Model LTM-ER4 User Manual

LTM-ER4
4 Machine Signal Router for Non-Linear Edit Systems

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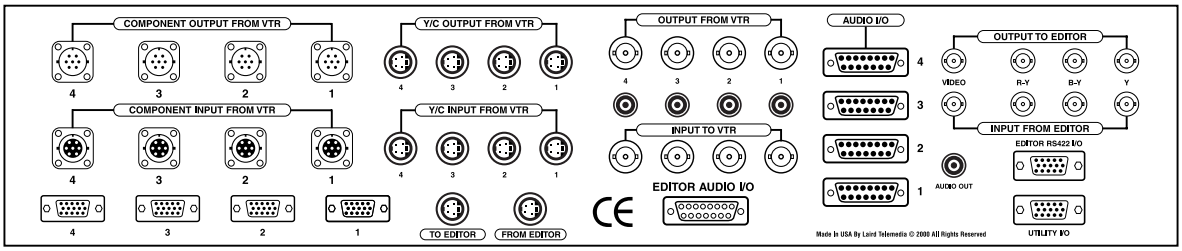

The LTM-ER4 provides a simple solution for routing multiple video sources in and out of your Non-Linear Edit (NLE) System. This clever router enables selection between four video sources to feed your NLE input in three video formats: Component, Y/C and Composite. Balanced 2-Channel audio and RS422 machine control will follow the video selection.

By connecting the NLE output to the LTM-ER4's assignment section, the NLE signals can be sent to any one of 4 devices, including the inputs to the same VTRs used in the NLE download process.

The LTM-ER4 provides a distinct advantage over multiple format patchbays and, with just a 2RU cabinet, it saves valuable rack space. NTSC, PAL, PAL-M, PAL-N and SECAM Compatible. Operates on 110/220 Volts with an automatic switching power supply.

SPECIFICATIONS

Mechanical Specifications:
4X1 SOURCE SELECTOR SECTION
VIDEO: **4 Component:** R-Y, B-Y, Y (7-Pin Female Connector)
(7 Pin Male to 3 BNC breakout cable provided)
4 YC Video: (4-Pin Din female)
4 Composite Video: 75Ω BNC connectors

AUDIO: **4 Dual Channel Balanced** (15-Pin D-Sub)
(15 Pin D-Sub to Female XLR Breakout Cable Provided)
4 Mono Unbalanced (RCA Phono)

CONTROL: **4 RS422 serial control-full duplex**
(each device)
Serial Control I/O (9-Pin D-Sub Female)

1X4 DESTINATION SELECTOR SECTION
VIDEO: **4 Component:** R-Y, B-Y, Y (7-Pin Male Connector)
(7-Pin Female to 3 BNC breakout cable provided**)**
4 YC Video: (4 Pin Din female)
4 Composite Video: 75Ω BNC connectors
AUDIO: **4 Dual Channel Balanced** (15 Pin D-Sub)
(15 Pin D-Sub to Male XLR Breakout Cable Provided)

EDITOR INTERFACE INPUT-OUTPUT
COMPONENT VIDEO: 1 R-Y, B-Y, Y (3 BNC Connectors)
YC VIDEO: 1 YC 4-Pin Din Female Connector
COMPOSITE VIDEO: 1 75Ω BNC Connector

BALANCED AUDIO I/O: 1 Dual Channel: 15-Pin Male D-Sub
(15-Pin to 2 Female XLR breakout Cable Provided)
1 Mono Channel: RCA Connector
SERIAL RS422 I/O: 1 9-Pin Female D-Sub Connector
UTILITY PORT: 1 9-Pin Male D-Sub Controls External Add-on Modules

VIDEO SPECIFICATIONS

VIDEO PERFORMANCE: Measured with a 40 IRE 3.58Mhz sine wave a linear ramp 0-100 IRE
BANDWIDTH: 70Mhz unity gain bandwidth
RESPONSE: DC - 100Mhz overall
DC - 70Mhz Baseband @ ± 0.05dB
TILT: < 0.5%
OVERSHOOT: < 0.15%
DC OFFSET: 0V @ 1Vp-p into 75 ohm
DIFFERENTIAL GAIN: 0.01%
DIFFERENTIAL PHASE: 0.05%
ADJ. CROSSTALK: -65dB tested @ 10Mhz

