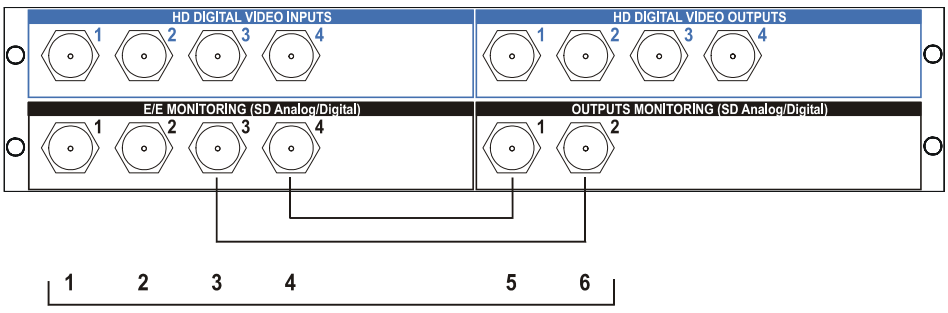
HD/SD out:
HD systems only. Defines the assignment of SD down-converted outputs :

- Monitoring *(default)*
- PGM+Monitoring: the E/E monitoring outputs are re-assigned to produce SD PGM outputs.

When looking at the rear panel of an HD XT server, there are 6 SD outputs. 4 of them are located on the left immediately below HD SDI inputs 1 to 4, the other 2 are located on the right immediately below HD SDI outputs 1 and 2. Let's call them, from left to right, SD outputs 1 to 6.

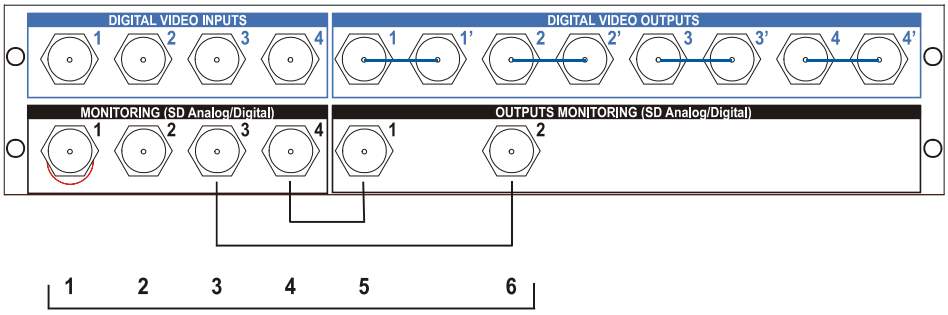
The first remark is that SD output 3 and 6 are actually the same, as well as 4 and 5. The system has only 4 internal SD outputs, but the last two are duplicated on the rear panel to make the connection easier in most LSM configurations.

Rear panel view #1 (older models)



SD VIDEO MONITORING OUTPUTS

Rear panel view #2 (newer models)



SD VIDEO MONITORING OUTPUTS

SD outputs assignment on 2-ch XT HD server when set to Monitoring only :

	SD Out 1	SD Out 2	SD Out 3	SD Out 4	SD Out 5	SD Out 6
0 REC + 2 PLAY	n.a.	n.a.	PGM2+OSD	PGM1+OSD	PGM1+OSD	PGM2+OSD
1 REC + 1 PLAY	REC1 clean	n.a.	n.a.	PGM1+OSD	PGM1+OSD	n.a.
2 REC + 0 PLAY	REC1 clean	REC2 clean	n.a.	n.a.	n.a.	n.a.

SD outputs assignment on 2-ch XT HD server when set to PGM+Monitoring :

	SD Out 1	SD Out 2	SD Out 3	SD Out 4	SD Out 5	SD Out 6
0 REC + 2 PLAY	PGM1 clean	PGM2 clean	PGM2+OSD	PGM1+OSD	PGM1+OSD	PGM2+OSD
1 REC + 1 PLAY	PGM1 clean	REC1 clean	n.a.	PGM1+OSD	PGM1+OSD	n.a.
2 REC + 0 PLAY	REC1 clean	REC2 clean	n.a.	n.a.	n.a.	n.a.

