QUESTTEL
Broadcast Systems

8 Chanel HD SDI Over Fiber

Transmitter and Reciever Extender

User Manual

L-8SDI-FE-HD-TX/RX

Contents

CHAPTER 1. INTRODUCTION 2

1.1 OVERVIEW 2
1.2 FEATURE 2
1.3 APPLICATION 3

CHAPTER 2. L-8SDI-FE-HD-TX/RX DESKTOP EQUIPMENT 4

2.1 FRONT PANEL 4
2.2 REAR PANEL 7

CHAPTER 3. L-8SDI-FE-HD-TX/RX RACK MOUNTING CHASSIS 8

3.1L-8SDI-FE-HD-TX/RX RACKPANEL 8

CHAPTER 4. TECHNICAL SPECIFICATION 10

CHAPTER 5. NTSC/PAL CONFIGURATION 12

APPENDIX1 SERIAL MANAGEMENT INTERFACE（CONSOLE） 14

Chapter 1. Introduction

1.1 Overview

The L-8SDI-FE-HD-TX/RX is a high performance, and reliable, 8-channel HD-SDI video optical transceiver, which perform real-time, loss-free and high-quality HD/SD-SDI transmission（audio embedded) over an optical line. Besides, L-8SDI-FE-HD-TX/RX provides one bi-directional RS485 data channel, and optional audio/contact closure/RS422/RS232 data transmission, which can be widely used in TV live broadcast, high-definition video conference,

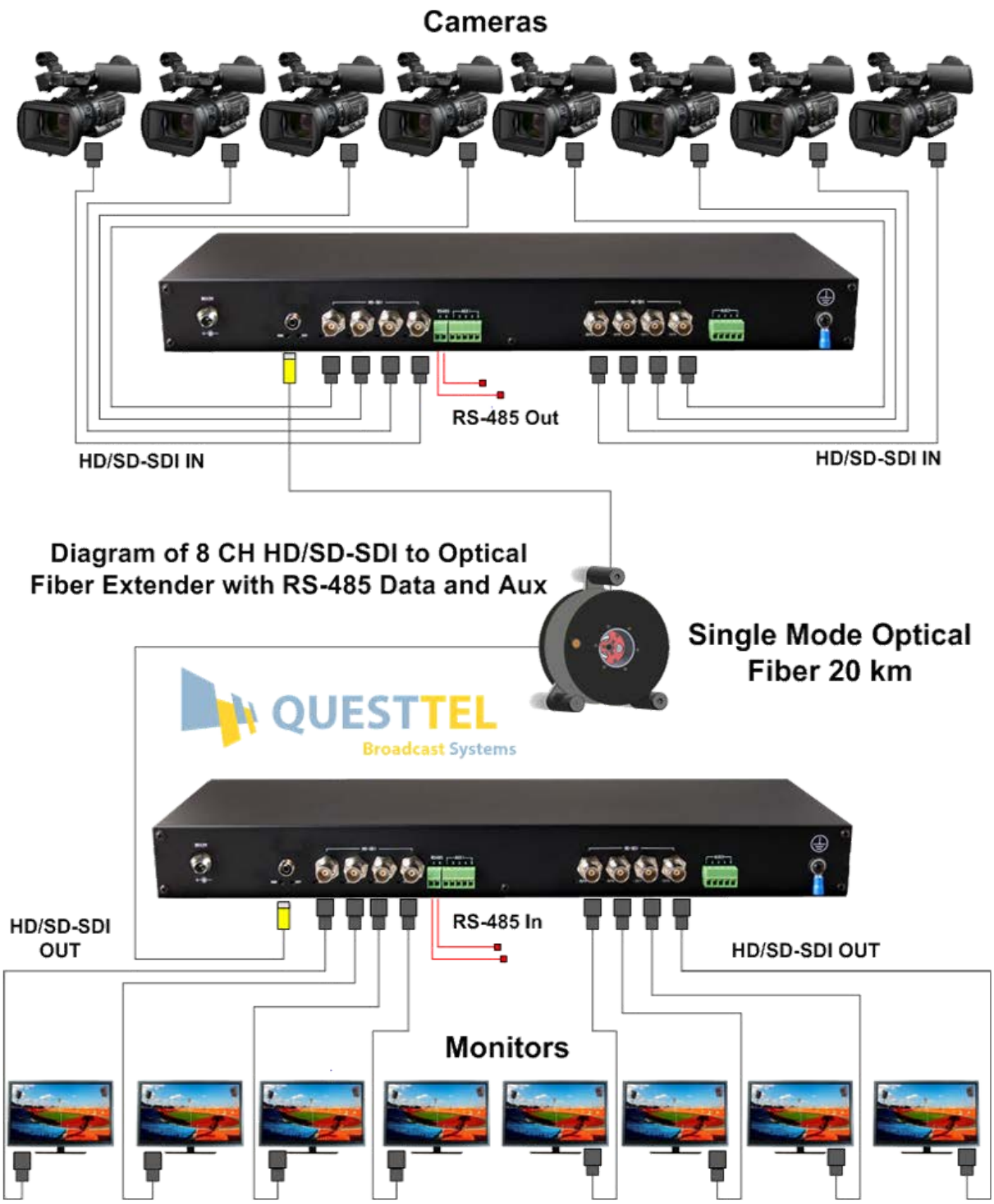
high-definition video monitoring, intelligent transportation system and public security system.