AUDIO SPECIFICATIONS

AUDIO PERFORMANCE: Measured with 1KHz 1.2Vp-p sine wave (balanced audio)
FREQUENCY RESPONSE: 10-60KHz ± 0.1dB
S/N RATIO: 85dB, at specified tested center frequency for response
DISTORTION: < 0.05%
CROSSTALK: > 110dB isolation

FRONT PANEL CONTROLS
SOURCE SELECTOR: 4 Pushbuttons with LED confirm:
Selects 1 of 4 source devices to Editor
RECORD DESTINATION SELECTOR: 4 Pushbuttons with LED confirm**:** Selects 1 of 4 destinations
CONTROL: Toggles RS422 control between Source Select or Record Destination switches

PHYSICAL SPECIFICATIONS
POWER: 110/220V AC 50/60 Hz @ .5amps, Automatic Switching
DIMENSIONS: 3.5"H x 7"D x 19"W EIA Rackmount

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LTM-ER4
4 Machine Signal Router for Non-Linear Edit Systems

General Description

The **LTM-ER4** represents the ultimate product for Non Linear Editor (NLE) to media machine interface. It features many operational functions that make this product a true enhancement to today's modern audio-video production facility.

The **LTM-ER4** is a multi-format 4x1 selector on the source/input side and a similar 1x4 assignment router on the output side. The **LTM-ER4** can be configured in several setups to accomplish the work demands of a production facility. The basic scenario is the 4 machine and one NLE configuration. In this setup, the **LTM-ER4** allows you to select & download from four source machines for input to the NLE. After editing is done on the NLE, the **LTM-ER4** assigns the NLE output signal back to any of the source machines now performing as recorders. With additional equipment, the **LTM-ER4** can actually accept four source machines and feed four separate recorders. In another configuration, the **LTM-ER4** can route signals between two NLE units and a single VTR.

The **LTM-ER4** features a state-of-the-art microprocessor embedded controller commanding high speed, low noise, high frequency, monolithic block router chipsets. This high tech design presents an ultra high performance platform providing years of service to your production facility.

Special Features

AUTOMATIC 110/220 50/60 CYCLE POWER OPERATION

The **LTM-ER4** delivers a high grade computer power supply assuring years of trouble free performance worldwide. It's always ready to operate - just plug it in and the system automatically determines & switches to the line voltage.

AUTOMATIC POWER-UP DIAGNOSTICS

The **LTM-ER4** will run its own self-diagnostics once power is supplied. This feature tests the on-board microprocessor and the software running the unit. After the diagnostics are completed, the **LTM-ER4** selects input #1 and awaits the operator's next command.

SINGLE BUTTON OPERATION

The **LTM-ER4** was designed to be extremely easy to operate, allowing the operator to concentrate on the production work at hand. Four input selector pushbuttons and four output selector pushbuttons are the major controls on the front panel.

BUILT-IN CABLE DRIVERS

The **LTM-ER4** is designed with audio and video buffered cable drivers. This feature allows the **LTM-ER4** to interface with extended cable runs between machines without the need for expensive cable driving electronics.

FULL RS422 SERIAL CONTROL

The **LTM-ER4** completely interfaces with standard RS422 (9pin) machine control protocol. Simply cable the machine under control to the **LTM-ER4** and the NLE, and all full duplex RS422 control is automatically routed by the front panel switches in conjunction with audio/video switching.

TWO CHANNEL BALANCED AUDIO INPUT-OUTPUT

The **LTM-ER4** features full 2 channel balanced audio for all four source and output devices. Using 15 pin D-Subs for low profile interface, the **LTM-ER4** is ready for any and all broadcast balanced audio equipment. Unbalanced audio switching is also provided using RCA connectors.

