

*TECHNICAL MANUAL*  
*888-2617-001*

*FlexStar™ HDI-100 Importer*  
*995-0005-003*

*FlexStar™*  
*HDI-100 Importer*

**HARRIS**

T.M. No. 888-2617-001

Rev. B: 1/30/2008

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Corporation

## Returns And Exchanges

Damaged or undamaged equipment should not be returned unless written approval and a Return Authorization is received from HARRIS Broadcast Communications Division. Special shipping instructions and coding will be provided to assure proper handling. Complete details regarding circumstances and reasons for return are to be included in the request for return. Custom equipment or special order equipment is not returnable. In those instances where return or exchange of equipment is at the request of the customer, or convenience of the customer, a restocking fee will be charged. All returns will be sent freight prepaid and properly insured by the customer. When communicating with HARRIS Broadcast Communications Division, specify the HARRIS Order Number or Invoice Number.

## Unpacking

Carefully unpack the equipment and preform a visual inspection to determine that no apparent damage was incurred during shipment. Retain the shipping materials until it has been determined that all received equipment is not damaged. Locate and retain all PACKING CHECK LISTS. Use the PACKING CHECK LIST to help locate and identify any components or assemblies which are removed for shipping and must be reinstalled. Also remove any shipping supports, straps, and packing materials prior to initial turn on.

## Technical Assistance

HARRIS Technical and Troubleshooting assistance is available from HARRIS Field Service during normal business hours (8:00 AM - 5:00 PM Central Time). Emergency service is available 24 hours a day. Telephone 217/222-8200 to contact the Field Service Department or address correspondence to Field Service Department, HARRIS Broadcast Communications Division, P.O. Box 4290, Quincy, Illinois 62305-4290, USA. Technical Support by e-mail: [tsupport@harris.com](mailto:tsupport@harris.com). The HARRIS factory may also be contacted through a FAX facility (217/221-7096).

## Replaceable Parts Service

Replacement parts are available 24 hours a day, seven days a week from the HARRIS Service Parts Department. Telephone 217/222-8200 to contact the service parts department or address correspondence to Service Parts Department, HARRIS CORPORATION, Broadcast Systems Division, P.O. Box 4290, Quincy, Illinois 62305-4290, USA. The HARRIS factory may also be contacted through a FAX facility (217/221-7096).

### NOTE:

The # symbol used in the parts list means used with (e.g. #C001 = used with C001).

## *Manual Revision History*

### *FlexStar™ Importer*

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REV.	DATE	ECN	Pages Affected
Preliminary	2007jun06		Created
A	8/16/2007	54844	Entire Manual Released
A1	9/07/2007	INT	Modified every chapter to reflect new hardware/software and technology changes.
B	1/30/2008	55980	Modified every chapter to reflect new hardware/software and technology changes.

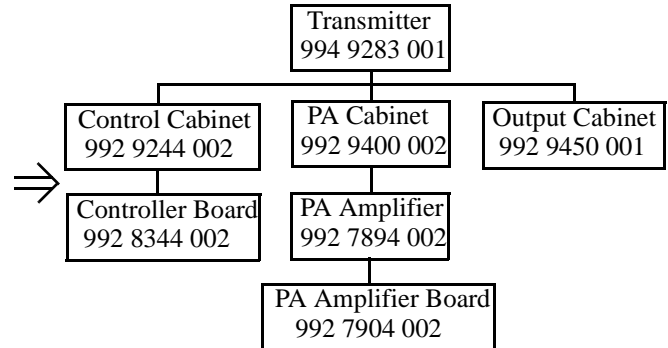


## Guide to Using Harris Parts List Information

The Harris Replaceable Parts List Index portrays a tree structure with the major items being leftmost in the index. The example below shows the Transmitter as the highest item in the tree structure. If you were to look at the bill of materials table for the Transmitter you would find the Control Cabinet, the PA Cabinet, and the Output Cabinet. In the Replaceable Parts List Index the Control Cabinet, PA Cabinet, and Output Cabinet show up one indentation level below the Transmitter and implies that they are used in the Transmitter. The Controller Board is indented one level below the Control Cabinet so it will show up in the bill of material for the Control Cabinet. The tree structure of this same index is shown to the right of the table and shows indentation level versus tree structure level.

Example of Replaceable Parts List Index and equivalent tree structure:

<u>Replaceable Parts List Index</u>	<u>Part Number</u>	<u>Page</u>
Table 7-1. Transmitter	994 9283 001	7-2
Table 7-2. Control Cabinet	992 9244 002	7-3
Table 7-3. Controller Board	992 8344 002	7-6
Table 7-4. PA Cabinet	992 9400 002	7-7
Table 7-5. PA Amplifier	994 7894 002	7-9
Table 7-6. PA Amplifier Board	992 7904 002	7-10
Table 7-7. Output Cabinet	992 9450 001	7-12



The part number of the item is shown to the right of the description as is the page in the manual where the bill for that part number starts. Inside the actual tables, four main headings are used:

- Table #-#. ITEM NAME - HARRIS PART NUMBER - this line gives the information that corresponds to the Replaceable Parts List Index entry;
- HARRIS P/N column gives the ten digit Harris part number (usually in ascending order);
- DESCRIPTION column gives a 25 character or less description of the part number;
- REF. SYMBOLS/EXPLANATIONS column 1) gives the reference designators for the item (i.e., C001, R102, etc.) that corresponds to the number found in the schematics (C001 in a bill of material is equivalent to C1 on the schematic) or 2) gives added information or further explanation (i.e., “Used for 208V operation only,” or “Used for HT 10LS only,” etc.).

Inside the individual tables some standard conventions are used:

- A # symbol in front of a component such as #C001 under the REF. SYMBOLS/EXPLANATIONS column means that this item is used on or with C001 and is not the actual part number for C001.
- In the ten digit part numbers, if the last three numbers are 000, the item is a part that Harris has purchased and has not manufactured or modified. If the last three numbers are other than 000, the item is either manufactured by Harris or is purchased from a vendor and modified for use in the Harris product.
- The first three digits of the ten digit part number tell which family the part number belongs to - for example, all electrolytic (can) capacitors will be in the same family (524 xxxx 000). If an electrolytic (can) capacitor is found to have a 9xx xxxx xxx part number (a number outside of the normal family of numbers), it has probably been modified in some manner at the Harris factory and will therefore show up farther down into the individual parts list (because each table is normally sorted in ascending order). Most Harris made or modified assemblies will have 9xx xxxx xxx numbers associated with them.

The term “SEE HIGHER LEVEL BILL” in the description column implies that the reference designated part number will show up in a bill that is higher in the tree structure. This is often the case for components that may be frequency determinant or voltage determinant and are called out in a higher level bill structure that is more customer dependent than the bill at a lower level.



**⚠ WARNING:**  
*THE CURRENTS AND VOLTAGES IN THIS EQUIPMENT ARE DANGEROUS. PERSONNEL MUST AT ALL TIMES OBSERVE SAFETY WARNINGS, INSTRUCTIONS AND REGULATIONS.*

This manual is intended as a general guide for trained and qualified personnel who are aware of the dangers inherent in handling potentially hazardous electrical/electronic circuits. It is not intended to contain a complete statement of all safety precautions which should be observed by personnel in using this or other electronic equipment.

The installation, operation, maintenance and service of this equipment involves risks both to personnel and equipment, and must be performed only by qualified personnel exercising due care. HARRIS CORPORATION shall not be responsible for injury or damage resulting from improper procedures or from the use of improperly trained or inexperienced personnel performing such tasks. During installation and operation of this equipment, local building codes and fire protection standards must be observed.

The following National Fire Protection Association (NFPA) standards are recommended as reference:

- Automatic Fire Detectors, No. 72E
- Installation, Maintenance, and Use of Portable Fire Extinguishers, No. 10
- Halogenated Fire Extinguishing Agent Systems, No. 12A

**⚠ WARNING:**  
*ALWAYS DISCONNECT POWER BEFORE OPENING COVERS, DOORS, ENCLOSURES, GATES, PANELS OR SHIELDS. ALWAYS USE GROUNDING STICKS AND SHORT OUT HIGH VOLTAGE POINTS BEFORE SERVICING. NEVER MAKE INTERNAL ADJUSTMENTS, PERFORM MAINTENANCE OR SERVICE WHEN ALONE OR WHEN FATIGUED.*

Do not remove, short-circuit or tamper with interlock switches on access covers, doors, enclosures, gates, panels or shields. Keep away from live circuits, know your equipment and don't take chances.