The L-8SDI-FE-HD-TX/RX includes desktop equipment and rack mounting chassis, the desktop equipment includes a transmitter named L-8SDI-FE-HD-TX and a receiver named L-8SDI-FE-HD-RX. The rack mounting chassis is used as the centralized HD-SDI receiver, adopts chassis with 19 inch width, 4U height

1.2 Feature

- Comply with SMPTE-292M HD-SDI and SMPTE-259M SD-SDI standard, supports 1.485Gb/s and 270Mb/s
- L-8SDI-FE-HD-TX: 8 HD/SD-SDI inputs (BNC)
- L-8SDI-FE-HD-RX:8 HD/SD-SDI outputs(BNC)
- Each SDI channel includes 2-channel audio embedded
- One bi-directional RS485 channel, half duplex, up to 115.2Kb/s baud rate
- Two auxiliary channels, which can be audio, RS422 , or RS232 channel
- Supports 1080P@30,25,24, 29.97, 23.98、1080I@60,50,59.94、720P@60,50,30,25,24, 59.94, 29.97, 23.98 and 625i、525i format
- With integrated cable equalizer
- Embedded ESD and surge protection circuit to prevent damage from static and thunder
- With NOP (No optical signal) alarm indications, output status indicator and input lock indicator
- With APC circuit to perform stable optical power