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Setup Guidelines

A. Be certain to twist, lock and properly seat the 7 pin Component cables.
B. Be certain to screw down all D-Sub connections firmly.
C. Dress cables in groups: Video, Audio, Control. Label each cable for easy recognition later.
D. Strain relieve all cables so that the weight of the cables are not pulling on the **LTM-ER4** cabinet.
E. Plug the **LTM-ER4** into a safe, surge protected AC outlet. **Do not** use low quality passive surge protector outlet strips. These strips can cause noise problems.
F. Do not run unbalanced audio cables for distances in excess of 20 feet. Unbalanced cables over this length can pick up noise from external sources.
G. Do not run balanced cables for over 100 feet. For distances over this length, it is suggested that a line driver amplifier be used.
H. Do not run RS422 cables longer than 15 feet. For distances in excess of 15 feet, use a high quality 9-Pin D-Sub cable.
I. Provide adequate ventilation for the **LTM-ER4**. Do not sandwich the unit between two very warm pieces of equipment such as waveform monitors or vectorscopes.
J. The **LTM-ER4** is not a vertical interval switcher. Switching live between VTR inputs will cause a glitch in the video signal.

Video Signal Operation

THE LTM-ER4 IS DESIGNED TO HANDLE THREE VIDEO SIGNAL FORMATS:

- **COMPONENT:** R-Y, B-Y, Y or Y,U,V
- **SVHS:** YC
- **COMPOSITE:** CVBS

The **LTM-ER4** handles up to four video signals in all three formats. All formats are handled simultaneously, therefore, when a selector button is depressed, the three formats are online. In the output section, the pushbuttons work the same way assigning the three NLE video formats to the selected destination simultaneously.

Laird provides 7-Pin multicore to 3 BNC breakout cables for the component video input & output signals. Utilize standard 4-Pin DIN SVHS cables for S-Video inputs & outputs and standard BNC cables Composite video signals.

Audio Signal Operation

The **LTM-ER4** handles standard 2 channel balanced audio. Because it would be impossible to fit 20 standard XLR connectors on a 2 RU enclosure, the **LTM-ER4** comes with 15-Pin D-Sub to Male/Female XLR breakout cables for balanced audio input and output. **Unbalanced** signals are accommodated via standard RCA jacks.

RS422 Control Operation

Each machine interface is equipped with a standard RS422 9 pin D-Sub for serial machine control. An RS422 port is also provided for the NLE connection. The **LTM-ER4** allows the operator to control the VTRs either in the source/download mode or output/record mode by a front panel toggle switch. During the download operation, the toggle switch is switched to face the "input select" pushbutton switches. Now each pushbutton will automatically select the VTRs audio, video and associated RS422 control.

When the NLE is feeding a VTR during upload/record (it is possible to use the same VTRs for download and upload as long as they are recorder/players), the control toggle is switched toward the "output selector" pushbuttons. Now the same RS422 routing functions will perform between NLE and VTR.

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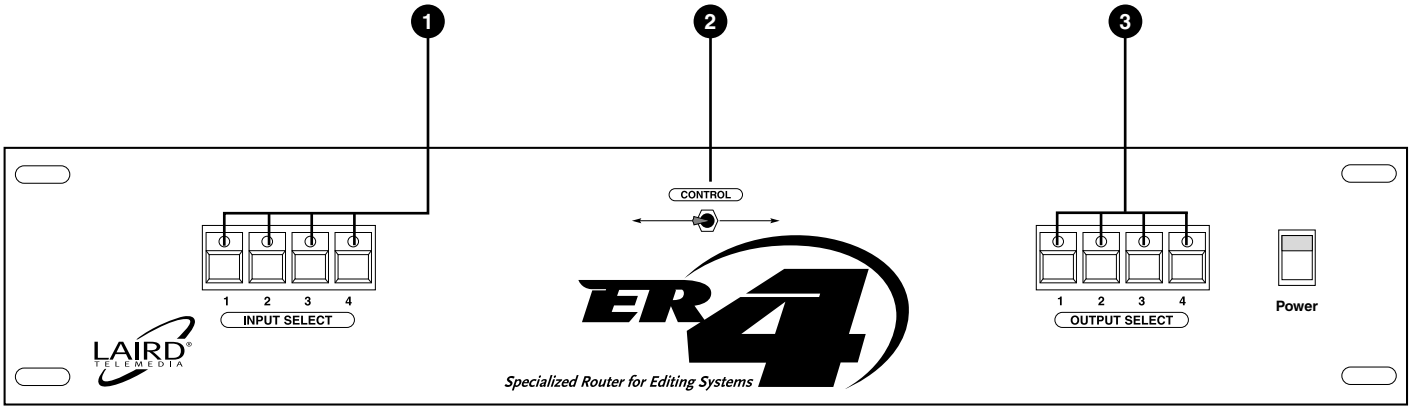
FRONT PANEL SECTION DESIGNATIONS