SD outputs assignment on 4-ch XT HD server when set to Monitoring only :

	SD Out 1	SD Out 2	SD Out 3	SD Out 4	SD Out 5	SD Out 6
0 REC + 4 PLAY	PGM4+OSD	PGM3+OSD	PGM2+OSD	PGM1+OSD	PGM1+OSD	PGM2+OSD
1 REC + 3 PLAY	REC1 clean	PGM3+OSD	PGM2+OSD	PGM1+OSD	PGM1+OSD	PGM2+OSD
2 REC + 2 PLAY	REC1 clean	REC2 clean	PGM2+OSD	PGM1+OSD	PGM1+OSD	PGM2+OSD
3 REC + 1 PLAY	REC1 clean	REC2 clean	REC3 clean	PGM1+OSD	PGM1+OSD	REC3 clean
4 REC + 0 PLAY	REC1 clean	REC2 clean	REC3 clean	REC4 clean	REC4 clean	REC3 clean

SD outputs assignment on 4-ch XT HD server when set to PGM+Monitoring :

	SD Out 1	SD Out 2	SD Out 3	SD Out 4	SD Out 5	SD Out 6
0 REC + 4 PLAY	PGM1 clean	PGM2 clean	PGM3 clean	PGM4 clean	PGM4 clean	PGM3 clean
1 REC + 3 PLAY	PGM1 clean	PGM2 clean	PGM3 clean	PGM1+OSD	PGM1+OSD	PGM3 clean
2 REC + 2 PLAY	PGM1 clean	PGM2 clean	PGM2+OSD	PGM1+OSD	PGM1+OSD	PGM2+OSD
3 REC + 1 PLAY	PGM1 clean	REC2 clean	REC3 clean	PGM1+OSD	PGM1+OSD	REC3 clean
4 REC + 0 PLAY	REC1 clean	REC2 clean	REC3 clean	REC4 clean	REC4 clean	REC3 clean

Audio:
Range: [On or Off]
Enables or disables the Audio.

Ref & Phase area:

Ref Type:
Selects the genlock reference input between:
- SD Black Burst *(default)*
- HD Tri-Level Sync (HD LSM only)

Sync Mode:
Select the frame synchronizer mode between:
- Studio mode : should be used when the video input signals are synchronized. *(default)*
- Resync mode : should be used when the video input signals are not synchronized. In this case, they will be re-synchonized on the digital I/O board. This can cause a shift of up to 3 fields between the various video input signals.

Genlock:
Range:[OK or BAD] This information is automatically displayed.
Checks if the Genlock input is valid.

TC In:
Display the status of the LTC input of the server, and the video format corresponding to the incoming timecode. Ex : "TC in 12:24:45:09 PAL" or "TC in 12:24:45:09 NTSC". If no valid timecode is detected, the display will show "TC in --:--:--:-- Bad".

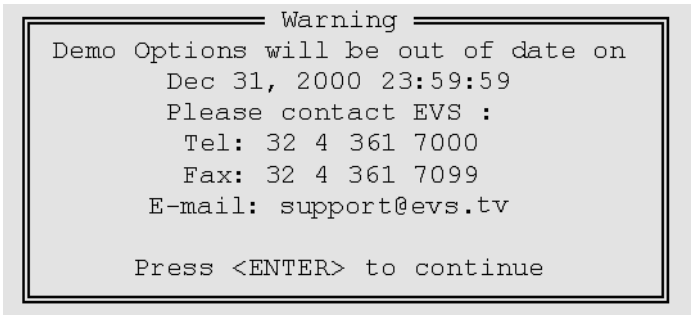
Phase:
This parameter shows the value currently set for the main video phase of the digital video outputs. Refer to the 'Phase Definition' section for details.