**⚠ WARNING:**  
*IN CASE OF EMERGENCY ENSURE THAT POWER HAS BEEN DISCONNECTED.*

**⚠ WARNING:**  
*IF OIL FILLED OR ELECTROLYTIC CAPACITORS ARE UTILISED IN YOUR EQUIPMENT, AND IF A LEAK OR BULGE IS APPARENT ON THE CAPACITOR CASE WHEN THE UNIT IS OPENED FOR SERVICE OR MAINTENANCE, ALLOW THE UNIT TO COOL DOWN BEFORE ATTEMPTING TO REMOVE THE DEFECTIVE CAPACITOR. DO NOT ATTEMPT TO SERVICE A DEFECTIVE CAPACITOR WHILE IT IS HOT DUE TO THE POSSIBILITY OF A CASE RUPTURE AND SUBSEQUENT INJURY.*

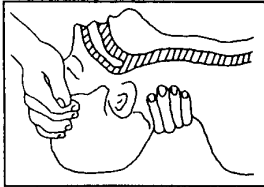
## TREATMENT OF ELECTRICAL SHOCK

1. IF VICTIM IS NOT RESPONSIVE FOLLOW THE A-B-CS OF BASIC LIFE SUPPORT.

PLACE VICTIM FLAT ON HIS BACK ON A HARD SURFACE

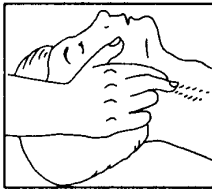
### **(A) AIRWAY**

IF UNCONSCIOUS,  
OPEN AIRWAY



LIFT UP NECK  
PUSH FOREHEAD BACK  
CLEAR OUT MOUTH IF NECESSARY  
OBSERVE FOR BREATHING

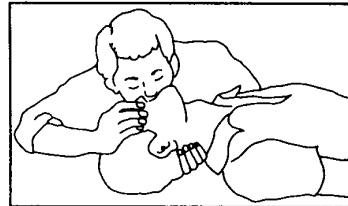
CHECK  
CAROTID PULSE



IF PULSE ABSENT,  
BEGIN ARTIFICIAL  
CIRCULATION

### **(B) BREATHING**

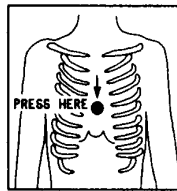
IF NOT BREATHING,  
BEGIN ARTIFICIAL BREATHING



TILT HEAD  
PINCH NOSTRILS  
MAKE AIRTIGHT SEAL  
4 QUICK FULL BREATHS  
REMEMBER MOUTH TO MOUTH  
RESUSCITATION MUST BE  
COMMENCED AS SOON AS POSSIBLE

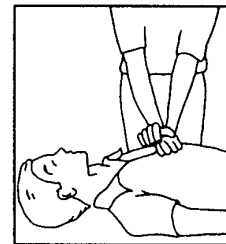
### **(C) CIRCULATION**

DEPRESS STERNUM 1 1/2 TO 2 INCHES



APPROX. RATE  
OF COMPRESSIONS { ONE RESCUER  
--80 PER MINUTE { 15 COMPRESSIONS  
2 QUICK BREATHS

APPROX. RATE  
OF COMPRESSIONS { TWO RESCUERS  
--60 PER MINUTE { 5 COMPRESSIONS  
1 BREATH



NOTE: DO NOT INTERRUPT RHYTHM OF COMPRESSIONS  
WHEN SECOND PERSON IS GIVING BREATH

CALL FOR MEDICAL ASSISTANCE AS SOON AS POSSIBLE.

2. IF VICTIM IS RESPONSIVE.

- A. KEEP THEM WARM
- B. KEEP THEM AS QUIET AS POSSIBLE
- C. LOOSEN THEIR CLOTHING
- D. A RECLINING POSITION IS RECOMMENDED



# FIRST-AID

Personnel engaged in the installation, operation, maintenance or servicing of this equipment are urged to become familiar with first-aid theory and practices. The following information is not intended to be complete first-aid procedures, it is a brief and is only to be used as a reference. It is the duty of all personnel using the equipment to be prepared to give adequate Emergency First Aid and there by prevent avoidable loss of life.

## Treatment of Electrical Burns

1. Extensive burned and broken skin
  - a. Cover area with clean sheet or cloth. (Cleanest available cloth article.)
  - b. Do not break blisters, remove tissue, remove adhered particles of clothing, or apply any salve or ointment.
  - c. Treat victim for shock as required.
  - d. Arrange transportation to a hospital as quickly as possible.
  - e. If arms or legs are affected keep them elevated.

### ⇒ NOTE:

If medical help will not be available within an hour and the victim is conscious and not vomiting, give him a weak solution of salt and soda: 1 level teaspoonful of salt and 1/2 level teaspoonful of baking soda to each quart of water (neither hot or cold). Allow victim to sip slowly about 4 ounces (a half of glass) over a period of 15 minutes. Discontinue fluid if vomiting occurs. (Do not give alcohol.)

2. Less severe burns - (1st & 2nd degree)
  - a. Apply cool (not ice cold) compresses using the cleanest available cloth article.
  - b. Do not break blisters, remove tissue, remove adhered particles of clothing, or apply salve or ointment.
  - c. Apply clean dry dressing if necessary.
  - d. Treat victim for shock as required.
  - e. Arrange transportation to a hospital as quickly as possible.
  - f. If arms or legs are affected keep them elevated.

### REFERENCE:

ILLINOIS HEART ASSOCIATION  
AMERICAN RED CROSS STANDARD FIRST AID AND PERSONAL SAFETY  
MANUAL (SECOND EDITION)



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# Section 1

## Introduction

# 1

### 1.1 Introduction

---

This technical manual describes the FlexStar HDI-100 Data Importer (Harris part number 995-0005-003), part of the new family of HD Radio products. It is to be used along side of the included iBiquitiy document, *Importer End User's Guide*.

This manual contains the following sections:

- Section 1: Introduction
- Section 2: Installation
- Section 3: Operation
- Section 4: Parts List
- Section 5: Troubleshooting

With the advent of HD Radio™, broadcast stations can now transmit their programs as a high quality digital signal. In addition to the Main Program Service (MPS) and Station Information Guide (SIG), the HD Radio system also provides the capacity to transmit other digital services referred to as Advanced Application Services (AAS). Supplemental Program Service (SPS) forms an essential part of the AAS framework.

The WebAdmin provides the broadcast station with the functional capabilities to efficiently manage the transmission, configuration and status of all Advanced Application Services provided by external Service Providers and other customers. Service Providers can be located in close proximity or even remotely connected across a Wide Area Network (WAN).

The WebAdmin also allows the broadcast station to define the allocation for each service which may be a fixed bandwidth allocation for dedicated services. It is designed so that its connection to the exciter ensures that the broadcast station makes an optimal use of its bandwidth capacity so that maximum services can be broadcast.



Figure 1-1 HDI 100-Importer with front cover and cover removed



Figure 1-2 HDI 100-Importer rear panel

## 1.2 Benefits and Features

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The new FlexStar HDI-100 Importer allows the addition of Advanced Application Services (AAS) including one or more supplemental audio channels for HD Radio. It accepts, manages, encodes and multiplexes all AAS including supplemental audio channels and Program Service Data (PSD) for transport to the HDE-100 Exporter or to an existing DEXSTAR Exciter. It also manages connections and content delivery from service providers, system bandwidth allocation, exciter configuration and codec bit rates. In addition, it handles monitoring and reporting capabilities for scheduling, traffic and utilization reports.

Future Advanced Applications Services that can be possibly supported by the HDI-100 are traffic information, breaking news, weather information and alerts, stock quotes, sports scores, Amber alerts, display of advertiser information including location specific advertising and possible resale of bandwidth to third parties.

This software upgradable Importer is compatible with the Harris DEXSTAR and HDE-100 Exporter and can evolve as the HD radio industry evolves.

### 1.2.1 Overall description

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The Importer is server-grade PC running Windows XP Professional operating system, with software provided by iBiquity.



## 1.3 Useful Terms

---

Below are some terms associated with the FlexStar HD Radio architecture.

- *AAS* - Advanced Applications Service. Non-program related data services encoded into the HD bitstream and include Supplemental Audio, traffic information, news, weather, stock quotes, etc. The first AAS to be implemented in HD receivers will be Supplemental Audio channels. The HDI-100 receives, manages and multiplexes all AAS services for HD Radio.
- *AES3* - Abbreviation for AES3-1992 which is the established standard for professional digital audio conveying two channels of periodically sampled and uniformly quantized digital audio on a single twisted pair wire. The sample rate standard for HD Radio is 44.1 kHz.
- *API* - Application Programmers Interface. A set of programming calls used to manipulate an existing program.
- *Capture Client* - Simple software application to ingest audio from the sound card.
- *Exgine* - iBiquity hardware used in an HD exciter to create the digital portion of the transmission.
- *FlexStar* - FlexStar is a Harris trademark for the series of HD Radio products.
- *MPS* - Main Program Service. The stations main program audio delivered from the station's on-air studio.
- *QoS* - Quality of Service
- *PAD* - Program Associated Data. Program-related data such as song title and artist information
- *PSD* - Program Service Data. Program-related data such as song title and artist information, *delivered in the iBiquity protocol* from the station's audio hard disk storage system via an Ethernet communications port. This may also be referred to as *HDP PSD*.  
This data is fed to the HDE-100 Exporter (or DEXSTAR exciter) as MPSPD, Main Program Service Data, when related to the main program audio; or fed to the Importer as SPSPD, Supplemental Program Service Data, when related to any of the supplemental audio streams.
- *SPS* - Supplemental Program Service. Also referred to as Supplemental Audio Service or multicasting, supplemental program audio is input to the HDI-100 Importer in AES3 digital format.
- *WebAdmin* - The application that manages the functional capabilities related to transmission, configuration and status of all AAS inputs.



# Section 2

## Installation

# 2

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## 2.1 Installation Introduction

---

This section contains the information to assist in the installation of the Importer.

The FlexStar HDI-100 Importer can be connected to a DEXSTAR Exciter or a FlexStar HDE-100 Exporter with either installation being basically the same.

