



Telecast
Fiber Systems, Inc.

Adder™ AES-8

Digital Audio Multiplexer

Instruction Manual

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Adder AES-8 Transmitter (Top) and Receiver (bottom)

Introduction

The introduction of the Telecast Fiber Systems Adder™ AES/EBU transmission system marks a new level of modularity and flexibility for the Telecast family of Digital Fiber-Optic Snakes. The system multiplexes up to 8 AES/EBU signals and transmits them on a single optical fiber to a receiver where the signals are restored. This product complements Telecast's comprehensive line of audio, video, data and intercom products and insures that you have digital audio to go with your digital video.

System Components

The Adder AES/EBU system is comprised of a transmitter and a receiver. These units occupy only a single rack space each and are powered by wall mount power transformers. Rack ears and screws are included.

After unpacking, inspect the units for mechanical damage. Also check all electrical connectors and cables for bent or damaged pins. Report any damage to the carrier and to Telecast Fiber Systems, Inc.

System Features

- Eight stereo AES Digital Audio channels or 16 audio channels
- User-selectable sampling rates of 32, 44.056, 44.1 and 48 KHz
- External synchronization to any valid AES source from 25 to 50 KHz
- All steel construction

Advantages

- Electrical isolation between sites
- Inherent immunity to both EMI and RFI
- No signal degradation
- No ground loops
- Transmission distances up to 5 km with multimode fiber
- High bandwidth allows 8 multiplexed signals to share one fiber reducing the size and weight of cable system
- Multimode or optional singlemode operation
- Easy installation and field setup

In this manual you will find helpful information about installation, proper use and features of this product. Please read thoroughly before trying to operate of this equipment. The information furnished does not include all the details of design or possible situations that may occur when using this device. For information beyond that covered in this manual please contact Telecast Fiber Systems, Inc. customer service at (508)754-4858.

Applications

There are many different applications to which that the Adder AES-8 Transmission System is suited. Listed below are a few examples.

Broadcast and Video Post-Production

- Links among multiple studios
- Links between mixing/editing suites
- Studio to transmitter links

Recording Studios

- Direct-to-digital recording
- Digital links between studios

Commercial Installations

- Schools and universities
- Convention facilities
- Post production facilities
- Board rooms
- Inter-campus linking
- Hotel ballrooms and facilities

Theory of Operation

The Adder AES/EBU system consists of an AES-8 Tx transmitter and an AES-8-Rx receiver. The Tx contains circuitry which can detect a valid AES signal at any of the 8 input channels or sync input and can synchronize to that signal. The AES digital audio signal is a serial data bit-stream containing two channels of digitized information along with clocks, flags and user information. Once a signal is received, it derives the sample rate clock frequency for synchronization of the 8 input channels.

An input FIFO circuit phase-aligns the clock boundaries of the 8 AES inputs to the synchronization signal, so that all inputs remain perfectly phase-aligned and in sync. These 8 AES inputs are essentially slots in the high speed multiplexer (MUX) and as such, the Adder AES-8 System is essentially an AES multiplexer and high speed fiber-optic transmission system. The serial data rate of the AES MUX is 125Mbit/sec.

The front panels feature SAMPLE RATE switches, active channel LED's, and indicators for sync and internal power supplies. The one rack space chassis features an all steel construction with a tough powder coat finish.

Power

Power to the AES-8 System is supplied by the wall mount transformers included in the packing. Connect to the power input located on the rear of the units. Power input is center pin negative at 12V DC at 0.5 Amps.