1 Input Selection: Each button, when pushed, selects an input to the 4x1 Router platforms. LED flashes when button is pressed.

2 Control Toggle: Determines which set of push buttons will control RS422 Serial Router. When switch is aimed to the **left**, input selector switches control RS422. When switch is aimed to the **right**, output selector switches control RS422.

3 Output Selection: Each button, when pushed, selects a destination for the 1x4 Assignment Router. LED flashes when button is pressed.

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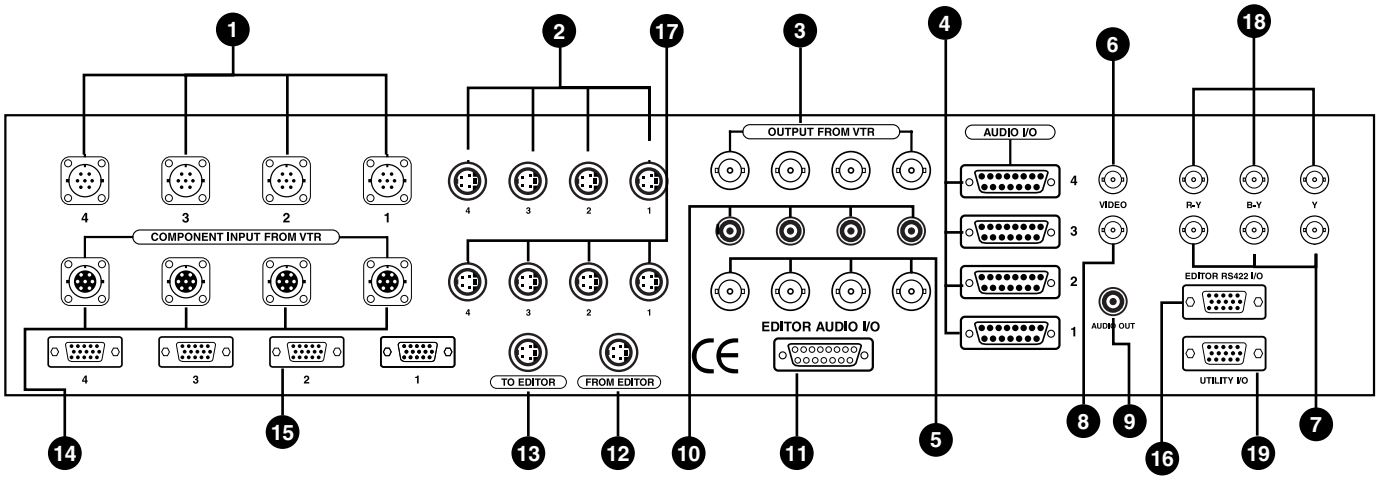
BACK PANEL SECTION DESIGNATIONS