### CURRENT COMPATIBILITY STATEMENT:

- Importer version 1.1.2 is compatible with DEXSTAR/Exporter IRSS version 2.2.5.
- Importer versions 2.X.X and 3.X.X or greater are compatible with DEXSTAR/Exporter IRSS version 2.3.3.
- Exporter version 2.3.3 is compatible with FlexStar exciter microprocessor software version 7.4 and Exgine version 2.3.

## 2.2 Unpacking

---

Carefully unpack the Importer and perform a visual inspection to ensure that no apparent damage was incurred during shipment. Retain the shipping materials until it has been determined that the unit is not damaged. The contents of the shipment should be as indicated on the packing list. If the contents are incomplete or if the unit is damaged electrically or mechanically, notify the carrier and HARRIS CORPORATION, Broadcast at 217-222-8200.

## 2.3 Returns and Exchanges

---

Damaged material or undamaged equipment should not be returned unless written approval and a Return Authorization (RMA) is received from HARRIS CORPORATION. Special shipping instructions and coding will be provided to assure

proper handling. Complete details regarding circumstances and reasons for return are to be included in the request for return. Custom equipment or special order equipment is not returnable. In those instances where return or exchange of equipment is at the request of the customer, or convenience of the customer, a restocking fee will be charged. All returns will be sent freight prepaid and properly insured by the customer. When communicating with HARRIS CORPORATION, Broadcast Communications Division, specify the Harris *order* number or *invoice* number.

## 2.4 Air Cooling Requirements

---

This Harris FlexStar™ Importer is designed to operate in an unobstructed environment with a maximum inlet air temperature of 48°C. Refer to the Outline Drawing in the schematic package for information on air requirements.



**NOTE:**

“Clean” air is required. No salt air, polluted air, or sulfur air can be tolerated. A closed air system is recommended in these environments; that is, an air conditioned room that recirculates, and properly filters the room air.

## 2.5 Installation

---

Prior to installation, this Technical Manual should be carefully studied to obtain a thorough understanding of the principles of operation, circuitry and nomenclature. This will facilitate proper installation and initial checkout.

**⇒ NOTE:**

Also see the following technical manuals for more information:  
HDE-100 Exporter (Harris part #888-2569-001)  
HDx-FM Exciter (Harris part #888-2570-001)  
*iBiquity Importer End User's Guide*

**The Importer installation is accomplished in the following order:**

1. Rack placement
2. Visual Inspection
3. Configuration
4. Interconnect wiring
5. Input connections
6. Output connections
7. Initial checkout

### 2.5.1 Rack Placement

---

Versions of the FlexStar Importer manufactured prior to July 2007 occupies 1 rack unit (1.75 inches) space. Later versions are 2RU size, approximately 3.5 inches. Otherwise the units are identical in functionality and interoperability.

If a new rack is also part of the installation, set the rack in place on a level surface near power and signal cables. Either or both sidewalls of the rack may be placed against a wall or other equipment. Complete access is through the front and rear.

### 2.5.2 Visual Inspection

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Before installing the Importer into the rack, visually inspect the Importer for any signs of rough shipping or handling.

### 2.5.3 Configuration

---

Configuration consists of both hardware and software configuration for your particular application. The Harris Importer is configurable to perform with one or two audio channels at different bitrate allocations.

Configuration of the Importer is controlled via an external monitor using a mouse and keypad.

**⇒ NOTE:**

You will need to provide an external monitor, keyboard, mouse and CAT5, or CAT6, cable for the Importer to set it up and connect it to your network. These are not included with the Importer. A conventional PC monitor, PS2 keyboard, PS2 mouse and CAT5/CAT6 cable are all that is needed.

An optional LCD display, keyboard and mouse unit (1RU size) is available from Harris: Part number MAARM-KB-LCD-15.

## 2.6 Bench Test

---

**⇒ NOTE:**

See "2.5 Quick Start - Bench Test" on page 2-3 of the Exporter tech manual for more information on first Bench Testing the Exporter and Exciter connectivity.

It is advisable to bench test the Importer, Exporter and HDx-FM exciter (or Importer with DEXSTAR exciter) together to ensure communications before separating them via a network, managed switch, firewall, etc. This will confirm operation of the these elements of the system prior to adding more layers and complexity that could possibly cause communication failure. When connecting an Importer/DEXSTAR combination directly together, a crossover cable is required. Otherwise, an Ethernet switch and CAT5/CAT6 cables may be used to connect all three units together.

## 2.7 Exciter Interconnections

---

This section provides simplified diagrams for connecting an Importer to an Exporter (or DEXSTAR exciter). An Importer is used as a device to multiplex SPS/AAS services into the Exporter (or DEXSTAR Exciter), which provides MPS services. The Importer administers the settings for MPS as well as SPS.

**⇒ NOTE:**

A customer supplied ethernet switch is a requirement for the Importer to Exporter connection because the Exporter also needs ethernet connectivity to access the HDx-FM exciter.

## 2.7.1 Ethernet connections

---

When connecting to the Exporter/DEXSTAR Exciter, either use an Ethernet cross-over cable to connect direct, or connect through a network switch, or managed switch.

**⇒ IMPORTANT:**

When connecting through a network, managed switch, firewall, etc., be sure the following ports are open: 10001, 10002, 10100, 9025, 8145, 8025 and 1600; also ports 10010 and 10011 are suggested for the Importer's PSD (PAD) ports; and the Exporter will use either 10000 for MPS PAD or 11000 for HDP PSD, depending on which data type you'll use.

When connecting Ethernet, check the IP address of the Importer itself. Verify that it is **static** and on the same subnet as the Exciter or Exporter, but a different address (the last set of numbers). Example; if the Exporter/DEXSTAR is 10.10.10.10 set the Importer to 10.10.10.9. Both units should be set to static IP addressing.

