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HD Radio

ASI 10
AM IBOC DIGITAL SIGNAL GENERATOR
Version 4.3.2
Instruction Manual

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Rev C
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Broadcast Electronics
Product Warranty (Two-Year Limited)

BE hereby warrants all new products manufactured by BE against any defects in material or workmanship at the time of delivery thereof, or that develop under normal use within a period of two (2) years from the date of shipment.

BE reserves the right to repair equipment under warranty with new or refurbished equipment or parts. BE's sole responsibility with respect to any equipment or parts not conforming to this warranty is to replace or repair such equipment upon the return thereof F.O.B. to BE's factory in Quincy, Illinois, U.S.A. In the event of replacement pursuant to the foregoing warranty, only the unexpired portion of the warranty from the time of the original purchase will remain in effect for any such replacement.

This warranty shall exclude the following products, component parts and/or assemblies:

(a) Transmitter power output tubes shall only carry the original manufacturers' or suppliers' standard warranty in effect on their original shipment date.

(b) All computers, computer peripherals, cables, hard disk drives, etc., shall only carry the manufacturers' or suppliers' standard warranty in effect on their original shipment date.

(c) "Components", defined as separate and individual parts (e.g. transistors, integrated circuits, capacitors, resistors, inductors, fans, etc), resold by BE from another manufacturer or supplier, shall only carry a 90 day warranty, effective the date of shipment. Any such 'Components' being returned for warranty claim must be (1) returned in their original packaging and (2) must be in new, unused condition.
BE is unable to process or resolve component defects or performance concerns on components that have been soldered, installed, wired or in any way altered from new their new condition.

(d) "Resale Equipment", defined as equipment purchased from another manufacturer or supplier, then resold by BE, shall only carry such manufacturer's or supplier's standard warranty in effect as of the original shipment date. All warranty claims against any and all 'resale equipment' sold by BE must be filed directly with the original equipment manufacturer. BE is unable to process or resolve equipment defects or performance concerns on products or services not manufactured by BE.

This warranty shall not extend to claims resulting from any acts of God, terrorism, war, defects or failures caused by Purchaser or user abuse or misuse, operator error, or unauthorized attempts to repair or alter the equipment in any way.

Under no circumstances shall BE be responsible for indirect, incidental or consequential damages, including, but not limited to transportation costs, non-authorized repair or service costs, downtime costs, costs for substituting equipment or loss of anticipated profits or revenue, incurred by Purchaser, whether based in contract, tort or for negligence or breach of statutory duty or otherwise.
The terms of the foregoing warranty shall be null and void if the equipment has been altered or repaired without specific written authorization from BE, or if not installed according to BE's instruction manuals, including, but not limited to, the absence of proper grounding, surge (TVSS) protection on the AC circuit panel or proper lightning protection/grounding on all output circuits, or if equipment is operated under environmental conditions or circumstances other than those specifically described in BE's product literature or instruction manual which accompany the equipment. The warranty shall be voided if the product or subassembly is equipped with a tamper seal and that tamper seal is broken. BE shall not be liable for any expense of any nature whatsoever incurred by the original user without prior written consent of BE. The warranty provided herein shall terminate at the end of the period set forth above. This warranty extends only to the original Purchaser and is not transferable. There are no third party beneficiaries of any of the provisions of this warranty. If the equipment is described as "used" equipment, it is sold as is and where is and no warranty applies unless authorized in writing.

EXCEPT AS SET FORTH HEREIN, AS TO TITLE AND AS SPECIFICALLY REQUIRED BY LAW, THERE ARE NO OTHER WARRANTIES, OR ANY AFFIRMATIONS OF FACT OR PROMISES BY BE, WITH REFERENCE TO THE EQUIPMENT, OR TO MERCHANTABILITY, FITNESS FOR A PARTICULAR APPLICATION, SIGNAL COVERAGE, INFRINGEMENT, OR OTHERWISE, WHICH EXTEND BEYOND THE DESCRIPTION OF THE EQUIPMENT ON THE FACE HEREOF.

IMPORTANT INFORMATION

EQUIPMENT LOST OR DAMAGED IN TRANSIT -

When delivering the equipment to you, the truck driver or carriers' agent will present a receipt for your signature. Do not sign it until you have:

1) Inspected the containers for visible signs of damage and 2) Counted the containers and compared with the amount shown on the shipping papers. If a shortage or evidence of damage is noted, insist that notation to that effect be made on the shipping papers before you sign them.

Further, after receiving the equipment, unpack it and inspect thoroughly for concealed damage. If concealed damage is discovered, immediately notify the carrier, confirming the notification in writing, and secure an inspection report. This item should be unpacked and inspected for damage WITHIN 15 DAYS after receipt. Claims for loss or damage will not be honored without proper notification of inspection by the carrier.

RF PRODUCT TECHNICAL ASSISTANCE, REPAIR SERVICE, PARTS -

Technical assistance is available from Broadcast Electronics by letter, prepaid telephone or E-mail. Equipment requiring repair or overhaul should be sent by common carrier, prepaid, insured, and well protected. If proper shipping materials are not available, contact the RF Technical Services Department for a shipping container. Do not mail the equipment. We can assume no liability for inbound damage, and necessary repairs become the obligation of the shipper. Prior arrangement is necessary. Contact the RF Technical Services Department for a Return Authorization.

Emergency and warranty replacement parts may be ordered from the following address. Be sure to include the equipment model number, serial number, part description, and part number. Non-emergency replacement parts may be ordered directly from the Broadcast Electronics stock room at the number shown below.

RF TECHNICAL SERVICES -

Telephone: +1 (217) 224-9617
E-Mail: rfservice@bdcast.com
Fax: +1 (217) 224-6258

FACILITY CONTACTS -

Broadcast Electronics, - Quincy Facility
4100 N. 24th St. P.O. BOX 3606
Quincy, Illinois 62305
Telephone: +1 (217) 224-9600
Fax: +1 (217) 224-6258
General E-Mail: bdcast@bdcast.com
Web Site: www.bdcast.com

PARTS -

Telephone: +1 (217) 224-9617
E-Mail: parts@bdcast.com

RETURN, REPAIR, AND EXCHANGES -

Do not return any merchandise without our written approval and Return Authorization. We will provide special shipping instructions and a code number that will assure proper handling and prompt issuance of credit. Please furnish complete details as to circumstances and reasons when requesting return of merchandise. All returned merchandise must be sent freight prepaid and properly insured by the customer.

MODIFICATIONS -

Broadcast Electronics, reserves the right to modify the design and specifications of the equipment in this manual without notice. Any modifications shall not adversely affect performance of the equipment so modified.

SAFETY PRECAUTIONS

PLEASE READ AND OBSERVE ALL SAFETY PRECAUTIONS//

ALL PERSONS WHO WORK WITH OR ARE EXPOSED TO POWER TUBES, POWER TRANSISTORS, OR EQUIPMENT WHICH UTILIZES SUCH DEVICES MUST TAKE PRECAUTIONS TO PROTECT THEMSELVES AGAINST POSSIBLE SERIOUS BODILY INJURY. EXERCISE EXTREME CARE AROUND SUCH PRODUCTS. UNINFORMED OR CARELESS OPERATION OF THESE DEVICES CAN RESULT IN POOR PERFORMANCE, DAMAGE TO THE DEVICE OR PROPERTY, SERIOUS BODILY INJURY, AND POSSIBLY DEATH.

DANGEROUS HAZARDS EXIST IN THE OPERATION OF POWER TUBES AND POWER TRANSISTORS -

The operation of power tubes and power transistors involves one or more of the following hazards, any one of which, in the absence of safe operating practices and precautions, could result in serious harm to personnel.

A. **HIGH VOLTAGE -** Normal operating voltages can be deadly. Additional information follows.

B. **RF RADIATION -** Exposure to RF radiation may cause serious bodily injury possibly resulting in Blindness or death. Cardiac pacemakers may be affected. Additional information follows.

C. **HOT SURFACES** Surfaces of air-cooled radiators and other parts of tubes can reach temperatures of several hundred degrees centigrade and cause serious burns if touched. Additional information follows.

D. **RF BURNS** Circuit boards with RF power transistors contain high RF potentials. Do not operate an RF power module with the cover removed.

HIGH VOLTAGE –

Many power circuits operate at voltages high enough to kill through electrocution. Personnel should always break the primary AC Power when accessing the inside of the transmitter.

RADIO FREQUENCY RADIATION

Exposure of personnel to RF radiation should be minimized, personnel should not be permitted in the vicinity of open energized RF generating circuits, or RF transmission systems (waveguides, cables, connectors, etc.), or energized antennas. It is generally accepted that exposure to "high levels" of radiation can result in severe bodily injury including blindness. Cardiac pacemakers may be affected.

The effect of prolonged exposure to "low level" RF radiation continues to be a subject of investigation and controversy. It is generally agreed that prolonged exposure of personnel to RF radiation should be limited to an absolute minimum. It is also generally agreed that exposure should be reduced in working areas where personnel heat load is above normal. A 10 mW/cm^2 per one tenth hour average level has been adopted by several U.S. Government agencies including the Occupational Safety and Health Administration (OSHA) as the standard protection guide for employee work environments. An even stricter standard is recommended by the American National Standards Institute which recommends a 1.0 mW/cm^2 per one tenth hour average level exposure between 30 Hz and 300 MHz as the standard employee protection guide (ANSI C95.1-1982).

RF energy must be contained properly by shielding and transmission lines. All input and output RF connections, such as cables, flanges and gaskets must be RF leak proof. Never operate a power tube without a properly matched RF energy absorbing load attached. Never look into or expose any part of the body to an antenna or open RF generating tube or circuit or RF transmission system while energized. Monitor the tube and RF system for RF radiation leakage at regular intervals and after servicing.

HOT SURFACES –

The power components in the transmitter are cooled by forced-air and natural convection. When handling any components of the transmitter after it has been in operation, caution must always be taken to ensure that the component is cool enough to handle without injury.

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1 HD Radio™ AM Reference ASi 10

1.1 System Overview

Broadcast Electronics uses the IBOC (in-band-on-channel) digital broadcasting system from iBiquity Digital Corporation now known as HD Radio. The system is designed to permit a smooth evolution from current analog amplitude modulation (AM) and frequency modulation (FM) radio to a fully digital IBOC system. This system delivers digital audio and data services to mobile, portable, and fixed receivers from terrestrial transmitters in the existing medium frequency (MF) and very high frequency (VHF) radio bands. Broadcasters may continue to transmit analog AM and FM simultaneously with the new, higher-quality and more robust digital signals, allowing themselves and their listeners to convert from analog to digital radio while maintaining their current frequency allocations. The ASi 10 is Broadcast Electronics' AM HD Radio Generator, used to create the HD signal overlaid with the AM signal.

1.2 Document Overview

This document provides a description of controls and indicators, system interconnection and operating procedures for the ASi 10 AM IBOC Digital Signal Generator.

2 Abbreviations and Conventions

2.1 Abbreviations and Acronyms

AES/EBU	Audio Engineers Society / European Broadcast Union
ALFN	Absolute L1 Frame Number
AM	Amplitude Modulation
BER	Bit Error Rate
CD	Compact Disk
CD/ROM	CD/Read Only Memory
FCC	Federal Communications Commission
FM	Frequency Modulation
GEL	Gateway to Exciter Link – Exciter = ASi 10
GPS	Global Positioning System
GUI	Graphical User Interface
IBOC	In-band On-channel
L1	Layer 1
MF	Medium Frequency
MP1–MP7	Primary Service Modes 1 through 7
MS1–MS4	Secondary Service Modes 1 through 4
PAC	Perceptual Audio Coder
PAR	Peak-to-Average Ratio
RF	Radio Frequency
VHF	Very High Frequency

2.2 Presentation Conventions

Unless otherwise noted, the following conventions apply to this document:

- Information enclosed in braces { } is either unavailable at the present time or subject to change.
- All vectors are indexed starting with 0.
- The element of a vector with the lowest index is considered to be first.
- In drawings and tables, the leftmost bit is considered to occur first.
- Bit 0 of a byte or word is considered the least significant bit.
- In representations of binary numbers, the least significant bit is on the right.
- When presenting the dimensions of a matrix, the number of rows is given first (e.g., an n x m matrix has n rows and m columns).
- In timing diagrams, earliest time is on the left.

3 Installation

Installation of the ASi 10 IBOC digital signal generator consists of: 1) installing the unit in a rack, 2) checking the ATU and antenna system, 3) modifying the transmitter, and 4) connecting the ASi 10 to the digital link, audio processing equipment, and the transmitter. Refer to the following text to install the ASi 10 and configure the AM system for IBOC transmission.

3.1 ASi 10 Installation

The ASi 10 may be installed in any convenient location in a 19 inch (48.3 cm) rack within reach of the transmitter, STL link, and audio processing equipment. The unit requires 7 inches (17.78 cm) of rack space. Once a rack location is determined, mount the chassis in the rack using 4 screws.

3.2 Checking the RF Transmission and Antenna System

The station RF transmission and antenna system may present problems for transmitting the AM IBOC signal. Generally, the most common problems are related to system linearity. Non-linearity can be caused by: 1) the transmission/radiating system presenting a non-optimized RF load to the transmitter, 2) bandwidth restrictions in the phasing, tuning, and radiating system. Non-optimized antenna systems traditionally are subject to such problems and do not lend themselves to IBOC transmission.
Prior to attempting to implement IBOC transmission, it is recommended that the antenna system be optimized to +/-15 kHz. Specific attention should be made to the +/- 5kHz region. Facilities with full quarter, half or 5/8 wave non-directional radiators generally experience few bandwidth problems and are good candidates for IBOC implementation. The following text presents some general recommendations:

1. For directional stations, the following information will be required to check/analyze antenna system performance.
2. A recent common point impedance sweep.
3. Pattern parameters such as tower height, spacing, and field ratios.
4. A phasor schematic.
5. Directional patterns should be optimized to minimize pattern modulation in the main lobes.
6. Reduce pattern modulation for Day & Night patterns between nulls. No minimum performance is yet specified. Pattern modulation is the change in the shape of the horizontal plane polar pattern. This is caused by different performance of the antenna system at different frequencies within the modulation bandwidth. Pattern modulation has four primary causes:
7. Frequency-dependent phase shifts and changes in power division introduced by the power division and phase-shift networks within the phasor.
8. Frequency-dependent phase shifts in the feedlines.
9. Frequency-dependent phase shifts introduced by the matching networks within the Line Tuning Units.
10. Changes in the tower geometry with frequency.
11. A polar pattern which changes significantly with frequency, will deliver an asymmetrical modulation spectrum to a distant receiver. The digital portion of the IBOC waveform is representative of a rectangular modulation spectrum delivered to the common point. Changes through the antenna system will cause the received spectrum to appear trapezoidal in the far field. IBOC signal generator and receiver equalization will address these issues, however best digital performance is achieved with a flat frequency response.

12. It is not possible, especially when deep nulls are present, to minimize pattern modulation in all directions of the compass at the same time. For that reason, it is important to identify those angular spans of the polar pattern where superior performance is most valuable and to concentrate on optimizing the performance within those angular spans.
13. As part of the rule making concerning AM IBOC, iBiquity has recommended a reduction in the bandwidth of the maximum analog modulating frequency from 10 kHz to 5 kHz. Extensive experimental operation of the AM IBOC system has shown that the performance of the system is primarily dominated by symmetry in the region +/- 5 kHz removed from the carrier. This is less than the +/-10 kHz bandwidth needed for present analog operation.

At this point, no exact specifications have been determined for RF transmission and antenna performance. Prior to configuring the system for IBOC operation, it is recommend the user contact the Broadcast Electronics Customer Service Department for assistance in evaluating the RF transmission/antenna system. The service group can provide information for determining the required performance for an IBOC transmission system.

3.3 Modifying the Transmitter

To broadcast the IBOC signal, the Broadcast Electronics A-Series and E-Series AM transmitters must be modified. The modifications consist of: 1) installing modulation level circuit board 919-0561, 2) jumper programming on the exciter circuit board, and 3) installing IBOC bypass circuit board assembly 919-0560. Modification kit 957-0100 provides the parts and information required to modify the transmitter. Refer to the documentation in kit 957-0100 and perform the procedures to modify the transmitter exciter circuit board.

3.4 IBOC System Connections

The ASi 10 is part of an IBOC broadcasting system. This system consists of several pieces of equipment. Connection diagrams 597-0541-77 and 597-0541-78 in SECTION 8 DRAWINGS present system wiring for the Broadcast Electronics A-Series and E-Series AM transmitters. Refer to SECTION 8 and the following checklist to connect the ASi 10 system.

AM System Checklist

Refer to wiring diagram 597-0541-77/78 found in Section 8 at the back of this manual.

☐ Install ASi 10 in a rack close to the transmitter (12' cables are supplied).
☐ Connect 1PPS Out on ASi 10 to 1PPS In on ASi 10
☐ Connect GPS Data Out on ASi 10 to GPS Data In on ASi 10
☐ Connect AES/EBU Out from Studio to Studio AES In on the ASi 10
☐ Connect Data Out from the studio to IBOC DATA on the ASi 10 if available
☐ Connect AM AES out from the ASi 10 to your analog audio processor's AES/EBU In
☐ Connect AM AES/EBU out from your analog processor to the AM/FM AES In on the ASi 10
☐ Connect the analog our from the analog processor to the AM Audio In on the ASi 10
☐ Connect the IBOC AES Out on the ASi 10 to the IBOC AES/EBU in on your digital audio processor
☐ Connect the IBOC AES/EBU Out of your digital audio processor to the IBOC AES In on the ASi 10
☐ Connect the GPS antenna to the GPS ANT In if available
☐ Mount and connect the IBOC Bypass Circuit assembly on your AM transmitter as shown in drawings 597-0541-77/78 in Section 8 of this manual.
☐ Connect P9 from ASi 10 to IBOC Bypass circuit on transmitter
☐ Wire red/black wire to pin 30 on TB-1/2 on the back of the transmitter as shown in drawing 597-0541-77/78 in Section 8 of this manual.
☐ Wire ground lug off P9 to screw on back of ASi 10
☐ Plug in P3 to Audio Bypass on back of ASi 10
☐ Connect coax from J1 on the IBOC Bypass circuit to the External Stereo Input on the transmitter
☐ Connect coax from AM Phase out on the ASi 10 to J3 on the IBOC Bypass Circuit on the back of the transmitter.
☐ If your Studio to Transmitter Link (STL) can support 4kbps of data you can send song artist and title information over the link. Connect the data output from the STL to the IBOC data input on the ASi 10. The input data stream must use the SLIP protocol. This type of data can also be sent via Ethernet or Modem.

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ASi 10 AC Power Connections. *Warning!!!* The ASi 10 can operate on either 110VAC or 220VAC. It is configured from the factory for 220VAC operation. If you are using a UPS to back up the ASi 10 ensure the voltage input switch is in the proper position prior to applying power and turning on the unit, otherwise *damage may result* !

4 Front Panel Description

Front panel descriptions are divided into two categories; Display/Indicator Definitions and Control Buttons. In all windows the following general rules apply:

1. Read only fields have a light blue background.
2. Read/Write fields have a blue-green background.
3. On data entry screens the Cancel button will not make any entered data permanent. Any screen with a Cancel button will also have an OK button that can be used to make data permanent.
4. On data entry screens the Close button only closes the window, any data that has been specified is already permanent because it was registered as entered.
5. On Numeric keyboard screens the valid range of data will be displayed.
6. Failures that need attention are displayed in RED.
7. Warnings are displayed in Yellow.
8. Normal status information is displayed in Green.

4.1 Graphical User Interface Display/Indicator Definitions

Figure *4-1* is the HD Radio AM Exciter Graphical User Interface (GUI) display screen: This screen is displayed upon system stabilization. Descriptions of Display/Indicator fields for this screen are provided in the following subparagraphs.

Figure *4-2* is the HD Radio AM Exciter Activity Monitor screen: This screen is displayed if no GUI interaction is detected for greater than 1 minute.

The first four lines depict the status of the four AES audio ports, Analog Input, Analog Output, Digital Input, and Monitor Output. These lights will blink from black to green as long as there is audio on each port. If silence is detected the light will remain black.

The Analog input and Digital input Fault lights should remain black during normal operation. If the AES stream at either port is not detected the light will turn Red indicating the Fault.

The Exporter Link activity monitor does not apply to the Generation 2 Exciter.

The Digital Up Converter activity monitor will blink from black to green as long as data is exchanged with the DUC. If no DUC data activity is detected this light will remain black.

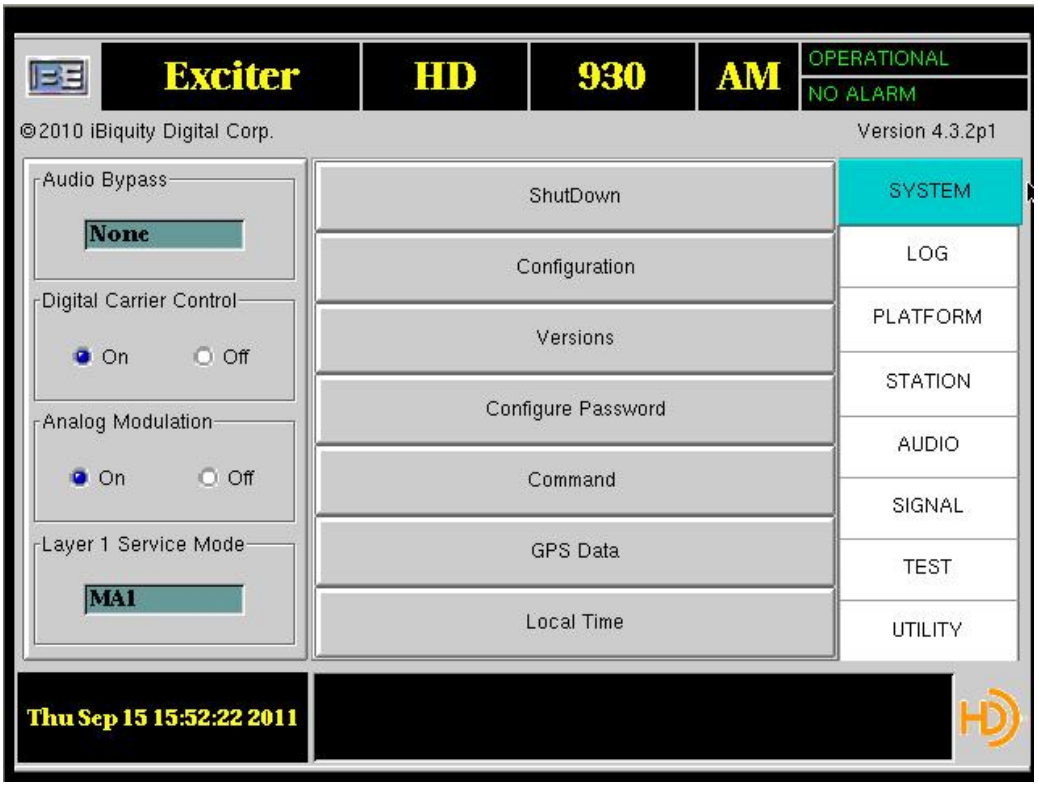


Figure 4-1: GUI Interface Screen

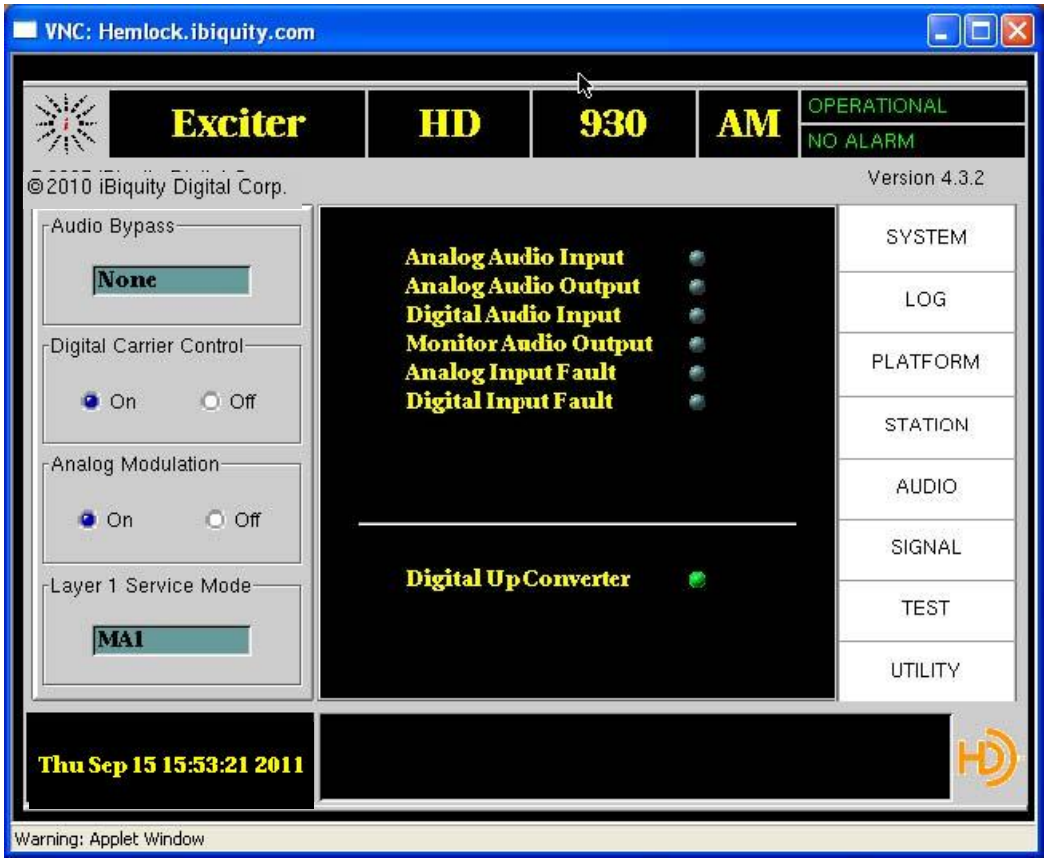


Figure 4-2: GUI Interface Activity Monitor Screen

4.1.1 Exciter Platform Indicator

This identifies the present system platform. When selected a platform menu is displayed as shown in Figure *4-3*.