2.4 OPTIONS

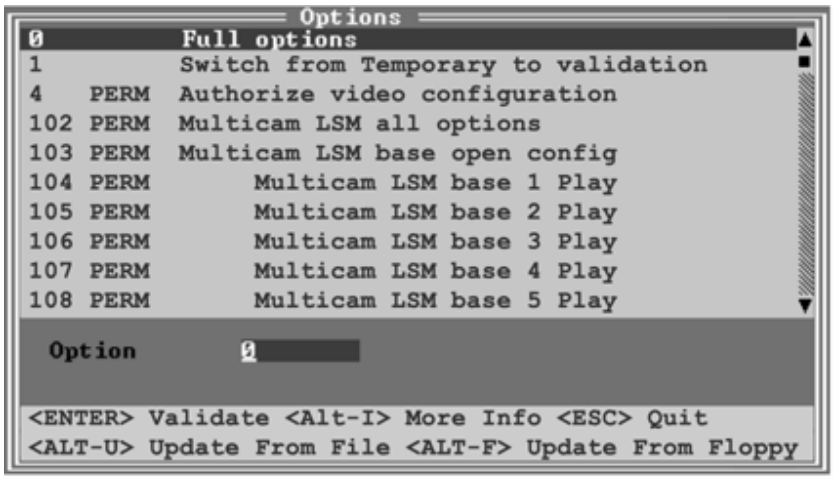
This function is used to manage software license codes for all applications. To run particular application software and/or specific software options, not only the software itself is required but also a license key, which is unique for every option on every system.

This license key can be temporary until a defined deadline for demonstration purposes, or permanent with no time limit.

When a temporary license key is about to expire, the system will warn the operator. The warning is displayed every time the EVS software starts, from 2 weeks before the expiration date. The following message appears:



To enter the Options menu, open the Maintenance Menu, then use the <↑> and <↓> keys to highlight the 'Options' line, and press <ENTER>. The Options window appears as shown below:



The highlighted lines show the valid options. The red line is the current line. Use the <↑> and <↓> keys to move inside the options list.
When temporary options are present, the limit time for these is shown in the lower part of the Options window.

To go back to the Maintenance Menu, press <ESC>.

EXAMPLE OF LINE FOR A PERMANENT OPTION:

104	**PERM**	**Multicam LSM Base 1 PLAY**

EXAMPLE OF LINE FOR A TEMPORARY OPTION:

109	**DEMO**	**Multicam LSM Base 6 PLAY**

TO ENTER NEW LICENSE CODES:

- If you have received a xxxxx.COD file (xxxxx = serial number of the server for which this file has been calculated) from EVS, copy this COD file on a floppy disk and press simultaneously [ALT]+[F] keys. The license codes will be automatically read from the floppy disk and updated into the system.

or

- You can also copy manually the xxxxx.COD file to the C:\ drive, then restart the EVS Menu, enter the Options windows and press simultaneously [ALT]+[U] keys. The codes will be read from the C:\ drive and updated into the system.

or

- Make sure the cursor blinks in the 'Option' box in the lower part of the Options windows.
- Type in the code corresponding to the desired option (license codes are sent by EVS Technical Support Dpt) and press <ENTER>.
- Repeat this operation for the next license code.
- You can check that the corresponding options are enabled by scrolling into the options list.

TO REMOVE A LICENSE CODE:

- Use the <↑> and <↓> keys to move inside the options list and select the option that must be removed.
- When the option is selected (white characters), press simultaneously <CTRL+ DEL> on the keyboard.
- Confirm the delete of the option with <ENTER> or cancel with <ESC>.

TO CHECK HARDWARE KEY (DONGLE) INFORMATION:

When the Options window is open, press simultaneously <ALT + I>
A new window 'Option Info' appears as shown below:

The following information is available:

System ID: ID code of the hardware key. This information is necessary for license code calculation. Factory setting only.

User: user's name. This information is a label and is for information only. Factory setting only.

Serial #: serial number of the mainframe. The S/N is also written on the back plate of the mainframe. Factory setting only.

Frame Type: defines the type of mainframe (6U or 4U). If this value is wrong, audio and video routing inside the system will not work properly. Factory setting only.

Limit time: expiry date & time for temporary license codes. This line does not appear when the permanent codes are installed.

Key time: current date & time of the hardware key. This is the date used to determine whether limit time for temporary license codes has been reached or not. Factory setting only.

Press <ENTER> to go back to the Options window

2.5 CLEAR VIDEO DISKS

This function is used to erase all clips and playlists of all applications present on the system. This will definitely delete all video and audio data, including protected clip and record trains.

- Use the <↑> and <↓> keys to select the 'Clear Clips' line and press <ENTER>
- You are asked to confirm <ENTER> or cancel <ESC> the command.