1.3 Application



Chapter 2. L-8SDI-FE-HD-TX/RX Desktop Equipment

2.1 Front Panel

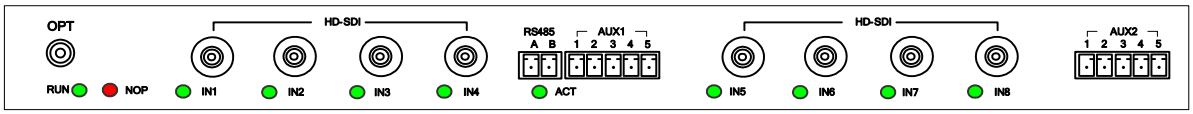


Figure 2-1-1 L-8SDI-FE-HD-TX Front Panel

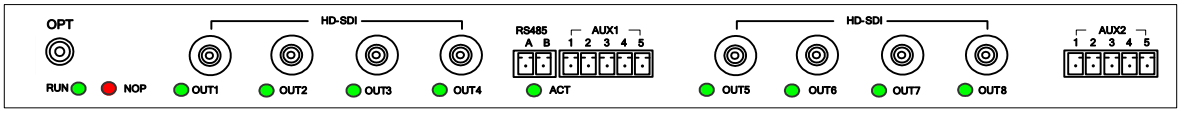


Figure 2-1-2 L-8SDI-FE-HD-RX Front Panel

Table 2-1-1 Interfaces on L-8SDI-FE-HD-TX/RX front Panel

Name	Description	
OPT	Optical interface, bi-directional, adopts FC connector	
HD-SDI	IN [1:8]	HD-SDI input 1~8
	OUT [1:8]	HD-SDI output1~8
RS485	RS485 interface, adopts PHOENIX connector	
	A	RS485 differential signal A
	B	RS485 differential signal B
AUX1	Auxiliary channel, all the interfaces listed in table 2-1-3 are supported, and both bi-directional and unidirectional interfaces are supported. Refer to table 2-1-3 for more.	
AUX2	Auxiliary channel, all the interfaces listed in table 2-1-3 are supported, but only unidirectional interfaces are supported. For example, AUX204 in AUX2 for RS485, only unidirectional RS485 from transmitter AUX2 input to receiver AUX2 output can be supported. Refer to table 2-1-3 for more.	

Note: if the auxiliary channel is used as the audio channel, the embedded audio channel in the HD-SDI signal will be unavailable.

Table 2-1-2 Indicators on L-8SDI-FE-HD-TX/RX front panel

Name	Description
NOP	Optical signal loss alarm indicator, red. ON: Optical signal loss is detected at the port. OFF: the optical port receive normal signal.
RUN	Running indicator, green. Normal blink: works normally OFF: Abnormal.
IN [1：8]	The HD-SDI input lock indicator, green.

	ON: video input normally. OFF: video input abnormally.
OUT[1：8]	The SD/ HD-SDI output status indicator, green. ON: output normally. OFF: output abnormally.
ACT	RS485 link indicator, green. Blink: There are data transmitting and receiving; OFF: No data transmit or receive;

Table 2-1-3 AUX interface

AUX interface	No.	Name	Description
2-channel bi-directional audio (AUX206)	1	AOUT1	Audio channel -1 output
	2	AOUT2	Audio channel -2 output
	3	G	Ground
	4	AIN1	Audio channel -1 input
	5	AIN2	Audio channel -2 input
4-channel forward audio input (AUX211)	1	AIN1	Audio channel -1 input
	2	AIN2	Audio channel -2 input
	3	G	Ground
	4	AIN3	Audio channel -3 input
	5	AIN4	Audio channel -4 input
4-channel backward audio Output (AUX212)	1	AOUT1	Audio channel -1 output
	2	AOUT2	Audio channel -2 output
	3	G	Ground
	4	AOUT3	Audio channel -3 output
	5	AOUT4	Audio channel -4 output
4-channel backward audio Output (AUX207)		AOUT1	Audio channel -1 output
		AOUT2	Audio channel -2 output
		G	Ground
		--	--
		--	--
4-channel backward audio input (AUX208)		AIN1	Audio channel -1 input
		AIN1	Audio channel -2 input
		G	Ground
		--	--
		--	--
2-channel contact closure output (AUX200)	1	NC0	The first channel contact closure output No alarm: the contact is normally-closed (NC) Alarm: the contact is open
	2	COM0	Command contact of the first channel contact closure