To change the exciter platform select the desired setting and press Restart button. The system application will now be restarted as the new platform type. To exit the menu with no changes select Cancel to exit.

NOTE: The platform selected must be compatible with the hardware in use or errors will occur.

Figure 4-3: Platform Configuration Screen

4.1.2 Station Information

The Station Call Sign indicator displays the call sign being transmitted with the digital data. When selected, the Station Information screen (Figure *4-4*) is displayed.

The Station Information screen is subdivided into 4 group boxes: Station Identification, Call Sign, Station Slogan, and Station Message.

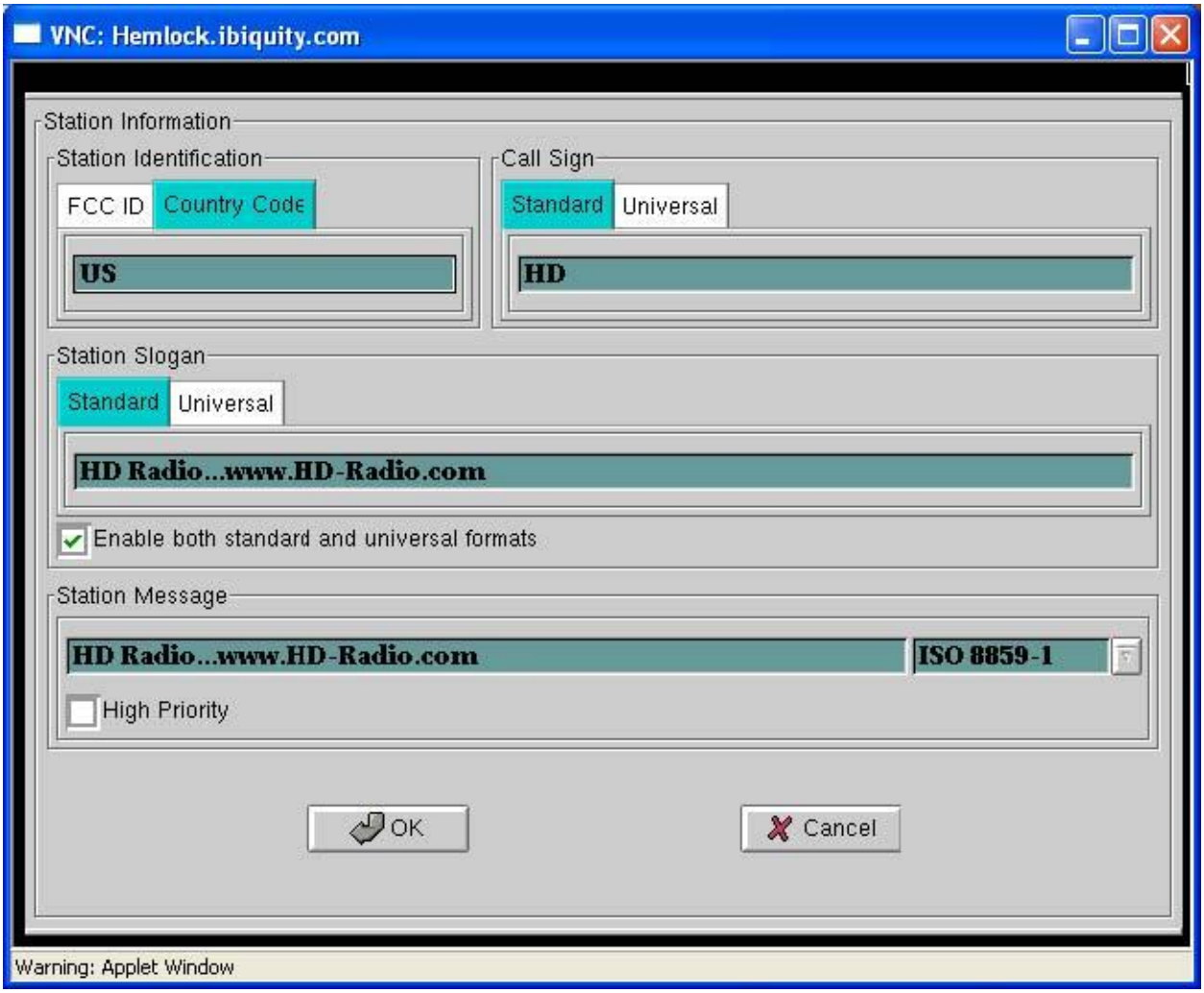


Figure 4-4: Station Information Screen

4.1.2.1 Station Identification

4.1.2.1.1 Country Code

The Country Code tab, when selected, displays a Numeric Keyboard screen similar to Figure *4-8*. To change the Country Code, enter the desired Country Code using the number keys. Press *Enter* to establish the new Country Code and return to the Station Information screen.

4.1.2.1.2 FCC ID

The (Federal Communications Commission) FCC ID field, when selected, displays a Numeric Keyboard screen (Figure *4-8*). To change the FCC ID, enter the desired FCC ID using the number keys. Press *Enter* to establish the new FCC ID and return to the Station Information screen.

4.1.2.2 Call Sign

There are 2, mutually exclusive, methods for transmitting a station's call signs: Standard & Universal.

4.1.2.2.1 Standard

NOTE: The Standard Call Sign field is limited to four characters; all characters MUST be upper case.

The Standard Call Sign field, when selected, displays a Alphanumeric Keyboard screen similar to Figure *4-6*. To change the Standard Call Sign, enter the desired letters. Selecting shift, type the desired four-character Call Sign using the character keys. Press *Enter* to establish the new call sign and return to the Station Information screen.

4.1.2.2.2 Universal

If a station's call sign is longer than 4 characters, or contains international symbols, the Universal Call sign should be used. The Universal Call Sign supports 2 different character sets: ISO8859-1 and Unicode. Use the drop down box (as shown in Figure *4-5*) to select the desired character set. The Universal Call Sign field, when selected, displays an Alphanumeric Keyboard screen similar to Figure *4-6*. To change the Universal Call Sign, enter the desired letters. Press *Enter* to establish the new call sign and return to the Station Information screen. If "Append Band" is selected (checked), the current frequency band will be appended to the Universal Call Sign that is displayed at the receiver.

4.1.2.3 Station Slogan

There are 2 methods for transmitting a Station Slogan: Standard & Universal. Unlike the Call Sign, both methods can be transmitted simultaneously. However, if they are transmitted simultaneously, the entries must be identical. If "Enable both standard and universal formats" is selected (checked) then the Universal Station Slogan entry is grayed out and displays the contents of the Standard Slogan.

4.1.2.4 Standard Station Slogan

NOTE: The Standard Station Slogan field is limited to 56 characters.
The Standard Station Slogan tab, when selected, displays a Alphanumeric Keyboard screen, similar to Figure *4-6*. To change the Standard Station Slogan, enter the characters using the Alphanumeric Keyboard. Press Enter to establish the new Standard Station Slogan and return to the Station Information screen.

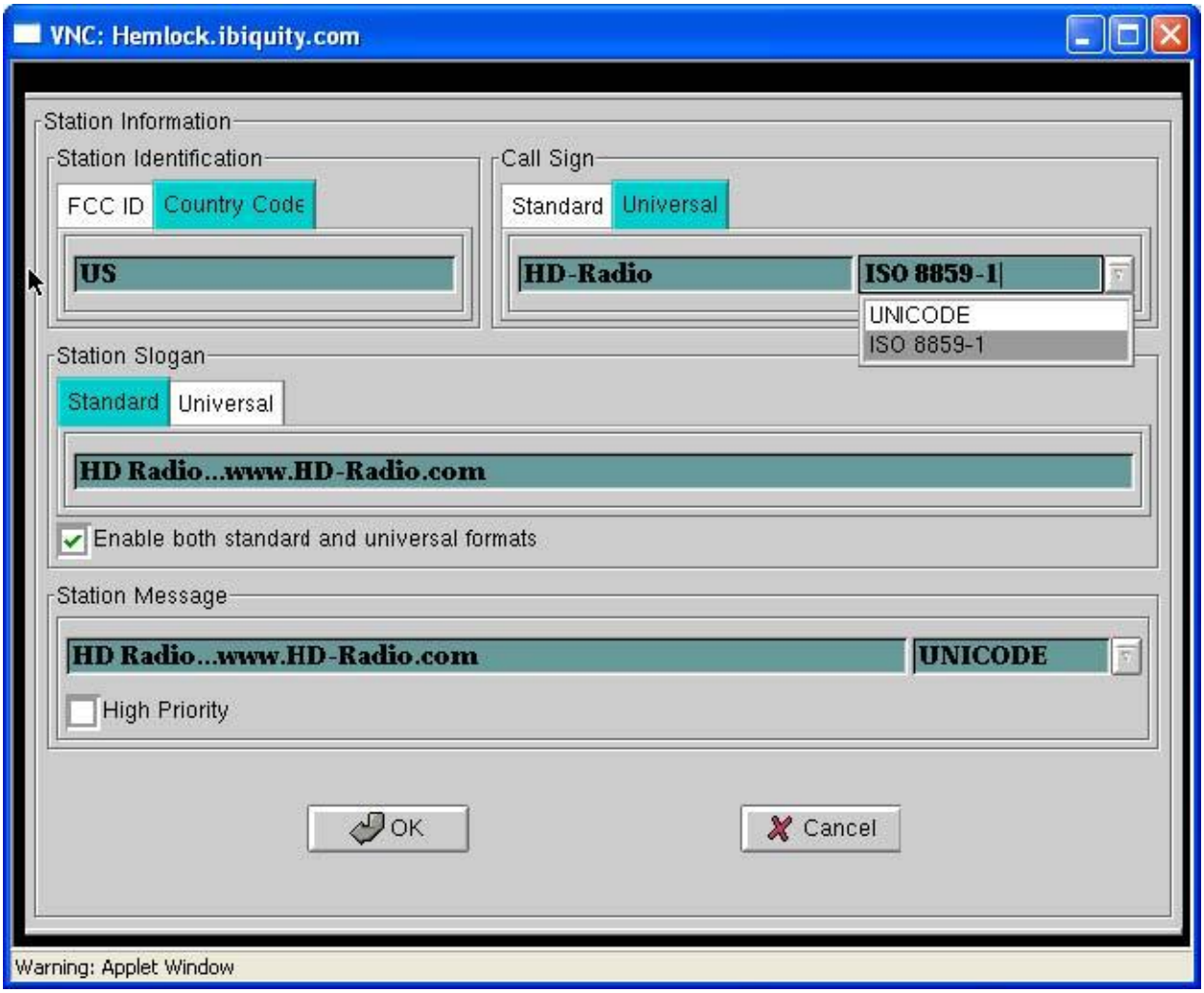


Figure 4-5: Universal Call Sign and Station Slogans

4.1.2.4.1 Universal Station Slogan

If a station's slogan is longer than 56 characters, or contains international symbols, the Universal Station Slogan should be used. The Universal Station Slogan supports 2 different character sets: ISO8859-1 and Unicode. Use the drop down box (as shown in Figure *4-5*) to select the desired character set. The Universal Station Slogan tab, when selected, displays an Alphanumeric Keyboard screen similar to Figure *4-6*. To change the Universal Station Slogan, enter the desired characters and press *Enter* to establish the new slogan and return to the Station Information screen.

4.1.2.5 Station Message

The Station Message field is used to transmit messages other than the call sign or station slogan. The Station Message field supports 4 different character sets: RBDS/RDS E.1, RBDS/RDS E.2, RBDS/RDS E.3, and Unicode. Use the drop down box (as shown in Figure *4-5*) to select the desired character set. The Station Message field, when selected, displays an Alphanumeric Keyboard screen similar to Figure *4-6*. To change the Station Message, enter the desired characters and press *Enter* to establish the new Station Message and return to the Station Information screen.

Check the "High Priority" box to indicate to receivers that current message has a high priority.

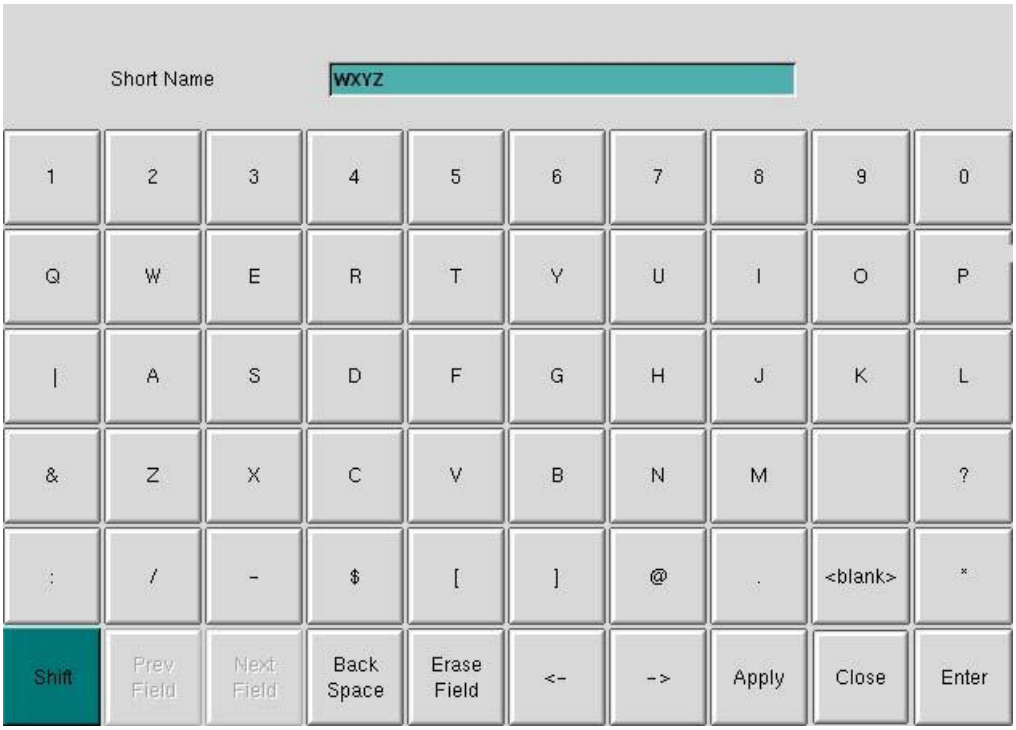


Figure 4-6: Alphanumeric Keyboard

4.1.3 Frequency

Frequency indicates the carrier center frequency. Select this option to change the carrier frequency. The Numeric Keyboard, Figure *4-8*, is displayed. To change the frequency, enter the desired frequency using the number keys. Press *Enter* to establish the new frequency.

For the new value to take effect the system must be rebooted. A screen will prompt you to restart, Figure *4-7*, press Yes to restart with the new frequency.

Figure 4-7: Frequency Change Restart Screen

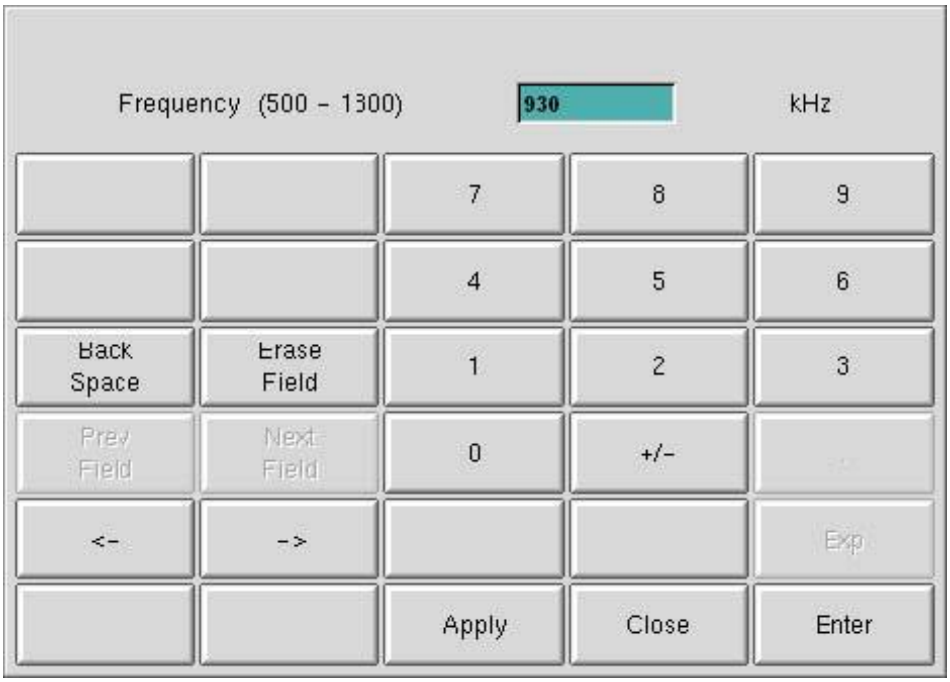


Figure 4-8: Numeric Keyboard

4.1.4 Band

The main menu frequency band indicator displays the exciter waveform selection: AM or FM.

4.1.5 Status Upper Section (Main Menu Upper Right)

The upper section displays current exciter state. Either Operational in Green or Non-Operational in Red.

4.1.6 Status Lower Section (Main Menu Upper Right)

The lower section displays current exciter Alarm state. Either No Alarm in Green or Alarm in Red. The Alarm can be cleared by selecting this area or the Station Interface section.

4.1.7 Audio Bypass

The Audio Bypass indicator displays None, Bypass A, Bypass B or Bypass A&B. When Audio Bypass is selected, the Audio Bypass selection screen is displayed, (Figure *4-9*).

NOTE: The EASU Audio toggle switches MUST be in the Auto position and Station Interface Outputs 13 and 14 must be connected to the EASU to enable this function.

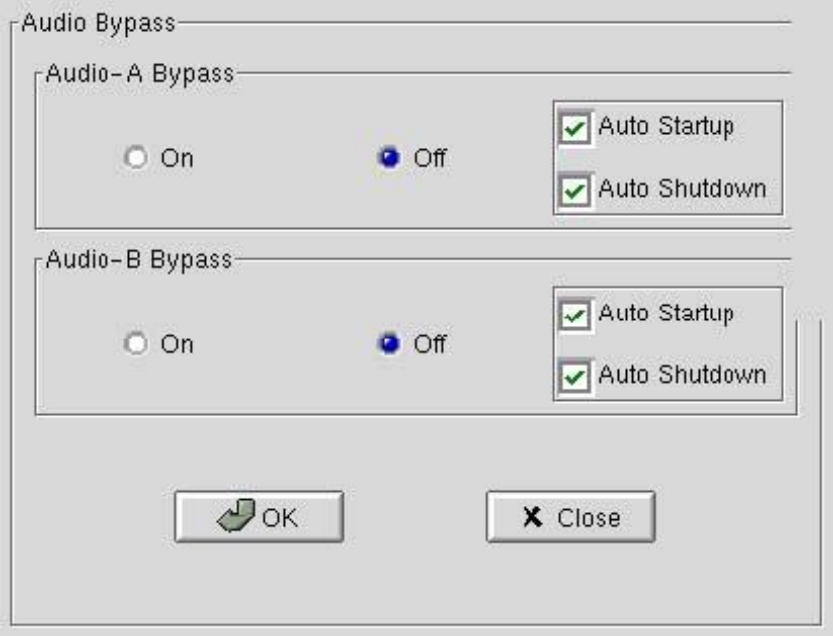


Figure 4-9: Audio Bypass Selection Screen

4.1.7.1 Audio-A Bypass

When on; The Exciter Station Interface Output 13 closes to switch the Exciter Auxiliary Service Unit (EASU) to the Bypass position. When off; The Exciter Station Interface Output 13 is determined by the software.

4.1.7.2 Audio-B Bypass

When on, Exciter Station Interface Output 14 closes to switch the Exciter Auxiliary Service Unit (EASU) to the Bypass position. When off, Exciter Station Interface Output 14 is determined by the software.

4.1.7.3 Auto Startup

When Auto Startup is selected, the audio bypass switches toggle to the delayed state to begin the audio ramp function (see paragraph 4.6.2.5). This overrides the Audio Bypass selection. If Auto Startup is not selected, the audio bypass switches toggle to the state defined by the Audio Bypass selection.

4.1.7.4 Auto Shutdown

When Auto Shutdown is selected, upon an error condition or receipt of a shutdown command, the audio bypass switches toggle to the Bypass state. This overrides the Audio Bypass selection. If Auto Shutdown is not selected, the audio bypass switches remain in the state defined by the Audio Bypass selection.

4.1.8 Digital Carrier Control

This indicator displays whether the digital subcarriers are on or off. All active IBOC digital subcarriers are added or removed by selecting On or Off.

4.1.9 Analog Modulation

The Analog Modulation indicator displays the state of the analog modulation On or Off. Selecting Off effectively reduces the modulation to 0%, leaving only the carrier. When the analog modulation is On the modulation percentage is controlled via the analog gain setting (see Section 4.7.3.8).

4.1.10 AM Layer 1 Service Mode

The AM Layer 1 Service Mode indicator displays the current service mode of operation.

If selected when not in BER mode the Dialog Box, Figure *4-10*: Dialog Box, is displayed. Select *OK* to return to the main menu.

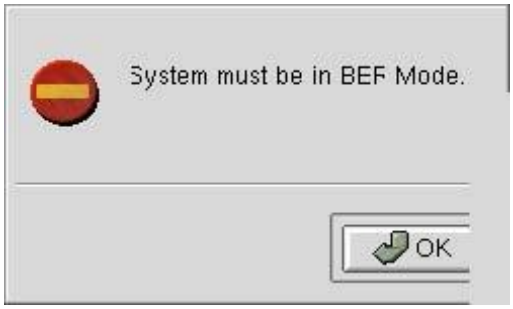


Figure 4-10: Dialog Box

When the AM Layer 1 Service Mode is selected when in BER Mode, see paragraph 4.8.1, the AM Service Mode screen, Figure *4-11*, is displayed.

Select the appropriate AM service mode, *MA1* or *MA3* and click *Ok* to activate the selection.

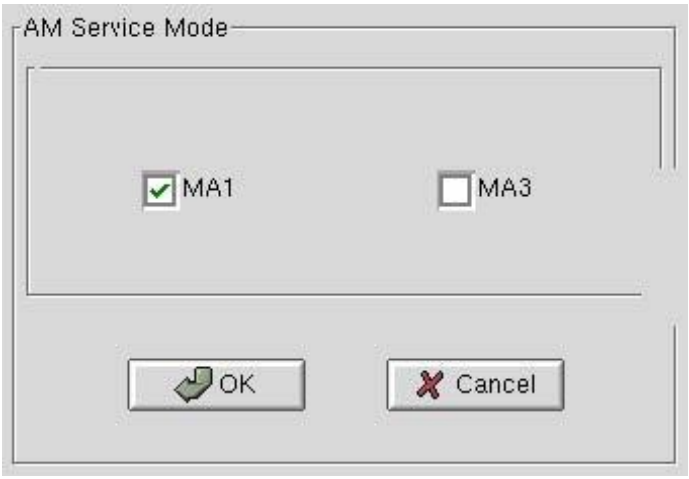


Figure 4-11: AM Service Mode Screen

4.1.11 Date and Time

Date and time displayed are local time. To obtain the Global Positioning System (GPS) and use it for display in the lower-left corner of the main menu, see Sync Local Time below. If the GPS is not connected to an antenna with access to GPS data, this window will display a time/date of 00:00:00 Jan 6, 1980 and increment from that time until the system attains GPS time lock.

When selected, the Local Time insertion screen is displayed, Figure *4-12*. This screen is broken up into 4 different group boxes: Date & Time Settings, Time Zone, Daylight Savings Time, and GPS Time Synchronization.

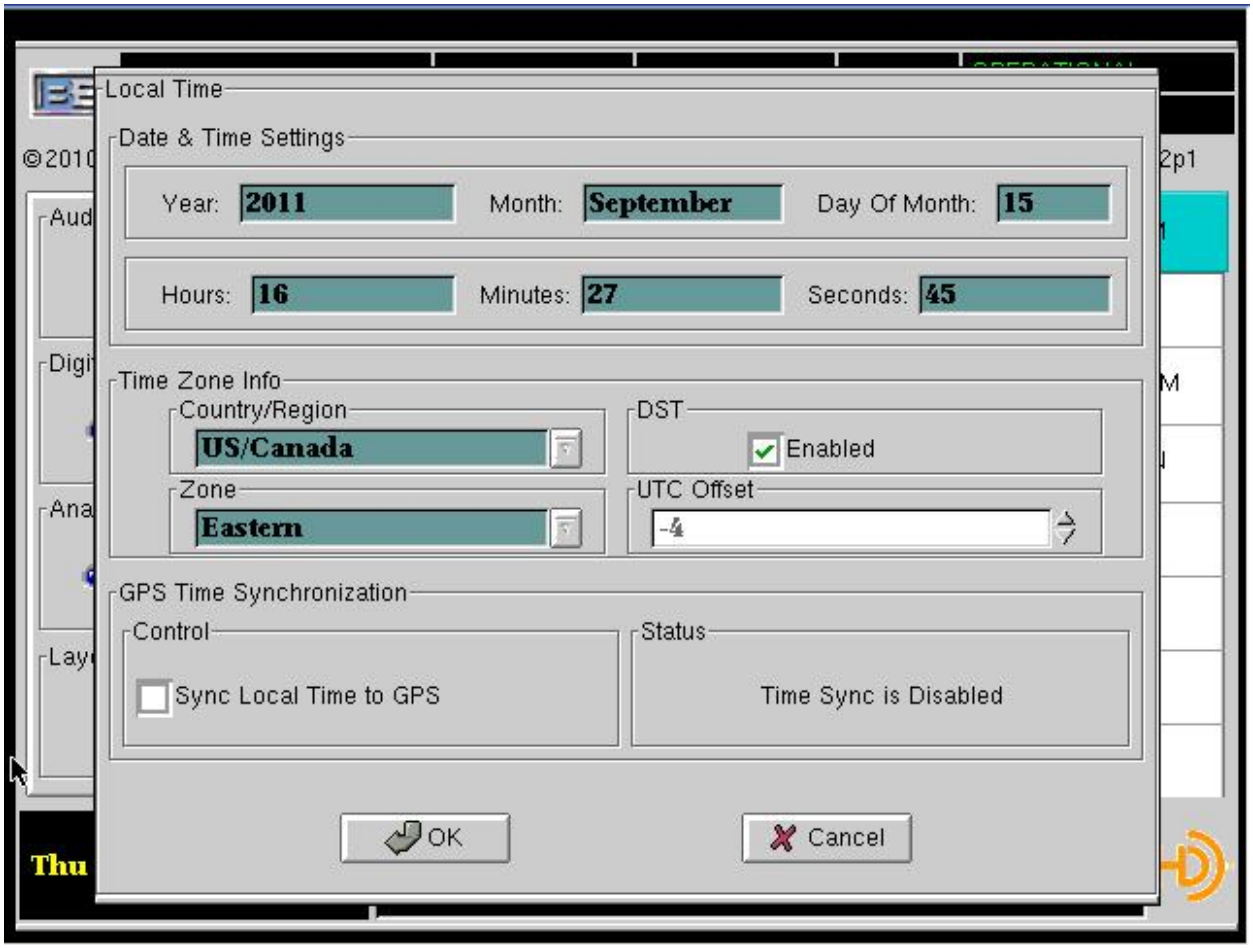


Figure 4-12: Local Time Insertion Screen

Date & Time Settings: This area allows manual entry of local time.
Time Zone: This area allows setting of the local time zone. If the Country/Region selection is None/Other the zone will be set to Universal (UTC) and an offset from UTC can be entered using the "UTC Offset" drop down box. Values from -12 to 12 are valid and are entered using a numeric keypad similar to Figure *4-8*.