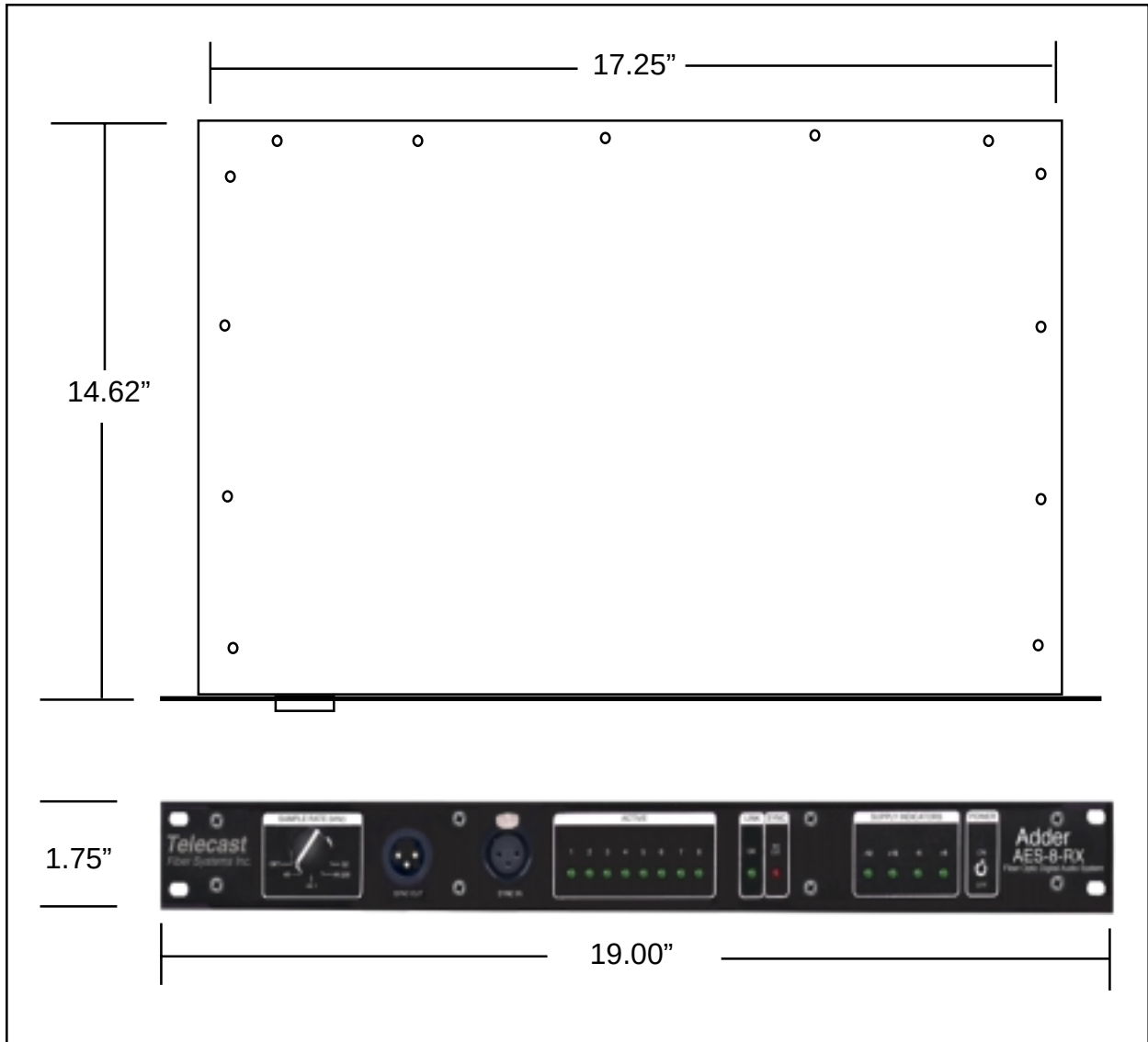


Figure 1. Mounting Dimensions

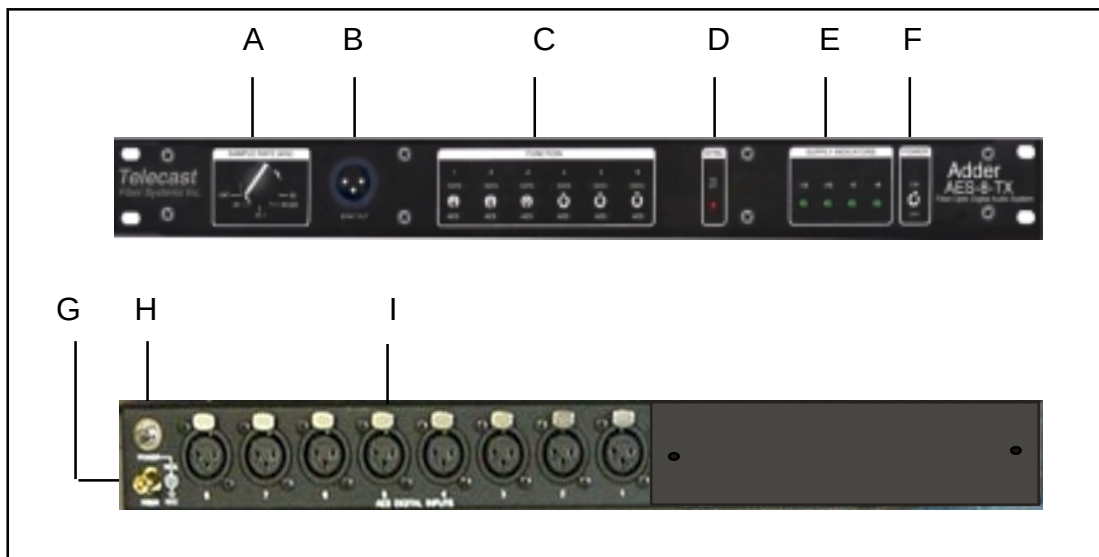


Figure 2. AES-8-Tx Front and Rear Features

AES-8-Tx Features

- A. **SAMPLE RATE (KHz)** Allows the user to select one of four commonly used sample rates. The sample rates are 48, 44.1, 44.056, 32 and EXT. for an external sampling rate via. any one of the eight AES Digital Input jacks.
- B. **SYNC OUT** Provides sync signal to an external device. The rate is determined by the SAMPLE RATE switch selection.
- C. **FUNCTION** Switches offers a selection between AES or Data usage. The Data functions for the Adder-AES-8 are permanently disabled thus all six switches should remain in the AES position.
- D. **SYNC** The red LED when lit indicates the unit is not receiving an external sync signal. Functional only when EXT. is selected for the SAMPLE RATE.
- E. **SUPPLY INDICATORS** Four green LED's show the status of each internal power supply, -12, +12, -5, +5.
- F. **POWER SWITCH** Routes power to each of the four internal power supplies.
- G. **FIBER** Fiber-optic output sends optical data down fiber optic cable to the AES-8 Rx receiver unit.
- H. **POWER INPUT** Power receptacle receives 12V DC from wall mount power transformer or from some other 12V power supply. Receptacle is center pin negative.
- I. **AES INPUTS** Female XLR connectors provide eight stereo AES Digital Inputs.