	3	NC1	The second channel contact closure output No alarm: the contact is normally-closed (NC) Alarm: the contact is open
	4	COM1	Command contact of the second channel contact closure
	5	--	--
2-channel contact closure input (AUX201)	1	K0	The first channel contact closure input
	2	COM0	Command contact of the first channel contact closure
	3	K1	The second channel contact closure input
	4	COM1	Command contact of the second channel contact closure
	5	--	--
1-channel bi-directional RS422/ 2-channel bi-directional RS485 AUX204(T side)	1	TXA(T/ RXA1)	RS422 differential signal A output/ RS485 channel-1 differential signal A
	2	TXB(T/ RXB1)	RS422 differential signal B output/ RS485 channel-1 differential signal B
	3	RXA(T/ RXA2)	RS422 differential signal A input/ RS485 channel-2 differential signal A
	4	RXB(T/ RXB2)	RS422 differential signal B input/ RS485 channel-2 differential signal B
	5	G	Ground
1-channel bi-directional RS422/ 2-channel bi-directional RS485 AUX204(R side)	1	RXA(T/ RXA1)	RS422 differential signal A input/ RS485 channel-1 differential signal A
	2	RXB(T/ RXB1)	RS422 differential signal B input/ RS485 channel-1 differential signal B
	3	TXA(T/ RXA2)	RS422 differential signal A output/ RS485 channel-2 differential signal A
	4	TXB(T/ RXB2)	RS422 differential signal B output/ RS485 channel-2 differential signal B
	5	G	Ground
2-channel bi-directional RS232 (AUX205)	1	TX1	RS232 signal output 1
	2	RX1	RS232 signal input 1
	3	G	Ground
	4	TX2	RS232 signal output 2
	5	RX2	RS232 signal input 2

Note1: The AUX interface of L-8SDI-FE-HD-TX/RX are used in pairs, e.g. if L-8SDI-FE-HD-TX use 4-channel unidirectional audio output interface, L-8SDI-FE-HD-RX should use 4-channel unidirectional audio input interface.

Note2: If the auxiliary channel is used as the audio channel, the embedded audio channel in the HD-SDI signal will be unavailable.

2.2 Rear Panel

Figure 2-2-1 L-8SDI-FE-HD-TX/RX Rear Panel

Table 2-2-1 L-8SDI-FE-HD-TX/RX Rear Panel

Name	Description
DC12V	DC 12V power input interface Adopts AC220V/DC12V power adapter, provides 12V power supply
⏚	Protective ground (PGND) screw, connect with the chassis.

Chapter 3. L-8SDI-FE-HD-RX Rack mounting chassis

Rack mounting chassis is 19 inch width, 4U height, with eight 8-channel HD-SDI optical receive cards L-8SDI-FE-HD-RX RACK. Besides, the rack mounting chassis has 3 fans and 2 power modules, supports redundant power protection.

Table 3-1 Card list of rack mounting chassis

Name	Module	Description	Slot	Remote
8-channel HD-SDI optical receive card	L-8SDI-FE-HD-RX RACK	8 HD-SDI output interfaces, one RS485 interface and one auxiliary channel.	1-16	L-8SDI-FE-HD-TX
-48V DC power card	PWR100DC	-48V DC power input, +12V power output. The power consumption is 100W, supports power management control.	Specific power card slot	-
220V AC power card	PWR100AC	~220VAC power input, +12V power output. The power consumption is 100W, supports power management control.		-

Note: The HD-SDI optical receive card supports hot-pluggable, which won't affect other working cards.

3.1 L-8SDI-FE-HD-TX/RX RACK panel

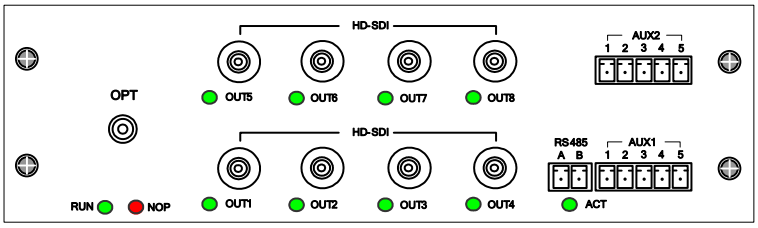


Figure 3-1-1 L-8SDI-FE-HD-RX RACK panel

The panel description of L-8SDI-FE-HD-RX RACK is the same with that of L-8SDI-FE-HD-RX, refer to section 2.1 for more.