Daylight Savings Time: This area allows the enabling of daylight savings time parameters if Time Zone Info selection is not None/Other. Checking "Enabled" will use daylight savings time based on the zone selected. Unchecking "Enabled" indicates to the receiver that daylight savings time is not to be used in regardless of the "Time Zone Info"/"Zone" selections. Changing the Time Zone Info and/or the DST Enable button will require the system to be restarted in order for the changes to be applied.

GPS Time Synchronization: Select "Sync Local Time" to synchronize the system time to the GPS time. The Status box gives the current status of the GPS.

NOTE: 1PPS from the EASU to the Exciter must be connected to sync to local time.

4.1.12 Exciter Status Bottom Right

4.1.12.1 Status Section

The status section displays current exciter status. Error conditions are displayed in red and warning conditions are displayed in green. Select this area or the System Status Log button to view the status history as shown in Figure *4-13* System Status Log Screen.

As seen in Figure *4-13* System Status Log Screen, several warnings appear. These indicate that the GPS is not time locked. The GPS antenna should be checked for proper view of the sky. At times it will take time for lock to be acquired so you may have to wait for GPS lock.

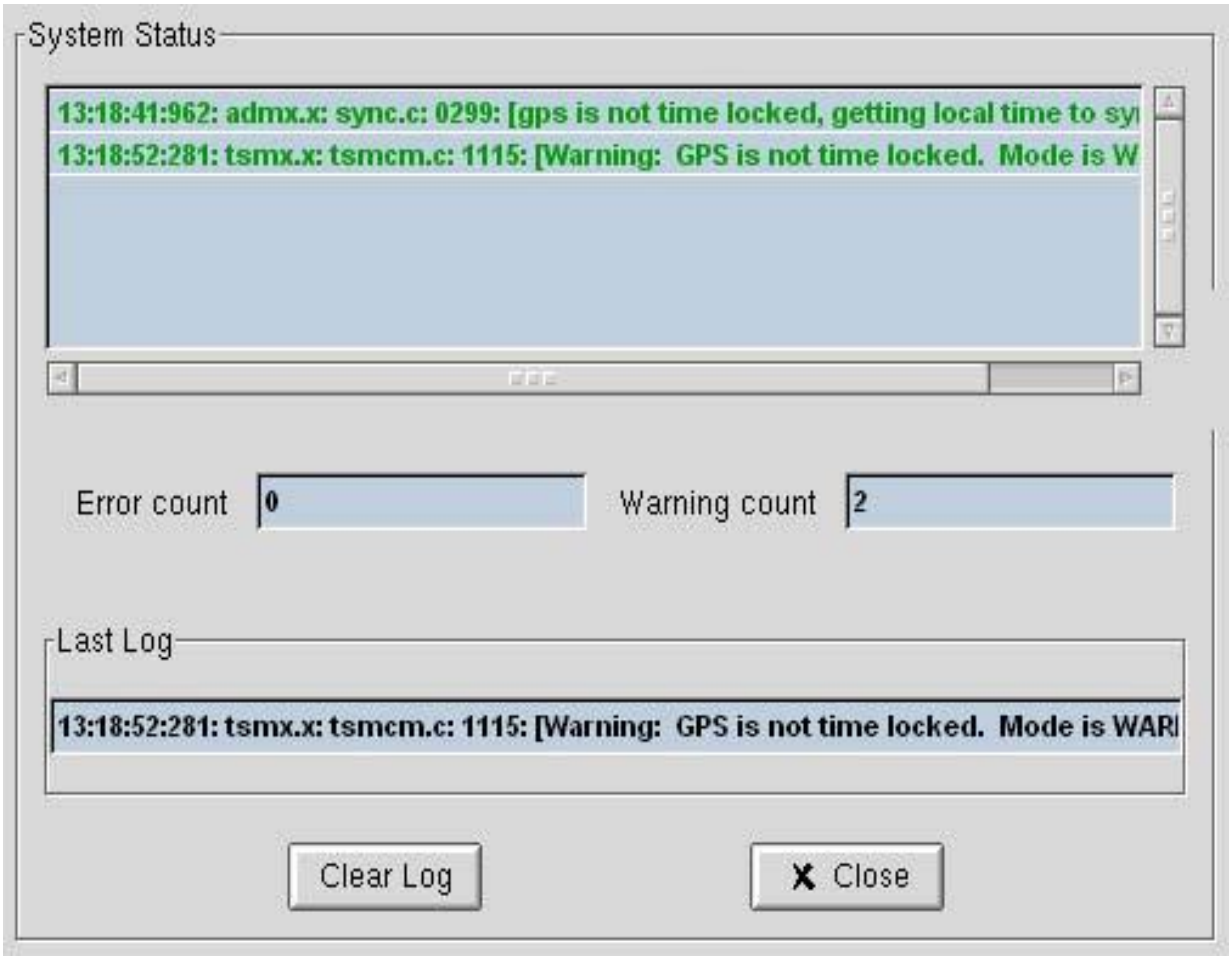


Figure 4-13: System Status Log Screen

4.2 System Tab Control Buttons

Figure *4-1* shows the GUI main menu System Tab screen: This screen is displayed upon startup. Descriptions of control buttons displayed on the System Tab of this screen are provided in the following subparagraphs.

4.2.1 Shutdown

The Shutdown control screen, Figure *4-14*, is used to shutdown the exciter. If power is to be removed, select *Shutdown* and press *OK*. This will halt the OS. Wait until the display indicates *OK* to power down. If the OS is to be restarted, select *OS Restart* and press OK. The system will reboot back to the default program. If the application is to be exited and restarted, select *Restart* and press *OK* to exit and rerun the program. If the

application is to be exited and a console session started, select *Console* and press *OK* to exit and start the session.

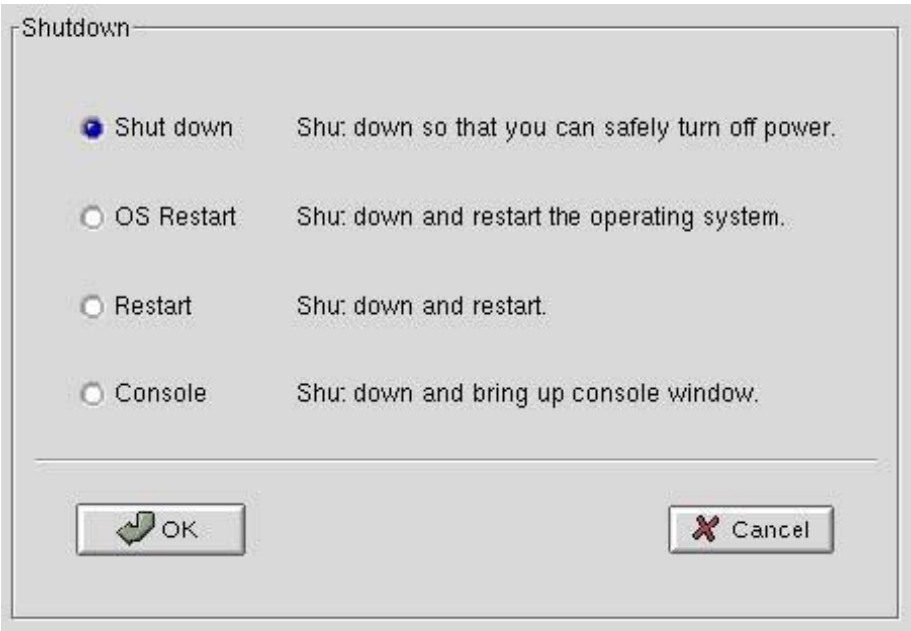


Figure 4-14:Exciter Shutdown Control Screen

4.2.2 Configuration

The System Configuration button provides access to the system configuration screen, Figure 4-15.

4.2.2.1 View Config

To view the configured rate of the logical channels select *View Config.* When selected, the Channel Configuration screen will be displayed, Figure *4-16*.

4.2.2.1.1 Channel Configuration

The Channel Configuration screen is used to view the amount of bandwidth given to each service available; Audio, Station information, or Data. These settings are repeated for all logical channels available:
Channel 0 – P1 Channel 4 -SIS
Channel 2 – P3

4.2.2.1.2 Carrier Configuration

Carrier Configuration displays the Layer 1 current configuration setting.

4.2.2.1.3 Mode

Mode displays the Service Mode.

4.2.2.1.4 Characteristics

The *Characteristics* group box displays the size of the logical channel PDU, the rate at which the PDU is sent, and the bandwidth (or average rate) of the PDU for each logical channel.

4.2.2.1.5 Partitioning

The Partitioning group box displays information pertaining to how each logical channel is partitioned between Main Program Audio (MPA) and Advanced Application Services (AAS).

4.2.2.1.6 Previous

Select Previous Page to scroll through all logical channels.

4.2.2.1.7 Next

Select Next Page to scroll through all logical channels.

4.2.2.2 Save Config

Selecting *Save Config* will create a file of the current system mode configuration files (freq, analog delay…).

4.2.2.3 Configuration Selection

Select the number adjacent to *Enter Item No. for selected configuration*. When selected, the Numeric Keyboard screen, similar to Figure *4-8*, is displayed. To change the configuration value, enter the desired configuration value using the number keys. Press *Enter* to establish the new configuration. When a selection is made, the user is prompted to restart the system. See Figure 4-15 for available choices.

4.2.2.4 Restart Options

Selecting *Load Saved Configuration* will use the saved configuration values when restarted.
Selecting *Load Default Configuration* will use the default configuration values when restarted, from this screen only.

4.2.2.5 Restart

Selecting *Restart* will restart the system. Selecting *Close* will exit this window.

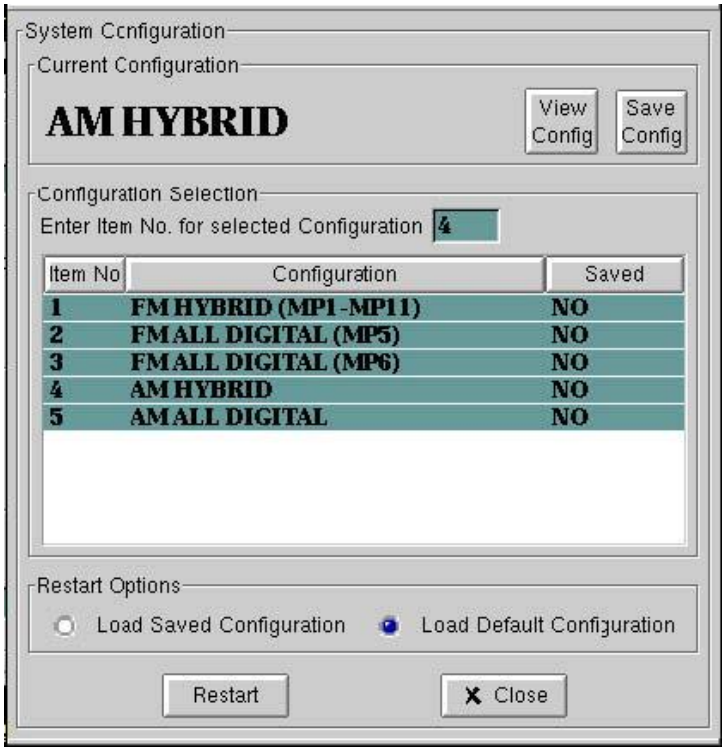


Figure 4-15: System Configuration Screens

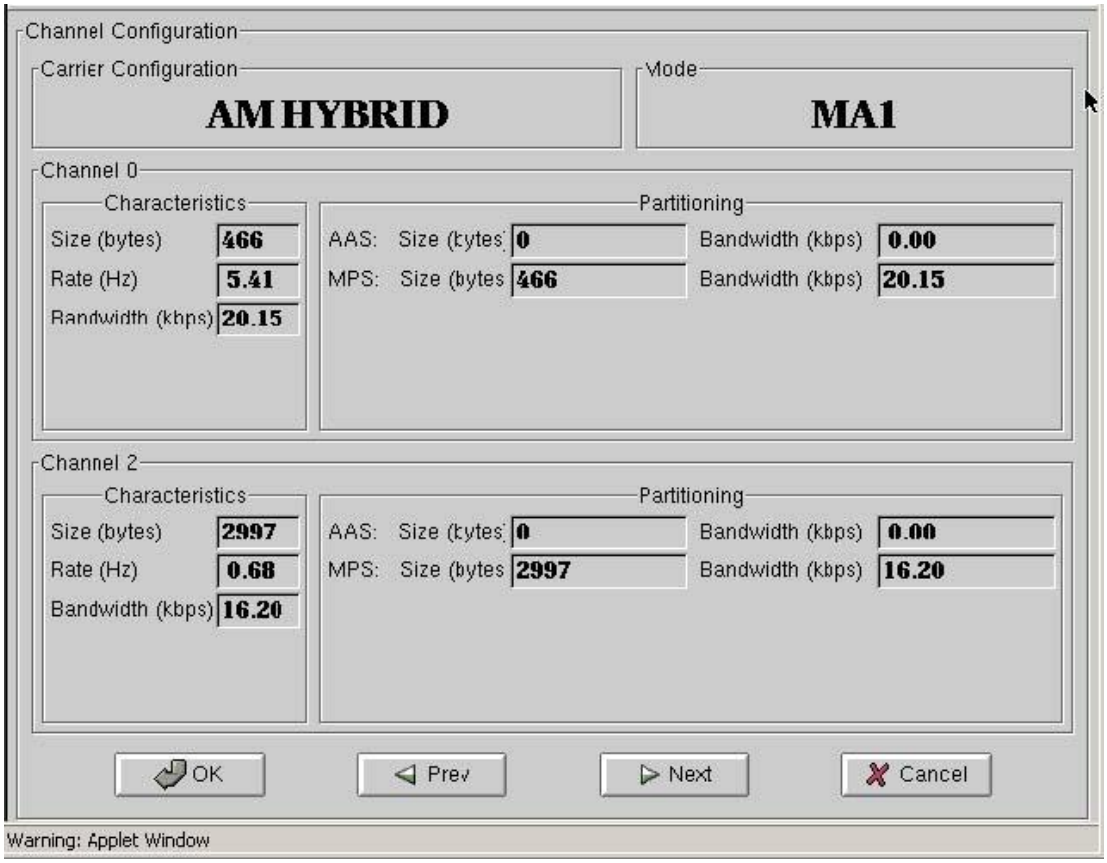


Figure 4-16: Channel Configuration

4.2.3 Versions

When selected a display of the present software/firmware/Motherboard configuration will be shown, Figure *4-17*. This information will not be valid until after the system has indicated it is Operational.

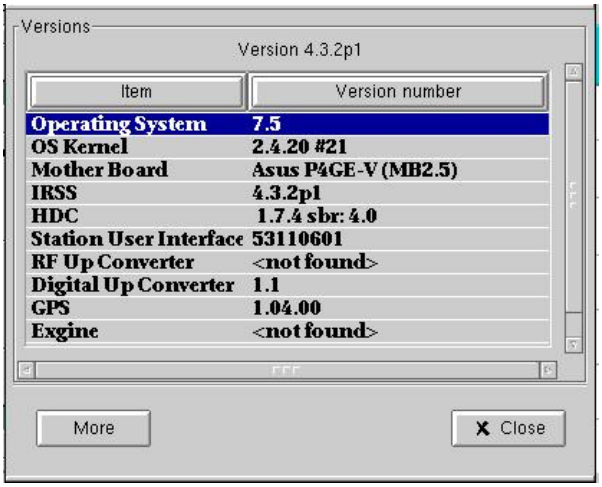


Figure 4-17: Versions Screen

To view additional detailed information, select the More button and the display in Figure *4-18*.

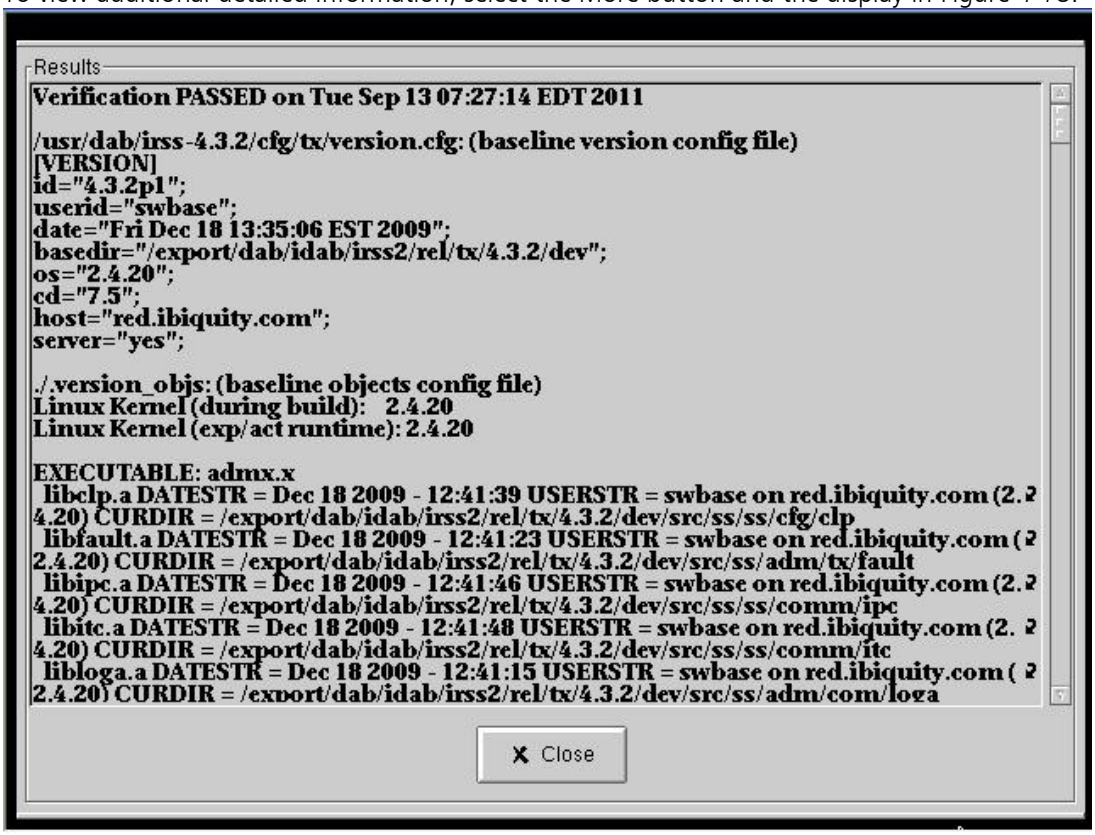


Figure 4-18: Versions More Screen

4.2.4 Configure Password

When selected the user will be prompted to enter the present password to gain access to the password configure screen, Figure *4-19*.

Figure 4-19: Password Screen

The new password can now be entered. Confirm the new password by entering it again in the Retype Password area.

Timeout in seconds value denotes how long, after entering a valid password, you have unlimited access before you are again prompted to enter the password again. If the checkbox is unchecked the access time has no limit and is valid until changed or the exciter is rebooted.

4.2.5 Command

The System Command screen, Figure *4-20*, is displayed when selected.

4.2.5.1 Command/Results

To execute a linux system command (ls, pwd …), enter the command here. The results of the command can be displayed immediately by placing a check mark in the *Display Results* box. The results can also go to a file as defined by the file name in the *Results/Output File:* line. To execute the command select *Execute*.

If the Display Results option is selected, Figure *4-22* will now be displayed. Select Close to return to the Exciter Submenu screen.

4.2.5.2 Browse

This button can be selected to choose a file/directory (for execution or results storage). Figure *4-21* will appear. Press *OK* to enter the selection and return to the System Command screen.

4.2.5.3 Common Applications Display Virtual Keyboard

This button, if selected will display a virtual keyboard (Figure *4-23*) on the display when the common application is run. This is useful only if a keyboard is not connected to the exciter.

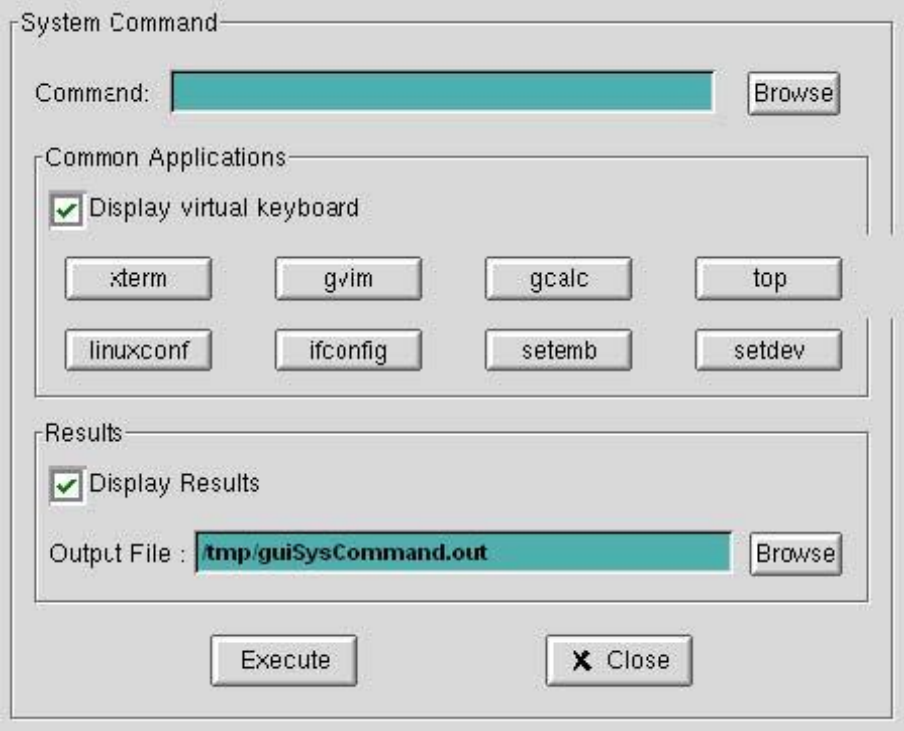


Figure 4-20: System Command Screen

4.2.5.4 Common Applications Xterm

This button, if selected, will display an Xterm Window, (Figure *4-24*). The user can now type commands. When done, the user types exit and presses return to close the window and return to the System Command window. In addition to the xterm button, pressing F12 on the keyboard will bring you to an xterm Window. This is the preferred method to access a Linux console. The other way is to press the key combination of CTRL-ALT-F2. However, switching back from this console to the GUI (CTRLALT-F7) may have a detrimental effect on system performance.

