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FXi 60 / 250 Exciter Engine Upgrade Application Guide

597-0545 Revision J
2/12/10

FXi 60 / 250 Exciter

Exgine Upgrade Application Guide

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1. Upgrading to 2nd Generation HD Radio™ System Architecture

The block diagrams below illustrate 1st Generation HD Radio System Architecture (**Figure 1**) and 2nd Generation HD Radio System Architecture (**Figure 2**).

To convert from 1st Generation HD Radio™ System Architecture to 2nd Generation HD Radio™ System Architecture, the FSi 10 HD Signal Generator at the Transmitter Site must be converted to an XPI 10 Exporter and then relocated along with the Audio Processors to the Studio Site. Secondly, the Engine Card must be installed into the FXi 60 / 250 HD Exciter at the Transmitter Site.

Note: The XPI 10, once converted, along with the Audio Processors may remain at the Transmitter Site ONLY if the LINK between the IDi 20 Data Importer and the XPI 10 Exporter is BI-DIRECTIONAL.

This document specifically describes the Upgrade of the FXi 60 / 250 Exciter with the Engine Card.

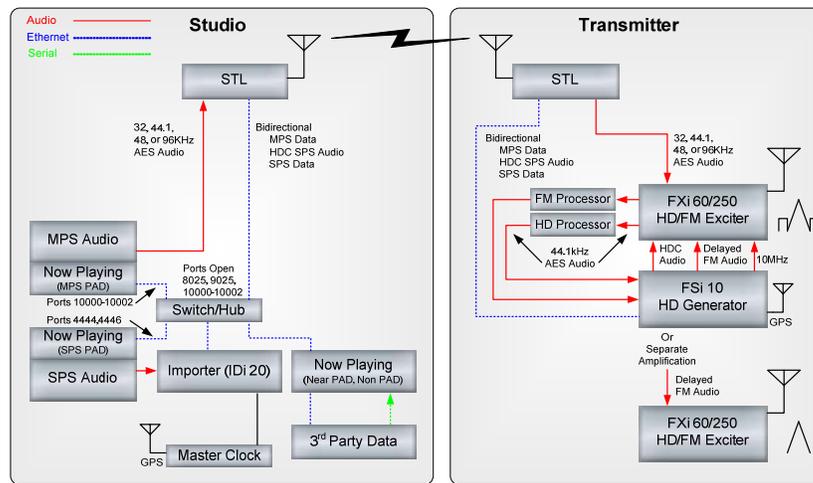


Figure 1 – 1st Generation HD Radio™ System Architecture

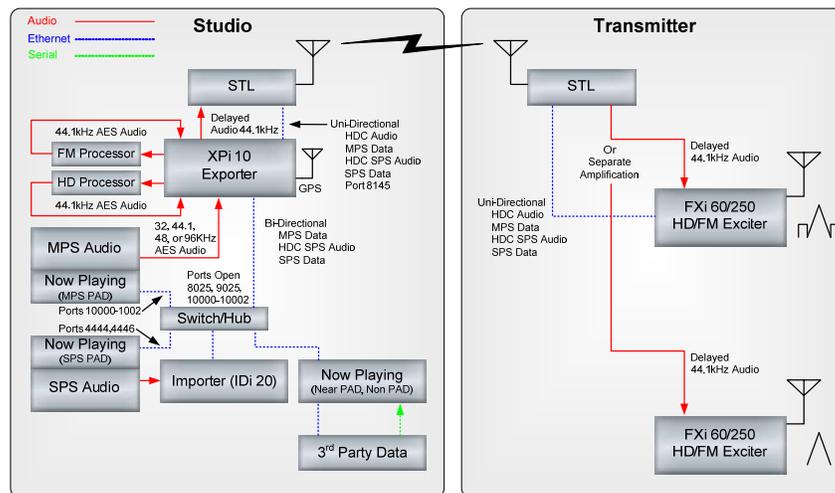


Figure 2 – 2nd Generation HD Radio™ System Architecture



2. FXi 60/250 Exciter Requirements for Engine Upgrade

2.1. Upgrading an IBOC FXi 60/250 Exciter with the Engine Card

If you have an IBOC FXi 60/250 Exciter that has the newer style rear panel (with the large cutout noted in **Figure 3**), proceed with the installation of the Engine Card using the instructions in this document.

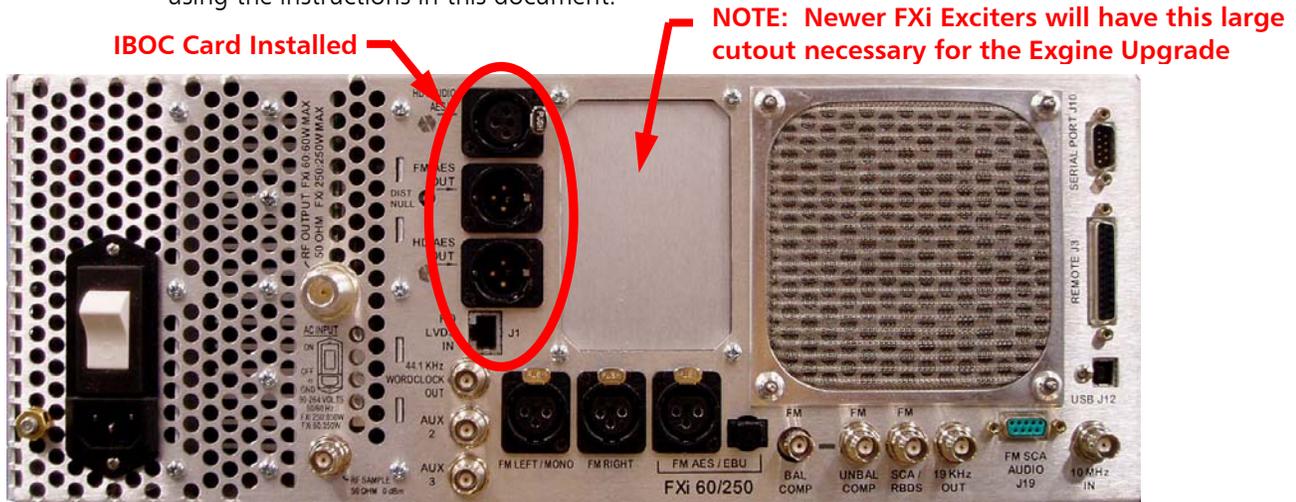


Figure 3 – IBOC FXi 60/250 Exciter (with IBOC card installed)

2.2. IMPORTANT! Upgrading “OLDER” IBOC FXi 60/250 Exciters

Some of the early FXi 60/250 Exciters that were equipped with the IBOC Card have an older style rear panel (without large cutout noted in **Figure 4**). If your FXi 60/250 Exciter has this older style rear panel, additional upgrades are required prior to the installation of the Engine Upgrade Kit! Contact RF Technical Services for Support.

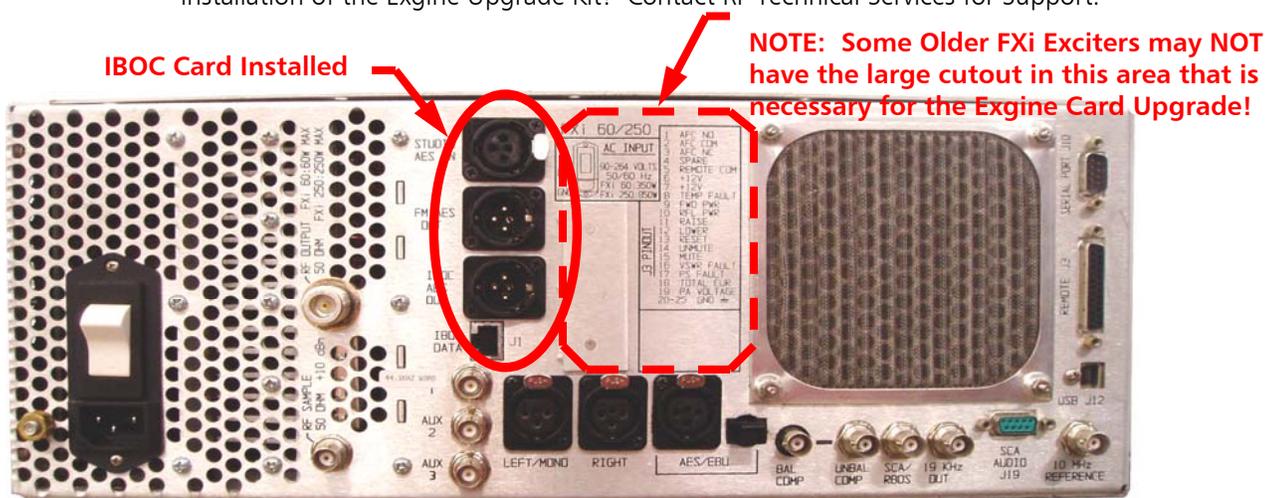


Figure 4 – FXi 60/250 Exciter Rear Panel Without Large Cutout that is Necessary for the Engine Upgrade

2.3. IMPORTANT! Upgrading “FM ONLY” FXi 60/250 Exciters

If your system is currently “FM ONLY” (no IBOC Card Installed in the FXi) contact RF Customer Service to schedule a Service Technician for the installation of the Engine Upgrade Kit into your FXi 60/250 Exciter, as well as to assist in updating your overall system for HD.