2.6 FORCE LOAD CLIPS

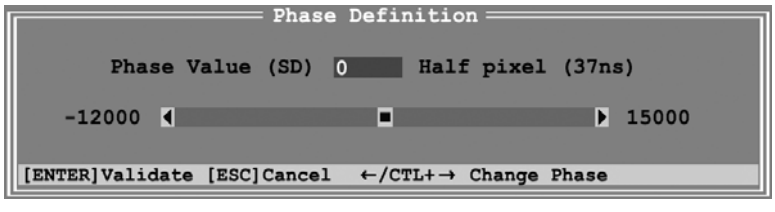
This function is used when swapping disks arrays between LSM's. If clips are saved to disks, this command forces the system to re-load the clips.

2.7 PHASE DEFINITION

This option is used to adjust the digital phase of the mainframe.

a. Standard Definition:

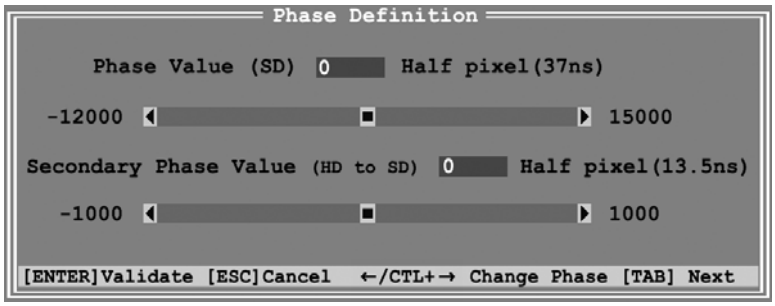
If the REF TYPE (see Configuration windows) is set to "SD BlackBurst", the phase definition window is as follows:



The phase value for SD can be adjusted between - 12000 ns and +15000 ns by 37 ns steps.

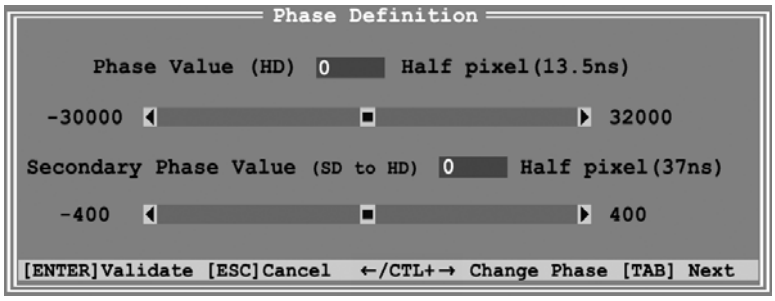
b. High Definition:

If the REF TYPE is set to “SD BlackBurst” and if the system is configured for HD, the phase definition window appears as follows:



The main phase value for SD can be adjusted between - 12000 ns and +15000 ns by 37 ns steps and the secondary phase value (relative phase of the HD SDI outputs compared to the phase of the SD SDI outputs) can be adjusted between - 1000 ns and +1000 ns by 13.5 ns steps

If the REF TYPE is set to “HD Tri-Level Sync” , the phase definition window is as follows:



The main phase value for HD can be adjusted between - 30000 ns and +32000 ns by 13.5 ns steps and the secondary phase value (relative phase of the SD SDI outputs compared to the phase of the HD SDI outputs) can be adjusted between - 400 ns and +400 ns by 37ns steps

COMMANDS:

- Use <←> and <→> keys to adjust the main phase value by half pixel (i.e. SD: 37 ns or HD:13.5 ns) steps or type in the value in the “pahse value” box.
- Use CTRL + <←> and <→> keys to adjust the phase value by 1-line (i.e. 1440 in SD; 2880 half pixel in HD 720p; and 3840 half pixel in HD 1080i) steps.
- Use <TAB> key to toggle between “Main Phase” and “Secondary Phase” boxes.
- Use <←> and <→> <↑> and <↓> keys to adjust the secondary phase value by half pixel (i.e. SD: 37 ns or HD:13.5 ns) steps or type in the value in the “phase value” box.

- Press <ENTER> to save the new values and return to the Maintenance menu or press <ESC> to go back to the Maintenance menu without saving the changes.


Note 1: The SD phase is always adjusted according to the SDI outputs. Internal CVBS outputs have a delay of 48 x 37 nsec compared to the corresponding SDI outputs.