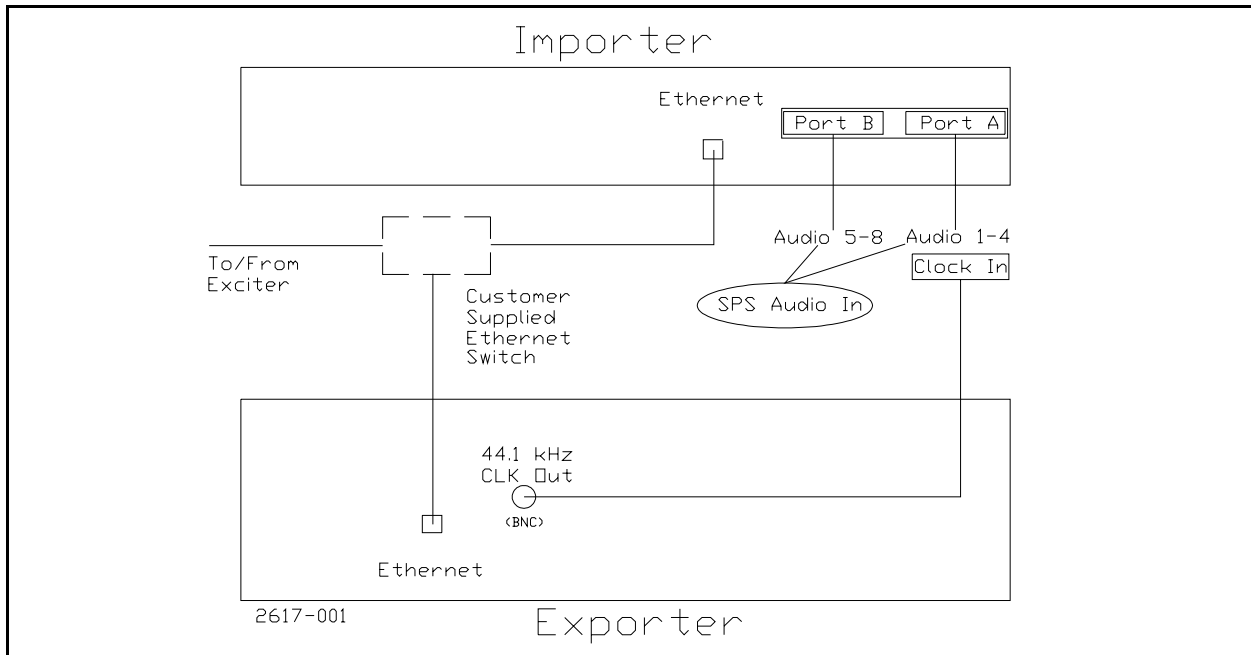
**Figure 2-1**

**To change the Importer's IP address:**

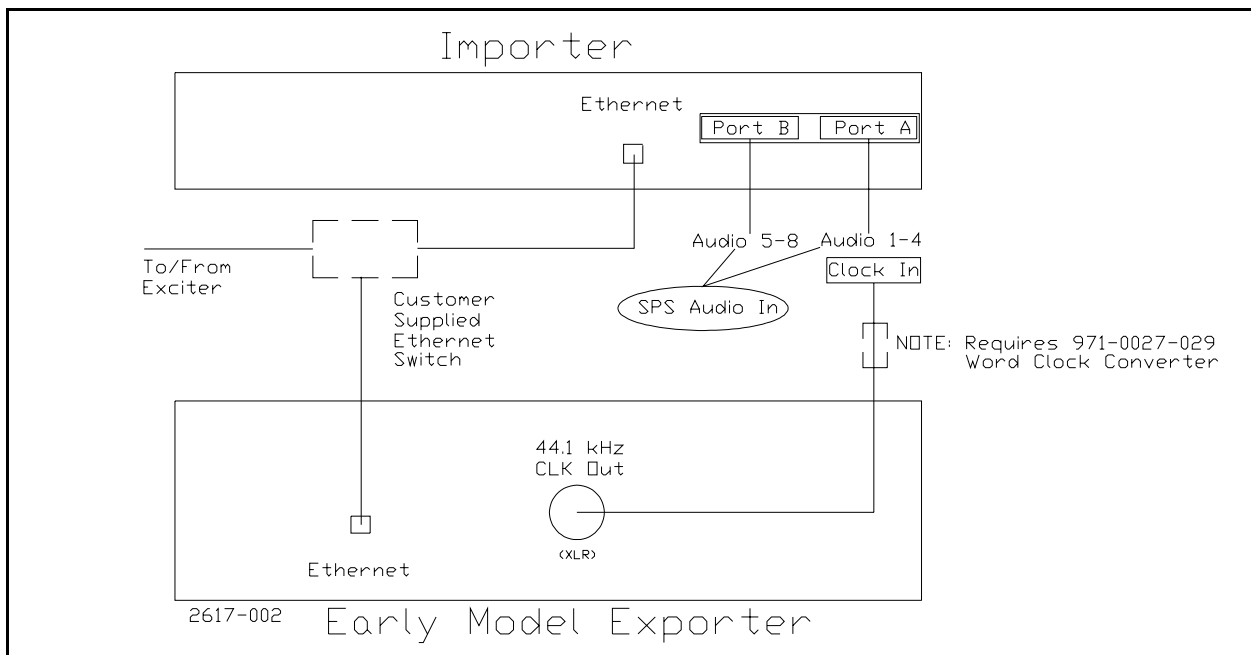
From the Importer computer's Start menu, go to Settings/Network connections. Right click the Local Area Network, and select properties. In the new window, click InterNet protocol (TCP/IP), then Properties. Select; Use this IP address (this sets it to static), and enter in the IP address mentioned above and the same subnet mask and Default Gateway as in the Exporter/DEXSTAR Network GPS screen. Remember that the Importer's IP address has to be different than the Exporter/DEXSTAR's IP address.

**Figure 2-2**

Figure 2-3 on page 2-6 and Figure 2-4 on page 2-6 shows the simplified specific connections necessary between an Importer and two versions of the Exporter.



**Figure 2-3**  
Simplified connection drawing showing *late* model Exporter connecting to late model Importer with the Lynx AES16-SRC audio card



**Figure 2-4**  
Simplified connection drawing showing *early* model Exporter connecting to late model Importer with the Lynx AES16-SRC audio card



## 2.7.2 SPS Audio and synchronization

---

TO DETERMINE CARD TYPE within Windows operating system, follow these steps:

- From the desktop, right click *My Computer*
- Click *Manage*
- Double click *Device Manager* in left pane
- Double click *Sound, video, and game controllers* to see installed devices
- Verify Lynx audio card type

or a secondary method to get to Device Manager:

- Click *Start*
- Click *Settings*
- Click *Control Panel*
- Double click *System*
- Click *Hardware* tab
- Click *Device Manager*
- Double click *Sound, video, and game controllers* to see installed devices
- Verify Lynx audio card type

In early versions of the Importer, the *Lynx One* or *Lynx AES16-XLR* audio cards were used. These types of cards required that the SPS audio into the Importer be synchronized *before* it enters the Importer, using the 44.1kHz Sync "out" from the DEXSTAR or the "Monitor" out of the DEXSTAR. The 44.1 kHz Sync out is a word clock, whereas the Monitor out is an AES stream. Select the output to satisfy the equipment used to synchronize the audio sample rate. An impedance transformer, like the Canare 100 Ohm to 75 Ohm transformer (Harris part number CANBCJ-XJ-TRB), may be used to convert from XLR to BNC.

Later versions of the Importer have the *Lynx AES16-SRC* audio card. The suffix "SRC" indicates the card has a Static Rate Converter built into it. This is noted in Windows Hardware Device Manager and on the card hardware.

This SRC version of the Lynx audio card requires a TTL 0-5Vdc single-ended word clock input. The output from early Exporters (manufactured before April 2007) only had an XLR,  $\pm 2$ Vdc, balanced output. For combinations of the later Importers utilizing the SRC card with the early Exporters, the Canare transformer mentioned above should *not* be used. An optional word clock converter cable (Harris part number 971-0027-029) is required to transform from XLR balanced to BNC TTL (see Figure 2-4 on page

2-6). Exporters manufactured after April 2007 have a 5Vdc TTL BNC word clock output (see Figure 2-3 on page 2-6).

The word clock converter cable assembly has a miniature circuit board integrated into the XLR connector housing to perform level conversion for the rate converter card. The circuit board on the DEXSTAR/Exporter end, gets its power from a break-out cable connection on the remote I/O connector. See drawing included with the cable assembly for 5V differences between DEXSTAR and Exporter.

Install the Importer at the transmitter site with the DEXSTAR. Install the Importer with the Exporter when using the FlexStar HDx-FM Exciter. The SPS audio inputs to the Importer audio card are D connectors to be used with the supplied break-out cabling.

The 8-channel type Importer digital cards, Lynx AES16-XLR and Lynx AES16-SRC, have two identical break-out cable assemblies. The Importer connector on the **right** side (as viewed from the rear) is Port A and the audio cables that connect there are inputs **1 through 4** and the cable labeled *clock* is an input. On port B (the left connector) the audio inputs are 5 through 8.

**⇒ IMPORTANT:**

The word clock BNC on the Port A cable assembly (right side) is *word clock input*. The word clock BNC on the Port B cable assembly (left side) is *word clock output*.

***Syncing the Lynx AES16-SRC audio card:***

Using the SRC type card allows you to sync the audio *within* the Importer. Be sure SRC Enable is checked (enabled) for all used inputs (see Figure 4-2 on page 4-3).

Connect program audio to inputs 5-8 of the breakout cable connected to the Importer.

**⇒ NOTE:**

The rate converter functionality is for the audio connected to inputs 5-8 only.

- For the latest version of the Exporter, use a BNC cable to connect the 44.1kHz CLK Out to the BNC input on the Port A breakout cable of the Importer.  
Select "External" as the Preferred Clock Source in the Adapter screen of the Lynx Mixer application (see Figure 4-2 on page 4-3).
- If you have a DEXSTAR or older Exporter, and wish to use the BNC clock input of the Importer, an optional word clock converter cable (Harris part number 971-0027-029) is required to transform the Sync/Clk Out XLR balanced output to a BNC TTL input for the Importer breakout cable from Port A (see Figure 2-4 on page 2-6).

**⇒ NOTE:**

The word clock converter cable assembly has a miniature circuit board integrated into the XLR connector housing to perform level conversion for the rate converter card. The circuit board on the DEXSTAR/Exporter end, gets its power from a break-out cable connection on the remote I/O connector. See drawing included with the cable assembly for 5V differences between DEXSTAR and Exporter.

- Alternatively, when using an ePAL, a spare AES RATE CONVERTER output can be used as an AES sync source. Connect this AES source to one of inputs 1-4 on the breakout cable of the Importer. Select "Digital In x" (x = the digital input 1 through 4 used as the sync input) as the Preferred Clock Source in the Adapter screen of the Lynx Mixer application.
- For any DEXSTARS or earlier Exporters without a BNC sync output, an AES type sync source is available via the MONITOR OUT output.

***Syncing the Lynx One and AES16-XLR audio cards:***

For either of these types of audio cards, you must use an external rate converter or an audio processor as the synchronizing device to sync the audio *prior* to the input of the Importer. These devices must be able to accept AES as a sync source.

To provide an AES sync source to your equipment, choose one of the sync methods below. For both of these methods, select "Digital In" as the Preferred Clock Source in the Adapter screen of the Lynx Mixer application.

- For any DEXSTARS or earlier Exporters without a BNC sync output, an AES type sync source is available via the MONITOR OUT output.
- When using an ePAL that is being clocked by a DEXSTAR/Exporter, an unused AES RATE CONVERTER output can be used as an AES sync source.

**2.7.2.1 SPSD Data**

Supplemental Program Service Data (was known as SPS PAD) is formatted by your source equipment. To enable the PSD data to go through, the network ports 10010 and 10011 must be opened by you network administrator.