Please note that along with upgrading the FXi Exciter with the Engine Card, your transmitter may require some modifications for HD operation.

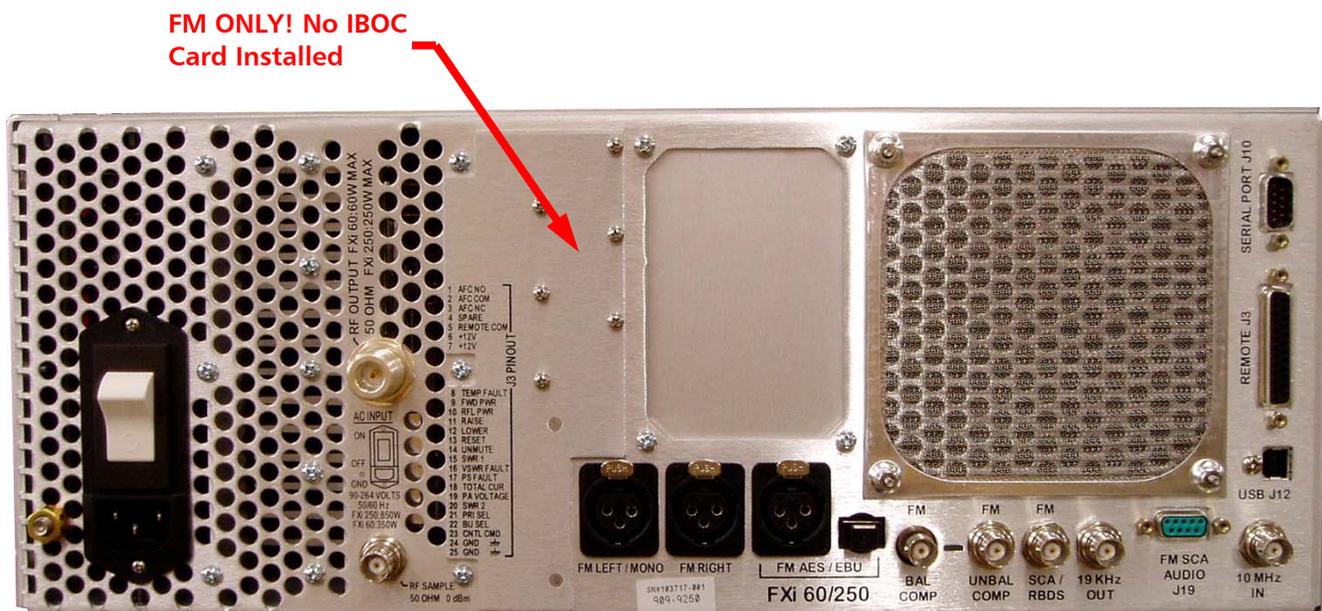


Figure 5 – FXi 60/250 FM ONLY Exciter (No IBOC Card Installed)

3. RF Technical Services Contact Information

RF Technical Services -

Telephone: (217) 224-9617

E-Mail: rfservice@bdcast.com

Fax: (217) 224-6258

www.bdcats.com

4. Prepare for FXi Exciter Engine Upgrade

4.1. Verify Contents of Upgrade Kit (909-0600)

- 597-0545 Manual, FXi 60 / 250 Engine Upgrade (this document)
- 919-0600 Assy, PCB, Engine
- 959-0600 Assy, Sub, Engine, Ethernet and I/O
 - 919-0601 Assy, PCB, I/O
 - 919-0602 Assy, PCB, Ethernet
 - 949-0600 Kit, Cable, Engine Upgrade
 - 949-0610 Assy, Cable, Serial to Engine
 - 949-0611 Assy, Cable, Ethernet to Engine
 - 949-0612 Assy, Cable, I/O to Engine
- 979-0541-011 Kit, Software, FXi, Controller (see Note below)
- 979-0545-001 Kit, Software, FXi, Engine (see Note below)
- 804-5002 Adaptor, Null Modem Cable, DB9 Male to DB9 Female
- 710-2618 Small Flat Blade Jeweler's Screwdriver

Note: Software Upgrade part numbers dependent upon revision level at time of shipment.

4.2. Tools / Items Needed

- No. 1 Phillips Screwdriver
- No. 2 Phillips Screwdriver
- Small Flat Blade Jeweler's Screwdriver (supplied in Kit)
- 9/16" Wrench or Nut Driver
- Personal Computer for Software Upgrade
- Standard Serial Cable (DB9 to DB9) (for Software Upgrades Via Serial Port)
- Adaptor, Null Modem Cable, DB9 Male to DB9 Female (supplied in Kit)
- Ethernet Straight Thru Cable (for Software Upgrades via I.P. thru a Switch or Hub)
- Ethernet Straight Crossover Cable (for Software Upgrades via I.P. directly to the FXi)

4.3. Estimated Time for System Upgrade

Providing you have the proper materials and tools listed above, it will take approximately 90 minutes to perform the 2nd Generation HD Upgrades to your system (45 minutes to convert the FSi 10 HD Signal Generator to an XPi 10 Exporter and 45 minutes to install the Engine Card into the FXi 60 / 250 Exciter).



5. FXi Exciter Engine Card Upgrade

5.1. Turn the FXi Exciter AC Power Switch OFF

Locate the AC Power Switch on the rear of the FXi Exciter and turn it OFF.

5.2. Disconnect all External Cables

Disconnect all cables from the rear of the FXi Exciter Chassis.

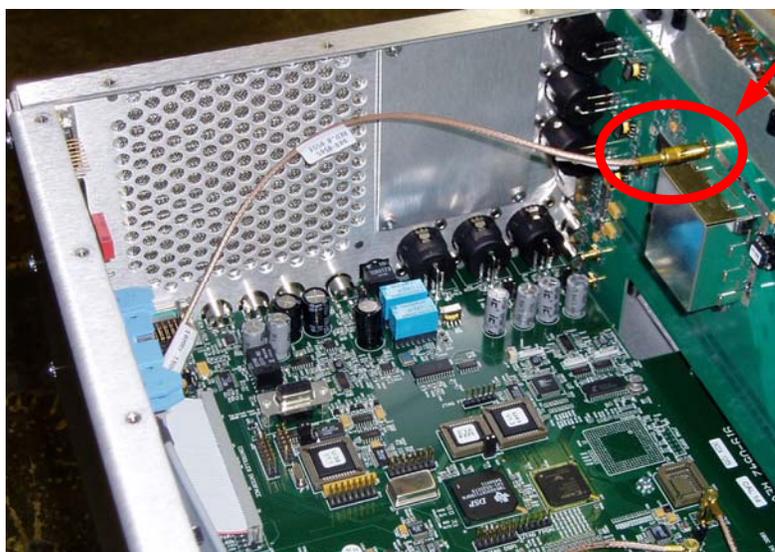
5.3. Remove from Equipment Rack

Remove the FXi from the equipment rack and place on a work bench or table.

5.4. Remove Top Cover

Remove the Top Cover screws from the FXi using a No. 1 Phillips Screw Driver.