3.3 The rear view of rack mounting chassis

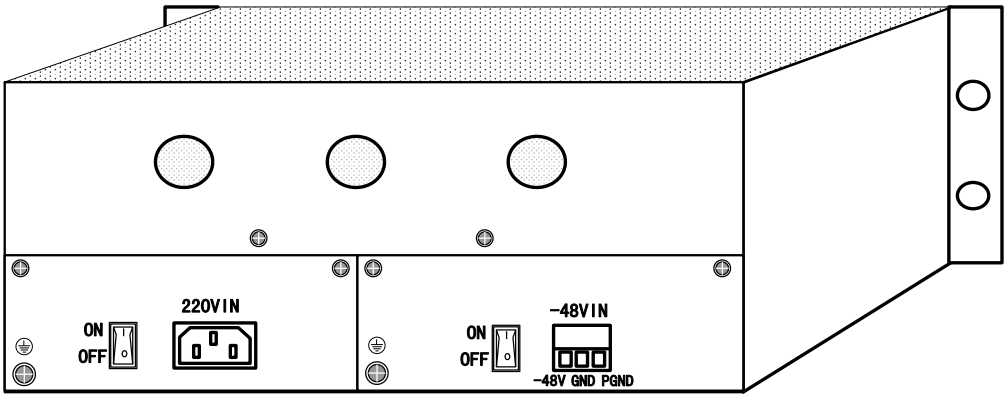


Figure 3-2-1 The rear view of rack mounting chassis

Table 3-2-1 The rear view of rack mounting chassis

Name	Description
-48VIN	-48VDC power interface, the voltage range：-36~-72V。
PGND	Protective ground (PGND) screw, connect with the chassis.
GND	-48V power ground
220VIN	~220V AC power interface, the voltage range:176~264V
Power switch	“ON”: Power On; “OFF”: Power Off.
⏚	Protective ground (PGND) screw, connect with the chassis.

Chapter 4. Technical Specification

Table 4-1 Technical Specification

Item	Typical value
SDI Interface	
Connector	BNC
Bit rate	1.485Gb/s and 270Mb/s auto adaptive
Impedance	75Ω
Return loss	>15dB
Output level	800mVp-p±10%
Rise and fall time（HD-SDI）	≤270ps
Rise and fall time（SD-SDI）	≤1.50ns
SD-SDI Alignment jitter (1KHz)	≤0.2UI
SD-SDI Timing jitter (10Hz)	<0.2UI
HD-SDI Alignment jitter (100KHz)	≤0.2UI
HD-SDI Timing jitter (10Hz)	<1.0UI
Standard	Comply to SMPTE-292M HD-SDI and SMPTE-259M SD-SDI standard
Audio Interface (Optional)	
Connector	PHOENIX connector
Impedance	Input high-impedance, output 600Ω
Quantization grade	20bits
Sample frequency	48KHz
Audio input/output voltage	2VP-P
Bandwidth	20Hz~20KHz
Total Harmonic Distortion	0.1%
RS485 Interface	
Connector	PHOENIX connector
Baud rate	0~115.2Kb/s
Bit error ratio	$<10^{-9}$
Duplex	Half-duplex
CONSOLE Interface	
Connector	RJ45
Baud rate	19200
bits	8
Stop bit	1
parity check	None
EMU/EMU-EX Interface	

Connector	RJ45
Bit rate	10Mb/s or 100Mb/s auto adaptive
Power and Consumption for desktop equipment	
Power supply	DC 12V
DC input voltage range	8V~14V
Power consumption	3W±10％
Power and Consumption for rack mounting chassis	
Power supply	AC 220V /DC-48V
DC input voltage range	-36～-72V DC
AC input voltage range	176~264V
Power consumption for each card	3W±10％
Environment Requirements	
Working temperature	-30～60℃
Relative Humidity	≤95％, no condensation
Storage temperature	-40～85℃
Equipment dimension	
Dimension of Rack mounting chassis （with rack ear）	330mm x 178mm x 482mm
Desktop equipment dimension	434mm×44mm×155mm

Note: The optical module is optional for users, the default is 20Km, other long distance needs to be declared when ordering.