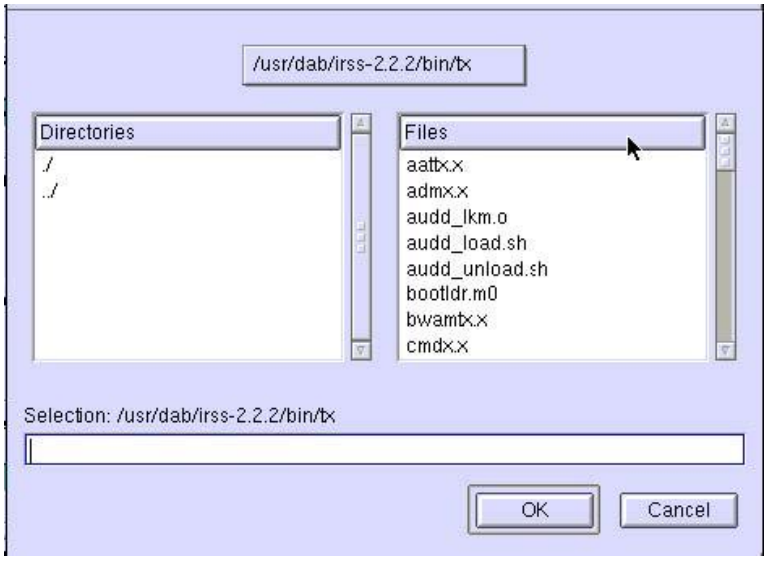


Figure 4-21: Browse Screen

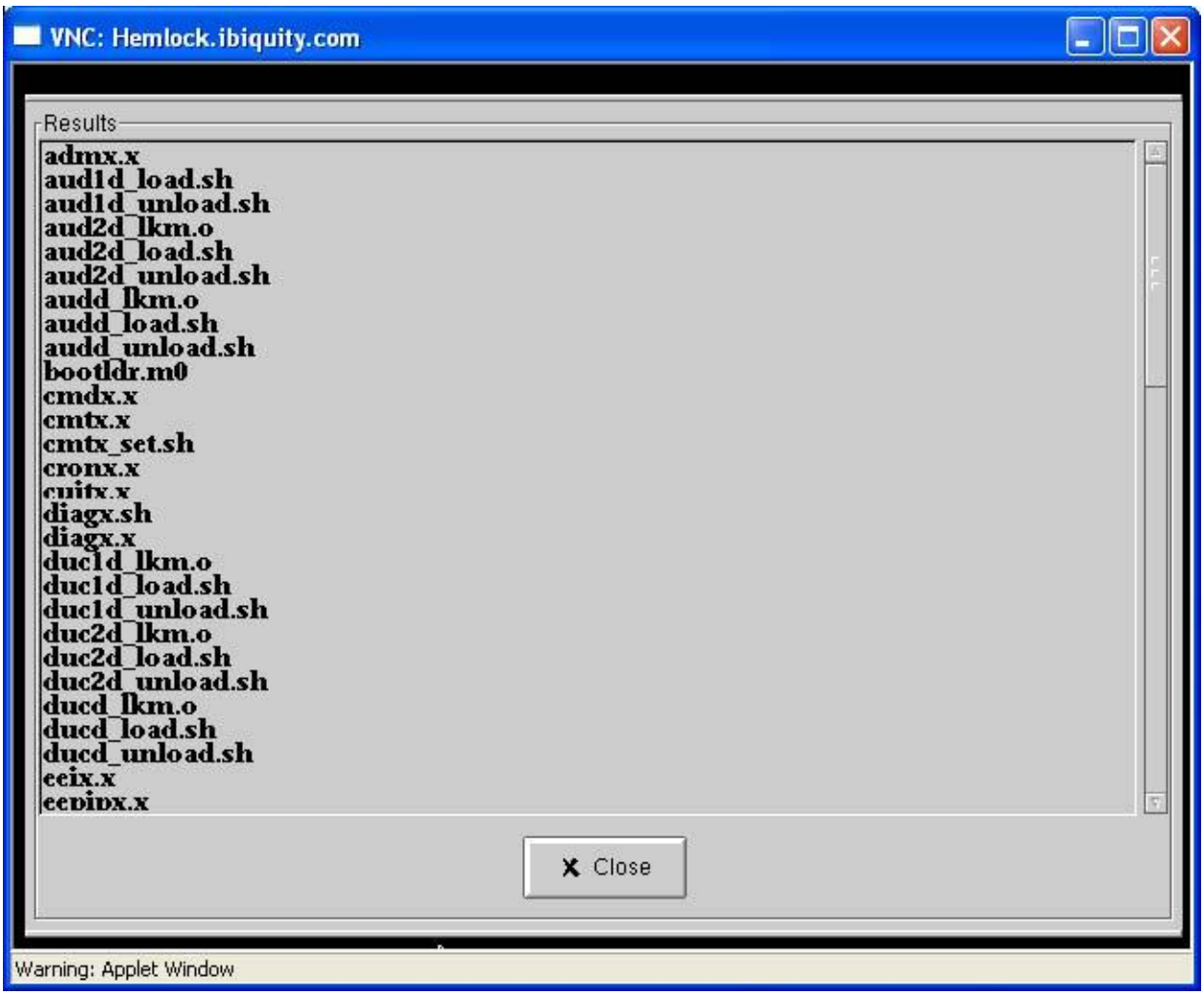


Figure 4-22: Command Results Display

Figure 4-23: Virtual Keyboard

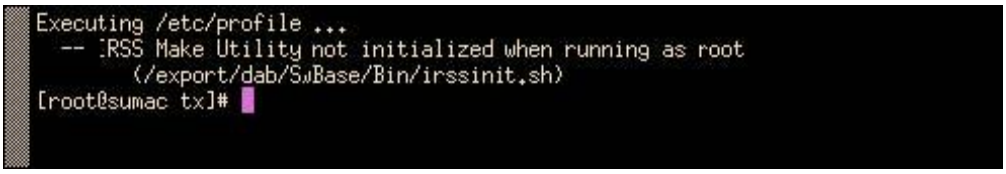


Figure 4-24: Xterm Window

4.2.5.5 Common Applications gvim

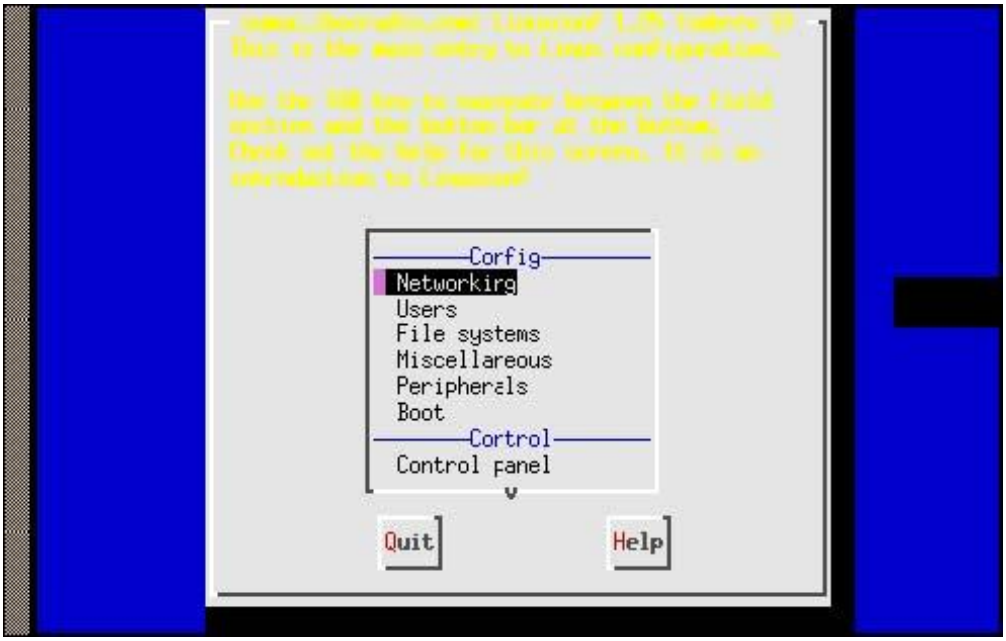


Figure 4-25: Gvim Editor

This button, if selected, will display a Graphical Text Editor (Figure *4-25*). The user can now call up a file to edit. When done, select file/exit to return to the System Command screen.

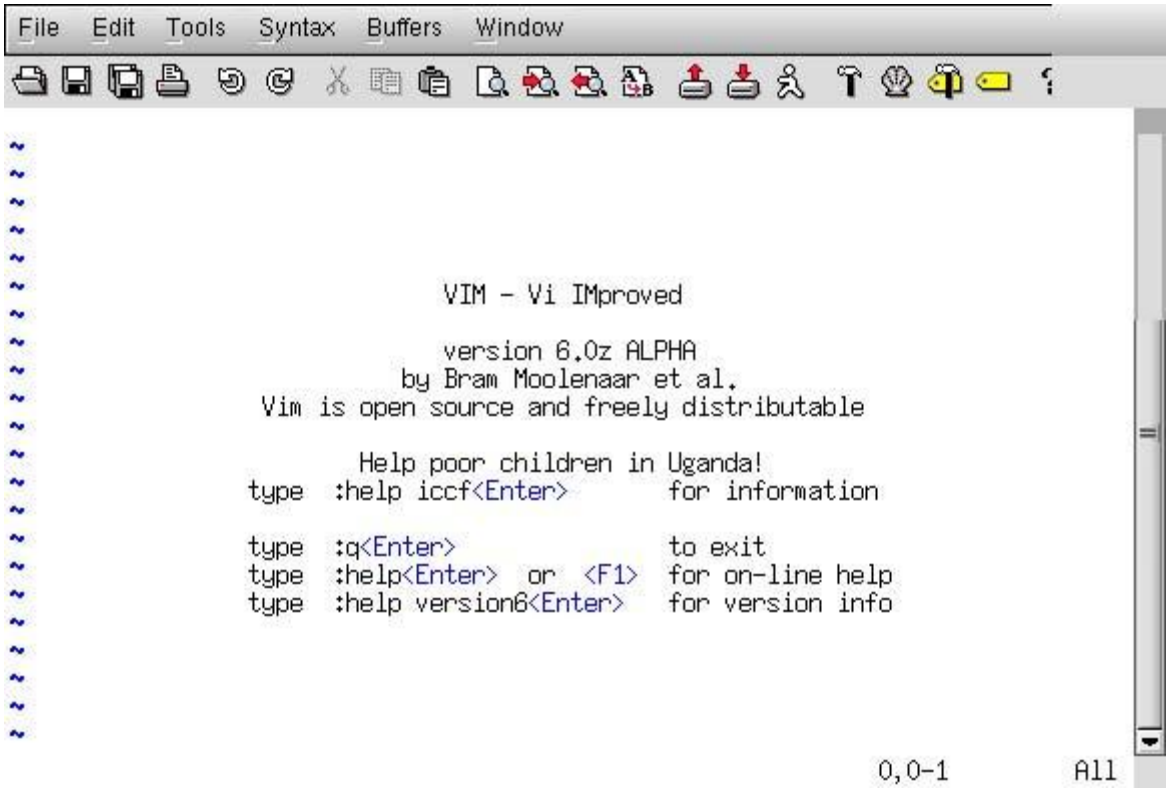


Figure 4-26: Linuxconf Screen

4.2.5.6 Common Applications linuxconf

This button, if selected, will display a graphical linux configuration application (Figure *4-26*). The user can now configure the system as desired. When done, select Quit to return to the System Command screen.

4.2.5.7 Common Applications gcalc

This button, if selected, will display a graphical calculator application (Figure *4-27*). The calculator is now displayed. Select file/exit to return to the System command screen.

Figure 4-27: Graphical Calculator Screen

4.2.5.8 Common Applications Top

This button, if selected, will display a summary of the processor usage (Figure *4-28*). Press Close to finish.

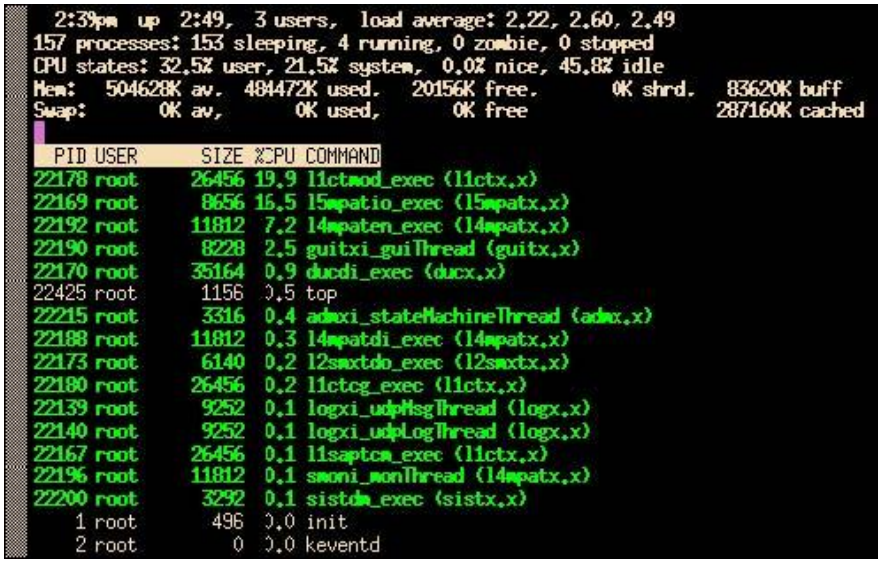


Figure 4-28: Top Display Screen

4.2.5.9 Common Applications ifconfig

This button, if selected, will display a summary of the processor network configuration (Figure *4-29*). Press close to quit and return to the System Command window.

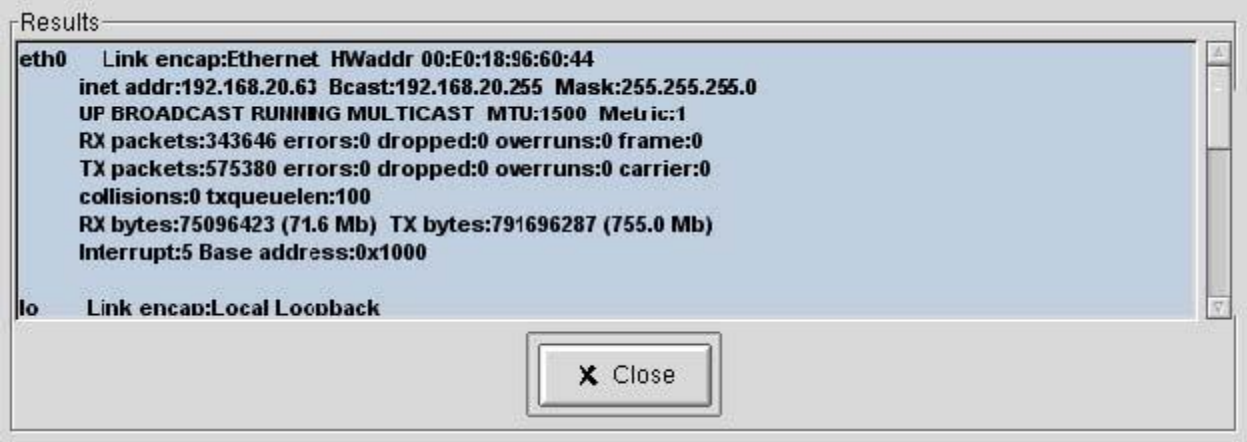


Figure 4-29: ifconfig Screen

4.2.5.10 Common Applications setemb

This button, if selected, will set the system to embedded mode. Press close to quit and return to the System Command window. The system is now in Embedded mode, see 1 Startup for embedded mode operation description.

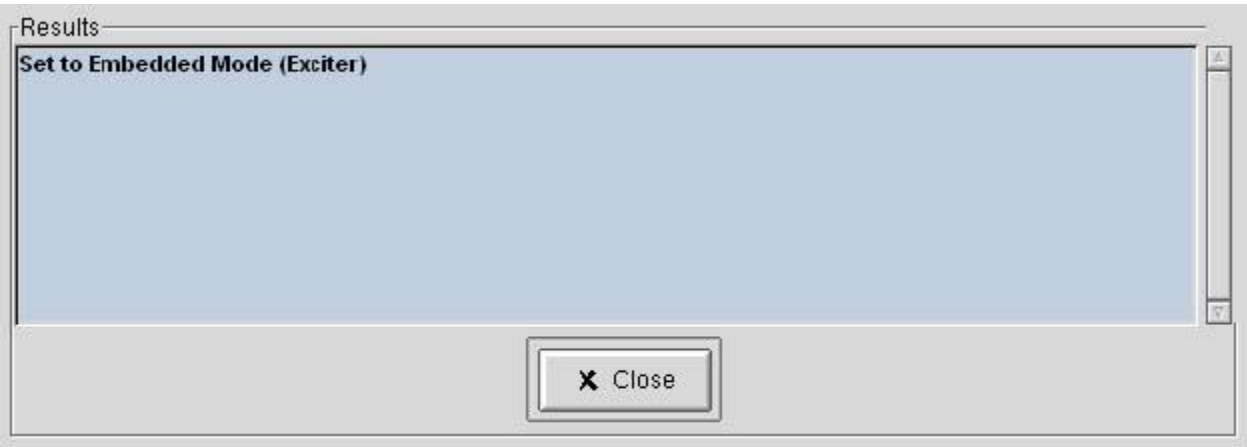


Figure 4-30: Dialog setemb Screen

4.2.5.11 Common Applications setdev

This button, if selected, will set the system to development mode. Press close to quit and return to the System Command window. The system is now in Development mode, see 5.1 Startup for development mode operation description.

4.2.6 GPS Data

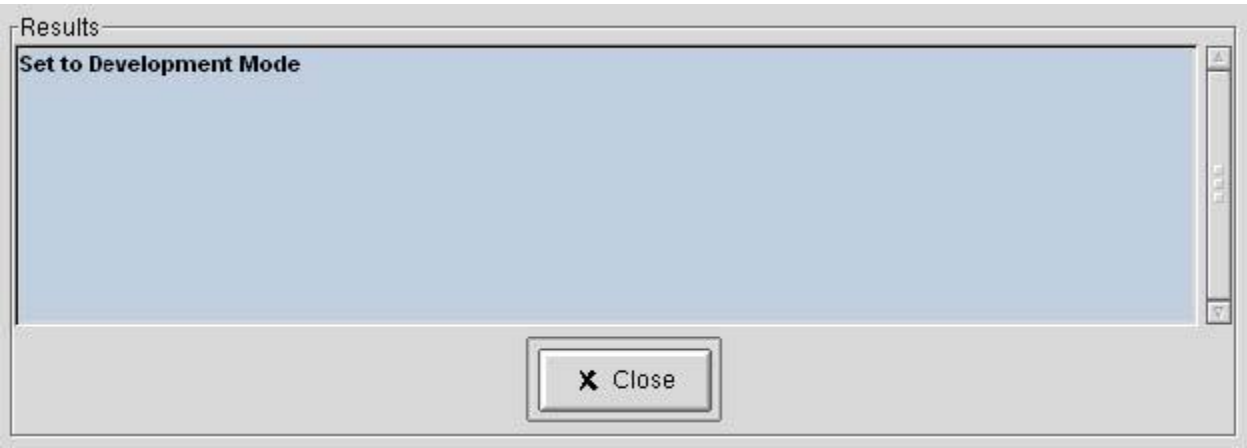


Figure 4-31: Dialog setemb Screen

The GPS Data button, when selected, displays the GPS Data screen similar to the one shown in Figure 4-32. This screen displays GPS Version, status, and allows setting of the GPS values.

If the GPS mode is in the **Not Locked mode** (no antenna attached) all the position information can be edited. This information will not be used for transmission unless the system is reset. If the information is changed a warning will be displayed, Figure *4-33*, as a reminder.

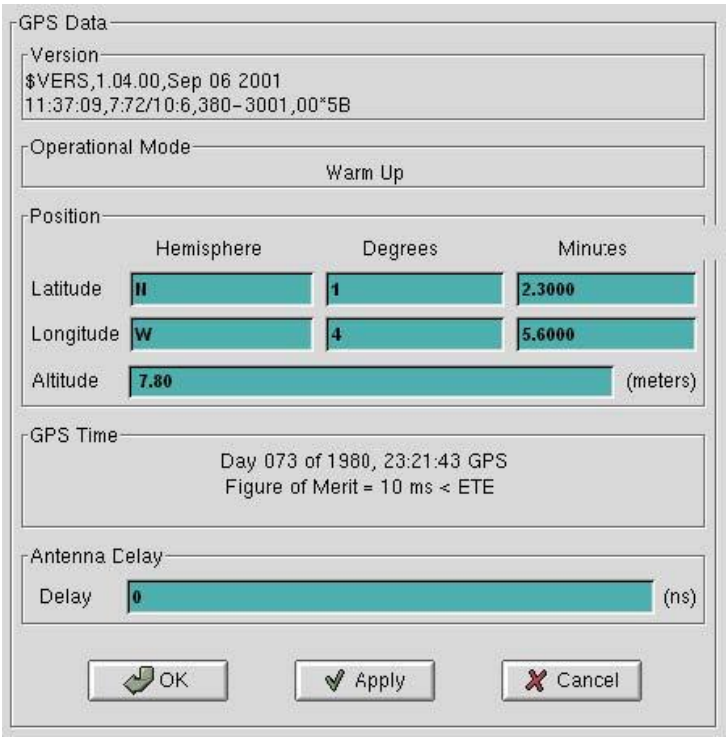


Figure 4-32: GPS Data Screen

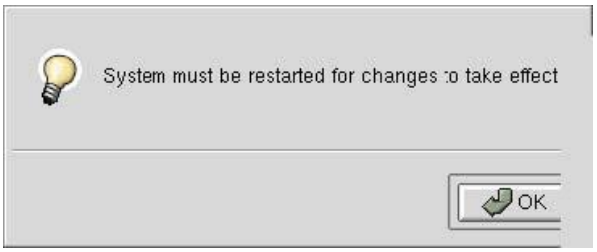


Figure 4-33: System Reset Warning Screen

4.2.6.1 GPS Antenna Delay

This variable is based on GPS cable type and length. Delay values for recommended cable types are listed in Table 4-1.

Table 4-1: GPS Cabling Delays

Cable Type	Delay Value
Belden 9311 (RG-58)	4.36 ns/m (1.33 ns/ft)
Belden 8267 (RG-213)	4.99 ns/m (1.52 ns/ft)
Belden 9104 (RG-59)	4.00 ns/m (1.22 ns/ft)
Belden 9913 (RG-8)	3.90 ns/m (1.19 ns/ft)

To determine the proper delay value, multiply the delay value from Table 4-1 by the length of cable used. For example, if the antenna system includes 50 ft of RG-58 cable, the total cable delay is:
50 ft x 1.33 ns/ft = 66.5 ns

When entering the data round the value to the nearest nanosecond (ns).
When Antenna Delay is selected, Figure *4-8*, is displayed. change the delay value, enter the desired delay value using the number keys. Press *Enter* to establish the new delay value and return to the GPS Data screen.

4.2.7 Local Time

See Section 16 .

4.3 Log Tab Control Buttons

Figure *4-34* shows the GUI main screen Log Tab. Descriptions of control buttons displayed on the Log Tab of this screen are provided in the following subparagraphs.

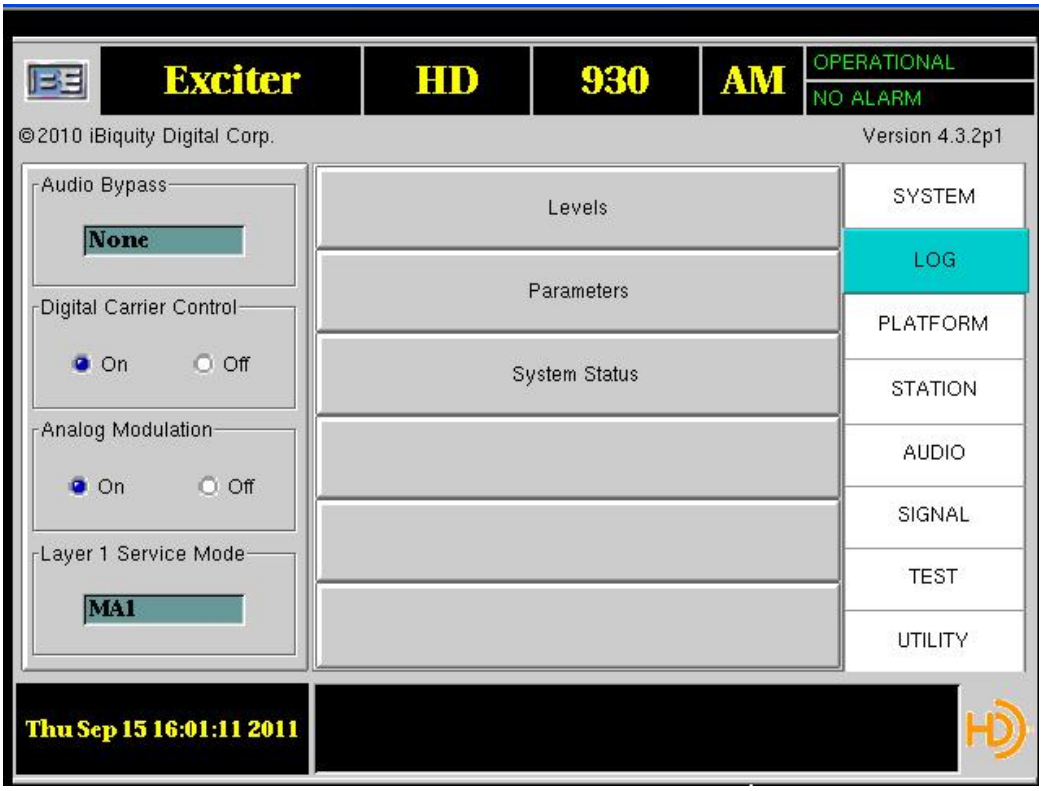


Figure 4-34: Reference Exciter GUI Interface Log Tab

4.3.1 Levels

Select Levels from the Log Tab main menu, to view and update log level information. The Log Levels screen, Figure *4-35*, is displayed. To set the logging level for an individual process, set the Log Level to a value 0 through 7 (0=Off, 7=Max). To set the description associated with the screen logging of each process (not to a file), increase the number under the Verbose Level column (0=Off, 7=Max) to the appropriate level. This sets the logging stored in file /mnt/data/irss.log. This file is archived to a date associated file. For example: /mnt/data/02-19-03/irss02:33:00.log.

4.3.1.1 Previous Page

Select Previous Page to scroll backward through exciter processes.

4.3.1.2 Next Page

Select Next Page to scroll forward through exciter processes.

4.3.1.3 All Log Levels

To set the log level to the same value for all processes, select All Log Levels. Figure *4-36* is displayed. Select the level desired for all processes and press *Close* to enter the new values.
This will log all data with a log level of the selected value or lower.

4.3.1.4 All Verbose Levels

To set the verbose level to the same value for all processes, select All Verbose Levels to display the screen shown in Figure *4-36*. Select the desired level and click *Close* to activate the new level.
This will print all data with a verbose level of the selected value or lower.

4.3.1.5 Exclusive Level

Exclusive Level, when selected will only print data that is the same level as the level selected (not lower or higher).