5.5. Disconnect 10 MHz Cable from the IBOC Card (919-0546)

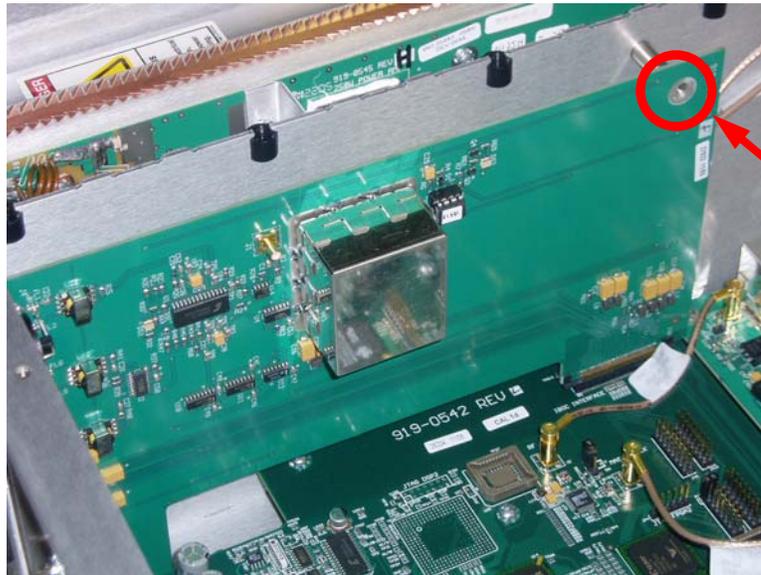


Step 1- Disconnect the 10 MHz Cable from J1 on the IBOC PCB Assembly

(this cable will be connected later to J31 on the Engine Card)

Figure 6 – 10 MHz Cable

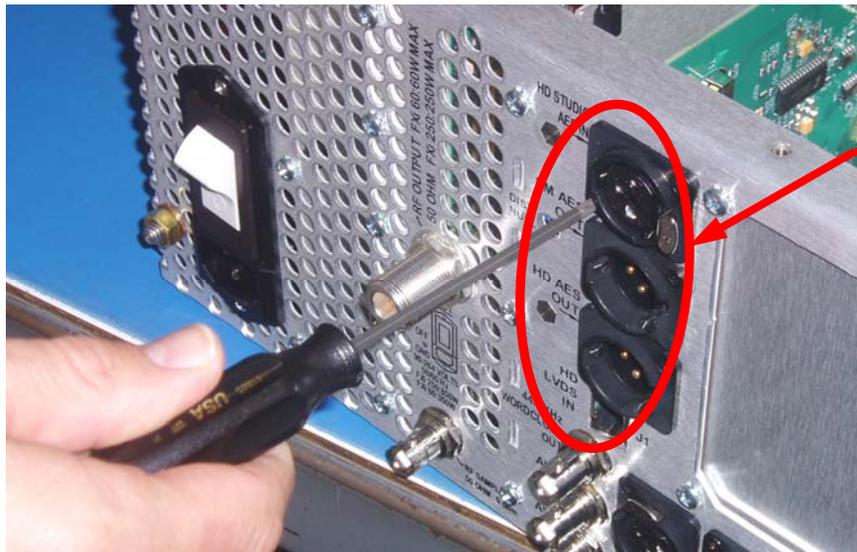
5.6. Remove the IBOC Card Mounting Hardware



Using a No. 1 Phillips Screwdriver, Remove the Mounting Screw Qty (1)

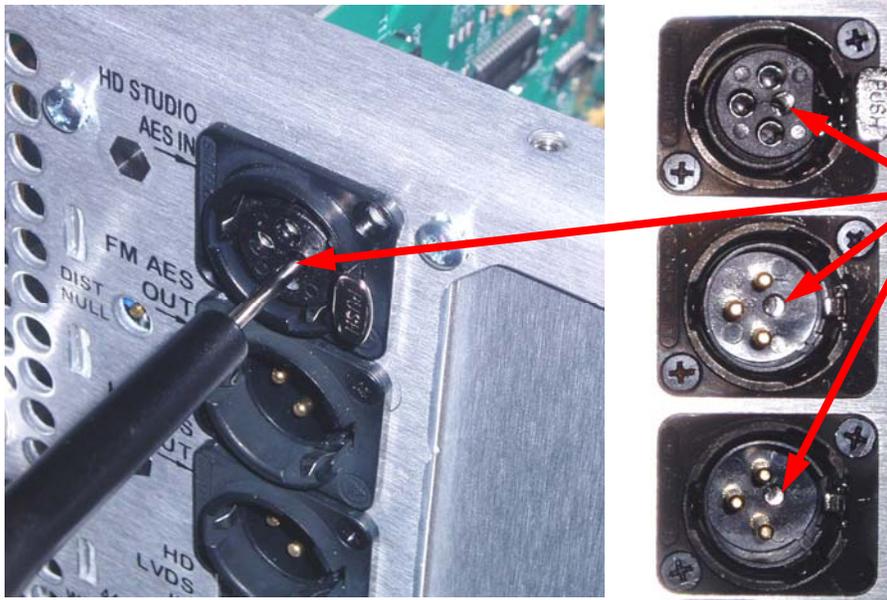
Figure 7 – IBOC Card Mounting Hardware

5.7. Remove the IBOC Card XLR Mounting Hardware



Step 1 - Using a No. 1 Phillips Screwdriver, Remove the XLR Mounting Hardware Qty (6)

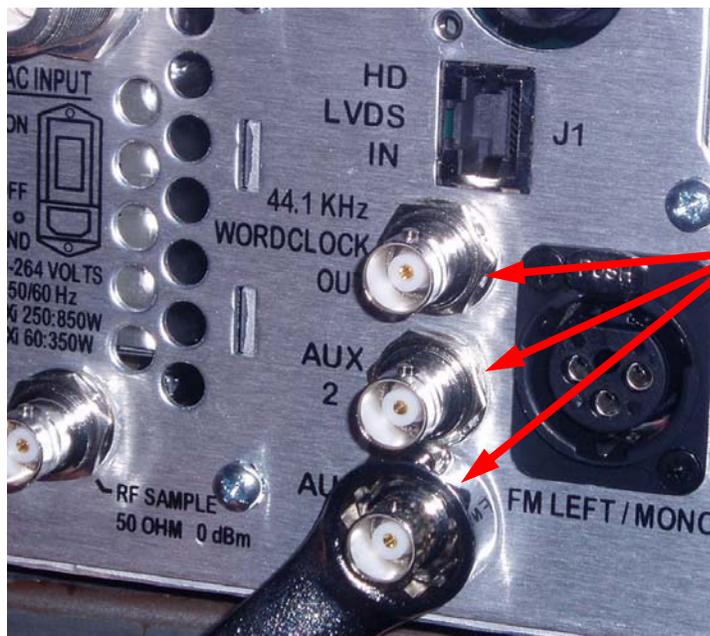
Figure 8 – IBOC Card XLR Mounting Hardware



Step 2 - Using the Small Flat Blade Jeweler's Screwdriver (Supplied in Kit) Unlock the (3) XLR Outer Shells By Turning the Locking Screws Counter Clockwise

Figure 9 – Remove XLR Connector Outer Shells

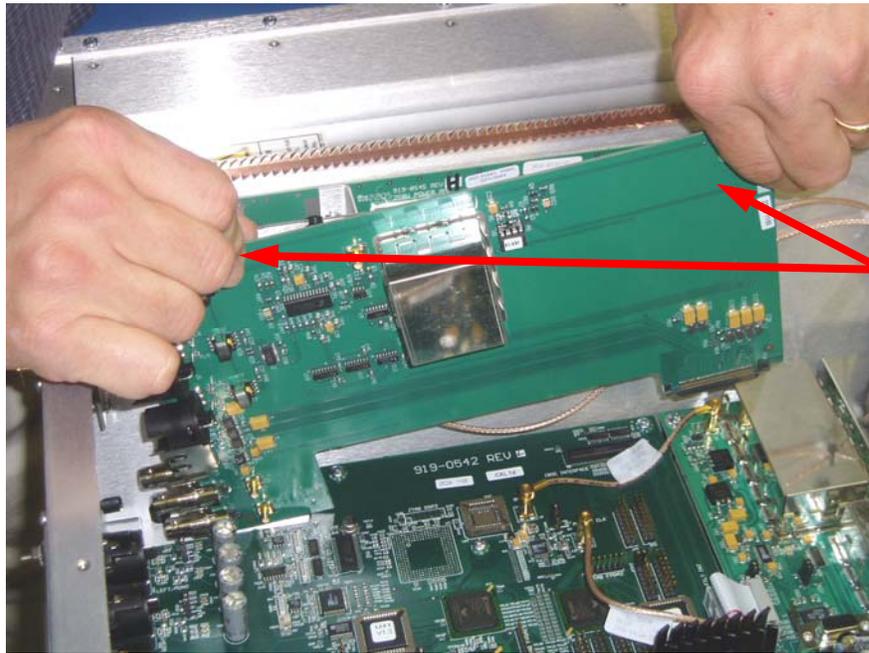
5.8. Remove the IBOC Card BNC Mounting Hardware



Using a 9/16" Wrench or Nut Driver, Remove the Qty (3) Jam Nuts and Qty (3) Internal Tooth Washers

Figure 10 – Remove BNC Connector Hardware

5.9. Remove the IBOC Card



Hold the IBOC Card as Shown, And Remove from the Chassis

Figure 11 – Remove IBOC Card

5.10. Install the Exgine Card into the FXi Exciter

Step 1 – Carefully Remove the Exgine Card from the ESD Packaging.