1. **Component Video Inputs** (R-Y, B-Y, Y - YUV)**:** To the LTM-ER4 4x1 Component Video Router using the 4 7-Pin female to BNC breakout cables provided. One cable for each device.
2. **SVHS Video Inputs** (Y/C)**:** 4-Pin DIN connectors - To the LTM-ER4 4x1 SVHS Router
3. **Composite Video Inputs**: BNC Connectors - To the LTM-ER4 4x1 Composite Video Router
4. **Audio Input/Output:** 15-Pin D-Sub Connectors - **Inputs** for LTM-ER4 4x1 balanced audio router (Female XLRs)
   Outputs from LTM-ER4 1x4 balanced audio router (Male XLRs)
   (**4 Sets of 15-Pin to XLR breakout cables** are provided with the LTM-ER4. 15-Pin connector pinout is provided in the technical data section of this manual)
5. **Composite Video Outputs:** BNC Connectors from the LTM-ER4 composite video 1x4 Assignment Router.
6. **Composite Video Output:** BNC Connector from the LTM-ER4 composite video 4x1Router.
7. **Component Video Input** (R-Y, B-Y, Y - YUV)**:** BNC Connectors to the LTM-ER4 1x4 Component video assignment router
8. **Composite Video Input:** BNC Connector to the LTM-ER4 1x4 Composite Video Assignment Router
9. **Unbalanced Audio Output:** RCA Connector from the LTM-ER4 4x1 Unbalanced Audio Router
10. **Unbalanced Audio Inputs:** RCA Connectors to the LTM-ER4 4x1 Unbalanced Audio Router
11. **Balanced Audio Input/Output:** **Output** from the LTM-ER4 4x1 Balanced Audio Router (Male XLRs)
    Normally fed to non-linear input
    Input to the LTM-ER4 1x4 Balanced Audio Assignment Router (Female XLRs)
    Normally from non-linear editor output
12. **SVHS Input:** 4-Pin DIN Connector to the LTM-ER4 1x4 Assignment Router
13. **SVHS Output:** 4-Pin DIN Connector from the LTM-ER4 4x1 SVHS Video Router
14. **Component Video Outputs** (R-Y, B-Y, Y - YUV)**:** From the LTM-ER4 1x4 Component Video Assignment Router using the 4 7-Pin Male to BNC breakout cables provided. One cable for each device.
15. **RS422 Machine Control:** 9-Pin D-Sub Connectors for the LTM-ER4 4x1 RS422 Router connect to each device under control
16. **RS422 Machine Control:** 9-Pin D-Sub Connectors from the LTM-ER4 RS422 4x1 Router. Connect to controller (NLE).
17. **SVHS Outputs:** 4-Pin DIN Connector from the LTM-ER4 1x4 SVHS Assignment Router
18. **Component Video Outputs** (R-Y, B-Y, Y - YUV): BNC Connectors from the LTM-ER4 4x1 Component Video Router
    Note: For the purpose of clarity, the back panel graphics and nomenclature of the LTM-ER4 pictured above has been altered.
19. **Utility I/O:** 9-Pin D-Sub Utility Port is used to control various external product interfaces developed for the ER4.

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Multiformat Video

The **LTM-ER4** features connections for three video formats. All three video formats are routed simultaneously when a front panel button is pushed.

COMPONENT: (R-Y, B-Y, Y)(YUV) commonly referred to as BETA
YC: (Y/C) commonly referred to as SVHS
COMPOSITE: (VBS) commonly referred to as baseband video

NOTE: THESE FORMATS WORK COMPLETELY INDEPENDENT OF EACH OTHER & DO NOT CONVERT OR TRANSCODE.

Audio

BALANCED AUDIO: Dual channel balanced audio sometimes referred to as “pro audio” using +, -, ground
UNBALANCED AUDIO: Standard unbalanced audio using +, ground.

NOTE: THE UNBALANCED AUDIO IS A SELECT INPUT OPTION ONLY AND ITS OUTPUT IS LABELED “MONITOR AUDIO OUT” ON THE ROUTE4 REAR PANEL.

RS422 Serial Control

RS422 SERIAL CONTROL: The **LTM-ER4** has full duplex RS422 control via standard 9pin D-Sub connectors. The front panel toggle switch allows the “follow” of RS422 serial control to either the select buttons or output buttons. When the toggle switch is aimed at the left switches, the RS422 will switch when the input select switches are pressed. When the toggle switch is aimed to the right, the output select switches now control the RS422.

Summary

The **LTM-ER4** will receive the signals from a maximum of 4 devices and route any one of the four signals to the input of a device such as a Non-Linear Editor, Projector, Another VCR, Control Room Feed, or Secondary Edit Suite.

The **LTM-ER4** assignment feature will accept signals from any compatible device such as a Non-Linear Editor, another VTR, Control Room Feeds or Graphics Station and route(assign) those signals(video and audio) to any one of four similar destinations.