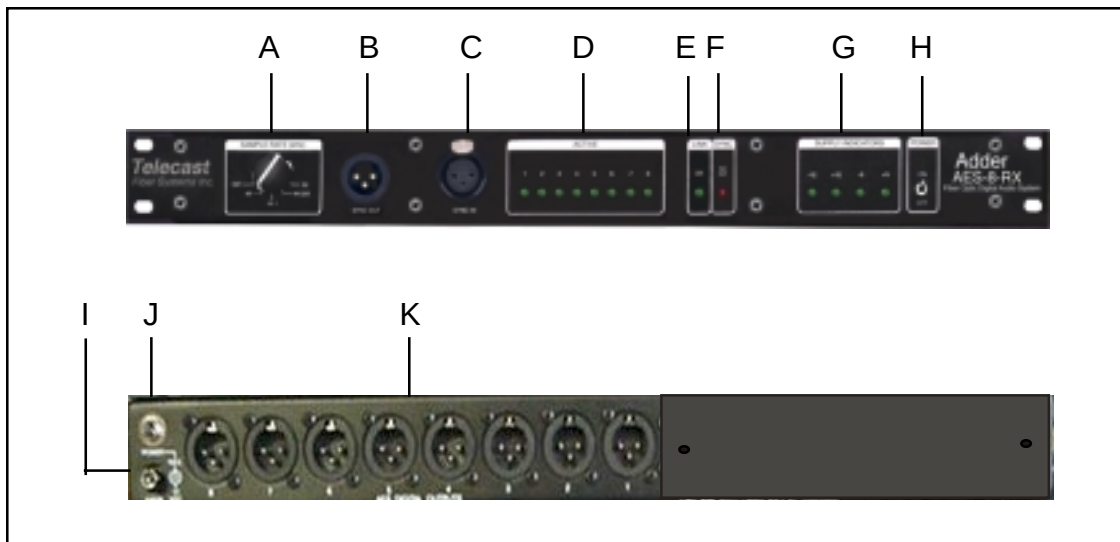


Figure 3. AES-8-Rx Front and Rear Features

AES-8-Rx Features

- A. **SAMPLE RATE (KHz)** Allows the user to select one of four commonly used sample rates. The sample rates are 48, 44.1, 44.056, 32 and EXT. for an external sampling rate via. the SYNC IN jack.
- B. **SYNC IN** Female XLR jack is provided for receiving external sampling rates.
- C. **SYNC OUT** Provides sync signal to other equipment. The rate is determined by the SAMPLING RATE switch selection.
- D. **ACTIVE** A signal activity LED for each of the eight channels.
- E. **LINK** Green LED indicates fiber integrity is good.
- F. **SYNC** The red LED when lit indicates the unit is not receiving the external sync signal. This indicator is used when EXT. is selected for the SAMPLING RATE.
- G. **SUPPLY INDICATORS** Four green LED's show the status of each internal power supply, -12, +12, -5, +5
- H. **POWER SWITCH** Routes power to each of the four internal power supplies.
- I. **FIBER** Fiber-optic input receives optical data from the AES-8 Tx transmitter unit.
- J. **POWER INPUT** Power receptacle receives 12V DC from a wall mount transformer or from any 12V power supply. Receptacle is center pin negative.
- K. **AES OUTPUTS** Male XLR connectors provide eight stereo AES Digital Outputs.

Installation

The Adder AES-8 Transmission System was designed to mount in a standard 19" rack. When mounting inside an enclosed rack make sure there is adequate ventilation. You should avoid placement next to excessive heat sources such as power amplifiers or heaters. In portable installations where subject to severe mechanical shock, secure the rear of the units.

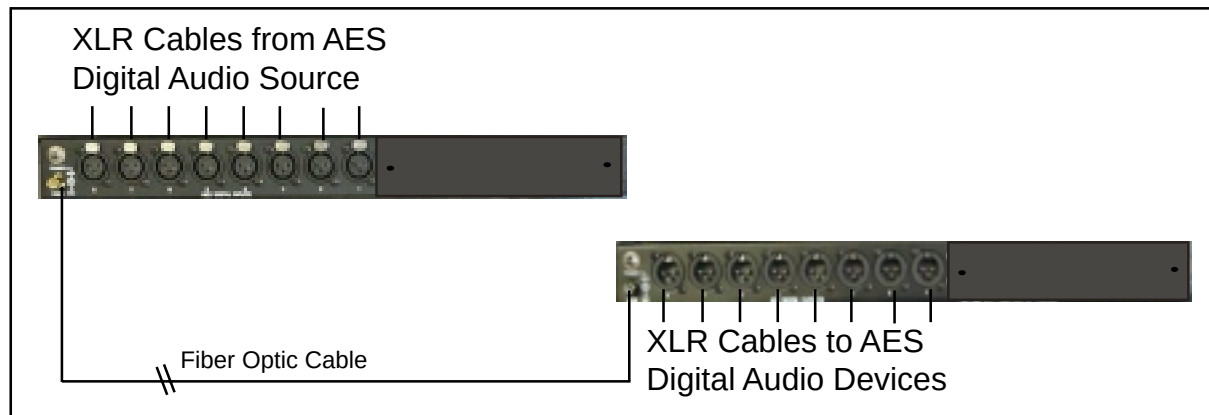


Figure 4 . Digital Audio Hookup Diagram

Hookups

Once the AES-8 units are installed you are ready for the fiber-optic connection. Attach the fiber-optic cable to each of the AES-8 units at the FIBER connector. The optical transmitter and receiver require 62.5/125m multimode fiber-optic cable with ST terminations. For field applications, secure it first by loosely tying off to the rack or a nearby anchor point. Special singlemode units require 8/125 micron cable with ST connectors.

If you are using multi-core fiber-optic cable with your system, the individual fiber lines will be color coordinated or numbered to help you identify each separate fiber line. Now connect all the AES digital audio inputs and outputs. An example of these hookups are demonstrated above in figure 4, Digital Audio Hook-up Diagram.

Operation

Before power-up, configure the AES-8 units for use. At the Tx unit, the SAMPLE RATE switch should be set to EXT. for external sync. The AES-8 will then detect and synchronize to the first valid AES input signal of the eight AES Digital inputs. For the Rx unit, the SAMPLE RATE switch can be set to the known sample rate frequency or a sync signal can be brought in at the SYNC IN and the SAMPLE RATE switch set to EXT. This is the typical configuration when using the AES-8 to transmit AES Digital Audio signals as demonstrated in the diagram above. The system can now be powered starting with the appliances preceding the AES-8, then the Tx and Rx units, and finally the equipment following. The units should immediately process signal unless configured or hooked-up improperly.