Step 2 – Remove the Outer Shell from Exgine Card's XLR Connector by inserting a Small Flat Blade Jewelers Screw-driver and Turning the Screw Counter-Clockwise to Unlock

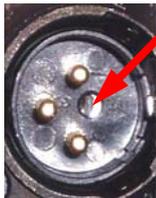
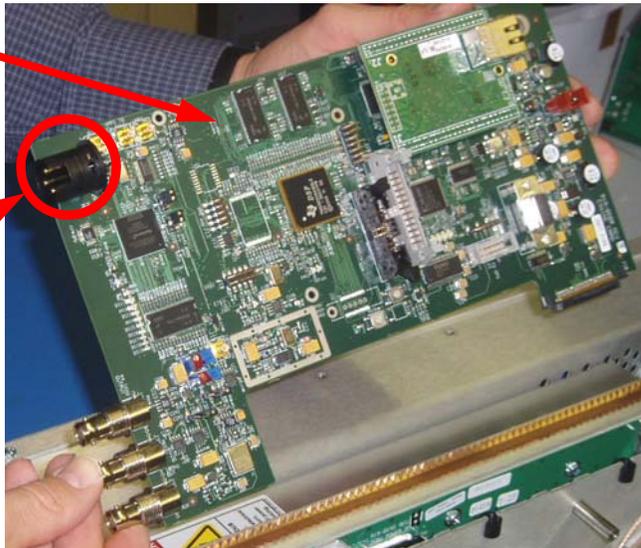


Figure 12 – Exgine Card

Step 3 – Install the Engine Card as shown Ensuring that the Card Edge is Seated into the Motherboard Connector

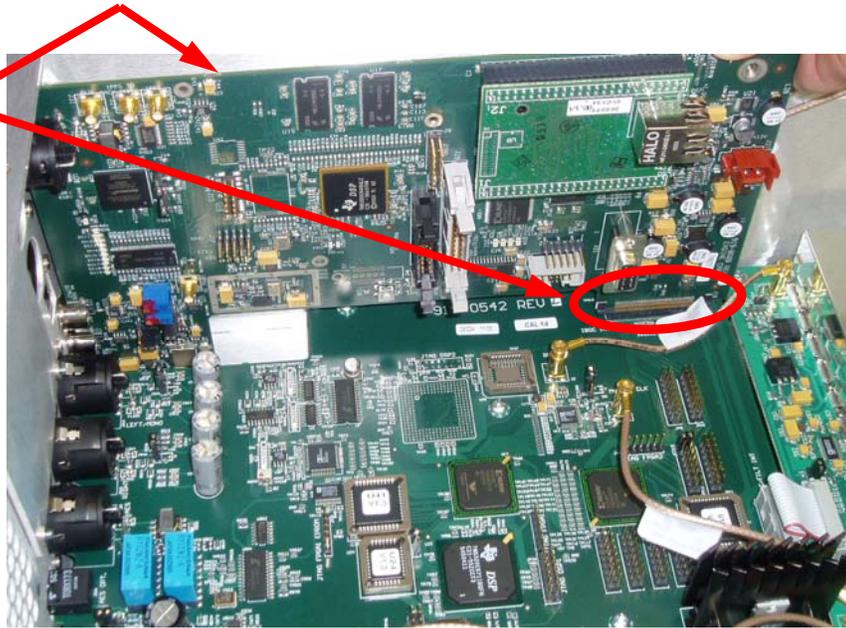
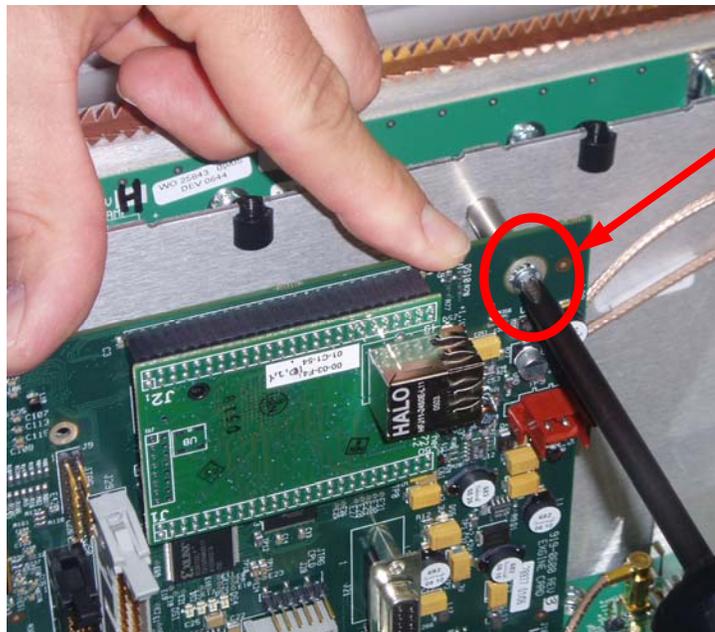


Figure 13 – Install the Engine Card into the FXi Exciter Chassis

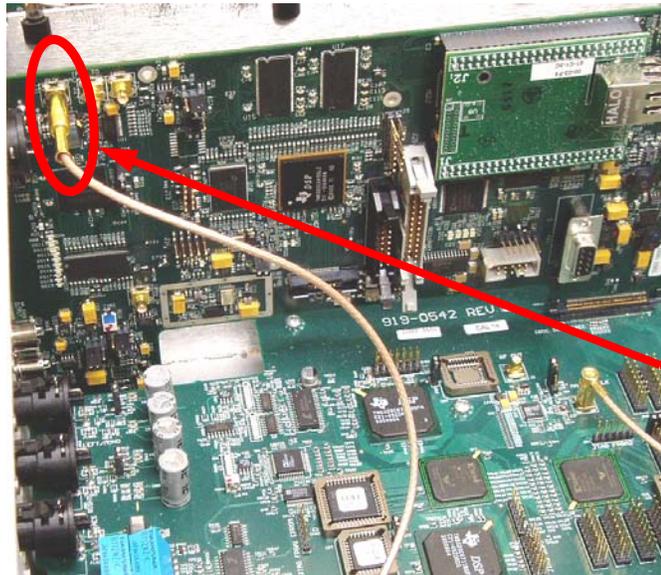
5.11. Install the Engine Card Mounting Hardware



Using a No. 1 Phillips Screw Driver Install the Mounting Screw Qty (1) that was Previously Removed

Figure 14 – Engine Card Mounting Screw

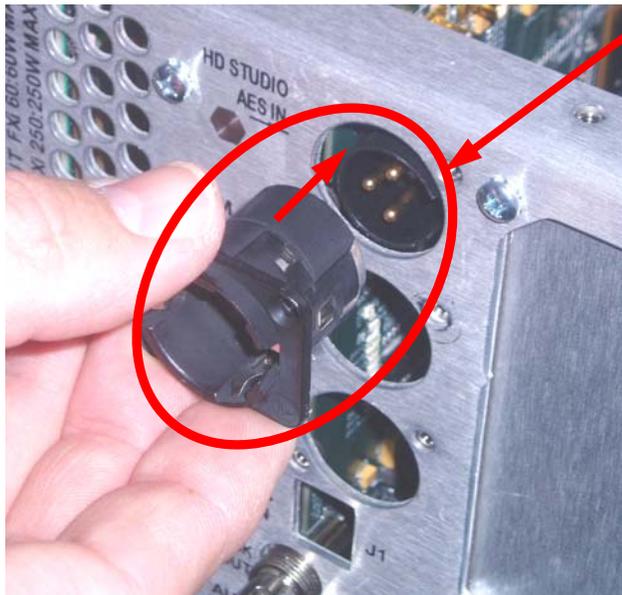
5.12. Connect 10 MHz Cable to the Engine Card