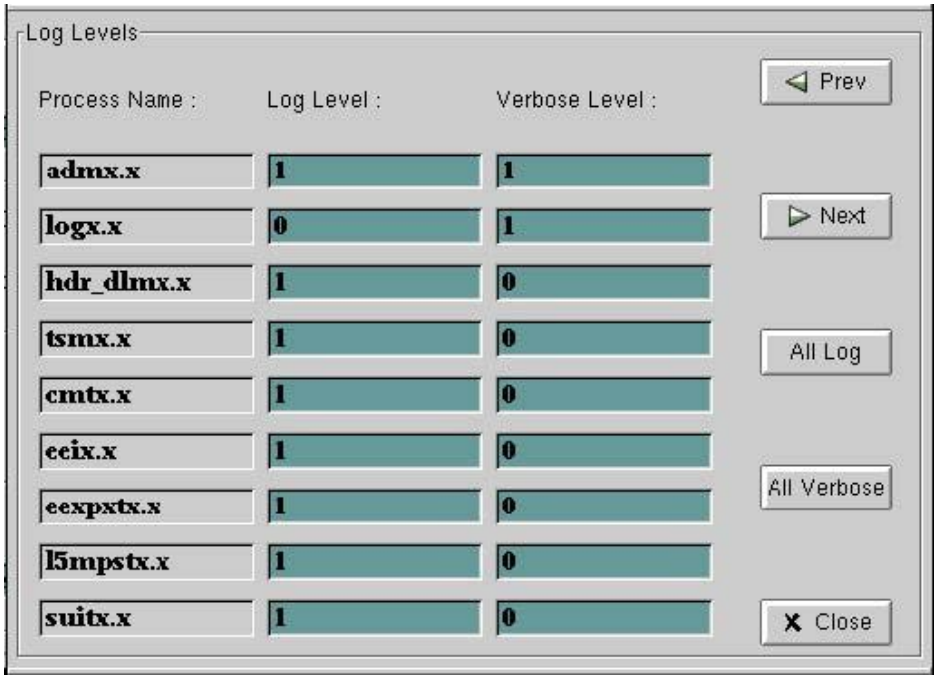


Figure 4-35: Log Level Screen

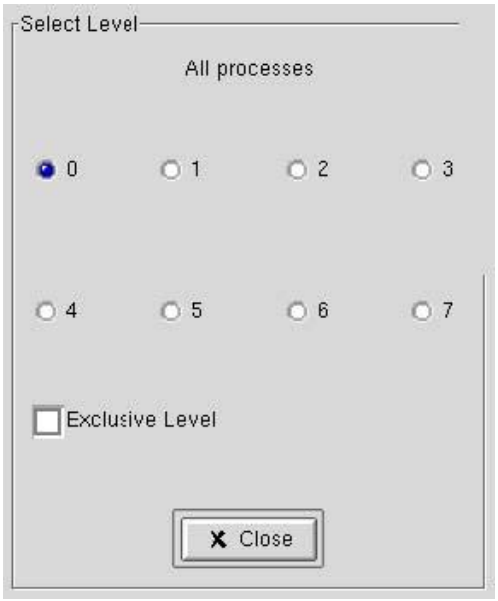


Figure 4-36: Select Level Screen

4.3.2 Parameters

Select Parameters from the Log main menu. The Log Parameters screen (Figure *4-37*) is displayed. This screen will display the present logging utilization and allow for the setting of warning parameters.

4.3.2.1 Warning Message Rate

When Warning Message Rate is selected, the Numeric Keyboard screen is displayed (Figure *4-8*). To set how often the user is warned that the maximum log rates have been exceeded; enter the desired time in seconds. Press enter to use the new value and return to the Log Parameters screen.

4.3.2.2 Window Size (sec):

When Window Size is selected, the Numeric Keyboard screen is displayed (Figure *4-8*). To set the duration over which the logging rate is calculated, enter the desired time in seconds. Press enter to use the new value and return to the Log Parameters screen.

4.3.2.3 ASCII Log Rate (bytes/sec):

ASCII Log Rate displays the instantaneous amount of ASCII logging.

4.3.2.4 ASCII Log Utilization:

ASCII Log Utilization displays the instantaneous amount of ASCII logging represented as a percentage of the maximum rate.

4.3.2.5 ASCII Log Max Rate:

When Max ASCII Log Rate is selected, the Numeric Keyboard screen is displayed (Figure *4-8*). To set the log rate for which, if exceeded, a warning will be issued, enter the desired rate. Press enter to use the new value and return to the Log Parameters screen.

4.3.2.6 Binary Log Rate (bytes/sec):

Binary Log Rate displays the instantaneous amount of Binary logging.

4.3.2.7 Binary Log Utilization:

Binary Log Utilization displays the instantaneous amount of Binary logging represented as a percentage of the Maximum rate.

4.3.2.8 Binary Log Max Rate:

When Max Binary Log Rate is selected, the Numeric Keyboard screen is displayed (Figure 4-8). To set the log rate for which, if exceeded, a warning will be issued, enter the desired rate. Press enter to use the new value and return to the Log Parameters screen.

4.3.2.9 Start Archive

When *Start Archive* is selected, all log files in the /mnt/data path along with any core files in the bin/tx path will be collected and placed in the specified archived file.

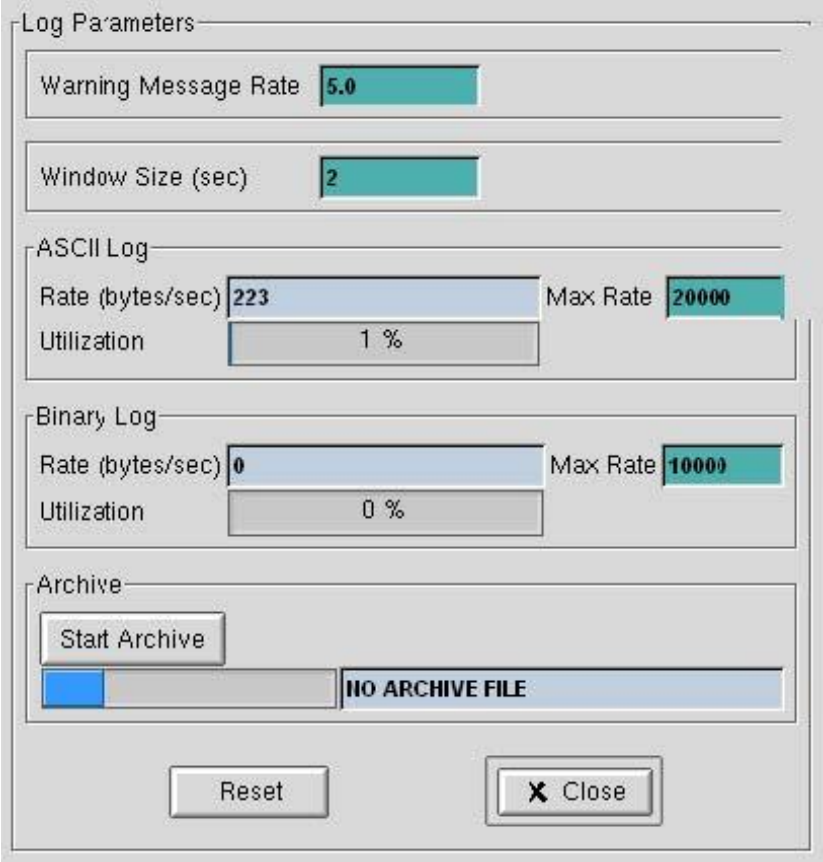


Figure 4-37: Log Parameters Screen

4.3.3 System Status

See paragraph 4.1.12.

4.4 Platform Tab Control Buttons

Figure *4-38* shows the GUI main screen Platform Tab. Descriptions of control buttons displayed on the Platform Tab of this screen are provided in the following subparagraphs.

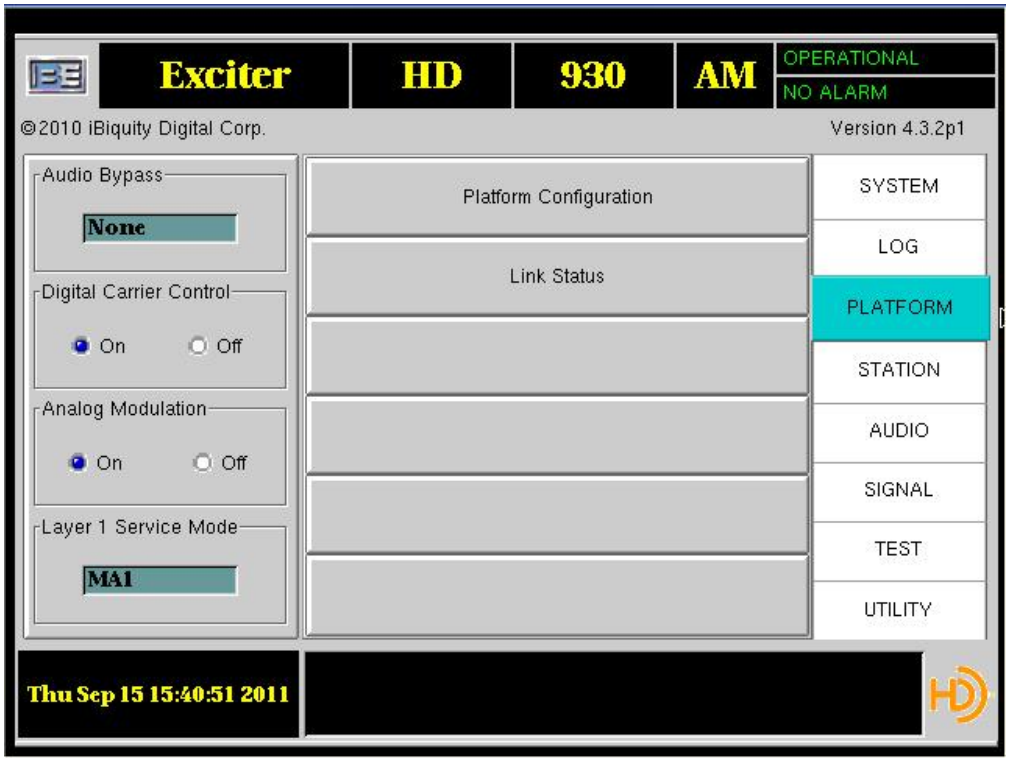


Figure 4-38: Reference Exciter GUI Interface Platform Tab

4.4.1 Platform Configure

See paragraph 4.1.1.

4.4.2 Link Status

The Link Status window provides status for all active TCP/UDPLink connections, Figure *4-39*.

Each Link (e.g. I2E, E2X) window is divided into 2 panels: a send panel and a receive panel. In both cases, statistics are displayed for all the messages received on the indicated connection. The connection being examined is displayed in the upper left corner. In Figure *4-39* it is the I2E link. In addition, an error count for a number of different types of standard failures is also displayed.

Each link has its own window. The user can scroll through each link by pressing the "*Prev*"or "*Next*" button. The number and types of windows available will depend on the platform type. For example, the E2X window is not displayed on an Exciter platform because it does not exist.

Figure *4-40* shows the GUI main screen Station Tab. Descriptions of control buttons displayed on the Station Tab of this screen are provided in the following subparagraphs.

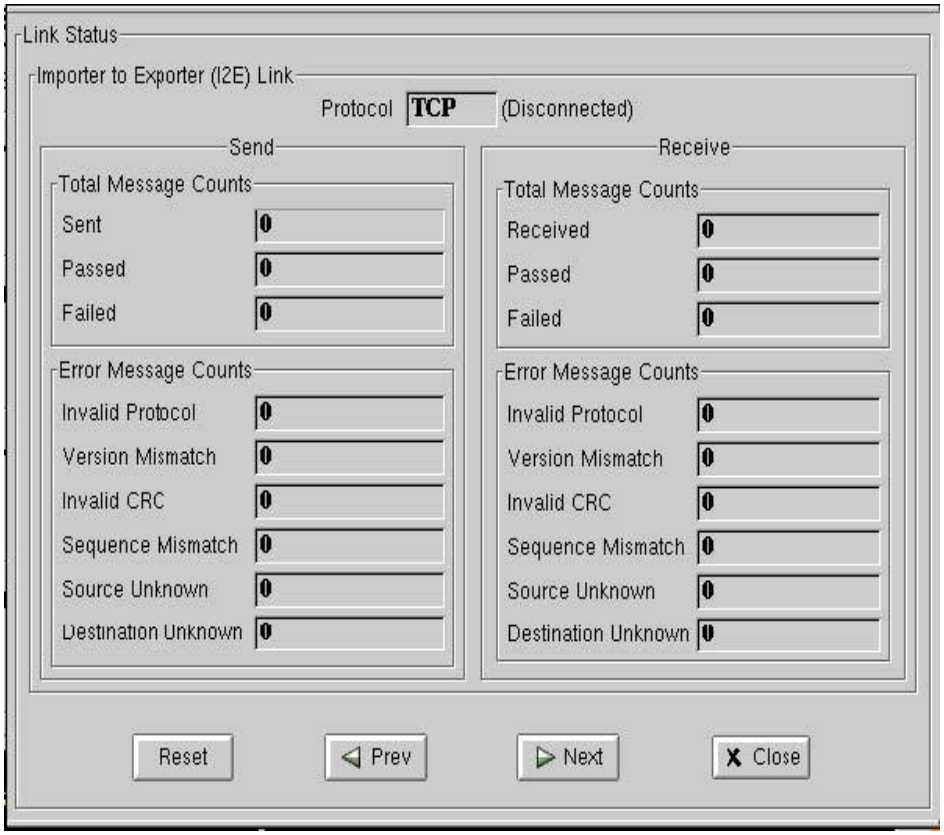


Figure 4-39: I2E Activity Monitor Screen

4.5 Station Tab Control Buttons

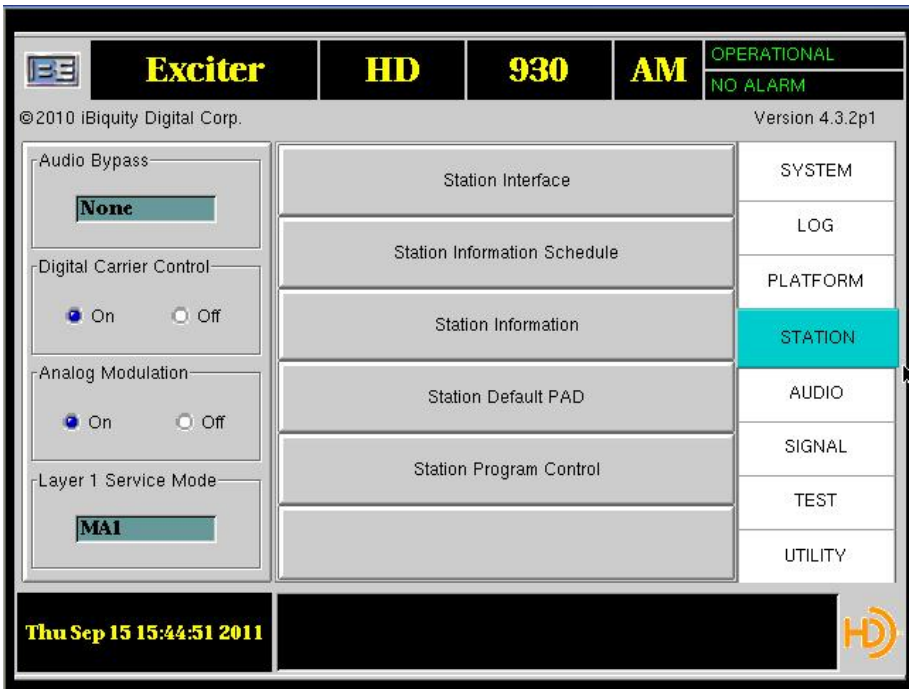


Figure 4-40: Reference Exciter GUI Interface Station Tab

4.5.1 Station Interface

Select Station Interface, to display the Station Interface screen, Figure *4-41*.

The current state of all 16 inputs is shown in the left column. For inputs 1 through 14, a high-to-low transition will initiate the corresponding action. For inputs 15 and 16, the input must be held low for at least 5 seconds, then, on the ensuing positive edge, the corresponding action is executed. The current status is shown in the right-hand column. To clear any present alarms select *Clear State Alarm.* To set the Non-operational state back to Operational select *Clear State Non-operational.* This will place the system back into a operational state until the next error is encountered.

When *Start Test* is selected, the outputs will all be set to a low state, and a high state will be walked through spending a second in each state. The inputs will still be continuously monitored. When *Stop Test* is selected, the outputs will return to the values stored prior to entering test mode. When *Enable Watchdog* is selected, the Watchdog timer on the Station Interface Card (SIC) will be enabled. When enabled, the SIC will monitor the serial port, if there is no activity for 1 second the host processor is assumed to be locked up. The Audio bypass relays will be set to Bypass, the system operational relay will be opened and the exciter will be rebooted.

Press *Close* to return to the Main Menu.

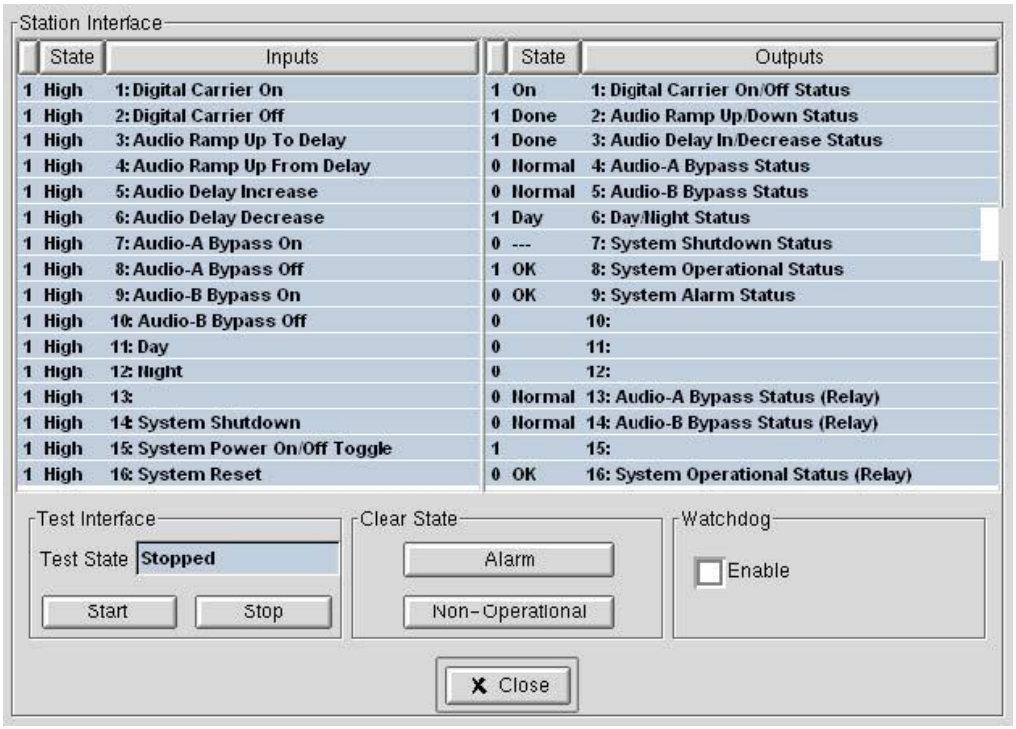


Figure 4-41: Station Interface Display Screen

4.5.2 Station Information Schedule

The Station Information Schedule, Figure *4-42*, is displayed when selected from the main menu.
Select the block to be changed and the payload selection menu will be displayed, Figure *4-43*. Select the payload option desired, and press *OK* to enter the new settings and return to the main menu.

Figure 4-42: Station Information Schedule Screen

Care must be taken when selecting payload options as some options are not compatible with other options. For example Slogan Universal requires both payloads, so Payload 2 must be left blank. If an incompatible payload is selected a warning message similar to Figure *4-44* will be displayed.

Figure 4-43: Station Information Payload Selection

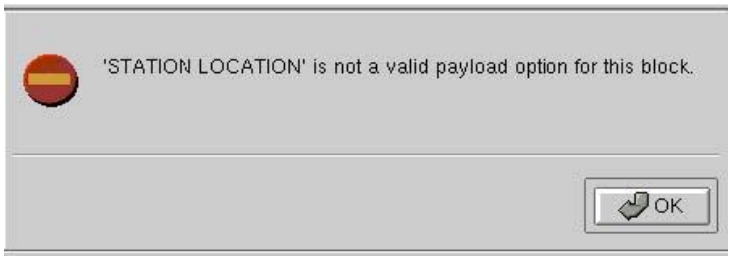


Figure 4-44: Incompatible payload option warning message

4.5.3 Station Information

See paragraph 4.1.2.

4.5.4 Station Default PAD

The Station's default PAD information, Figure *4-45*, is displayed when selected from the Station main menu. This menu has four tabs: General, Comment, Commercial, and Last Message Sent. Each tab is described in turn.

4.5.4.1 General

Use this tab shown in Figure *4-45* to enter the Title, Artist, Album, and Genre information by selecting the desired field and using the alphanumeric keyboard similar to the one in Figure *4-6*. To include this information as part of the PAD message make sure the "Enable" box is checked. Clearing the Enable box will exclude this information from being sent.

Note: Even though Genre is a text field, the user should select one of the types defined in the IDS standard, if possible.

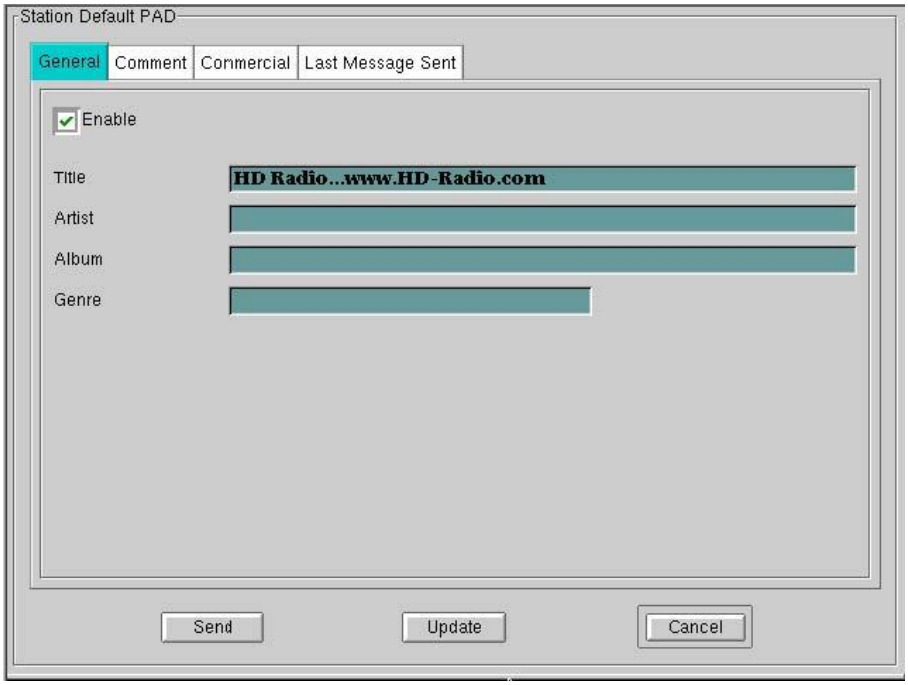


Figure 4-45: Station Default PAD (General Tab)

4.5.4.2 Comment

Use this tab shown in Figure *4-46* to enter the Comment Title and Comment Description information by selecting the desired field and using the alphanumeric keyboard similar to the one in Figure *4-6*. To include this information as part of the PAD message make sure the "Enable" box is checked. Clearing the Enable box will exclude this information from being sent.

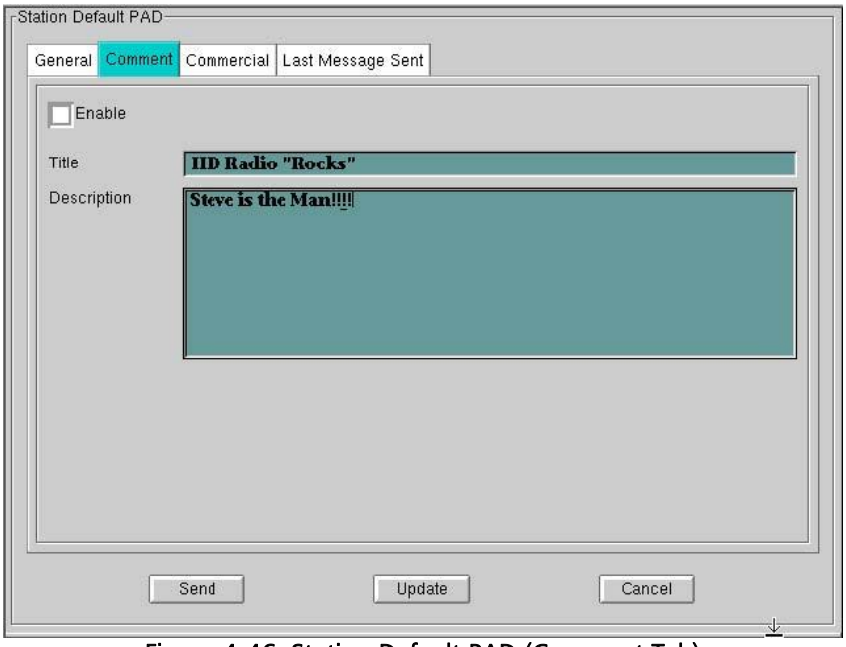


Figure 4-46: Station Default PAD (Comment Tab)

4.5.4.3 Commercial

Use this tab shown in Figure *4-47* to enter the Commercial information by selecting the desired field and using the alphanumeric keyboard similar to the one in Figure *4-6*. To include this information as part of the PAD message make sure the "Enable" box is checked. Clearing the Enable box will exclude this information from being sent.

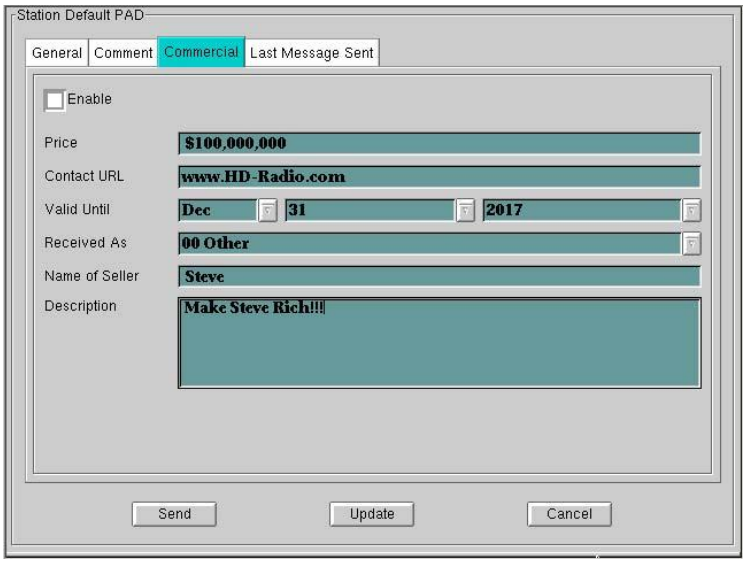


Figure 4-47: Station Default PAD (Commercial Tab)

4.5.4.4 Last Message Sent

Use this tab, shown in Figure *4-48*, to view the last message sent in ID3 format.