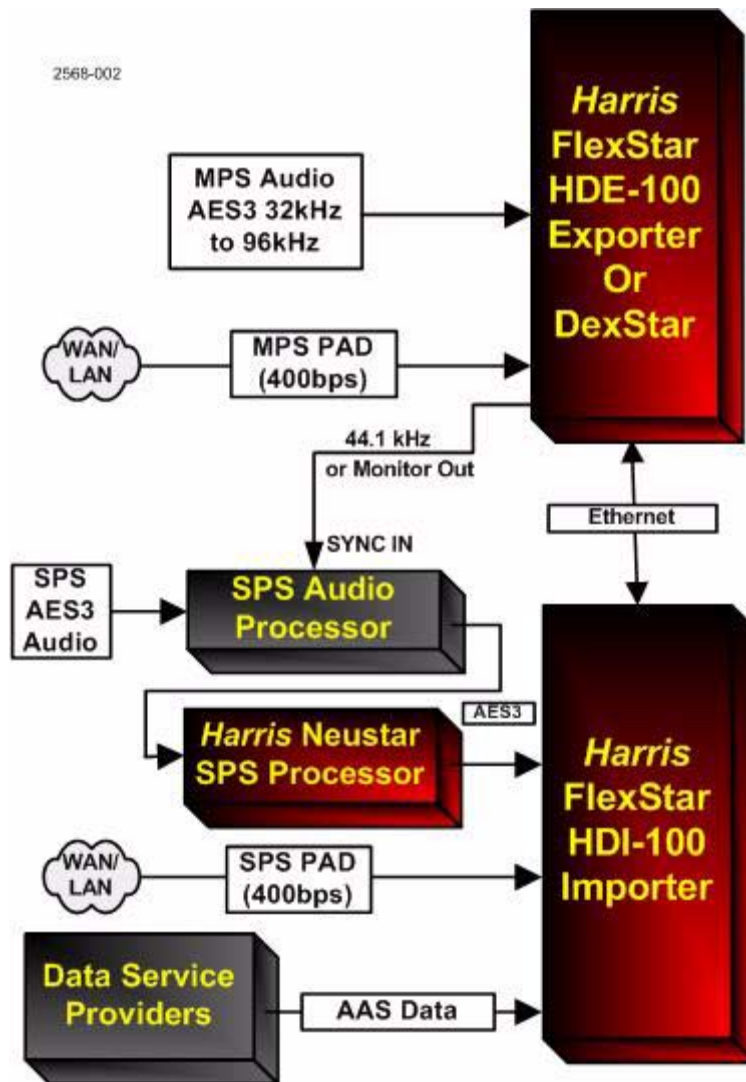


Figure 2-5 Complex System Connections

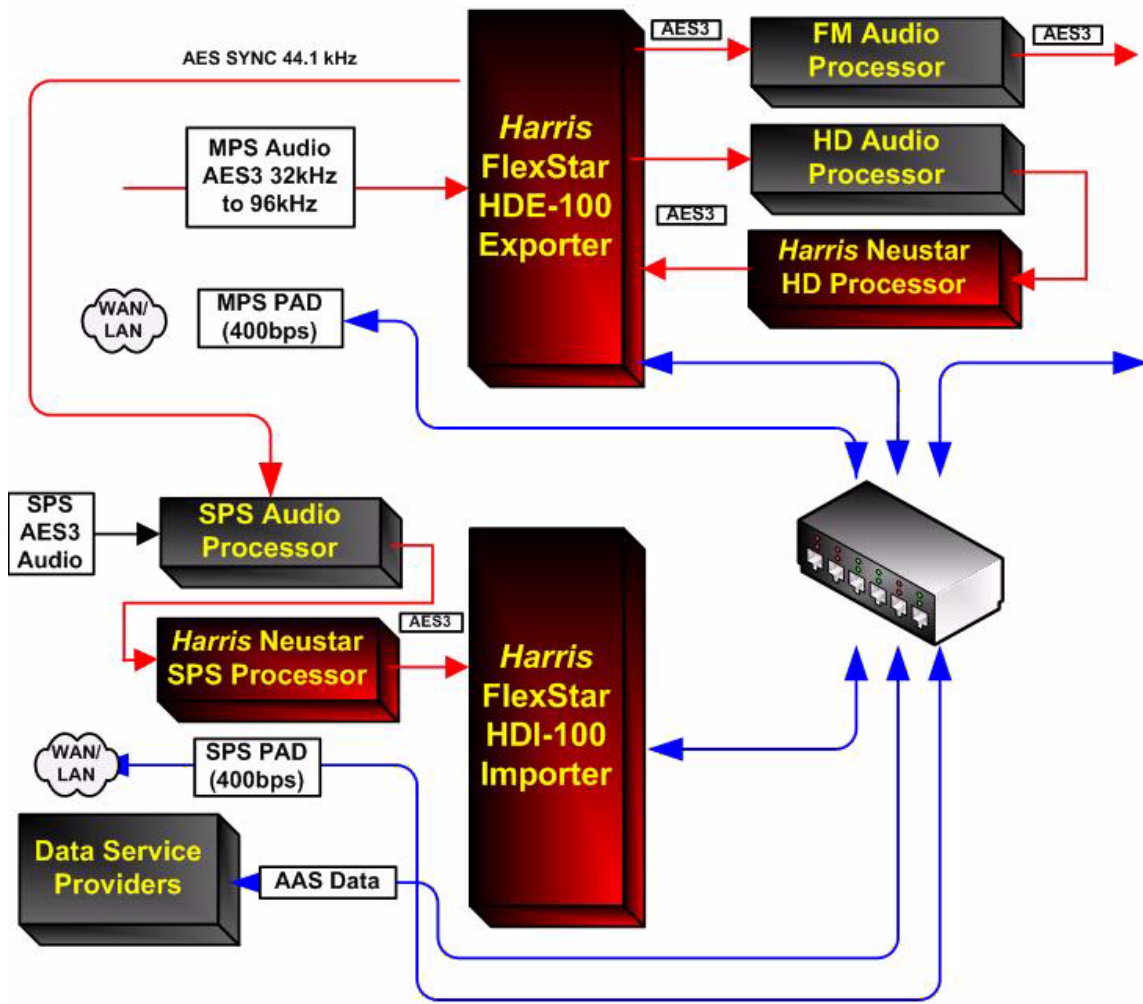


Figure 2-6 Complex System Connection Using a (Managed) Switch.

## 2.8 Licensing

There are two licensing arrangements associated with this Importer; Windows operating system and iBiquity HD Radio.

The Windows XP operating system is activated by Harris during factory testing. This is a one-time activation. It is recommended that you register the Windows XP Professional; see [www.Microsoft.com](http://www.Microsoft.com).

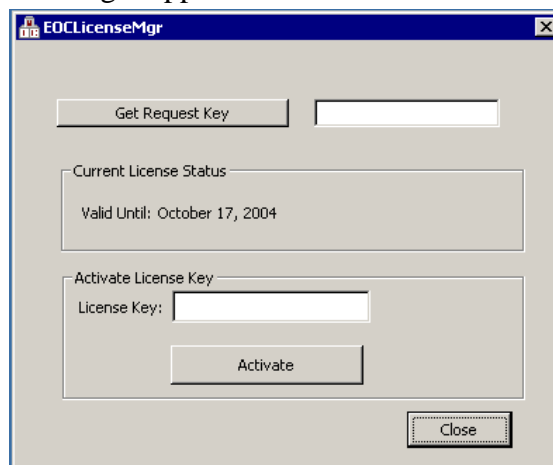
### 2.8.1 License Key

The end-user must submit a request for a License Key in accordance with the license agreement with iBiquity.

**NOTE:**

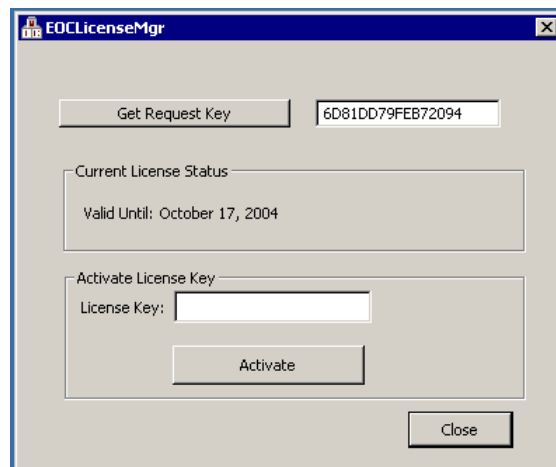
You will need to renew the iBiquity license agreement in one year.

When the License Manager application is started the Window shown is displayed.



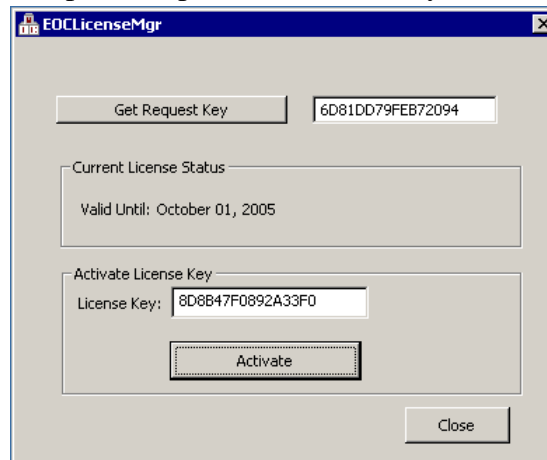
**Figure 2-7 License Manager: initial dialog box**

Press “Get Request Key” and a 48 character key is displayed. E-mail this key to iBiquity Digital ([importerkey@ibiquity.com](mailto:importerkey@ibiquity.com)).



**Figure 2-8 License Manager: Request key example**

A 48 character activation key will be emailed back. Enter this key in the Activate License Key data entry area and press activate. The current License Status Valid Until data will be updated upon acceptance of a valid key Press close to complete the process.



**Figure 2-9 License Manager: Valid license key acceptance example**





# Section 3

## Operation

# 3

### 3.1 Lynx Audio Card

The Importer can have one of three different Lynx audio cards: the Lynx One analog card with one AES or one L/R analog input; the AES16-XLR which has 8 AES input channels and 8 AES output channels; or an AES16-SRC which is also an 8-channel input/output digital audio card with static rate conversion available on inputs 5-8.

For information on operating the Lynx audio card, refer to the Lynx users manual.