Connect the 10 MHz Cable (that was previously disconnected from the IBOC PCB) back to J31 on the Engine Card

Figure 15 – 10 MHz Cable Connection to the Engine Card

5.13. Install XLR Connector Outer Shell



Step 1 – Insert the Outer Shell that was Previously Removed from the Engine's XLR Connector

Step 2 – Insert a Small Flat Blade Jewelers Screwdriver, Lock the XLR Outer Shell by Turning the Screw Clockwise

Step 3 – Install Mounting Screws Qty (2) that were Previously Removed

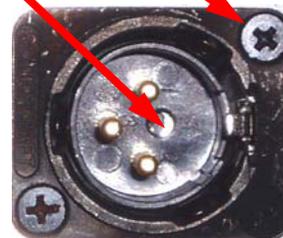
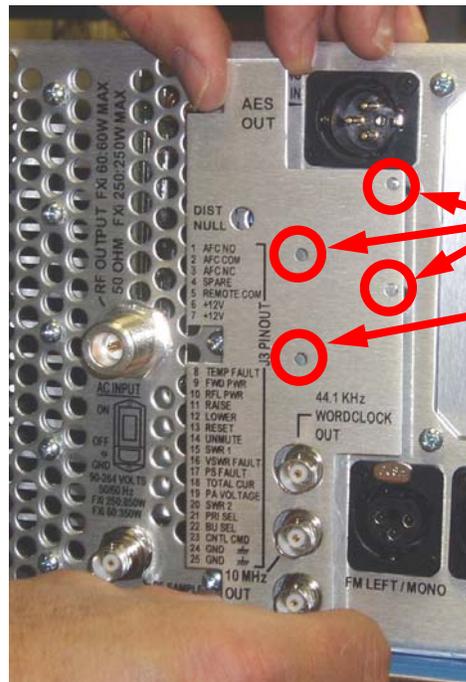


Figure 16 – Install XLR Connector Outer Shell

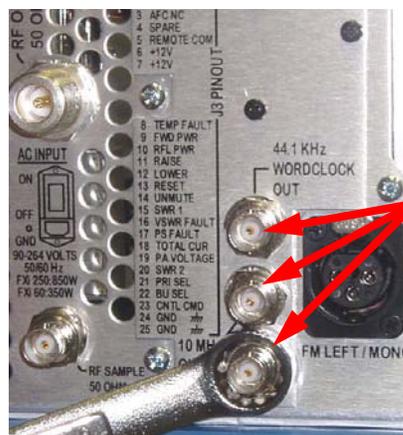
5.14. Install Cover Plate



Install Cover Plate and 4-40 X 3/8 PPH SEM Screws, Qty (4), From the Installation Kit

Figure 17 – Install Cover Plate

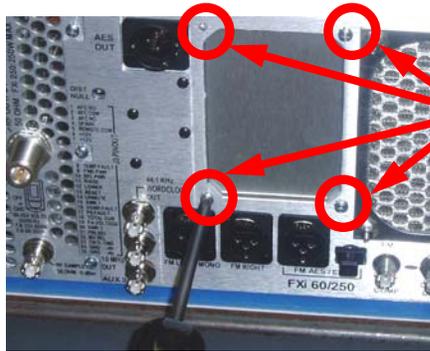
5.15. Install BNC Connector Hardware



Using a 9/16" Wrench or Nut Driver Install the Internal Tooth Washers Qty (3) and Jam Nuts Qty (3) That Were Previously Removed

Figure 18 – Install BNC Connector Hardware

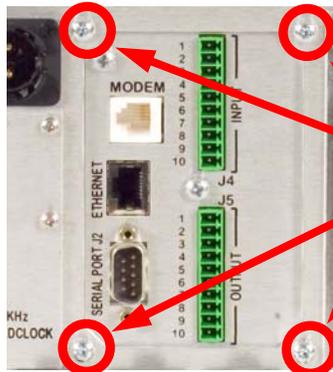
5.16. Remove Filler Panel



Using a No. 1 Phillips Screwdriver, Remove the Filler Panel Mounting Screws Qty (4)

Figure 19 – Filler Panel

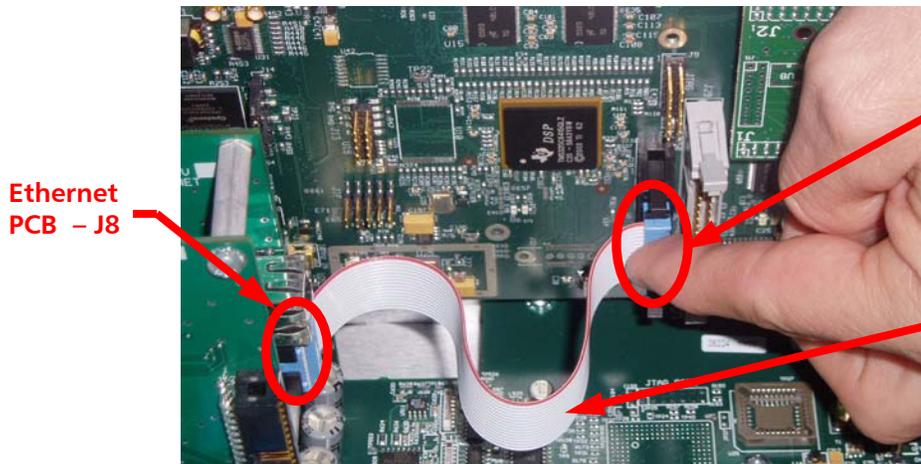
5.17. Install Ethernet and I/O Sub-Assembly (959-0600)



Using a No. 1 Phillips Screwdriver, Install the Mounting Screws Qty (4) That Were Previously Removed

Figure 20 – Ethernet and I/O Sub-Assembly (959-0600)

5.18. Install 16 Pin Serial Cable (949-0610)



Ethernet PCB – J8

Exgine Card – J8

Connect the 16 Pin Serial Cable (949-0610) to J8 on the Ethernet PCB (919-0602) and then to J8 on the Exgine Card (919-0600)

Figure 21 – Serial Cable (949-0610)



5.19. Install 26 Pin I/O Cable (949-0612)

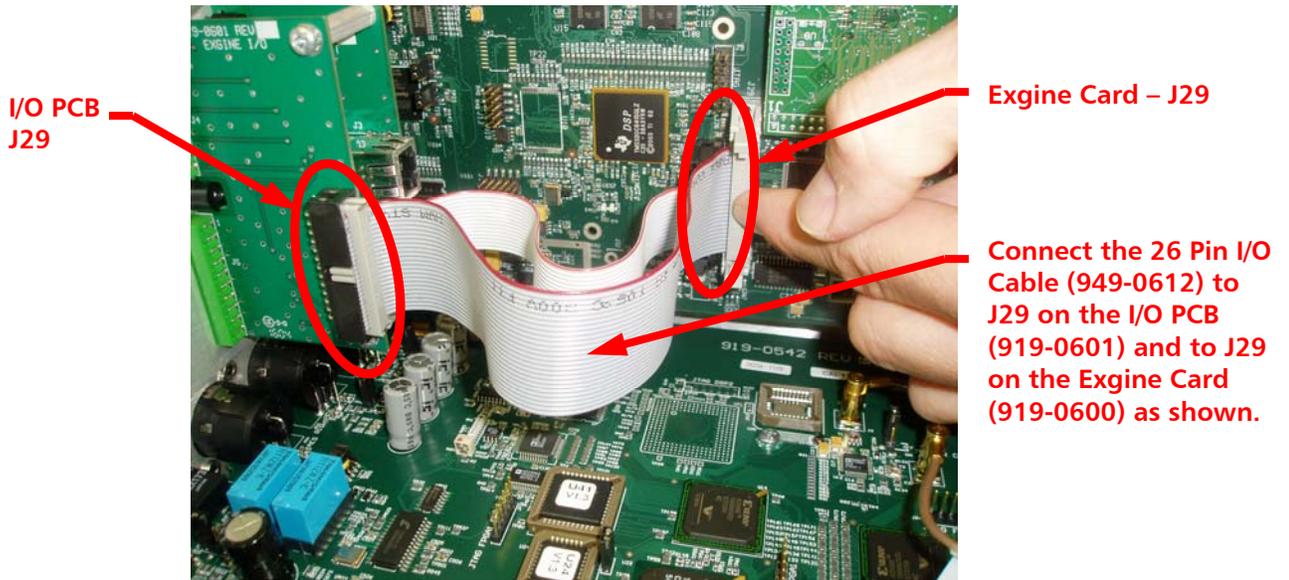


Figure 22 – I/O Cable (949-0612)