Chapter 5. NTSC/PAL Configuration

The transmitter can automatically detect the HD-SDI/SD-SDI standard of the input video, the receiver supports a PAL/NTSC dial switch to configure the standard of the output video. When the input video is 1080P@30,25,24, 1080I@60,50, 720P@60,50,30,25,24, the receiver should be configured as PAL; when the input video is 1080P@29.97, 23.98, 1080I@59.94, 720P@59.94, 29.97, 23.98, the receiver should be configured as NTSC; when the input video is 625i, 525i i.e. SD-SDI, both the PAL and NTSC are OK on the receiver.

Figure 5-1 The dial switch for PAL/NTSC standard and embedded audio

When the input video is 625i, 525i i.e. SD-SDI, the audio embedded in the SD-SDI can be tramsmitted to the receiver transparantly. When the input video is HD-SDI, if there is AUX audio interface, the audio signal is transmitted between the AUX audio interface and the audio embedded in the HD-SDI is muted; if there is not AUX audio interface, the audio embedded in the HD-SDI can be transmitted. Only in the last case above, the HD MUTE dial switch is valid: NORMAL means the audio embedded in the output video is normal, and HD MUTE means the output video is muted.

Appendix1 Serial management interface（CONSOLE）

Table A-1 Pin description of CONSOLE interface

Pin	Definition	Remarks
PIN1	-	Null
PIN2	-	Null
PIN3	-	Null
PIN4	-	Null
PIN5	-	Null
PIN6	GND	Ground
PIN7	RSNM-IN	Serial network management channel input
PIN8	RSNM-OUT	Serial network management channel output

The CONSOLE cable adopts RJ45 connector at one end to connect the front panel of equipment, and DB9 connector at the other end to connect PC, the diagram is as Fig. A-1-1, Fig.A-1-2 shows:

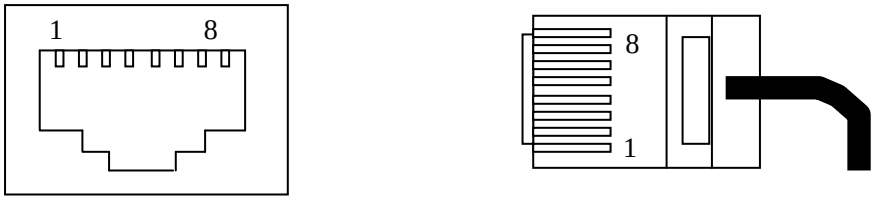


Figure A-1-1 RJ45 connector

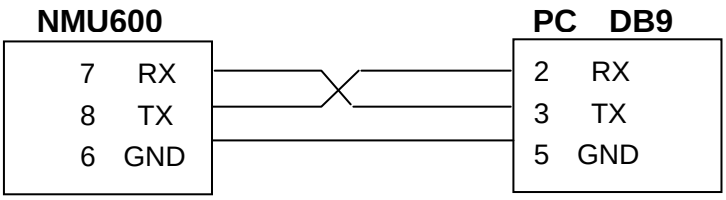


Figure A-1-2 Connection

Safety Instructions

Read before operating equipment.

1. Cleaning - Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
2. Power Sources - Use supplied or equivalent UL/CSA approved low voltage DC plug-in transformer.
3. Outdoor Antenna Grounding - If you connect an outside antenna or cable system to the product, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna discharge unit, connection to grounding electrodes, and requirements for the grounding electrode.
4. Lightning - Avoid installation or reconfiguration of wiring during lightning activity.
5. Power Lines - Do not locate an outside antenna system near overhead power lines or other electric light or power circuits or where it can fall into such power lines or circuits. When installing an outside antenna system, refrain from touching such power lines or circuits, as contact with them might be fatal.
6. Overloading - Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.
7. Object and Liquid Entry - Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short out parts, resulting in a fire or electric shock. Never spill liquid of any kind on the product.
8. Servicing - Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
9. Damage Requiring Service - Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
- When the power supply cord or plug is damaged.
- If liquid spills or objects fall into the product.
- If the product is exposed to rain or water.
- If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions. An improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.
- If the video product is dropped or the cabinet is damaged.
- When the video product exhibits a distinct change in performance, this indicates a need for service.