#### 3.1.1 Helpful information

Early Importers used in the Dell PowerEdge 750 chassis were configured with a LynxOne audio card. When Using the Lynx One card, the following information may be useful.

##### ***Checks to ensure it is properly installed and is functioning correctly:***

1. Open the Lynx One mixer.
2. Audio Source Digital Out goes into LYNX Audio Card Digital In.
3. If correctly connected, the Digital In panel should show PRO and lock.
4. Sample Clock should show the following:
  - a. Source: Digital
  - b. Reference: Auto
  - c. Auto Selection should be checked.
  - d. Reference: Word
5. Digital Format: Out of the two options, AES/EBU should be selected.
6. Lynx One should show activity in meter.

7. Rate should be 44100.

***Checking using Sound Recorder:***

1. From file menu, click on properties.
2. In Format conversion grouping, Set to Recording formats. Click on Convert Now...
3. Set to 44.1 KHz, 16 bit and Stereo.
4. Click OK.
5. Start recording. The Sound Recorder should show signs of recording.

***Syncing the Lynx AES16-SRC audio card:***

See " Syncing the Lynx AES16-SRC audio card:" on page 2-8 for configuration settings depending on equipment vintage.

***Syncing the Lynx One and AES16-XLR audio cards:***

See " Syncing the Lynx One and AES16-XLR audio cards:" on page 2-9 for configuration settings depending on equipment vintage.

# Section 4

## Troubleshooting

# 4

### 4.1 Troubleshooting Audio

---

Buffer overruns or underruns at the Exporter (or DEXSTAR) or Importer can occur when the audio processor or rate converter ahead of the Importer is allowed to self clock. The result is minor audio glitches or pops when the two clocks are not linked together. These errors can occur over a long period of time as the two clocks skew, or drift relative to each other and fill up the buffer or deplete the buffer. The time period between occurrences of the glitches can be a matter of days to months depending on the accuracy of the 44.1 reference sources. A GPS reference is the best source and the Exporter (or DEXSTAR) provides this with its 44.1kHz reference.

If the Importer and Exporter/DEXSTAR are not co-located they must best derive their clock from an external GPS source.



**CAUTION:**

*IT IS IMPERITIVE THAT THE AES AUDIO ENTERING THE IMPORTER IS CLOCKED BY THE EXPORTER/DEXSTAR!*

#### 4.1.1 Verify Audio via Meters

---

Check to verify audio is present by checking both the Output and Record/Play meters.

1. Double-click on Lynx Mixer desktop shortcut: or browse to **C:\Lynx\LMixer.exe**.
2. Once Lynx Mixer application is loaded, click on the "Record/Play" or "Outputs" window to make it visible. Or select either from the "Window" drop down toolbar menu.
3. Verify meter movement on desired channel (see Figure 4-1 on page 4-2)

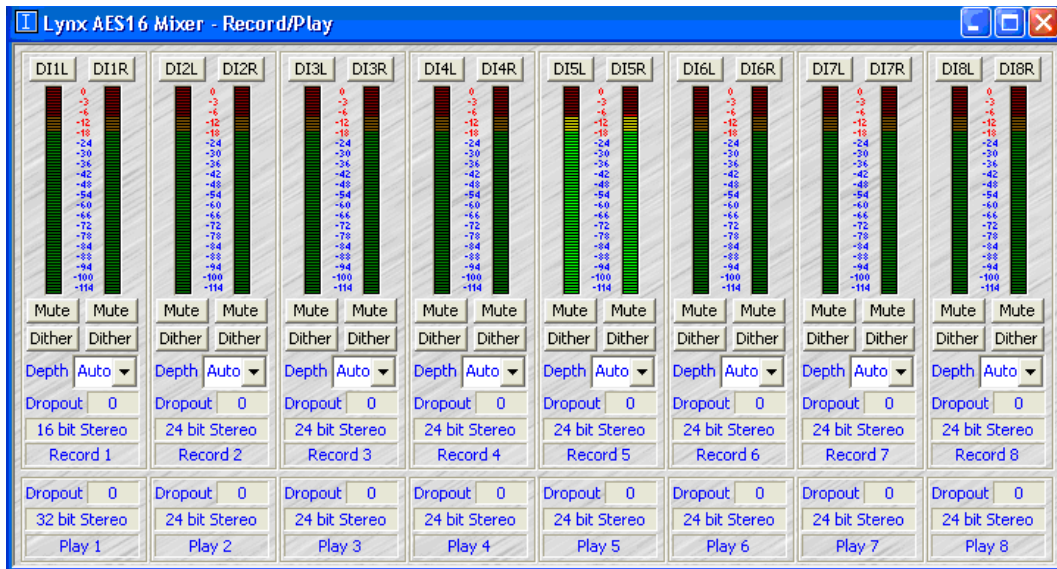


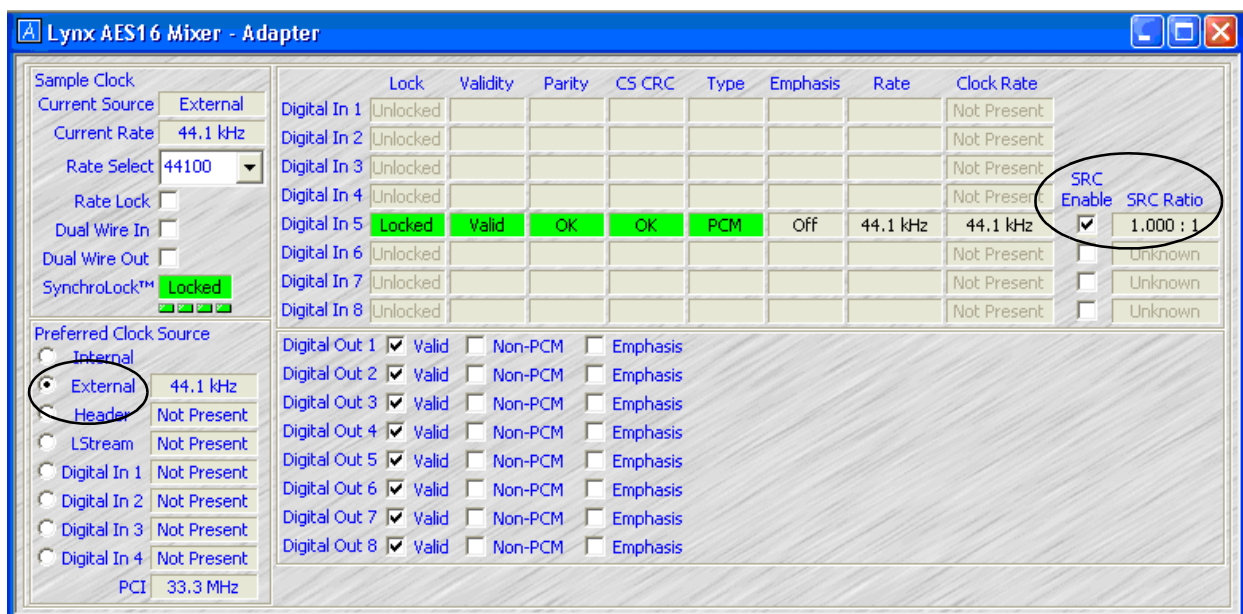
Figure 4-1 Record/Play Mixer Screenshot

## 4.2 Factory Audio Mixer Settings

### 4.2.1 Lynx AES16-SRC

If the Lynx AES16-SCR audio card drivers have to be reinstalled, a couple default settings need to be changed to return Importer to factory setting.

1. Double-click on Lynx Mixer desktop shortcut: or browse to **C:\Lynx\LMixer.exe**
2. Once Lynx Mixer application is loaded, click on the "Adapter" window to make it visible. Or select Adaptor from the "Window" drop down toolbar menu
3. Within the "Preferred Clock Source" box, select "External"
4. Be sure SRC Enable is checked to assure that any of the inputs on 5-8 are being clocked by the BNC Clock input on the breakout cable of Port A (remember only inputs 5-8 utilize the rate converter -synchronization-function)