Note 2: The internal CVBS outputs can not be used to feed directly a vision mixer or any equipment performing video effects, since the phase of the chroma subcarrier is not adjustable internally.

2.8 DEFAULT APPLICATION:

This option is used to define the default application that is automatically started by the system. Every time the EVS software is entered, the default application is started a few seconds later. You can avoid the automatic start by pressing the <SPACE BAR> or the <↑> and <↓> keys immediately when entering the EVS software. If no default application has been defined, the system will remain in the EVS software.

The default application is shown against a black background in the Application window.

TO DEFINE A DEFAULT APPLICATION:

- In the 'Application window', select the new default application using the <↑> and <↓> keys and press <F7>

OR:

- Call the Maintenance menu with <F9> and select "Default Application", select the defined application from the list, and press <ENTER>

→ If a default application was already defined, a message warns the operator that it will be disabled. The command can be confirmed with <ENTER> or cancelled with <ESC>.

→ If the command is confirmed, another message tells the operator that a new default application has just been defined.

TO REMOVE THE DEFAULT APPLICATION :

- In the 'Application window', select the application that is the current default application (blue characters with black background) using <↑> and <↓> keys, and press <F7>.

OR:

- Call the Maintenance menu with <F9> and select "Default Application". Then select the current default application from the list and press <ENTER>

→ a message warns the operator that the current default application will be disabled. The command can be confirmed with <ENTER> or cancelled with <ESC>.

2.9 DEFAULT PARAMETERS

This command erases all current parameters settings and restore the default factory settings for all applications. When selecting this option, you are asked to confirm the command or cancel it.

DEFAULT PARAMETERS FOR ALL APPLICATIONS:

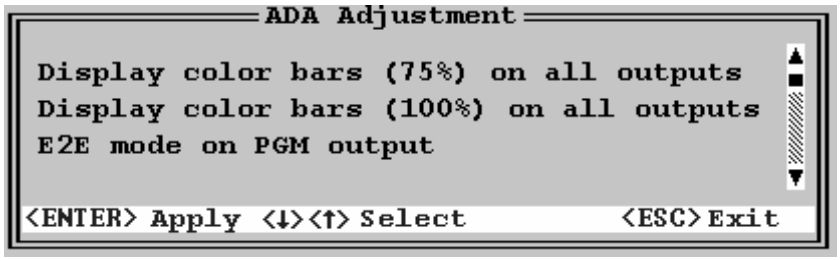
Line	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Application	LSM Custom	LSM 1CAM Cut	LSM 1CAM FX	LSM 2CAM Cut	LSM 2CAM FX	LSM 3CAM Cut	LSM 3CAM FX	Triple LSM	LSM 4CAM Cut	LSM 4CAM FX	Super LSM Cut	Super LSM FX	Super LSM + 1CAM	Super LSM + 2CAM
Video Players	1	1	2	1	2	1	2	3	1	2	1	2	2	1
Video Recorders	1	1	1	2	2	3	3	3	4	4	1	1	2	3
Type of REC 1	1	1	1	1	1	1	1	1	1	1	2	2	2	2
Audio Format	Analog	Analog	Analog	Analog	Analog	Analog	Analog	Analog	Analog	Analog	Analog	Analog	Analog	Analog
Audio Type	Stereo	Stereo	Stereo	Stereo	Stereo	Stereo	Stereo	Stereo	Stereo	Stereo	Stereo	Stereo	Stereo	Stereo
Recorders configuration (% Disk) *	100	100	100	50/50	50/50	33/33 /33	33/33 /33	33/33 /33	25/25 /25/25	25/25 /25/25	100	100	75/25	60/20 /20
Lipsync	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teletext	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disk Block Size	512	512	512	512	512	512	512	512	512	512	512	512	512	512
Operational Disk Size	90	90	90	90	90	90	90	90	90	90	90	90	90	90
Video Bitrate (SD)	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Video Bitrate (HD)	100	100	100	100	100	100	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4-line interpolation	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Interpolation Validation	0	0	0	0	0	0	0	0	0	0	1	1	1	1

* (% per channel)
Ex: 50/50 means 2 record channels, 50% of available storage for each channel.