5.20. Install the Ethernet Cable (949-0611)

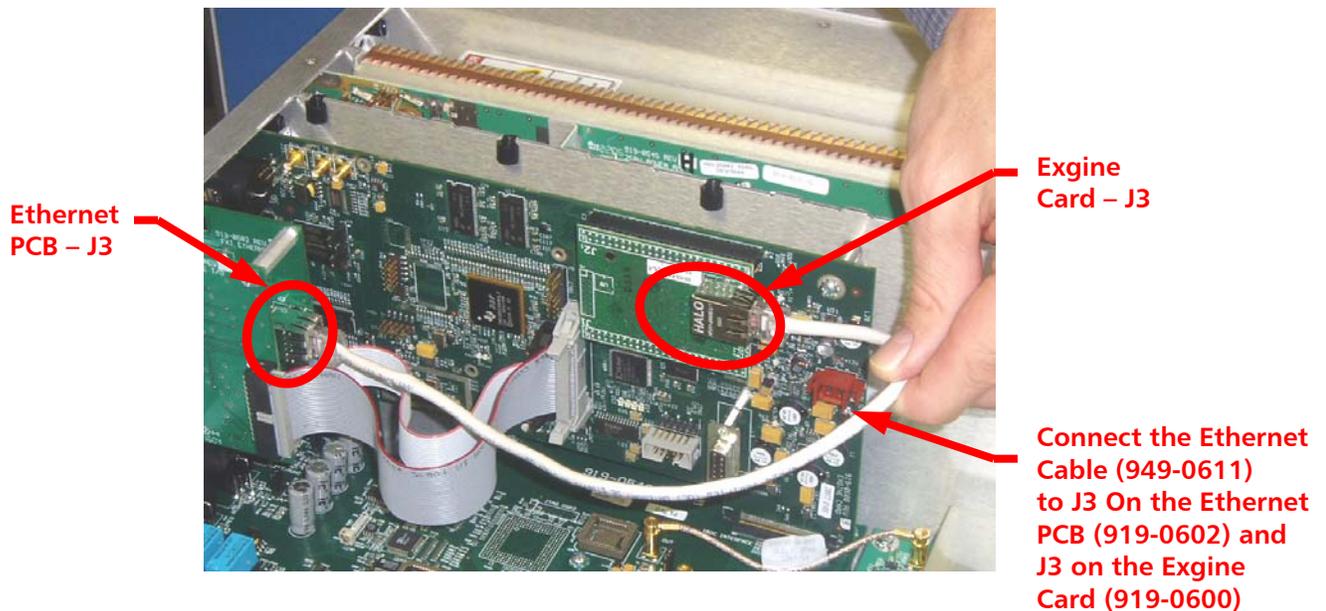


Figure 23 – Ethernet Cable

5.21. Install the Top Cover

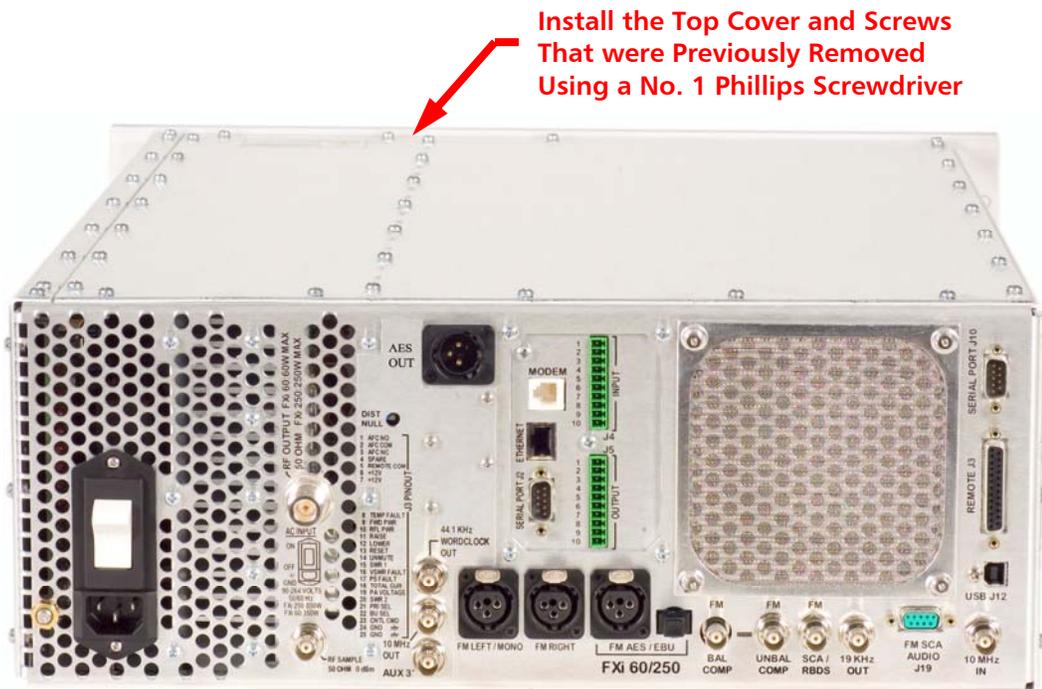


Figure 24 – FXi Exciter with / Exgine Installed (Rear View)

This completes the FXi Exciter with Exgine Hardware upgrade.

5.22. FXi Exciter Controller Software Upgrade Kit

Next, it is necessary to upgrade the **FXi Exciter's Controller Software** to ensure compatibility with the newly installed Exgine Card. Included in the **Exgine Upgrade Kit (909-0600)** is the **FXi 60/250 Exciter Controller Software Upgrade Kit (979-0541-011)**. Use the CD and instructions included in this Kit to upgrade the FXi's Controller Software.

5.23. Exgine Card Software Kit

The Exgine Card ships from the factory with the latest rev of software and should not need to be upgraded after installing the Exgine Card into the FXi. The **FXi Exgine Software Upgrade Kit (979-0545-001)** is also included in the **Exgine Upgrade Kit (909-0600)** if it is necessary to re-load the Exgine Software for some reason.

5.24. Ensure that the FXi is Powered ON

Ensure that the FXi is powered ON before proceeding.