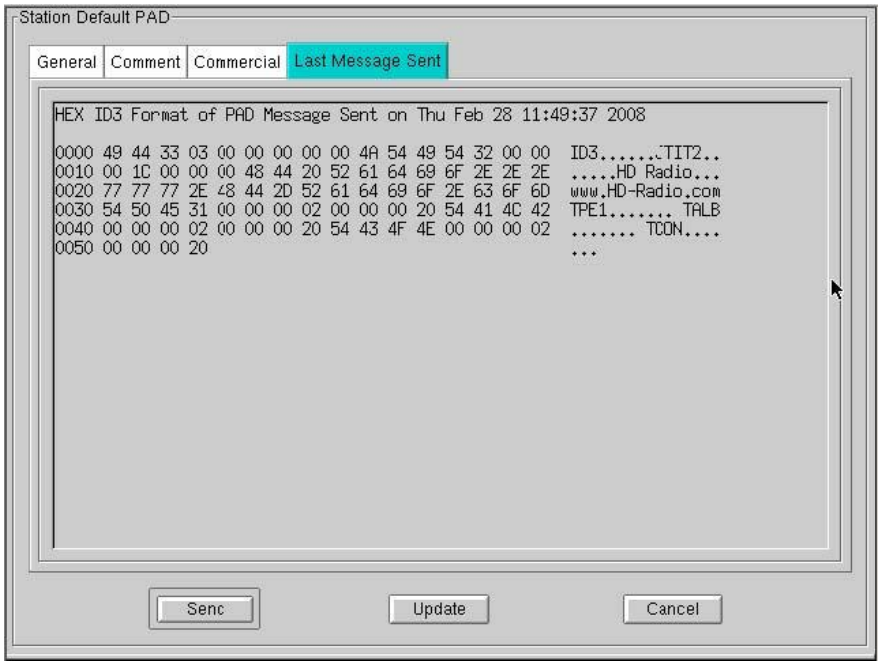


Figure 4-48: Station Default PAD (Last Message Sent Tab)

In addition to the four tabs, the Station Default PAD screen also has four buttons: Send, Update, Advanced, and Cancel.

4.5.4.5 Send

When pressed, the current information in the General, Comment and Commercial screens, if enabled, will be queued for transmission as indicated by the screen shown in Figure *4-49*.

Figure 4-49: Information Sent acknowledgement message

4.5.4.6 Update

When pressed, the current information in the General, Comment, and Commercial screens is saved as part of the default configuration for that Service Mode as indicated by the acknowledgement message shown in Figure *4-50*.

Figure 4-50: PAD Configuration update acknowledgement

4.5.4.7 Cancel

Use Cancel to return to the main Station screen.

4.5.5 Station Program Control

The station's programming genre and program audio processing selection, Figure *4-51*, is displayed when the Select Station Program Control is selected.

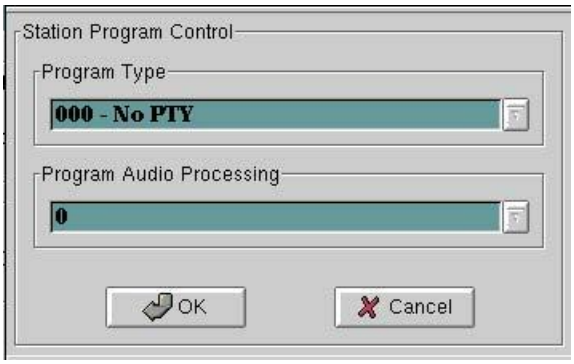


Figure 4-51: Station Program Control screen

This "Program Type" allows the user to send a genre type transmitted as part of the SIS message and embedded in the main program audio bit-stream. To change the genre, use the pull down menu and select the genre type most appropriate. The "Program Audio Processing" indicates to the receiver what, if any, additional audio processing is being performed on the main program audio. Currently the Program Audio Processing is a number from 0-31 and it will be up to the audio processing constituents to coordinate the assignments of numbers.

4.6 Audio Tab Control Buttons

Figure *4-52* shows the GUI main screen Audio Tab. Descriptions of control buttons displayed on the Audio Tab of this screen are provided in the following subparagraphs.

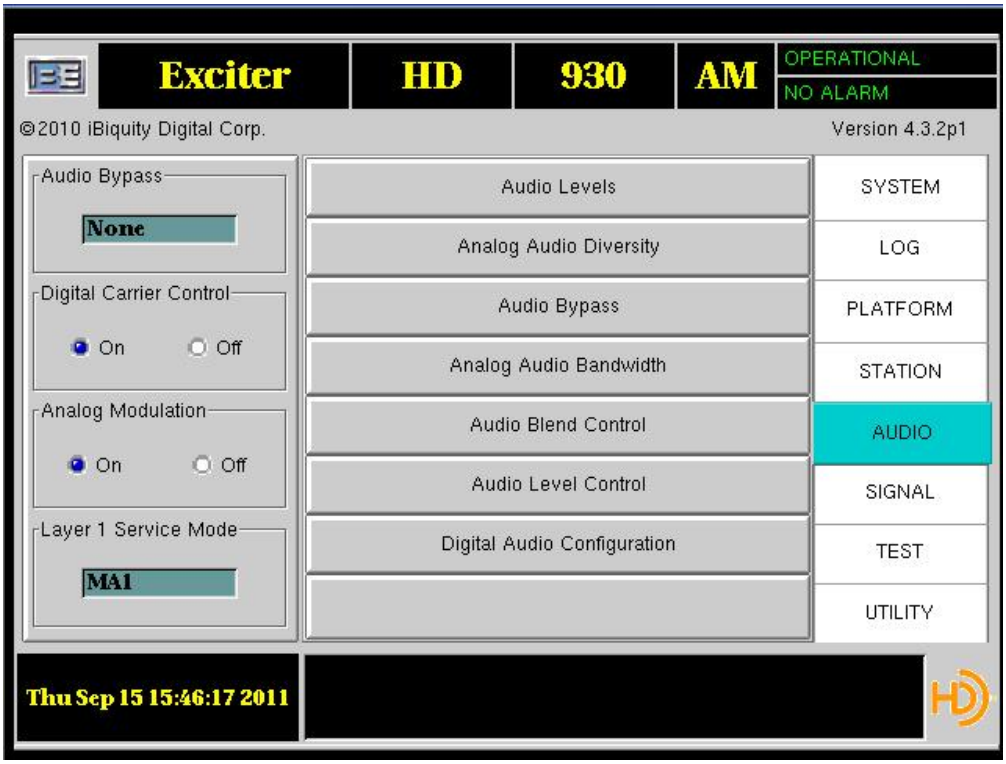


Figure 4-52: Reference Exciter GUI Interface Audio Tab

This button, if selected, will display the Analog Audio Diversity Screen, Figure *4-54*.

4.6.1 Audio Levels

This button, if selected, will display a dynamic Audio Monitor, Figure *4-53*.

4.6.1.1 Range (dB)

Select this option to change the Minimum value (left most value of audio bars) of the audio Bar graph, the Numeric Keyboard (Figure *4-8*) is displayed. To change the Range, in dB down from Full Scale, enter the new value using the number keys.

4.6.1.2 Average (sec)

Select this option to change the time over which the average of audio power is taken to be displayed as the green portion of the audio Bar graph. The Numeric Keyboard (Figure *4-8*) is displayed. To change the average time, enter the new value using the number keys.

NOTE: If this number is larger than the peak and/or peak hold numbers those values will be changed to equal the Average time.

4.6.1.3 Peak (sec)

Select this option to change the time over which the peak of audio power is taken to be displayed as the Yellow portion of the audio Bar graph. The Numeric Keyboard (Figure *4-8*) is displayed. To change the Peak time, enter the new value using the number keys.

NOTE: If this number is larger than the peak hold number the Peak Hold value will be changed to equal the Peak time.

4.6.1.4 Peak Hold (sec)

Select this option to change the time over which the peak of audio power is taken to be displayed as the Red portion of the audio Bar graph. The Numeric Keyboard (Figure *4-8*) is displayed. To change the Peak Hold time, enter the new value using the number keys.

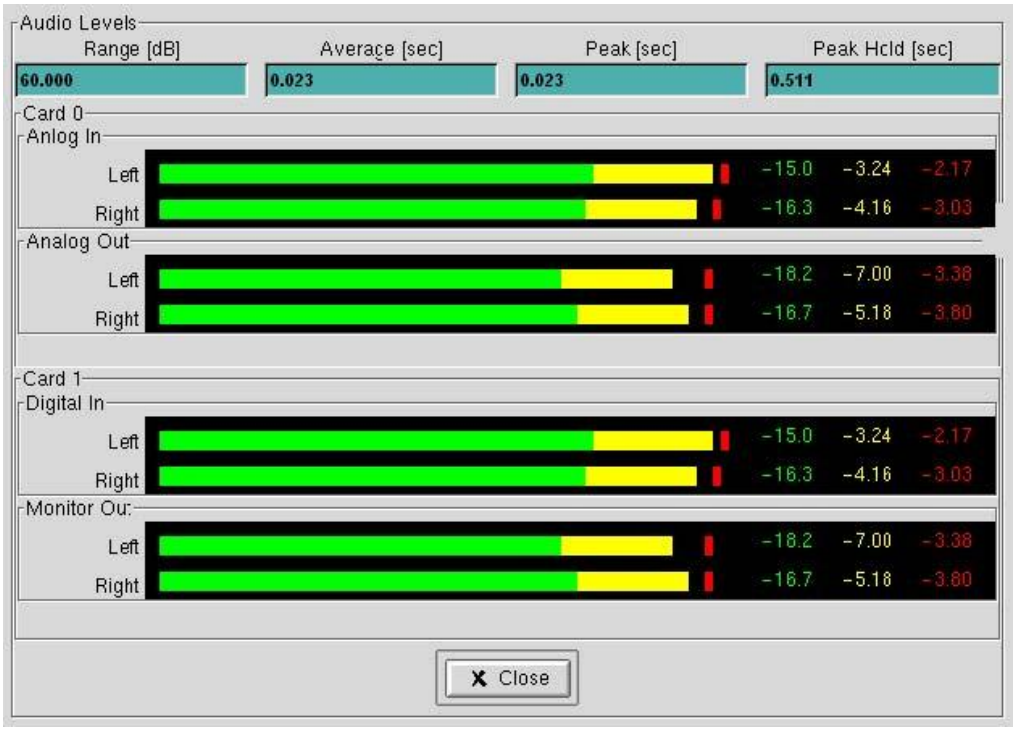


Figure 4-53: Audio Levels Screen

4.6.2 Analog Audio Diversity

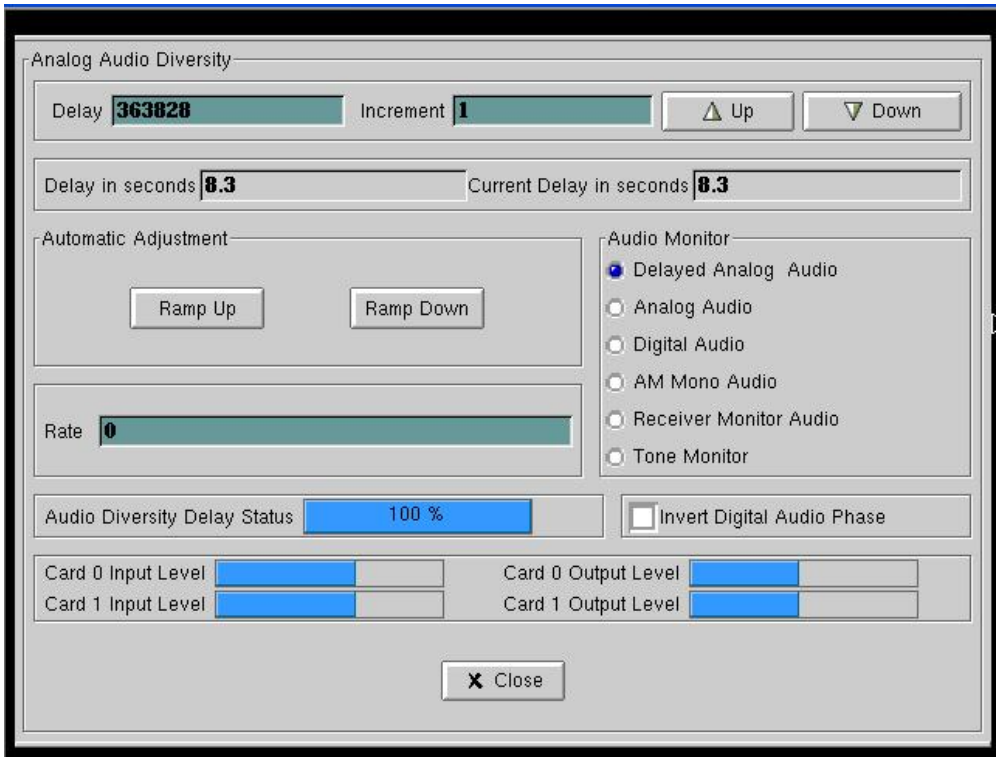


Figure 4-54: Analog Diversity Delay Screen

4.6.2.1 Delay

The Delay indicator displays the number of 44.1-kHz audio samples (22.67 us/sample) analog audio is to be delayed if the Analog Audio Diversity Status is 100%.

The Delay field, when selected, displays the Numeric Keyboard screen (similar Figure *4-8*). To change the delay value, enter the desired Delay Value using the number keys. Press *Enter* to establish the new delay value and return to the Analog Audio Diversity screen.

4.6.2.2 Increment

The Increment indicator displays the number of 44.1-kHz audio samples the delay value is changed when the up or down arrow buttons are selected.

The Increment field, when selected, displays the Numeric Keyboard screen (similar to Figure *4-8*). To change the increment value, enter the desired increment value using the number keys. Press *Enter* to establish the new increment value and return to the Analog Audio Diversity screen.

4.6.2.3 Delay in seconds

The Delay-in-seconds indicator displays the total analog audio delay when the Audio Diversity Delay Status is 100%. The displayed value is only accurate to +/-50 milliseconds.

4.6.2.4 Current Delay in seconds

The Current Delay-in-seconds indicator displays the current analog audio delay in seconds. Depending on the delay and the rate, the current value should either be equal to or converging to the delay value or converging to 0. The displayed value is only accurate to +/-50 milliseconds.

4.6.2.5 Automatic Adjustment Ramp Up

Ramp Up, when selected, begins a delay increase using the rate value from 0 to the desired delay value.

4.6.2.6 Automatic Adjustment Ramp Down

Ramp Down, when selected, begins a delay decrease using the Rate value from the present delay value to 0.

4.6.2.7 Rate

The Rate indicator displays the rate at which the total delay can be changed. If the rate is 0 when the delay is changed, it will be executed immediately. If the rate is 100 and the delay is changed, that change will slowly take effect: for every 100 audio samples, 1 extra sample is inserted or extracted. The higher the rate, the longer it will take to achieve the final value.

The Rate field, when selected, brings up the Numeric Keyboard screen (similar to Figure *4-8*). To change the Rate value, enter the desired rate using the number keys. Press *Enter* to establish the new Rate and return to the Analog Audio Diversity screen.

4.6.2.8 Audio Monitor

The Audio Monitor indicates/controls the audio stream present at the Exciter Monitor output. The options are:

- Delayed Analog Audio is (same as the analog Audio out) the diversity delayed input analog audio.
- Analog Audio is the input analog audio.
- Digital Audio is the input digital audio.
- AM Mono Audio is the monophonic input analog audio. Any internal band-limiting filters have not yet been applied.
- Receiver Monitor Audio is the digital audio encoded then decoded.
- Tone Monitor places a 1-kHz full-scale sine wave on the monitor output.

4.6.2.9 Invert Digital Audio Phase

When this box is checked, the phase of the digital audio stream is inverted.

4.6.2.10 Audio Diversity Delay Status

The Audio Diversity Delay Status indicator displays the percentage of current diversity delay.

4.6.2.11 Audio Card 0 Input Level

The Audio Card 0 Input Level indicator displays activity on the audio card 0 input path.

4.6.2.12 Audio Card 0 Output Level

The Audio Card 0 Output Level indicator displays activity on the audio card 0 output path.

4.6.2.13 Audio Card 1 Input Level

The Audio Card 1 Input Level indicator displays activity on the audio card 1 input path.

4.6.2.14 Audio Card 1 Output Level

The Audio Card 1 Output Level indicator displays activity on the audio card 1 output path.

4.6.3 Audio Bypass

4.6.3.1 See Section 4.1.7 .

4.6.4 Analog Audio Bandwidth

The Analog Audio Bandwidth indicator displays the bandwidth limit of the transmitted analog audio as 5kHz, 8-kHz, 5 kHz External, or 5-8 kHz External. When selected the Analog Audio Bandwidth screen, Figure *4-55* is displayed. The state is changed by selecting the desired radio button. When complete select *Ok* to activate the new setting and return to the main menu.

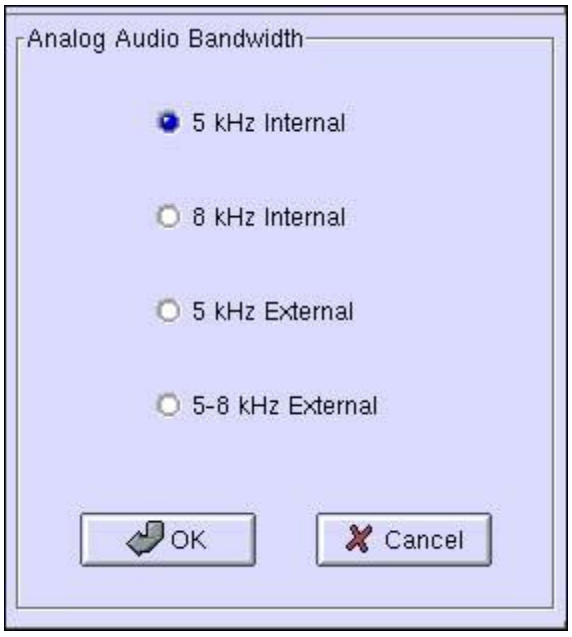


Figure 4-55: Analog Audio Bandwidth Control

Note: The External options assume the appropriate filtering has been applied prior to input into the exciter.

4.6.5 Audio Blend Control

The Exciter can transmit a control bit to the receiver that indicates not to blend between analog and digital. This could be used in cases of different audio content or non-time alignment. When this bit is set it is up to the receiver to determine which audio stream is used. Figure *4-56* shows the selections possible.

If *Enable Audio Blending* is selected, blending will occur regardless of the mode or the state of the diversity delay. If *Enable Audio Blending, only when audio alignment is completed* is selected, blending will only be enabled if the diversity delay is completely ramped up. Blending will automatically be disabled when diversity delay is either being applied (Section 4.6.2.5) or removed (Section 4.6.2.6) or if the diversity delay is completely ramped down. *Disable Audio Blending* allows the blending to be disabled for certain service modes. *Disable Audio Blending, But Allow Independent Selection* is used when different program material is being transmitted on the digital or analog channels.

Figure 4-56: Audio Blend Control Screen

4.6.6 Audio Level Control

The exciter can transmit control information to the receiver to indicate adjustments between the analog and digital audio using the Audio Level Control screen shown in Figure 4-57. When selected a numeric keyboard screen similar to Figure *4-8* is displayed. To change the recommended level adjustment, enter the desired value using the number keys. Press "Enter" to establish the new value and return to the Audio screen.

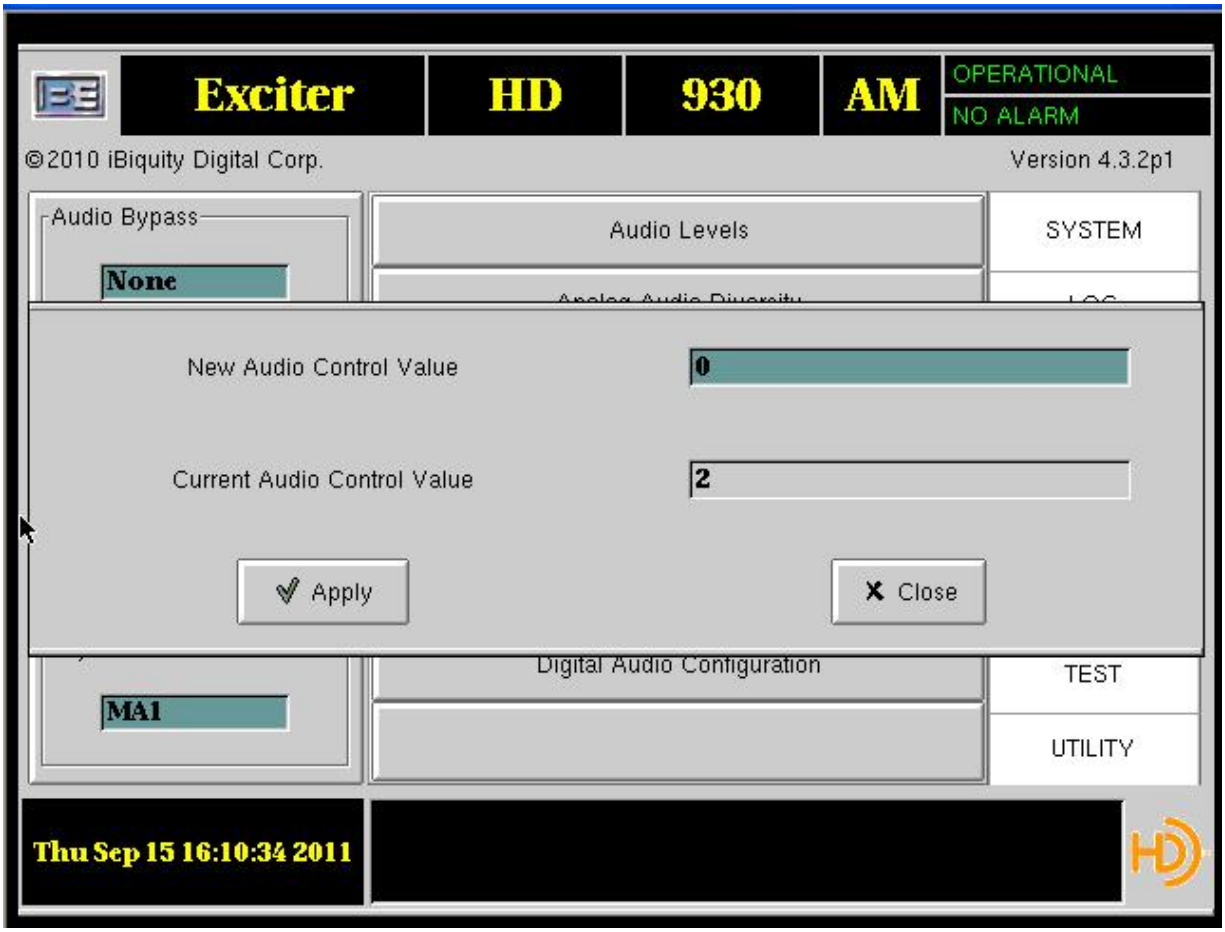


Figure 4-57: Audio Level Control Screen

4.6.7 Digital Audio Configuration

The exciter can set the core audio mode for the MPS audio stream using the Digital Audio Configuration screen shown in Figure *4-58*. The setting selected is normally based on the bit rate of the MPS audio stream. For bit rates less than 16 kbps the Monophonic setting is recommended, for bit rates greater than 16 kbps and less than 32 kbps the Parametric Stereo selection is recommended and for bit rates greater than 32 kbps the Stereo selection is recommended.

Figure *4-59* shows the GUI main screen Signal Tab. Descriptions of control buttons displayed on the Signal Tab of this screen are provided in the following subparagraphs.