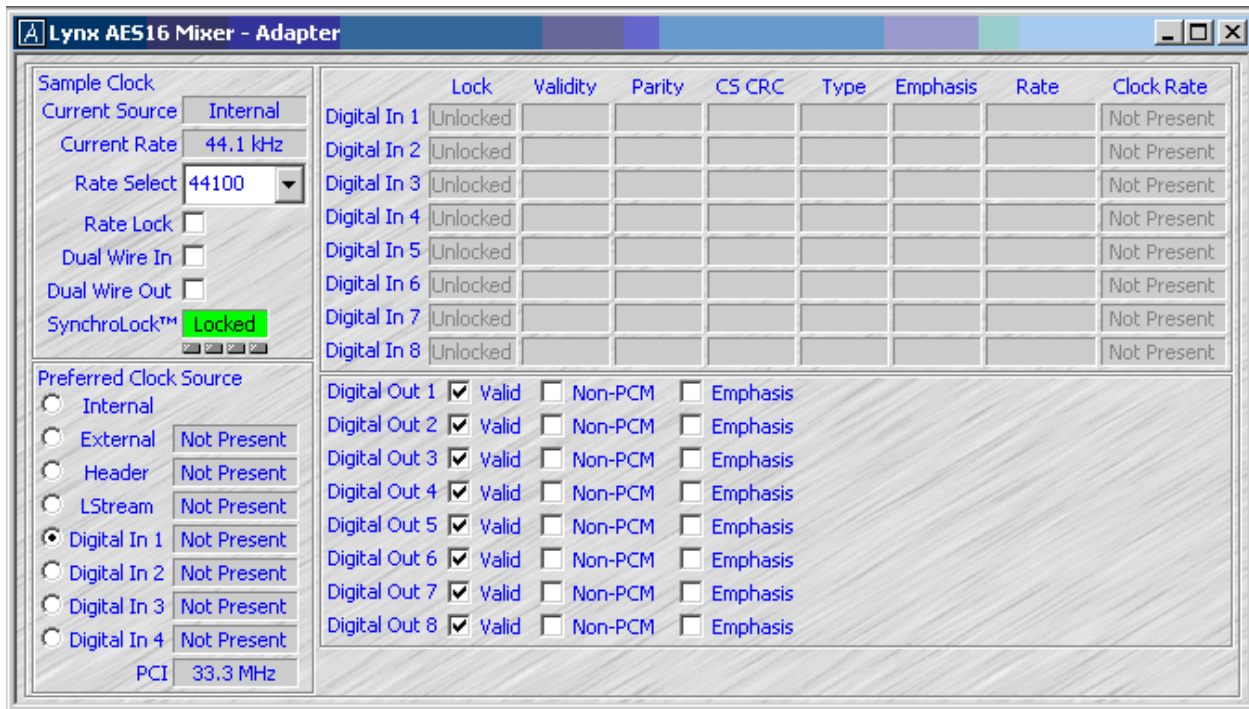


**Figure 4-2 Lynx AES16-SRC Mixer Adapter**  
Shown configured correctly for Word Clock (External) sync source.

## 4.2.2 Lynx AES16-XLR

If the Lynx AES16-XLR audio card drivers have to be reinstalled, a couple default settings need to be changed to return Importer to factory setting.

1. Double-click on Lynx Mixer desktop shortcut: or browse to **C:\Lynx\LMixer.exe**
2. Once Lynx Mixer application is loaded, click on the "Adapter" window to make it visible. Or select Adaptor from the "Window" drop down toolbar menu
3. Within the "Preferred Clock Source" box, select "Digital In 1"



**Figure 4-3 Lynx AES16-XLR Mixer Adapter  
Shown configured correctly for AES sync source.**

4. Click on "Settings" in the menu bar and then click on "Advanced."
5. Select "Allow Clock Change if Active" and make sure that it has a check mark next to it.

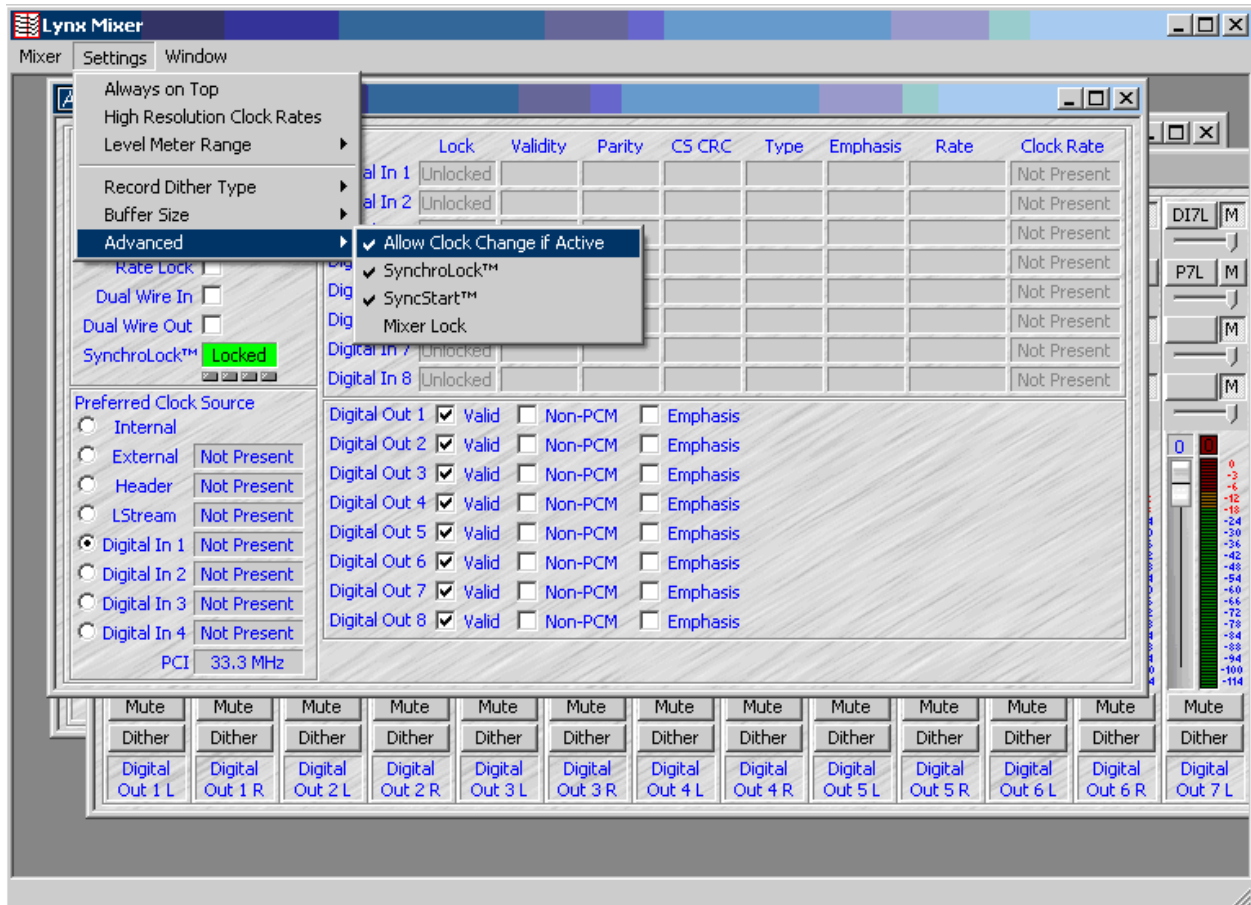


Figure 4-4 AES16-XLR Advanced Settings

6. If the Lynx mixer no longer sees the preferred clock source set in step 3, it will default back to its internal clock as a clock source. The "Allow Clock Change if Active" allows the Lynx mixer to automatically switch back to the preferred clock source once it's sensed again.

## 4.3 System Issues

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### 4.3.1 Restoring/reloading operating system

---

**WARNING:**

*THIS IS AN EMERGENCY OPERATION ONLY. DO NOT ATTEMPT TO LOAD THE OPERATING SYSTEM OR SOFTWARE UNLESS A TOTAL SET UP IS DESIRED. LOADING THESE ONTO YOUR IMPORTER WILL EFFECTIVELY OVER WRITE ALL PREVIOUSLY INSTALLED OPERATING SYSTEMS AND SETTINGS. AFTER THE OPERATING SYSTEM HAS BEEN RESTORED IN THIS MANNER, THEN A SOFTWARE UPGRADE IS NEEDED TO GET IT TO THE CURRENT SOFTWARE VERSION.*

This information is provided in the event of a hard-drive failure where you would need to start over and reload all previous software. Obtain the reload software off the Internet via the <https://premier.harris.com/broadcast/> website. Read the read-me document for instructions. Complete all the following procedures.

#### 4.3.1.1 OS Reinstallation Procedures

---

This procedure will effectively be starting over with the installation of Windows operating system and reload the iBiquity Importer software. *ALL* settings will be over written. Only perform this procedure as an emergency restore. Allow sufficient time to perform this task, approximately 20 minutes. Locate the *three* CD ROM disks needed to complete this operation by requesting them or down loading the ISO files from the [www.premier.harris.com](http://www.premier.harris.com) site and burning the "ISO image" to CDs (do not simply copy the file to a data disk).

**NOTE:**

Record ALL network information for the HDI-100 Importer and HDE-100 Exporter (or DEXSTAR) prior to these procedures as all parameters will be over written.

##### 4.3.1.1.1 *To Record HDI-100 Importer Network Info*

---

- Left-click on the "**Start**" button. Select "**Settings**" then "**Network Connections**"
- Right-click on "**Local Area Connection**" icon



- Left-click on "**Properties**". Left-click on "**Internet Protocol (TCP/IP)**" then left-click on "**Properties**". Record *IP address*, *subnet mask*, and *default gateway* if using static IP address.

#### 4.3.1.1.2 *To Record HDI-100 Importer Network Info*

---

- Select the "**System**" button. Enter password to enable access to Network setup.
- Select the "**Network GPS**" button. Record *IP address*.