5.25. Configure the I.P. Address of the FXi 60 / 250

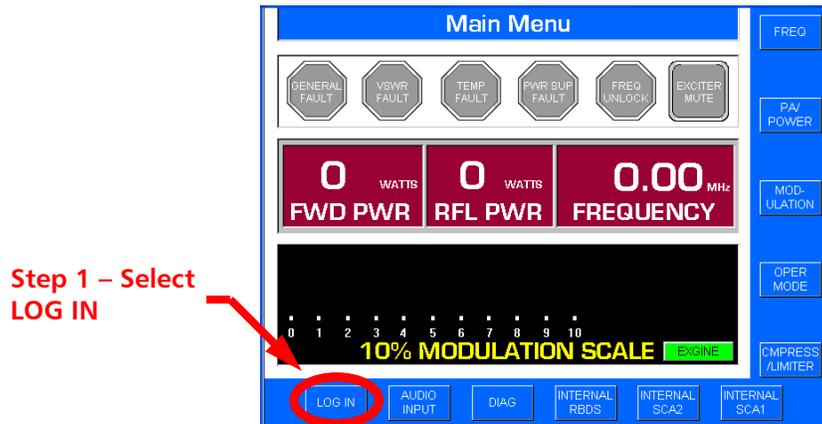


Figure 25 – Main Menu Before Login

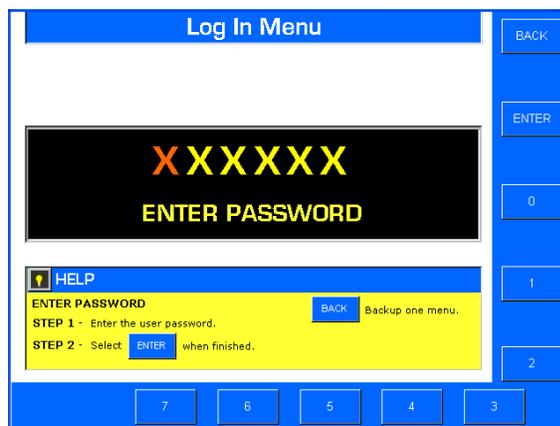


Figure 26 – Login Menu

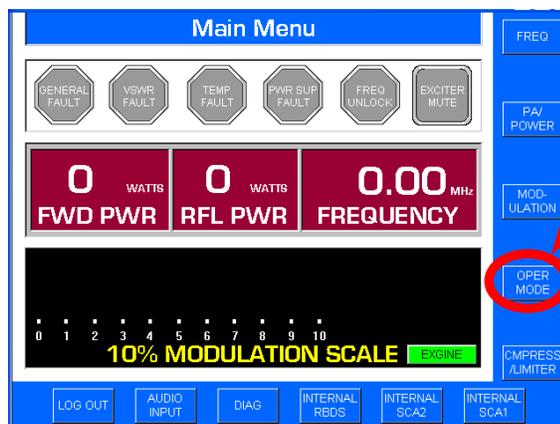


Figure 27 – Main Menu After Login

Step 4 – Select IP SETUP

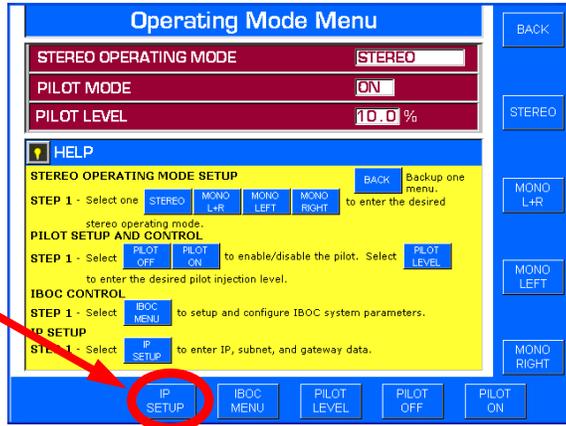


Figure 28 – Operating Mode Menu

Step 5 – Select SET IP

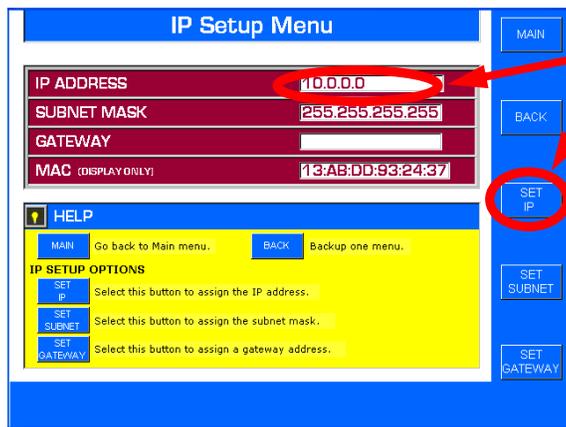


Figure 29 – I.P. Setup Menu

Step 6 – Use the Buttons Provided to Enter the I.P. Address. (Use the <ENTER/.> Button To Advance to the Next Field).

Also, Be sure to press <ENTER/.> When Finished or the I.P. Address will NOT be Saved.

NOTE: The XPi 10 Exporter MUST Be Configured From the Main GUI Menu Under PLATFORM-> LINK CONFIG-> with the I.P. Address of the FXi or Communication Between the XPi 10 Exporter and the FXi Exciter Will NOT be able to be Established.

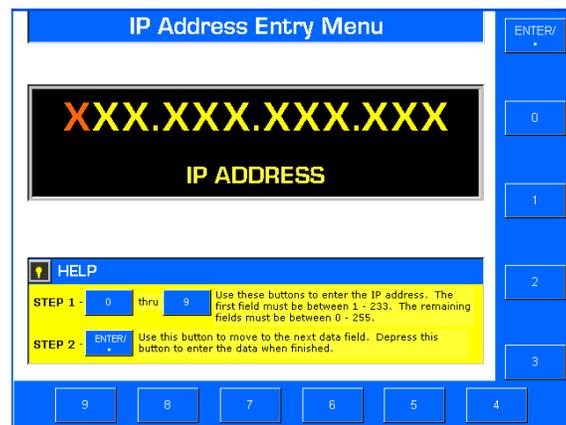
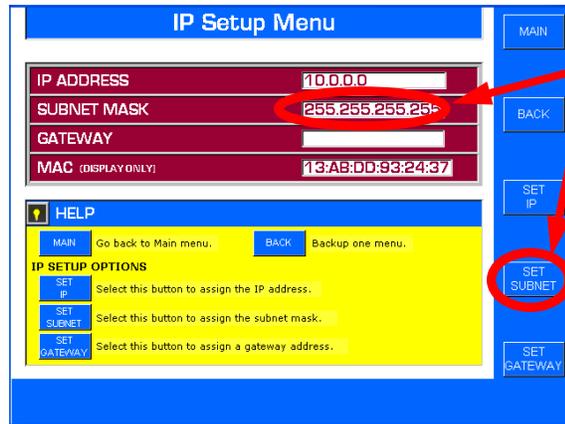


Figure 30 – I.P. Address Entry Menu

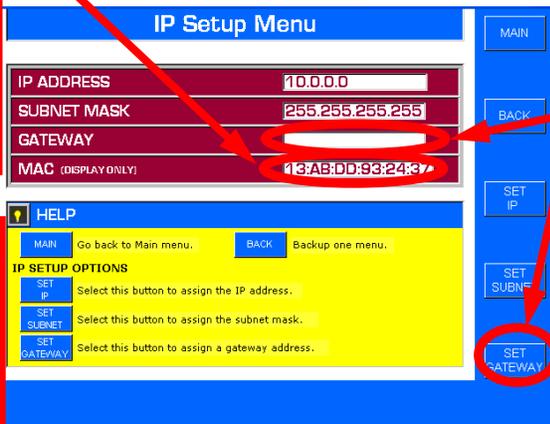




Step 7 – Select SET SUBNET and ENTER the Subnet Mask

Figure 31 – I.P. Setup Menu

IMPORTANT NOTE!
The MAC Address from The Exgine / NetBurner Card will be Automatically Displayed Here Upon the Restart Power UP after the Installation of the Hardware / Software Upgrade!



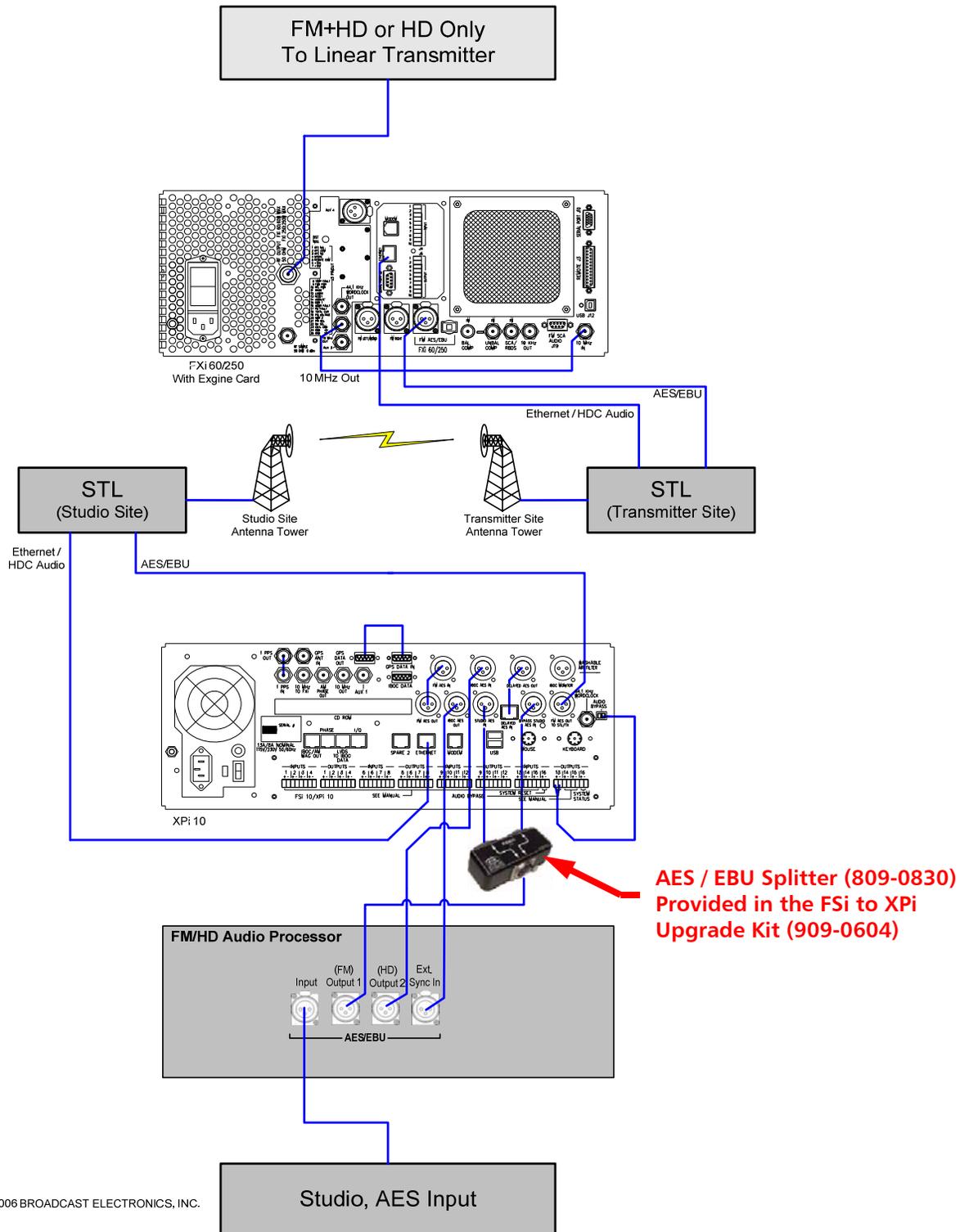
Step 8 – If a Gateway Address Is Required, Select SET GATEWAY and Enter the Gateway