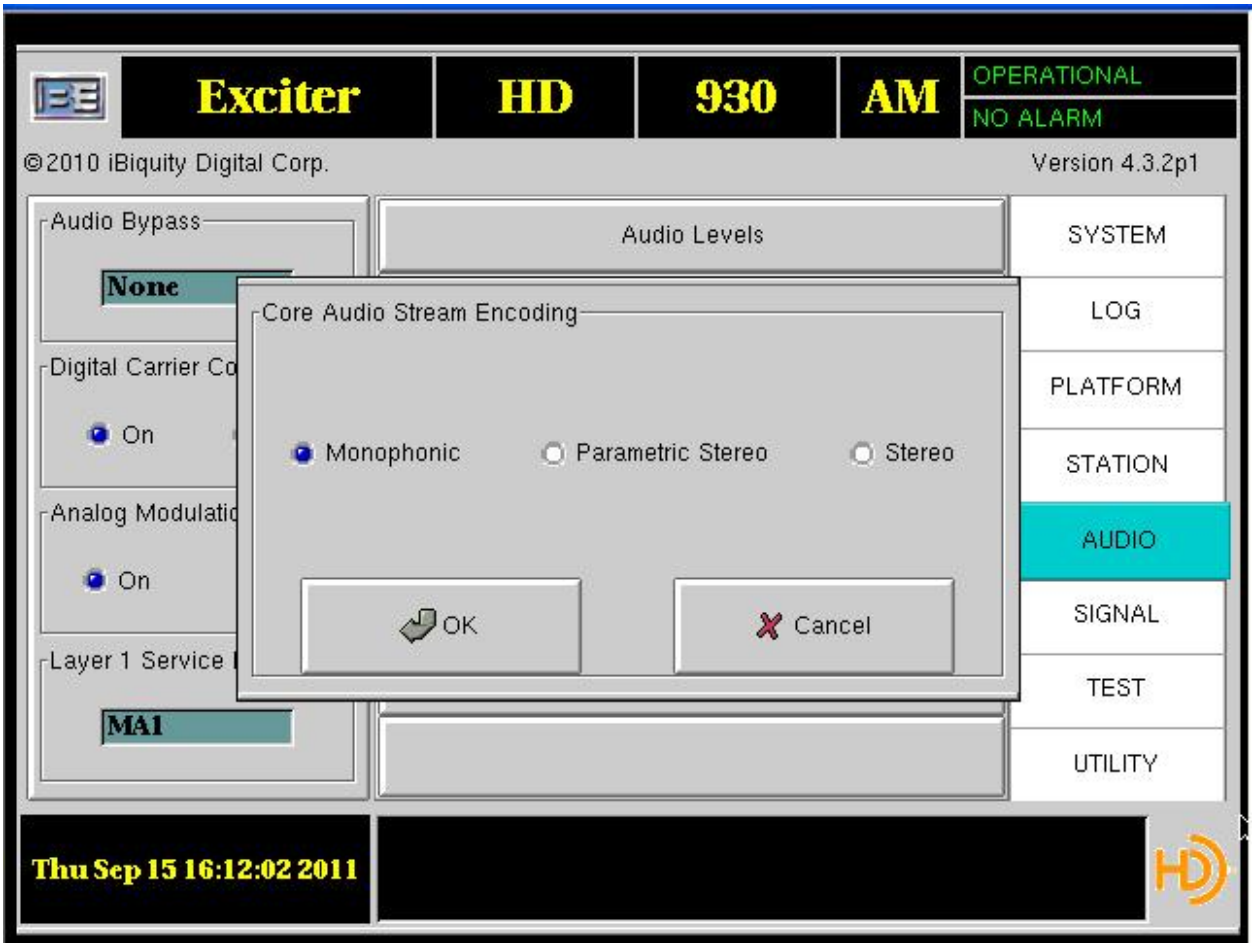


Figure 4-58: Digital Audio Configuration

4.7 Signal Tab Control Buttons

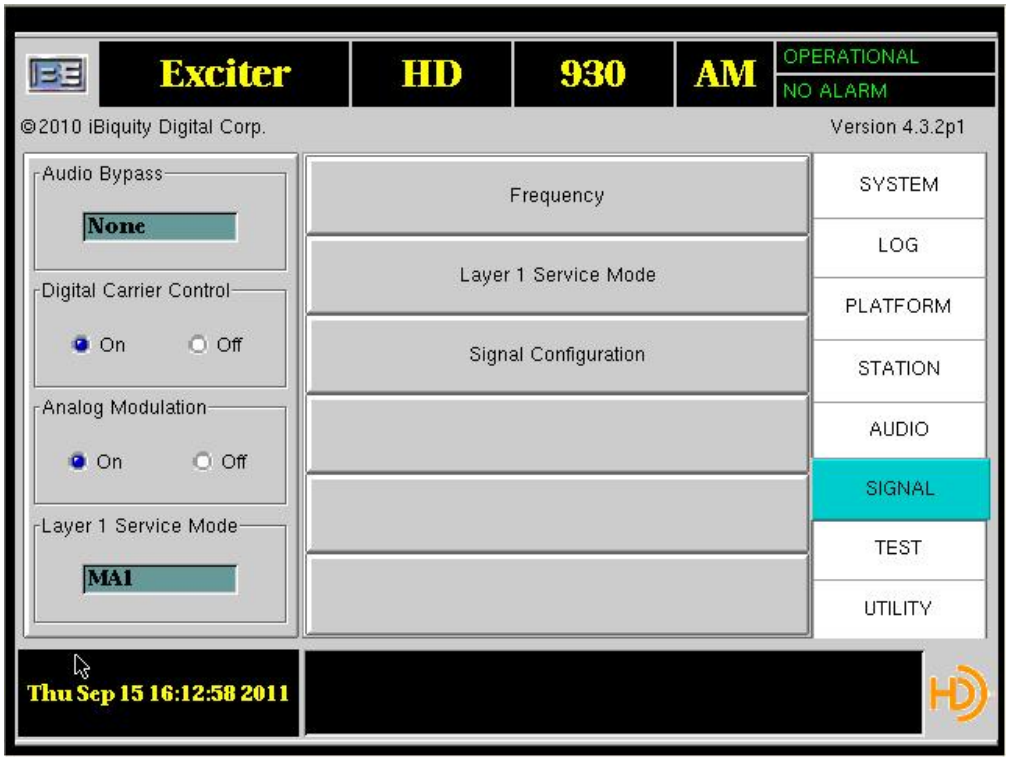


Figure 4-59: Reference Exciter GUI Interface Signal Tab

4.7.1 Frequency

See paragraph 4.1.3.

4.7.2 Layer 1 Service Mode

See paragraph 4.1.10.

4.7.3 Signal Configuration

Figure *4-60* shows signal configuration screen. Descriptions of control button and value selections displayed on this screen are provided in the following subparagraphs.

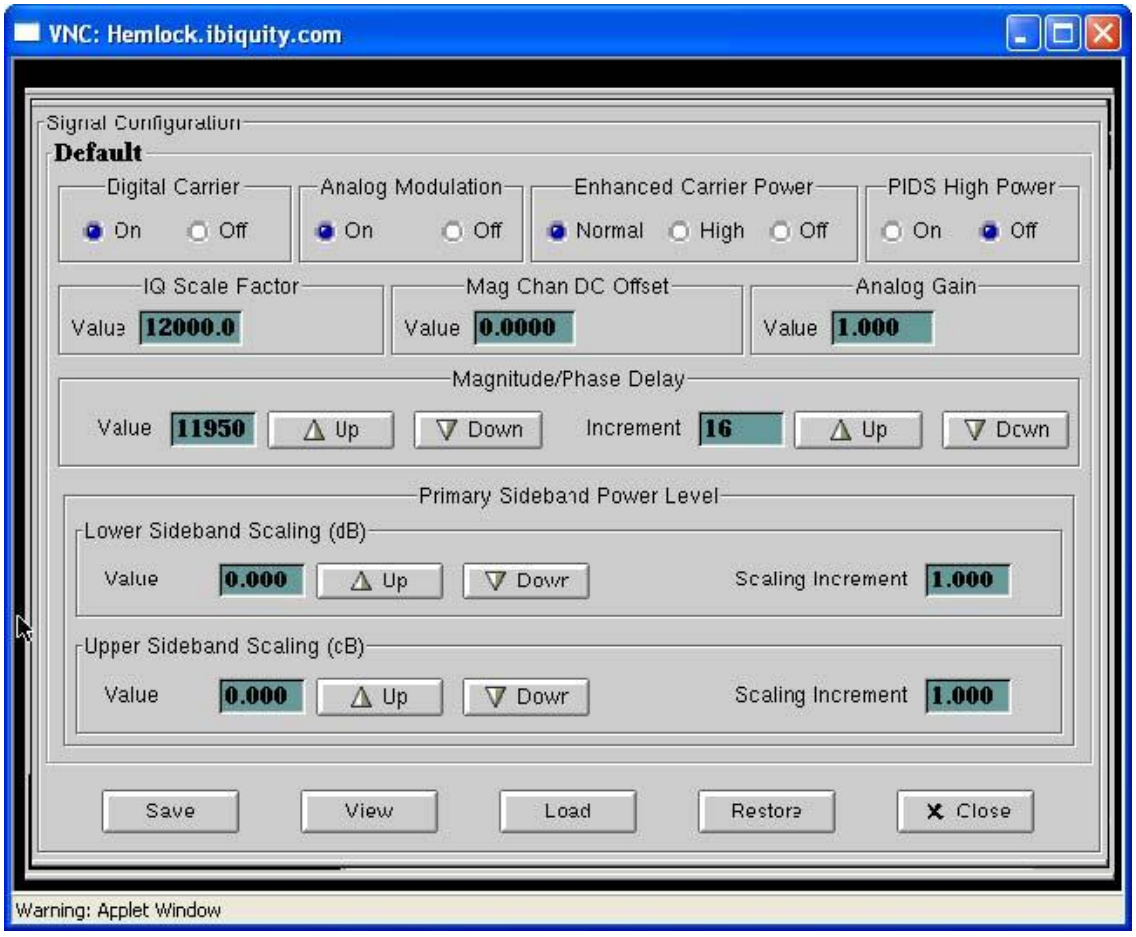


Figure 4-60: Signal Configuration Window

4.7.3.1 Digital Carrier

See paragraph 4.1.8.

4.7.3.2 Analog Modulation

See paragraph 4.1.9.

4.7.3.3 Enhanced Carrier Power Level

The Enhanced Carrier Power Level group box displays the level of the enhanced carriers as Normal, High (MA1 only) or Off. When in the Normal state the secondary and tertiary portion of the IBOC waveform are set to -44dBc and -50dBc respectively for MA1 and -30dBc for both in MA3. When in the high state, the levels of the secondary and tertiary sidebands portion of the IBOC waveform are increased by 6 dB relative to the Normal setting When in the Off state the secondary and tertiary portions of the IBOC waveform are turned off. The Enhanced Carrier Power Level selection determines what PIDS High Power selections are available and the power levels that correspond to the High Power PIDS states. See section

4.7.3.4 PIDS High Power

The selection and meaning of the High Power PIDS states depend on the Enhanced Carrier Power Level selection as shown in Table 4-2 and Table 4-3.

Table 4-2: PIDS Carriers Power Levels Mode MA1

Selected Enhanced Carrier Power Level	Selected High Power PIDS	Inner PIDS Carriers (between Secondary/Tertiary portion of IBOC waveform)	Outer PIDS (between Primary/Secondary portion of IBOC waveform)
Normal	Off	43 dB below unmodulated analog carrier	13 dB below Primary Carriers Level
Normal	On	43 dB below unmodulated analog carrier	Same as Primary Carriers Level
High	Off	37 dB below unmodulated analog carrier	7 dB below Primary Carriers Level
High	On	37 dB below unmodulated analog carrier	Same as Primary Carriers Level
Off	On	Carriers are turned off	Same as Primary Carriers Level

Table 4-3: PIDS Carriers Power Level Mode MA3

Selected Enhanced Carrier Power Level	Selected High Power PIDS	PIDS Carriers
Normal	Off	15 dB below Primary Carrier Power Level
Normal	On	Same as Primary Carriers Level
Off	Off	15 dB below Primary Carrier Power Level
Off	On	Same as Primary Carriers Level

4.7.3.5 I/Q Scale Factor

I/Q Scale Factor sets the level of the composite magnitude signal prior to the last D/A (nominally 12000 for MA1 and 6000 for MA3). Exercise caution when adjusting this value. This, in combination with Analog gain and Magnitude DC level, can cause D/A overflow resulting in spectral distortion.

Selecting I/Q Scale Factor, Figure *4-59*, displays the Numeric Keyboard screen, similar to Figure *4-8*. To change the I/Q Scale Factor enter the desired value using the number keys. Press *Enter* to activate the new I/Q Scale Factor and return to the Signal Configuration Menu.

4.7.3.6 Magnitude Channel DC Offset

Magnitude Channel DC Offset adjusts the desired Magnitude channel DC level. This is the amount of modification to the normal value 1. When set to 0, the Magnitude DC level is 1.

Selecting Magnitude Channel DC Offset, Figure *4-59*, displays the Numeric Keyboard screen, similar to Figure *4-8*. To change the Magnitude Channel DC Offset, enter the desired Magnitude Channel DC Offset using the number keys. Press *Enter* to execute and return to the Signal Configuration menu.

4.7.3.7 Analog Gain

Analog Gain allows you to adjust the modulation of the analog signal. Care should be taken when adjusting this value to ensure the analog audio remains within the FCC limits of +125%, -99% modulation. In addition this, in combination with I/Q Scale Factor and Magnitude Channel DC offset, can cause D/A overflows resulting in spectral distortion.

Analog Gain, when selected, will bring up the Numeric Keyboard screen, similar to Figure *4-8*. To change the Analog Gain, enter the desired Analog Gain using the number keys. Press *Enter* to activate the new Analog Gain and return to the Signal Configuration menu.

4.7.3.8 Magnitude/Phase Delay

Magnitude/Phase Delay provides adjustment of the delay between the Magnitude and Phase signals. The initial Magnitude/Phase Delay should be set to 13445 and should be advanced in increments of 16 (a single unit is 84ns).

When either Value or Increment is selected a numeric keyboard similar to Figure *4-8* will be displayed. Use this keyboard to change the value of the "*Value*" or increment to the desired value.

The up/down buttons can be used to increase/decrease the values of "*Value*"or "*Increment*." Increment is increased/decreased by one where "*Value*" is increased/decreased by "*Increment*."

4.7.3.9 Primary Sideband Power Level

The Primary Sideband Power Level group allows the primary upper and lower (Core) carriers to be scaled up or down.

NOTE: Care should be taken when adjusting these parameters. Increasing these carrier levels will increase the adjacent channel interference and decreasing the carrier level will decrease the stations coverage area.

When Lower or Upper Sideband Scaling Number is selected, the numeric keyboard, Figure *4-8*, is displayed. To change the Sideband Scaling enter the desired Sideband Scaling in dB using the number keys. Press *Enter* to select the new Sideband Scaling and return to the Signal Configuration menu.

To change the Sideband Scaling value in 1 dB increments use the up/down arrow buttons.

To change the Sideband Scaling value in other dB increments select the scaling Increment, the numeric keyboard, similar to Figure *4-8*, is displayed. To change the Scaling increment, enter the desired Scaling

increment in dB using the number keys. The up/down arrows will now change the sideband using the new increment value.

4.7.3.10 Presets

The 5 buttons at the bottom of the Signal Configuration menu allow for the management of the available preset configurations. Once the desired signal configurations are set, press *Save* and a dialog box similar to Figure *4-61* is displayed. Select the desired preset, enter the desired name and hit OK.

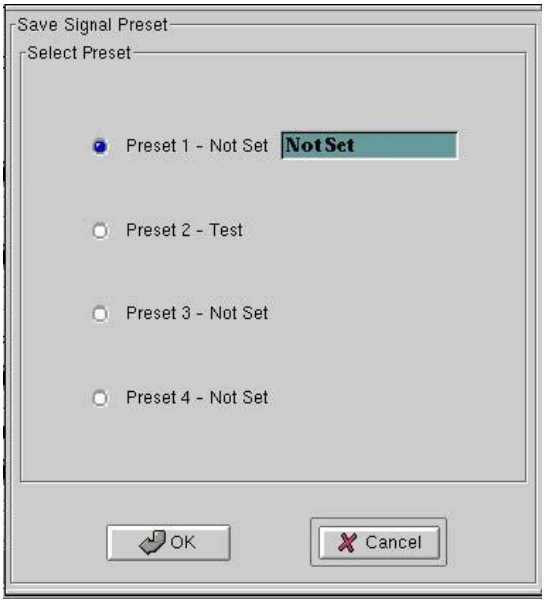


Figure 4-61: Save Signal Preset Dialog box

To view the setting for all presets select *View* and a display box similar to Figure *4-62* will be displayed.

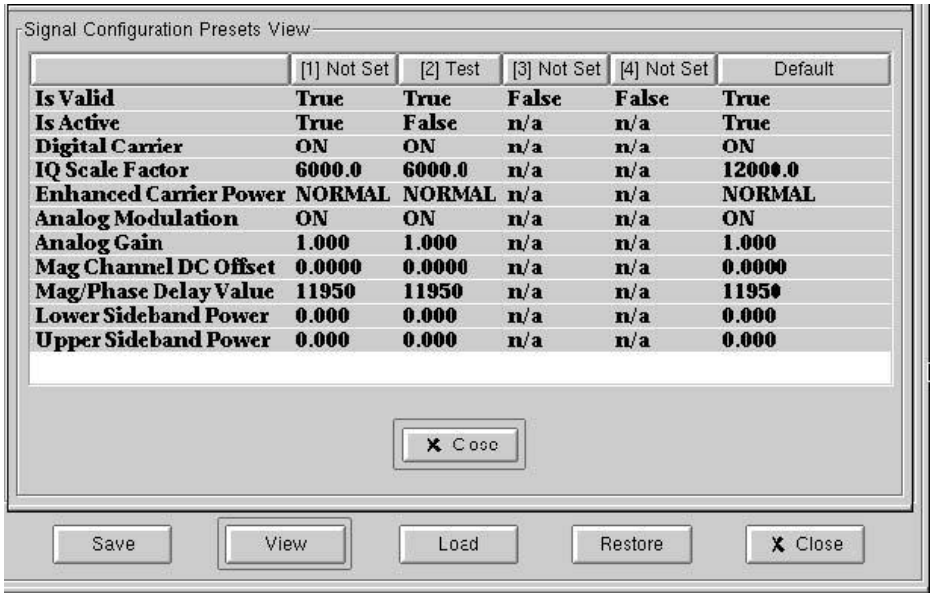


Figure 4-62: Signal Preset View Window

To load a preset simply press *Load* and a dialog box similar to Figure *4-62* will be displayed. Select the desired preset and hit OK to return to the Signal Configuration menu. To restore the signal configurations to the factory default parameters select *Restore*. Finally to return to the main menu press *Close*.

4.8 Test Tab Control Buttons

Figure *4-63* shows the GUI main screen Test Tab. Descriptions of control buttons displayed on the Test Tab of this screen are provided in the following subparagraphs.

NOTE: All functions under the Test Tab REQUIRE a password to be accessed.

Figure 4-63: Reference Exciter GUI Interface Test Tab

4.8.1 Bit Error Rate Mode

The Bit Error Rate (BER) mode control selects either normal audio mode or Layer 1 BER mode (no digital audio) (Figure *4-64*).

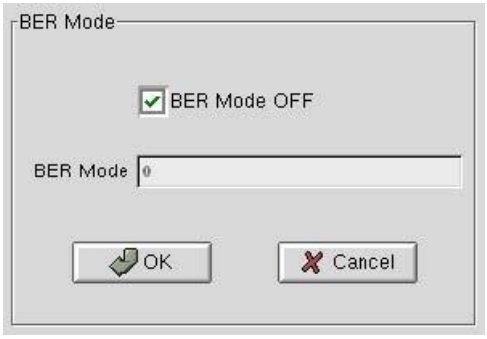


Figure 4-64: Bit Error Rate Mode Screen

BER Mode = 1 sets the exciter to transmit a bit pattern that can be checked at the receiver Modem output. Once in BER Mode the AM Layer 1 Service mode can be selected. To exit BER Mode, return the Layer 1 service mode to MA1 and select BER Mode Off.

4.8.2 Single Subcarrier Mode

The Single Subcarrier Screen, Figure *4-65*, is displayed when selected from the GUI Interface menu, Figure *4-63*. This screen provides digital carrier selection for test purposes.

Select hybrid Subcarrier mode for MA1 and all digital for MA3.

The subcarrier number refers to the carrier that will be transmitted. The value -81 corresponds to the lowest frequency subcarrier and increments to +81 for MA1 and -53 to 53 for MA3. When Subcarrier Number is selected, Figure *4-65*, the numeric keyboard, Figure *4-8*, is displayed. To change the Subcarrier Number enter the desired Subcarrier Number using the number keys. Press *Enter* to select the new Subcarrier Number and return to the main menu.

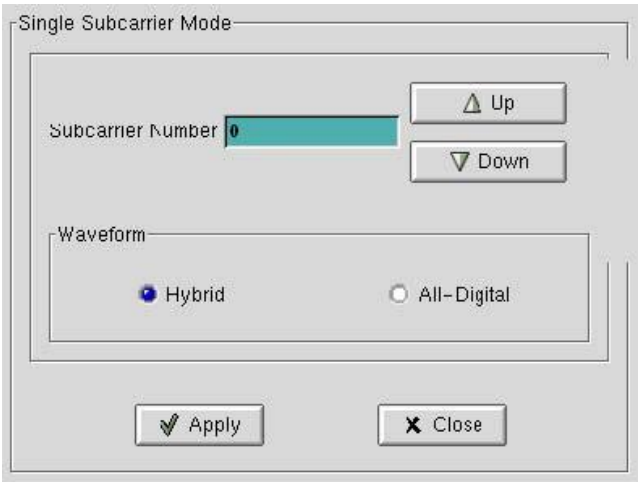


Figure 4-65: Single Subcarrier Mode Screen

4.8.3 Test Vector Capture

The Test Vector Capture screen, Figure *4-66*, is displayed when selected from the GUI Test Menu. This screen provides the ability to capture IF modulated IQ samples over a number of L1 Frame times. This functionality requires specialized knowledge of other system configuration elements which must be correctly set and is use for iBiquity test purposes. Without the correct configuration no data can be captured and this screen has no effect.

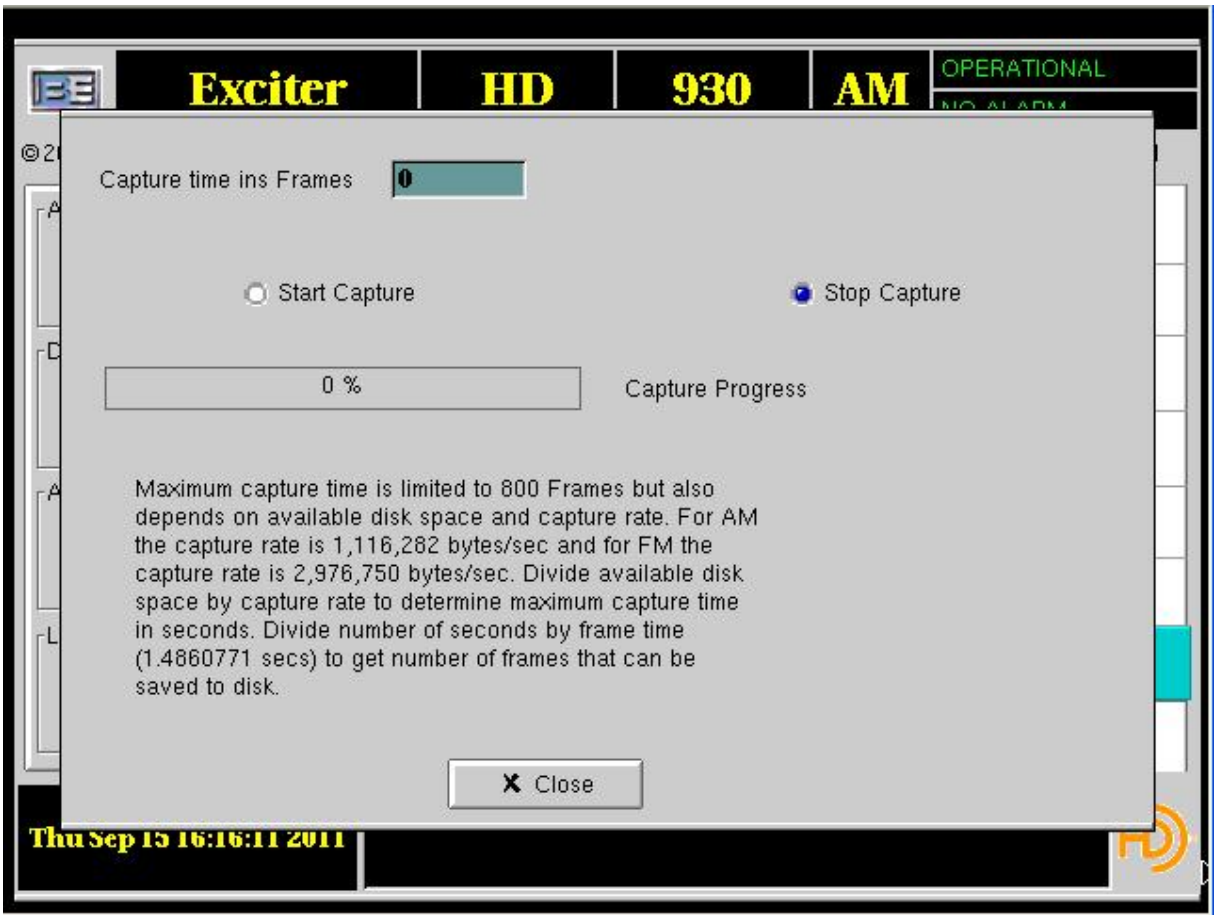


Figure 4-66:Test Vector Capture Screen

4.9 Utility Tab Control Buttons

4.9.1 Screen Resize

The Screen Resize window allows the user to change the dimensions of the display, Figure 4-67.

4.9.1.1 Width Value

This displays the present value of the screen width. This can be raised or lowered using the + or – buttons.

4.9.1.2 Height Value

This displays the present value of the screen height. This can be raised or lowered using the + or – buttons.

4.9.1.3 Test

When selected, Test will display a test screen, Figure 4-68. Verify that the entire border is visible and select OK when complete.

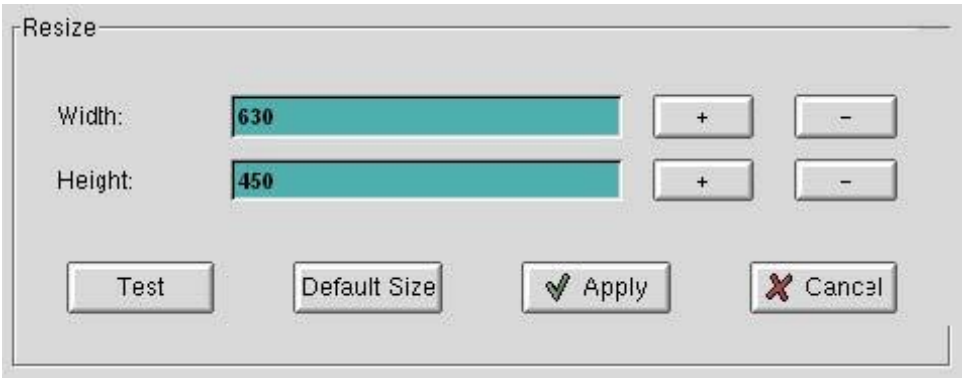


Figure 4-67: Screen Resize Screen

Figure 4-68: Screen Size Test Screen

4.9.1.4 Default Size

When selected, both the height and the width values will be reset to default settings.

4.9.1.5 Apply

When selected, the user will be prompted to reboot the system to make use of the new screen settings, Figure 4-69. Selecting Yes will proceed with the reboot and NO will cancel the action and return to the Exciter Main screen.