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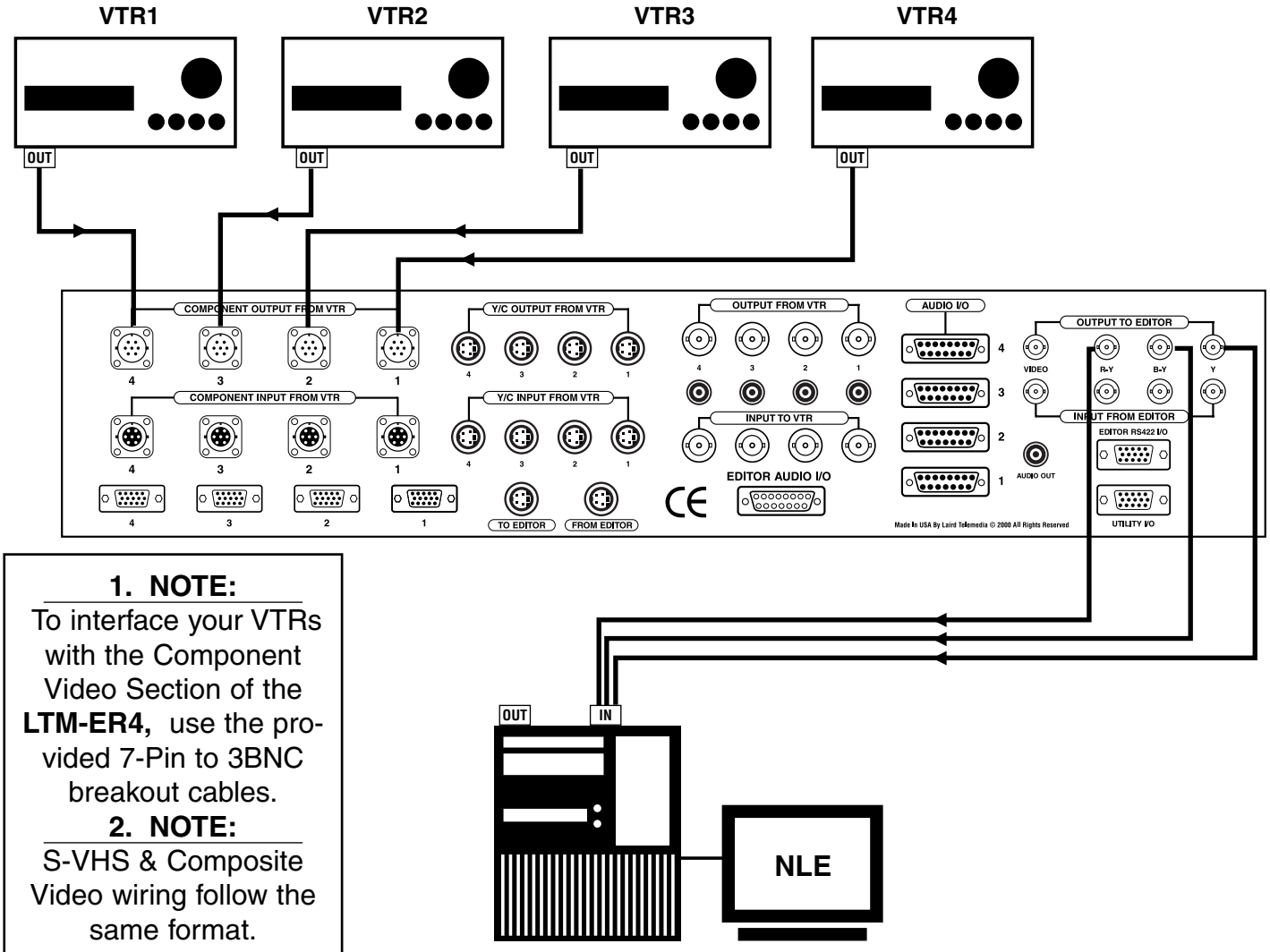
Component Video Input Section

The **LTM-ER4** is divided into 2 basic sections: **INPUT SELECTION & OUTPUT DESIGNATION.** The input section operates as 4x1 Multi-format Video router with Audio-Follow video.