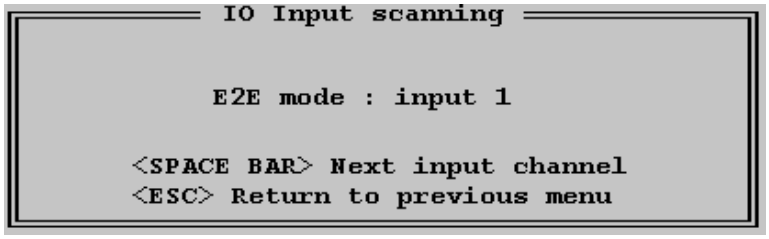
2.10 ADA ADJUSTMENT

This option is only available when the server is equipped with a frame buffer/mixer board of rev. A3 (not A3/R2 !)

This command displays colour bars (75% and 100%) on all outputs. It is useful to adjust the luminance and chrominance of ADA converters.



The E2E mode (Live) displays one input on the PGM output. So the video signal passes through the disk recorder system and through the ADA converters.
To switch inputs, press <SPACE BAR> in the I/O INPUT SCANNING window:



Note: To perform properly the ADA adjustments, please refer the ADA user's manual.

2.11 DEFAULT TO VGA

Between the PC boot and the I/O boot, the video driver is loaded and the display is switched to:

- VGA mode
- or B&W video mode, allowing the VGA screen to be displayed on a standard composite video monitor using the VGA↔BNC adapter provided with the unit.

At start-up, the keys' combination < ALT > and <Backspace> on the keyboard is still available for switching from one mode to the other.

2.12 TS CALIBRATION

When the Touch Screen option is installed, it can be calibrated using this command. If the Touch Screen is not installed, a warning message is displayed.

2.13 SET TIME

The Set Time command allows adjusting the system time & date.

Example of time format:

11:24:32a for 11 h 24 min 32 sec (a.m.)
10:58:00p for 10 h 58 min 00 sec (p.m.)

Example of date format:

10-24-1999 for October 24, 1999
03-15-2001 for March 15, 2001

2.14 HARDWARE CHECK / RAID REBUILD

The purpose of this tool is to check the hardware and to verify the validity of the data recorded on the video disk array. After the selection of this command from the Maintenance menu, the system automatically starts the test process.

One after the other, the different stages are displayed in the BOOT.HCTS window. The test process is complete when the HCTS board is initialized.

Hardware check is also used to rebuild the video and audio information after replacing a faulty disk.

When one disk of the video raid array has sustained errors, the Multicam automatically disconnect that disk and use the parity disk to rebuild the missing data and provide the video and audio data blocks to the application → the operator can continue working normally and the message "!Dsk" appears on all monitoring outputs.

When exiting the Multicam application, a warning will appear to remind the operator that one disk was disconnected, and invite him to perform a hardware check to repair the video raid:

```
1 Video disk disconnected.  Exit Multicam and
  run Hardware Check to rebuild Video RAID.
                Enter : OK
```

If the Multicam is restarted without the RAID being rebuilt, the following message is blinking during the Bootwins : "SCSI Controller #C disconnected in operation !". Then when entering the Multicam, another message appears :

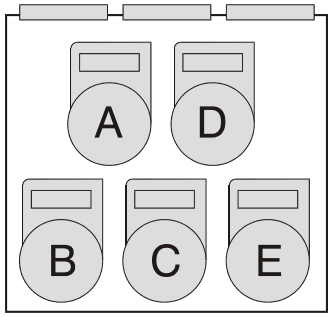
```
1 Video disk disconnected.  Exit Multicam and
run Hardware Check to rebuild Video RAID.
ESC : Exit        Enter : Continue
```

The operator can press enter and operate normally on 4 disks or exit the software and return to EVS Menu to run a Hardware Check.

From EVS Maintenance Menu, select the "Hardware Check" option. This allows the operator to identify the faulty disk. When the following message appears, turn off the system and replace the faulty drive :

```
REBUILD YOUR SYSTEM ?
SCSI Controller #C disconnected in operation !
Do you want to REBUILD your system on 5 disks ?
[Y]es  [N]o  [C]lear Clips
```

The faulty disk on the disk tray can be identified using the following diagram :



Then run Hardware Check again and answer "Yes" this time. Rebuild time takes about 1h for 5x18GB disks, 2h for 5x36GB disks, 4h for 5x73GB disks. A progress bar shows the rebuild status.