IMPORTANT NOTE!
The XPi 10 Exporter MUST Be Configured From the Main GUI Menu Under PLATFORM-> LINK CONFIG-> With the MAC Address of the Exgine / NetBurner or Communication Between the XPi 10 Exporter and the Exgine Card in the FXi Exciter Will NOT be able to be Established!

Figure 32 – I.P. Setup Menu

This completes the I.P. Address setup of the FXi Exciter.

5.28. Connection Diagram (Single Audio Processor)



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Figure 34 – Connection Diagram for a Single Audio Processor



5.29. Connection Diagram (Dual Audio Processors)

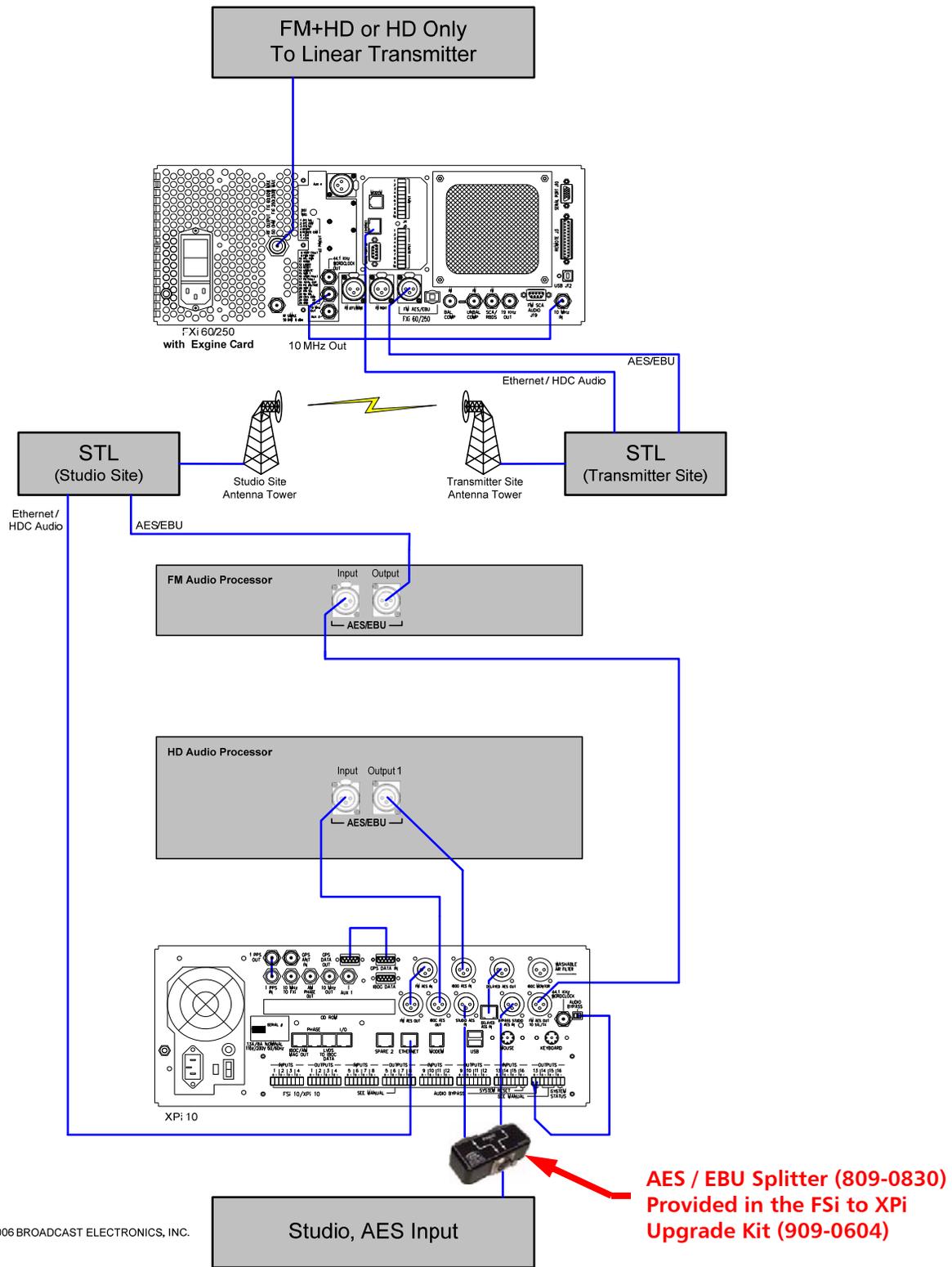


Figure 35 – Connection Diagram for Dual Audio Processors



6. Additional Software Upgrade Information

The latest versions of software for the **FXi 60/250 Exciter Controller**, and **Engine Card** are available from the Broadcast Electronics Customer Service website under the Registered User Login section here: <http://www.bdcast.com/support/index.php>

7. Software Upgrade Documentation

The latest **FXi 60/250 Exciter Controller**, and **Engine Card** software upgrade instructions are also available on the Broadcast Electronics Customer Service website at www.bdcast.com under the **"Support"** tab, then **"Application Guides."**

7.1. Upgrading FXi 60/250 Exciter Controller Software

Document **597-0541-005** provides detailed instructions for upgrading **Controller Board** software in the **FXi 60/250 Exciter**.

7.2. Upgrading FXi 60/250 Engine Card Software

Document **597-0541-006** provides detailed instructions for upgrading **Engine Card** software in the **FXi 60/250 Exciter**.

8. Terms and Definitions

AAS	Advanced Application Services
AES/EBU	Audio Engineers Society/European Broadcast Union
AM	Amplitude Modulation
EASU	Exciter Auxiliary Service Unit
EOC	Ensemble Operations Center
FM	Frequency modulation
IBOC	In-Band On-Channel
MF	Medium Frequency
MPA	Main Program Audio
MPS	Main Program Service
PAD	Program Associated Data
QoS	Quality of Service
SIS	Station Information Service
SPS	Supplemental Program Service
VHF	Very High Frequency
WAN	Wide Area Network
LAN	Local Area Network
CM	Connection Manager
LP	Logistics Processor
IDi	Broadcast Electronics' brand name for an Importer
FSi	Broadcast Electronics' IBOC Signal Generator
FXi	Broadcast Electronics' Digital Exciter
XPi	Broadcast Electronics' Digital Exporter

Figure 36 - Terms and Definitions



9. Schematics

- 9.1. Schematic – Engine PCB Assembly (919-0600)
- 9.2. Schematic – I/O PCB Assembly (919-0601)
- 9.3. Schematic – Ethernet PCB Assembly (919-0602)