INPUT SELECTION: The left front panel pushbuttons control a functioning multi-format audio-follow-video 4x1 router with RS422. By the push of a button, the three video routers, audio routers and RS422 all operate to switch the associated signals of the device connected to that numbered input to the designated output connectors. **(See diagram below)**



1. NOTE:
To interface your VTRs with the Component Video Section of the **LTM-ER4,** use the provided 7-Pin to 3BNC breakout cables.

2. NOTE:
S-VHS & Composite Video wiring follow the same format.

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Technical Data : VTR Balanced Audio I/O Cable

D15M PIN#	XLR PIN	LABEL	FUNCTION
1	2 XLF1	CH1 OUT	AUDIO + IN TO RT4
2	3 XLF1		AUDIO - IN TO RT4
3	2 XLF2	CH2 OUT	AUDIO + IN TO RT4
4	3 XLF2		AUDIO - IN TO RT4
5	2 XLM1	CH1 IN	AUDIO + OUT FROM RT4
6	3 XLM1		AUDIO - OUT FROM RT4
7	2 XLM2	CH2 IN	AUDIO + OUT FROM RT4
8	3 XLM2		AUDIO - OUT FROM RT4
9	1 XLF1		GROUND
10			
11	1 XLF2		GROUND
12			
13	1 XLM1		GROUND
14			
15	1 XLM2		GROUND

Part No. D15M-4XLR-6 - Four provided with each LTM-ER4

Technical Data : Editor Balanced Audio I/O Cable

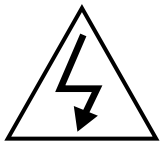
D15F PIN#	XLR PIN	LABEL	FUNCTION
1	2 XLF1	CH1 OUT	AUDIO + IN TO RT4
2	3 XLF1		AUDIO - IN TO RT4
3	2 XLF2	CH2 OUT	AUDIO + IN TO RT4
4	3 XLF2		AUDIO - IN TO RT4
5	2 XLM1	CH1 IN	AUDIO + OUT FROM RT4
6	3 XLM1		AUDIO - OUT FROM RT4
7	2 XLM2	CH2 IN	AUDIO + OUT FROM RT4
8	3 XLM2		AUDIO - OUT FROM RT4
9	1 XLF1		GROUND
10			
11	1 XLF2		GROUND
12			
13	1 XLM1		GROUND
14			
15	1 XLM2		GROUND

Part No. D15F-4XLR-6 - One provided with each LTM-ER4

Technical Support

The LTM-ER4 is a highly specialized, flexible and adaptive product. It would be impossible to include with this manual all the possible wiring solutions that we can think of and that customers have developed. In an effort to provide you with as much information and assistance as possible, we will continually post application diagrams at our web site: **www.lairdtelemedia.com.** You may also E-mail us at **info@lairdtelemedia.com.**

Safety Precautions



1. To prevent fire or shock hazard, do not expose this equipment to the environment of Humidity and/or dust. Do not use this equipment in an unprotected outdoor installation or any area classified as a wet area.
2. The operating temperature of this product must be kept between -40°C and +95°C. Direct sunlight or an intense source of heat, direct or ambient, must not be introduced to the product either by induction or contact.
3. Always keep the product on a stable and secure base or enclosure. Do not drop the product or subject it to sudden heavy impact.
4. Provide adequate ventilation so that thermal characteristics do not cause an increase in product temperature to resulting in overheating.
5. Do not clean the unit by using electrically conductive or corrosive chemicals. Always be certain to unplug the unit from AC wall power before any major cleaning. Use a damp cloth only for cleaning.
6. Do not subject the product to electrical mains power over voltage: The product must be used at the rated supply voltages indicated on the product rear panel only.
7. Do not plug the product into an overloaded electrical outlet. This may result in fire or electrical shock.
8. Object Ingress and Liquid Entry: Never insert or push sharp metal objects into the product or use such devices for an attempt at opening or servicing the product. Servicing should be referred to a trained and qualified technician only. Do not allow liquid of any type to enter the unit. Do not allow the unit to be submersed in water as this may cause a shock hazard.
9. A trained qualified technician should perform all servicing of the unit. There are no serviceable components within the unit for user access.