Note : If errors are detected during the rebuild process, a message appears after the rebuild is complete to warn the operator, and the raid is not considered as properly rebuilt. In this state, the system will keep working on 4 disks. If you want to run on 5 disks again, you can try replacing the disk again and perform another rebuild, or clear all clips.

If you don't need to retrieve the clips, you don't need to rebuild the RAID. In this case, select the "Clear All Clips" answer when the message with this option appears in the Hardware Check.

If you don't rebuild the RAID array or if you don't clear clips, the LSM will keep running on 4 disks only, and the operator will see a warning message appearing every time he starts or closes the multicam application. Normal operation can be achieved on 4 disks, but then, if another disk fails, the system will hang and all video and audio data will be definitely lost.

Note : If you suspect that the drive disconnection in operation was not due to an severe disk failure, but perhaps to the server being too prompt to disconnect a drive, you must run a hardware check immediately after ending the session during which the disk was disconnected and run a hardware check. Don't rebuild the RAID, but press simultaneously the [ALT] and [L] keys to generate the log file C:\SCSI.LOG, and send this file to EVS for detailed analysis. Note that this procedure is only valid if the drive is disconnected during operation, not for a drive being disconnected when booting the system.

Chapter 8 : Bootwin & Error Messages

1. Introduction

This section of the manual describes the sequences of the system's initialization and the errors that might occur during this process. These different error messages will allow the EVS engineers to identify quickly the reason of a hardware problem and to provide the operator a relevant solution.

2. Disk initialization

The system is trying to initialize the SCSI hard disks.
The message *"Waiting for disk information ... "* appears. The procedure is started on the system to initialize hard disks.
A status table is displayed :

	DISK A	DISK B	DISK C	DISK D	DISK E
Board #0	READY	READY	READY	READY	READY
Board #x	READY	READY	READY	READY	READY
Primary defects	XXX	XXX	XXX	XXX	XXX
Grown defects	YYY	YYY	YYY	YYY	YYY

It gives the status of each disk of each board. The different status are :

NOT PRESENT	Disk is not found.
PRESENT	Disk is present but Test unit ready function failed.
MAJOR ERROR	A major error has been detected: Disk cannot be used.
READY	Disk initialization succeeded.
NOT_READY	Time out after attempting to start the disk.
VERIFY_ERROR	An error occurred while verifying sectors on the disks. The system can probably work for a while but should be disconnected in operation.
LBA ERROR	LBA size is not 512. System cannot work.
SYS ERROR	All other possible errors.

The information regarding primary and grown defect is only available in maintenance mode (start check program in EVS menu). XXX is the number of primary defects found on each disks. YYY is the number of defects found on each disks.

After this table, the system displays the total capacity of all boards.
The message "Capacity of board #x : m.n GBytes or XXX blocs of YYY KBytes" is displayed.
where x is the board number
m.n is the size of the board in base 1024*1024*1024 (Giga bytes)
XXX is the number of blocs available on the disks
YYY is the size of each bloc.

If a major error has been detected on a disk, it has been disconnected. In this case, the system displays the message *"!!! SCSI CONTROLLER #X DISCONNECTED !!!"*. Where X is the number of the controller. It is advised to replace this disk and to rebuild its data if necessary. Start CHECK program in EVS menu to rebuild.

If more than 2 disks are faulty at start up, the system displays the message:

MORE THAN 2 CONTROLLERS IN ERROR
SYSTEM CANNOT WORK PROPERLY.

In that case, the faulty disks must be replaced. Data rebuild is not possible.

It is also possible that a major error occurred on the board or the board is not correctly plugged or simply missing, ... In this case, the system displays the message :

!!! ERROR : TIMED OUT -> SCSI BOARD #0 PROBABLY NOT PRESENT

In that case, check board installation. If the error persists, plug a new board.

3. Reading the configuration file

After the disk initialization sequence, the system reads the configuration file stored on the disk. This file contains the parameters which guarantee the coherence of main parameters of the system from session to session. Those parameters are : diskBlockSize and operationalDiskSize.