#### 4.3.1.1.3 *Norton Ghost Install*

---

- STEP 1** Stop SPS processors.
- STEP 2** Close Logistics Processor and Connection Manager.
- STEP 3** Remove the front cover from the Importer to expose the CDROM drive. Press the eject button and insert Disk 1 of 3 (close Windows Explorer if it opens).
- STEP 4** Left-click the "**Start**" button on the Windows Desktop. Select "**Turn off computer...**". Select "**Restart**".
- STEP 5** Norton Ghost will load. Left-click "**OK**" in the "**About Norton Ghost**" screen.
- STEP 6** Select "**Local**" | "**Disk**" | "**From Image**" from the menu options.
- STEP 7** A screen called "**Image file name to restore from**" will display. Left-click (on the blue line with the red arrow pointing left) *once* to go back one level in the directory.
- STEP 8** Left-click *once* on "**V305-BMP.GHO**" file name (it will be the only GHO file on the list.).
- STEP 9** Select "**OK**" when the "**Select local destination drive by clicking on the drive number**" screen appears.
- STEP 10** Select "**OK**" to "**Destination Drive Details**" screen.
- STEP 11** Left-click "**Yes**" to "**Proceed with disk restore?**"
- STEP 12** Disk 1 will start loading. A display bar will show progress of installation. Disk 1 load time is approximately 5 minutes and the progress bar will display approximately 20% when Disk 1 is complete.
- STEP 13** When "**Span Volume [1] Done (1660)**" appears, *eject Disk 1 and insert Disk 2*. Left-click "**OK**" on "**Span Volume [1] Done (1660)**".

- STEP 14** Disk 2 will start loading. Disk 2 load time is approximately 8 minutes and the progress bar will display approximately 81% when Disk 2 is complete.
- STEP 15** When "**Span Volume [2] Done (1660)**" appears, *eject Disk 2 and insert Disk 3*. Left-click "**OK**" on "**Span Volume [2] Done (1660)**".
- STEP 16** Disk 3 will start loading. Disk 3 load time is approximately 7 minutes and the progress bar will display 100% when Disk 3 is complete.
- STEP 17** When installation is complete a "**Clone Complete (1912)**" screen will appear with the message "**Clone Completed Successfully**". *Eject Disk first and then click "**Reset Computer**".*

#### 4.3.1.1.4 Windows XP Setup:

---

- STEP 1** When "**Welcome to Microsoft Windows**" screen appears, left-click on "**Next**".
- STEP 2** Left-click on "**Yes, I accept**", then "**Next**" to read and accept the End User License Agreement.
- STEP 3** Using an attached keyboard, type in the **Windows XP Product Key**. The Microsoft product key code label is located on the top cover of the Importer. Left-click on "**Next**".
- STEP 4** At the "**Help protect your PC**" screen, left-click on "**Not right now**", then "**Next**".
- STEP 5** At the "**What's your computer's name?**" screen, type **IMPORTER-WXYZ** (WXYZ being your call letters) in the computer name box and leave the computer description box blank. Left-click on "**Next**".
- STEP 6** After a few moments, setup will ask you to enter an **administrator password**. Leave these boxes blank and left-click on "**Skip**".
- STEP 7** Setup will then ask if this computer is in a domain. Make sure that "**No, don't make this computer part of a domain**" is selected, then left-click on "**Next**".
- STEP 8** Wait while setup is **checking for an internet connection** (Left-click on "**Skip**" if Importer is not connected to a network with Internet access).
- STEP 9** Setup will then ask if you are "**Ready to activate Windows?**"
- STEP 10** If the Importer isn't connected to a network with Internet access then you can activate via Microsoft's activation phone number.
- STEP 11** Accept default "**Yes**" to "**Will this computer connect to the Internet directly, or through a network?**"

**STEP 12** Left-click "**Yes, I'd like to register with Microsoft now**", then "**Next**". Enter your registration information then left-click "**Next**".

**STEP 13** At "**Thank you!**" screen, left-click on "**Finish**". The Importer should now successfully reboot up to Windows XP Professional.

#### 4.3.1.1.5 *iBiquity License*

---

**STEP 1** Double-click on the "**License Manager**" icon on the Desktop. Left-click "**OK**" to "**Invalid license**". Left-click "**OK**" to "**Unable to check validity of the License, License not found.**"

**STEP 2** Left-click on "**Get License Key**". You can re-use the existing license key code if you have it on record. If not write down the **request key code** and

**Email to:** *importerkey@ibiquity.com*

**Subject line enter:** *Importer 3.0.5 license key code request*

**In the email text body enter:** *Upgrading Harris HDI-100 Importer to revision 3.0.5.*

*Request key code: (your request code). Please reply with valid license key code.*

**STEP 3** Enter the new license key code into the "**License Key**" field. Left-click on "**Activate**". "**Current License Status**" should now say valid until (today's date plus 1 year on new license key).

**STEP 4** Left-click "**Close**" to close the License Manager window.

#### 4.3.1.1.6 *Importer Network Setup:*

---

**STEP 1** Left-click on the "**Start**" button. Select "**Settings**", then "**Network Connections**".

**STEP 2** Right-click on "Local Area Connection" icon. This is for the bottom network connector on the back of the Importer - Port 2.

**STEP 3** Left-click on "**Properties**". Left-click on "**Internet Protocol (TCP/IP)**" then left-click on "**Properties**".

**STEP 4** Select "**Use the following IP address**". Enter your **static IP address**, **subnet mask** and **default gateway** recorded earlier.

**Default Static IP address:** 10.10.10.9

**Default Subnet mask:** 255.255.255.0

**Default Gateway:** 10.10.10.13

- STEP 5** Left-click "OK", then "OK" again to close "Local Area Connection" windows.
- STEP 6** The default setup for "Local Area Connection 2" is for "Obtain an IP address automatically" (DHCP). This is for the *top* Ether connector on the back of the Importer - Port 1. If a static IP address is required change this connection using same method as above.

#### 4.3.1.1.7 *LYNX AES16-XLR Driver Update (XLR Cards Only):*

---



**NOTE:**

Skip this section if you are using a Lynx AES16-SRC audio card.

- STEP 1** Left-click "Start", "Settings", then "Control Panel".
- STEP 2** Double-click on "Sounds and Audio Devices". Select the "Hardware" tab.
- STEP 3** Double-click on "Lynx AES16" in the devices window.
- STEP 4** Select the "Driver" tab. Left-click on the "Update Driver" button.
- STEP 5** The "Hardware Update Wizard" window will open.
- STEP 6** Select "No, not at this time" to "Can Windows connect to Windows Update to search for software?" Left-click "Next".
- STEP 7** Accept default "Install the software automatically (Recommended)". Left-click "Next".
- STEP 8** Left-click "Continue Anyway" in the Windows Logo testing window.
- STEP 9** After the driver completes loading left-click "Finish".
- STEP 10** Close the Lynx AES16 properties window.
- STEP 11** Left-click "OK" on "Sounds and Audio Properties" window.
- STEP 12** Close the "Control Panel" window.
- STEP 13** Double-click on the "Lynx Mixer" icon on the Desktop to verify proper operation.

#### 4.3.1.1.8 *Initial Importer Setup:*

---

- STEP 1** Double-click on the "Importer Control Panel" icon.
- STEP 2** Left-click on the "Setup" menu option, then "Importer".

- STEP 3** Change the "**Exporter IP address**" to the Exporter IP address recorded earlier. Leave all other fields with default settings. Left-click "**OK**".
- STEP 4** Left-click on the "**File**" menu option then "**Exit**". Left-click "**Yes**" to "**Do you want to exit the Importer Control Panel?**"
- STEP 5** Double-click the "**Administrator**" icon on the Desktop.
- STEP 6** When the "**Administrator**" window opens left-click the "**Verify Exporter Interface**" button. This should report back that "**Exporter interface has been successfully verified!**" (If a failure is reported check the network connection to the Exporter, or DEXSTAR, and IP address settings in that device). Left-click "**OK**".
- STEP 7** Left-click the **red X** on the top right corner of the window to close the "**Administrator**".
- STEP 8** This completes the installation for Importer software 3.0.5. Please review the "HD Radio Importer's User Guide Release 3.0.5" for information on SPS configuration and operation. A PDF version is available for download from the Harris Premier web site:

To download guide go to URL <https://premier.harris.com/broadcast>. After login select "Support/Software Library" option from the left menu column. Under "Categories" select "Software Downloads". Drill down the submenus "Flexstar Family", "HDI-100 Importer". Select the file link "HD Radio Importer's User Guide Release 3.0."

### 4.3.2 License Key Issues

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If License Manager has stopped recognizing a known-good license key, verify that the Ethernet connection is enabled. Re-Enabling the connection will allow License Manager to recognize the license key.

**⇒ NOTE:**

Early versions of the Importer had two Ethernet ports. If *two* Ethernet ports are present on your Importer, and both are being used, be sure that both ports are enabled in Network Connections. If only *one* of the two Ethernet ports are being used, remember to use the *bottom* Ethernet port only.

- STEP 1** Right click Network icon in task tray
- STEP 2** Select Open Network Connections

Or, if icons are not available...

- STEP 1** Click Start

**STEP 2** Select Control Panel

**STEP 3** Select Network Connections

Once you have Network Connections open, verify Ethernet Connection(s) are either enabled or connected. If Disabled:

**STEP 1** Right click disabled connection

**STEP 2** Select Enable

**STEP 3** Close Network Connections

**STEP 4** Verify License Manager recognizes license key

# Section 5

## Parts List

# 5

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### 5.1 Replacement Parts Listing

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- 746-0311-000, PCI Audio Card, LynxONE
- 746-0314-000, PCI Audio Card, Lynx AES16-SRC
- 961-1127-011, FlexStar Importer Software, *for Dell™ PowerEdge™ 750 (earliest Importer)*
- 961-1127-012, FlexStar Importer Software, *for Dell™ PowerEdge™ 850 (early Importer)*
- 961-1127-015, FlexStar Importer Software, *for latest version of Importer*