In the unique case where you have a AES Digital signal with a unknown frequency, set the SAMPLE RATE switch for the Tx to EXT., at the Rx simply step through each of the sample rate choices. If none of the four choices work, then an external sync signal will have to be provided at the Rx unit.

Troubleshooting and Repair

The Adder AES-8 system is “plug and play”. There are no use adjustments inside nor are there any user serviceable parts inside. Assuming the units have power indications, operation is immediate following the presentation of a valid AES signal. If any problems arise that can not be solved using this manual, contact Telecast.

Call Telecast Fiber Systems, Inc. for assistance with the Adder 161 System at 508-754-4858 and ask for our service department. To return a unit for repair, you must obtain a return material authorization (RMA) number from Telecast service.

Specifications

Electrical Specifications

Sample rates	Selectable for 32KHz, 44.056KHz, 44.1KHz, 48KHz, or external sync
Inputs	8 channels (XLR female conn.)
Outputs	8 channels (XLR male conn.)
Input/output format	AES/EBU digital audio (complies with full implementation of the AES 3spec.)
AES sync input/output	XLR connectors
Input power	12V DC at .5 Amps, center pin negative
Supply indicators	Green LED's, -12,+12,-5,+5V DC

Optical Specifications

Transmission distance	Up to 20km
Wavelength	1310nm Multimode or Singlemode
Tx optical output (Avg.)	0 dBm
Rx optical input Sensitivity (Avg.)	-30 dBm
Optical power budget	Up to 30 dBm

Physical

Dimensions	1.75"H x 19"W x 14.75"D
Shipping weight	11 lbs.

***** Note that in cases of short fiber lengths or runs of very little optical loss, an optical attenuator of at least 15dBm may be needed to reduce the potential of overloading the receiver.**

Warranty

LIMITED WARRANTY STATEMENT

Telecast Fiber Systems, Inc. ("Telecast") expressly warrants to Buyer that the Products supplied shall be free from defects in materials and workmanship for a period of 12 months following the date the Products are delivered to Buyer (the "Warranty Period"). Telecast's liability under this limited warranty shall be limited, at its option, to providing refund of purchase price for Products, or replacing or repairing Products shown to be defective either in materials or workmanship. Buyer's sole and exclusive remedy for breach of warranty shall be such refund, replacement or repair.

A claim of defect in materials or workmanship in any Product shall be allowed only when it is submitted in writing to Telecast Fiber Systems, Inc. within seven days after discovery of the defect, and in any event within the Warranty Period. No claim shall be allowed in respect of any Product which has been altered, neglected, damaged or stored in any manner which adversely affects it. In order to obtain service under the terms of this warranty, Distributor's customer or Distributor must notify Telecast of the defect prior to the expiration of the applicable warranty period and obtain a Return Authorization Number from Telecast. In no event may products be returned to Telecast or to Distributor for warranty service without having obtained from Telecast a Return Authorization Number.

This limited warranty applies only to new and unused Products delivered to Buyers located within the United States of America, or to international Buyers if sold through an authorized Distributor organization, and shall not extend to any equipment not manufactured by Telecast Fiber Systems, Inc., even though such equipment may be sold or operated with the Products. In addition, this limited warranty shall be void and of no further force or effect whatsoever if the Product is repaired or modified by any person other than an authorized representative of Telecast Fiber Systems, Inc. without the consent of Telecast Fiber Systems, Inc. This warranty shall not apply to any defect, failure or damage caused by improper use or inadequate maintenance and care. Nor shall this warranty apply to any damage caused in whole or in part by attempts by personnel other than Telecast's personnel, as approved in advance in accordance with the foregoing provisions, to open, install, repair, or service the Product; nor to damage resulting from improper connection with incompatible equipment; nor to damage to a unit which has been modified by personnel other than Telecast personnel.

Products returned to Telecast for warranty service shall be shipped, freight prepaid to Telecast. Telecast will return the repaired product or ship a replacement, freight prepaid, to either Distributor or Distributor's customer, as requested by Distributor's customer, at a location within the United States or, at Telecast's option, to Distributor's location in the case of international sales.

This limited warranty shall also apply to Products that replace defective Products and Products that have been repaired by authorized representatives of Telecast Fiber Systems, Inc., but only for the original Warranty Period. The Warranty Period shall not be extended by reason of defect, or any period of time during which the Product is not available to Buyer because of defects or repairs, without the express written consent of Telecast Fiber Systems, Inc.

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