"Reading configuration file ... please wait" message is displayed during process.

IF THE CONFIGURATION FILE IS FOUND ON DISKS:

The parameters are displayed :

Configuration	**→ of user**	**on disks**
block size	**xxx kBytes**	**yyy kBytes**
nbr of blocks	**aaa**	**bbb**

This table shows the parameters stored on the system ('on disks' column) and the ones from the EVS advanced parameters ('of user' column).
The values from both colunms must be identical to use properly the system. If not, the system displays a warning message : *"A parameter incoherence has been detected" "Would you like to format the system"*. Answer *'Yes'* to format the A/V data saved on disks. Answer *'No'* to go back to EVS main menu.

Warning : If you answer 'Yes' and decide to format the system, all clips will be cleared. This operation is instantaneous.

IF THE CONFIGURATION FILE IS NOT FOUND

A warning message appears : *"Your system is not formatted" "Would you like to format the system ?"*. Answer *"Yes"* to format the A/V data saved on disks. Answer *"No"* to go back to EVS main menu.

IF ERRORS OCCUR WHILE READING THE CONFIGURATION FILE

The following message appears:
"Error reading configuration file – status = [Err]".
The type of error [Err] can be :

1. block error: A disk error occurred while loading the configuration file to disks. In this case, the disks have to be replaced by new ones.
2. cache overflow error: No more memory blocks are available from the memory cache.
3. checksum error: This error might occur when a disk has been replaced but the data of this disk is not restored. For solving the problem, start the Rebuild data process.
4. signature error: The signature of the configuration file is modified or the file format is modified and then the file is not compatible with the microcode. In this case, select the Format command to correct the error.

If the loading duration of the configuration file is too long, a time-out error message appears: *"READ CONFIGURATION ERROR : TIMED OUT – state = [ST]"*. In this case, reset the system and start again the application.

4. Formating the configuration file.

If the operator answers *'Yes'* to the message *"Would you like to format the system"*, the system generates a new configuration file on disks. The following messages appears:

```
Format : creating a new configuration file.
         blk size =        xxx kBytes
         number of blocs   aaa
         =
Formating … please wait.
```

If an error occurs, the message *"FORMAT ERROR : TIMED OUT – state = [ST]"* is displayed. In this case, reset the system and start again the application.

When format is completed successfully, the message *"Format completed"* is displayed and the system read the configuration file to be sure everything is in order.

Warning : If you answer 'Yes' and decide to format the system, all clips will be cleared. This operation is instantaneous.

5. Initializing the COLDFIRE microcode

The final step is the initialization of the microcode.

If the first line of the application is flashing with the message "Disk #x has been disconnected in operation", the system will display the message : "Disk to be disconnected : x". The system will work on 4 disks. Raid function is turned off.

The message "**Init board : nb blocks of size kBytes. Audio:aud DiskUse:use%**" is displayed.

Where	nb	is the number of blocks used on the system
	size	is the size in kBytes of a block on a disk
	aud	is ON/OFF
	use	is the operationalDiskSize in %

If the system must load tables (no clear clips done in EVS main menu), the message "Loading tables ..." will appear.

When the initialization is complete, the system displays the message *"HCTS board initialized"* and the system is ready. If an error occurs, the message *"ERROR (0xErr) : HCTS board not correctly initialized"* is displayed". The error (Err) can be :

If an error is detected while loading tables, the following message is displayed : *" LOAD TABLE ERROR – state = [St]"*. St can be :

1. block error. A disk error occurred while loading the table on hard disks. Maybe a disk failure. Replace disks.
2. cache overflow error. No more blocks available in cache. Algorithm problem.
3. checksum error. This can occur if a disk has been replaced and data not rebuilt on it. Rebuild data on the disk to clear the message.
4. overflow error. The size of the data saved on disk is higher than the size of the table. Software error. Immediately contact EVS.

If the message *"INIT ERROR : TIMED OUT – state = [St]"* is displayed, it means the initialization is not complete. St refers to a position in the code.

Note : Never forget that to start the multicam, the bootwins must successfully initialize the microcode. In that case, the message *"HCTS board initialized"* is displayed. In all other error case, the boot sequence or initialization phase is cancelled and multicam cannot be started.

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