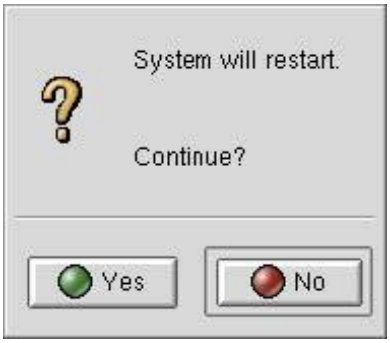


Figure 4-69: Apply Reboot Screen

4.9.1.6 Cancel

When selected, the user will be returned to the Exciter Main screen.

4.9.2 Fonts

This button, if selected, will display a System Fonts screen, Figure 4-70.

Figure 4-70: System Fonts Screen

The upper section if selected allows the user to select the font used on all small data presentation areas. The lower section if selected allows the user to select the font used on all large data presentation areas.

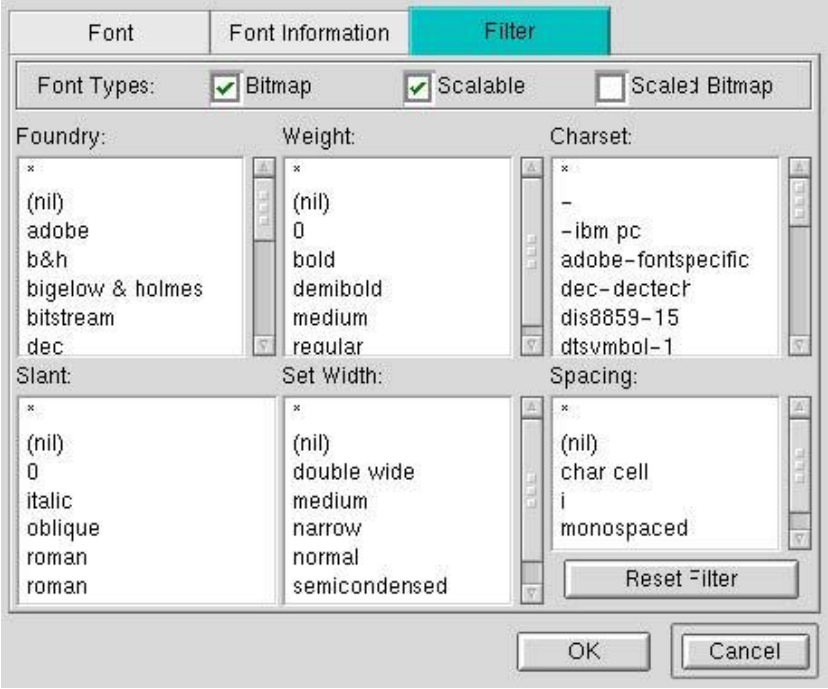


Figure 4-71: System Pick-a-Fonts Screen

4.9.3 Virtual Chat

The Virtual Chat Screen, Figure 4-72, allows direct communication between 2 users logged in to the same exciter. If a user is at the exciter and a second user has logged in remotely, using Virtual Chat they can communicate directly. By entering the information to be sent in the bottom window and pressing Send the message will be relayed to the other user. All communications will be displayed in the upper window.

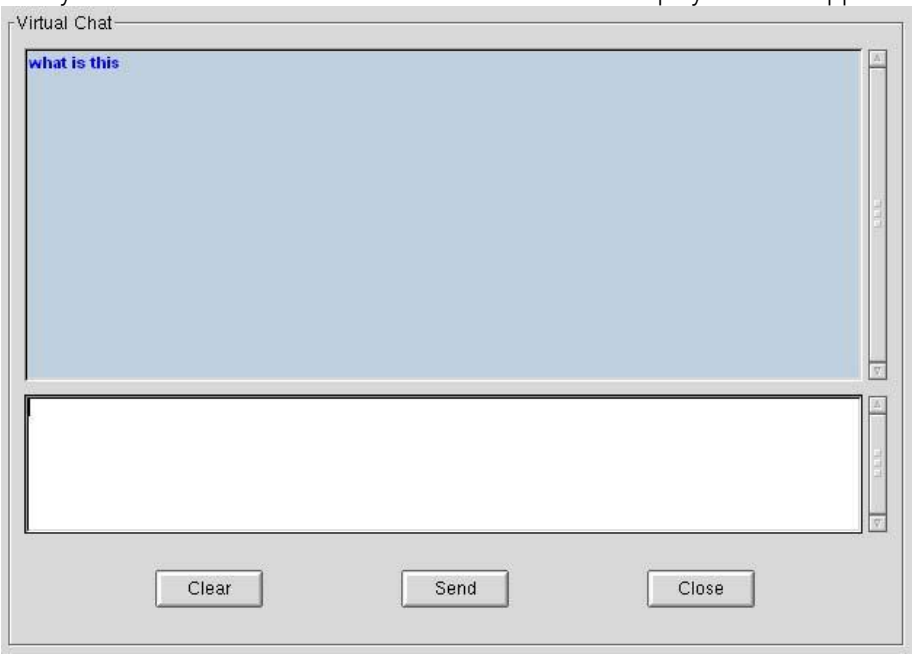


Figure 4-72: Virtual Chat Screen

4.9.4 Activity Monitor

See paragraph 4.1.

4.9.5 Up Time

When selected, the screen shown in Figure 4-73 displays information about the length of time the exciter has been operational. Two columns are displayed: Calendar Time and Elapsed Time. Calendar Time represents the date and time the last event occurred. The Elapsed Time displays the total time in years, days, minutes, and seconds from the last event.

The events displayed are:
1. OS Start – The last time the OS was restarted.
2. System Start – The last time the application was started.
3. Last System Shut-down – The last time the system was shutdown.
4. Last System Error – The last time a warning or system error occurred.

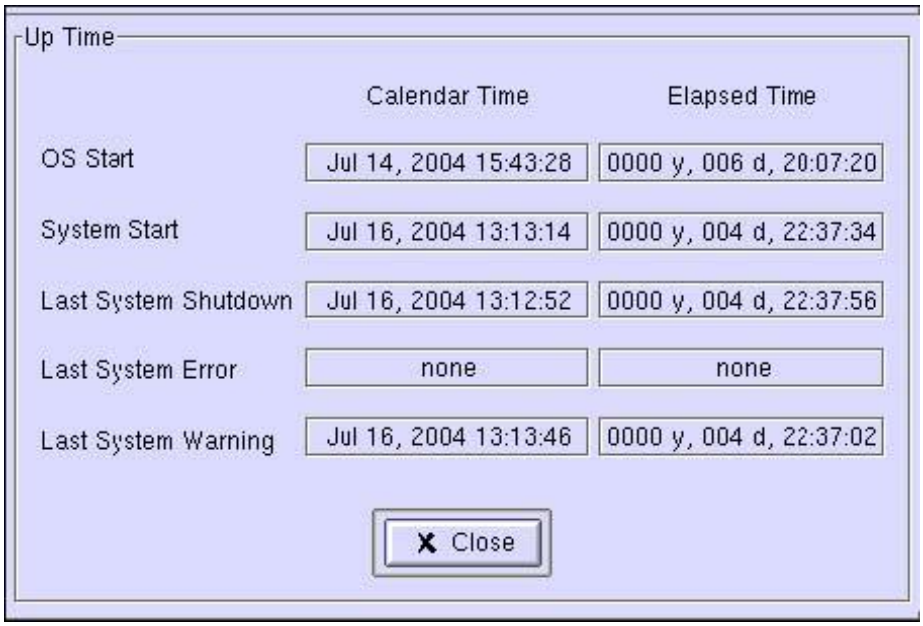


Figure 4-73: Up Time Information Screen

5 Operating Procedures

This section provides ASi 10 operating procedures.

5.1 Startup

The ASi 10 will start up on its own after power is applied and the power switch is on.

NOTE: Be sure to have the ASi 10 Line Voltage switch in the correct location for the AC voltage to be applied. Damage can result if the wrong voltage is used!

5.2 Audio Diversity Blend Delay Adjustment

On a calibrated receiver, set the Audio Mode to Split Analog/Digital. If a calibrated receiver is not available, use a standard HD radio receiver and switch between Analog and Digital to monitor the transmission time difference between the two.

On the ASi 10:

1. Select Analog Audio Diversity, from the Main Screen Audio Tab.
2. Set Delay to 367500. This is the delay that synchronizes audio in a BE system with no processors using the IBiquity reference receiver and no processing delay. Your system may require a different delay when measured using a commercial receiver.
3. Set Increment to 1000.
4. Set Rate to 0.
5. Monitor the audio from the receiver while using the up/down arrow keys until proper alignment of the digital and analog audio streams is achieved. They are aligned when you can no longer notice a time delay difference between analog and digital receive modes. Close all adjustment windows and the values will be saved for subsequent startup.

5.3 Shutdown Procedure

1. Select Shutdown from the Main Screen System Tab. You should then see.
2. If power is to be removed, select Shutdown and press OK. This will halt the OS. Wait until the display indicates OK to power down.
3. If the OS is to be restarted, select OS Restart and press OK. The system will reboot back to the default program.
4. If the application is to be exited and restarted, select Restart and press OK to exit and rerun the program.

5.4 Magnitude/Phase Delay Adjustment

5.4.1 AM Phase Delay Adjustment

The IBOC system is aligned for the correct signal spectrum using the AM phase delay adjustment and an amplitude adjustment. The following text presents the information to adjust the AM phase delay.

Select Magnitude/Phase Delay. The Magnitude Phase Delay screen, Figure 5-1, is displayed.

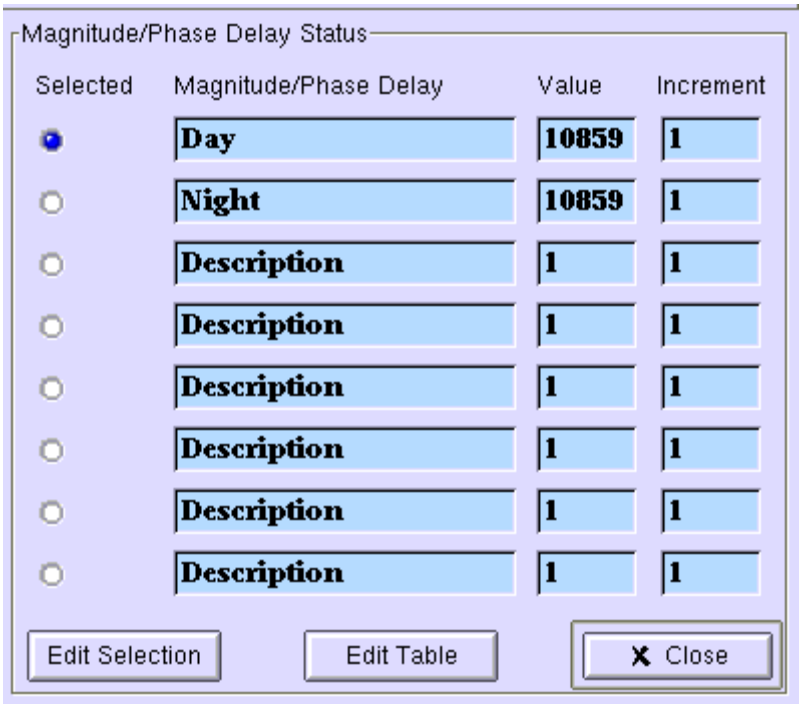


Figure 5-1: Magnitude/Phase Delay Screen

Select the first area under the value column to modify for the initial value (10875 is a good starting point).
Select the first area under the increment column (16 is a good starting point). This increment has an 84ns resolution.
Select the box under the Activate column and the adjustment screen, Figure 5-2, is displayed:

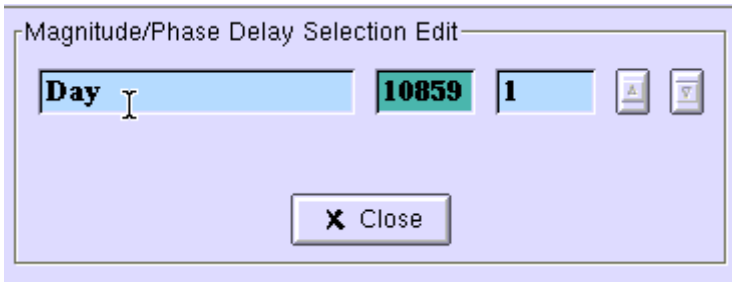
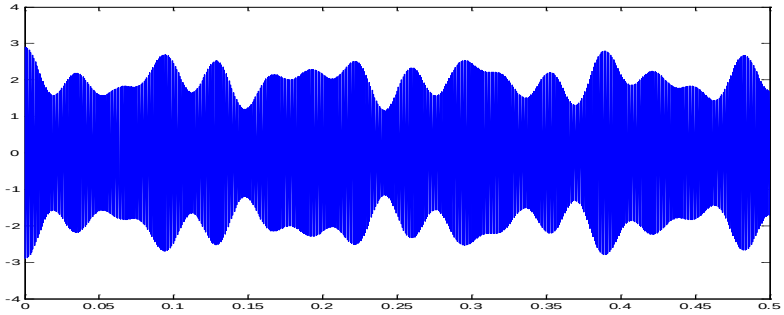


Figure 5-2: Delay Adjustment Screen

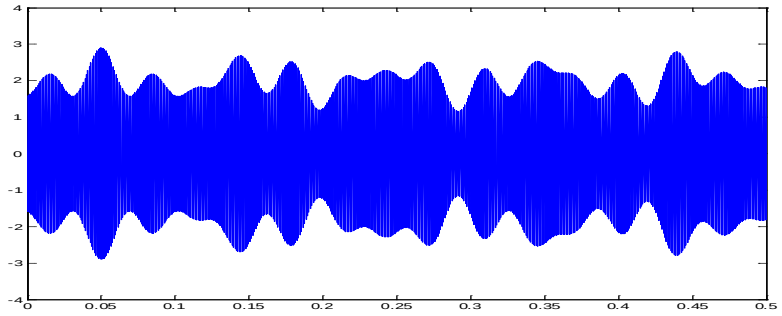
5.5 IBOC System Alignment

The IBOC system is aligned for the correct signal spectrum using the AM phase delay adjustment and an amplitude adjustment. To align the system perform the following:

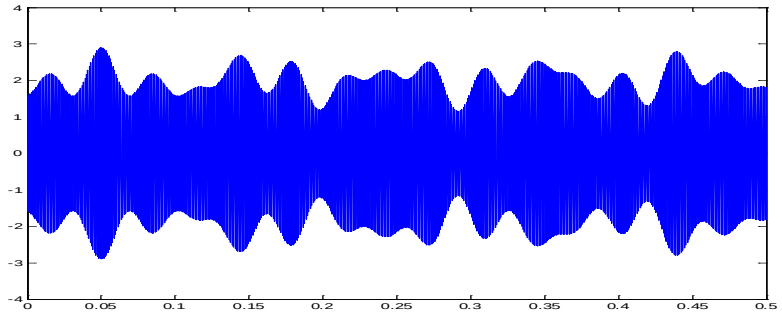
1. Locate a 2-channel oscilloscope.
2. Connect a cable from the transmitter sample port to channel 1 on the oscilloscope.
3. Connect a cable from the AM OUT on the ASi to channel 2 on the oscilloscope.
4. The waveforms will appear as random amplitude variations of the carrier with widely varying peaks (refer to Figure 5-3). Sync one channel of the oscilloscope with the maximum signal level. The two channels will appear to reach peak and minimum levels at the same instance in time. The waveforms shown include only one sample sweep such as from a digital storage scope. An analog oscilloscope display will contain many seemingly random sweeps and must be viewed carefully.
5. To amplitude align the ASi and the transmitter, adjust the output level control in the ASi until the amplitude level is identical for both waveforms (refer to Figure 5-4).
6. To time align the ASi and the transmitter, refer to AM Phase Delay Adjustment in the preceding text and adjust the delay until the delay (peaks and valleys of the AM signal) are aligned in time (refer to Figure 5-5).
7. Once the waveforms are amplitude and time aligned, the receiver will lock to the digital mode. This alignment also provides for optimum spectral performance (refer to Figure 5-6).



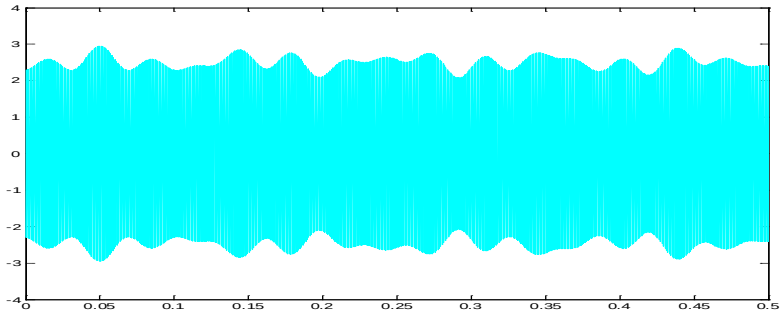
Transmitter Waveform



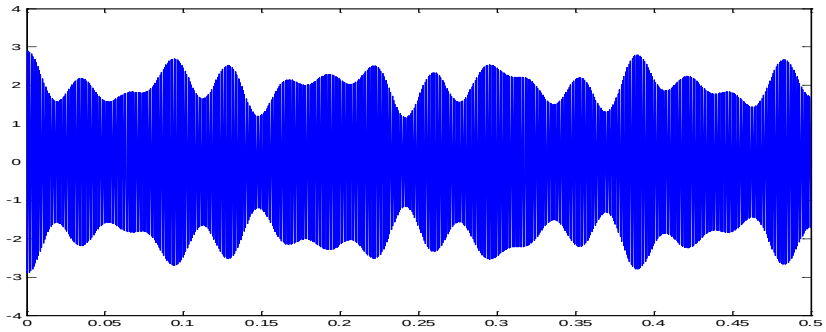
ASi AM OUT Waveform - Misaligned Time Waveforms



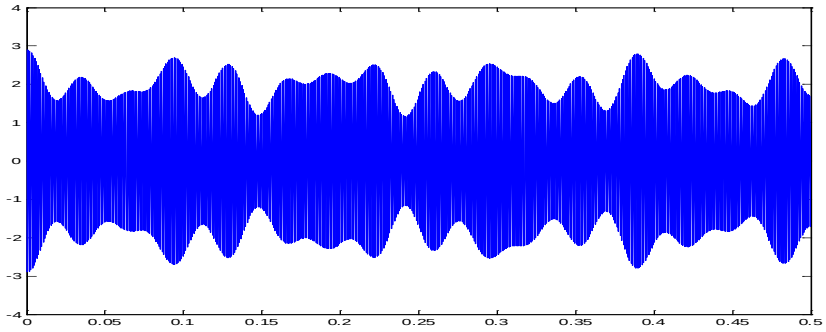
Transmitter Waveform



ASi AM OUT Waveform
Misaligned AM Amplitude Waveforms
Figure 5-3: Misaligned Transmitter/ASi Waveforms

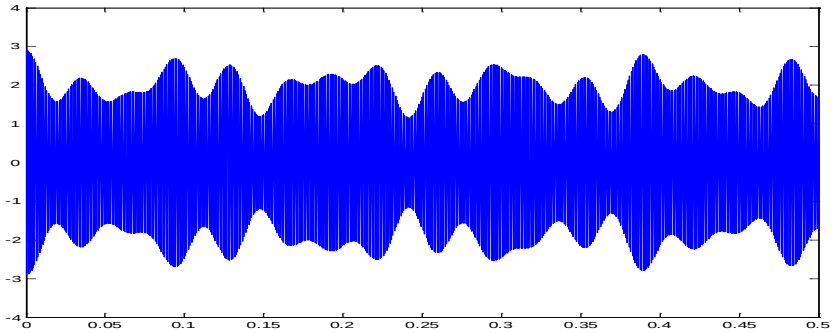


Transmitter Waveform

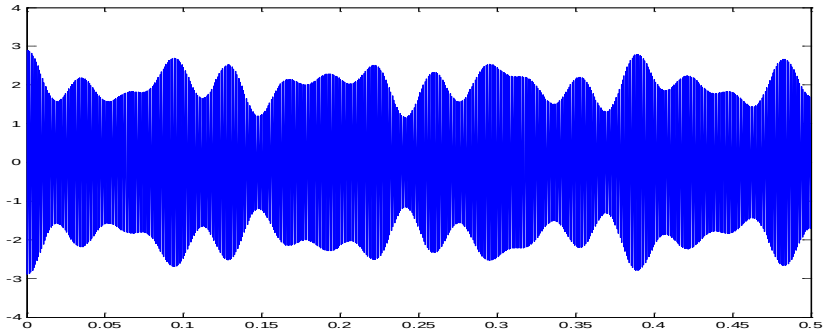


AM OUT Waveform from ASi

Figure 5-4: Aligned AM Amplitude Transmitter/ASi Waveforms



Transmitter Waveform



AM OUT Waveform From ASi

Figure 5-5: Time Aligned Transmitter/ASi Waveforms

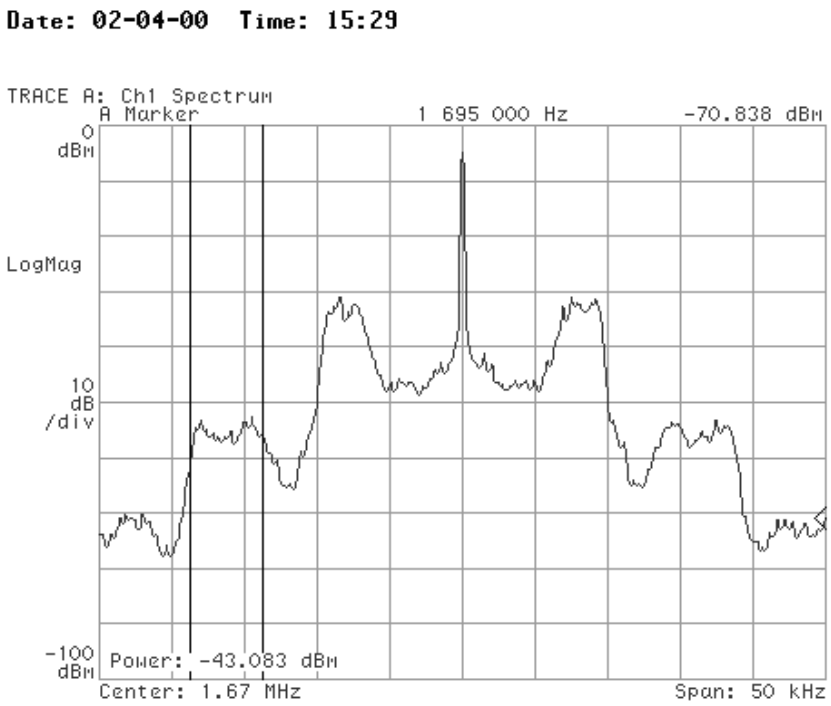


Figure 5-6: Typical AM aligned spectrum

5.6 Remote GUI Control

When the ASi 10 operating system is running, control can be remotely established using a standard web browser such as Internet Explorer. A network connection to the ASi must be established either by Ethernet or modem (see Paragraph 5.7).

Network setup for the ASi 10

Using an external keyboard is recommended.

1. Press the Command button on the Main ASi 10 screen. The following screen will open after typing in the Password.

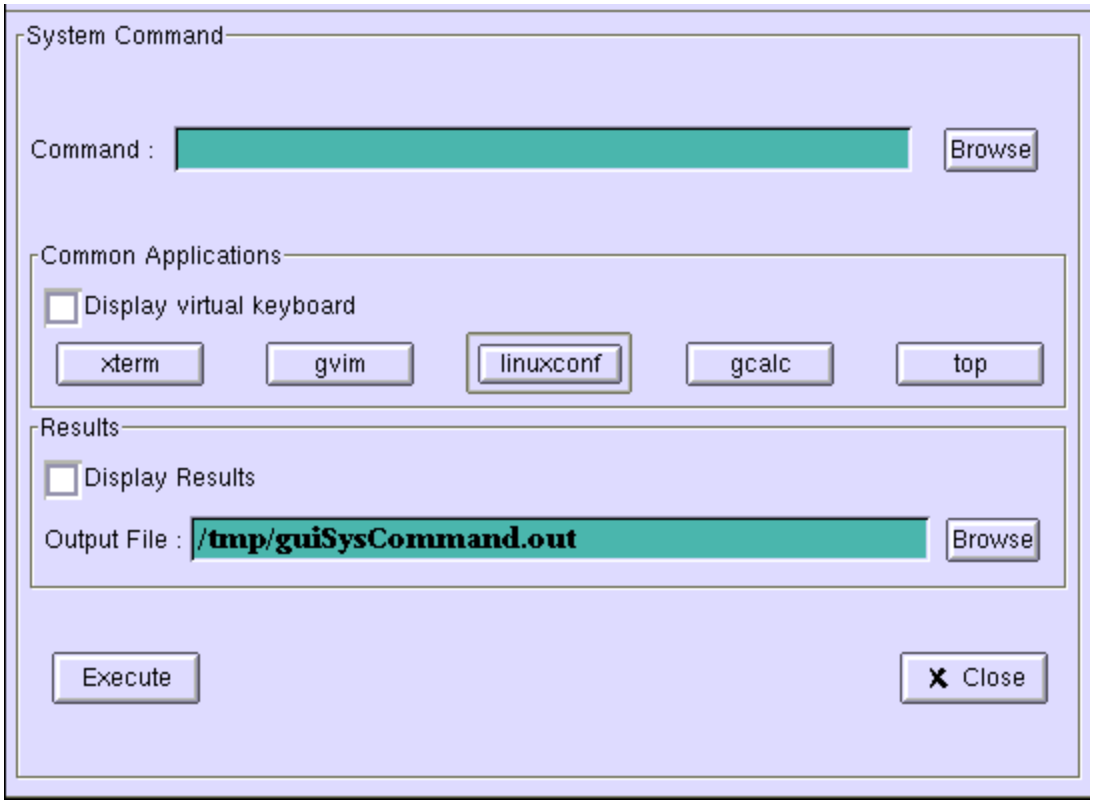


Figure 5-7: System Command window

2. Press linuxconf. The following screen will open.

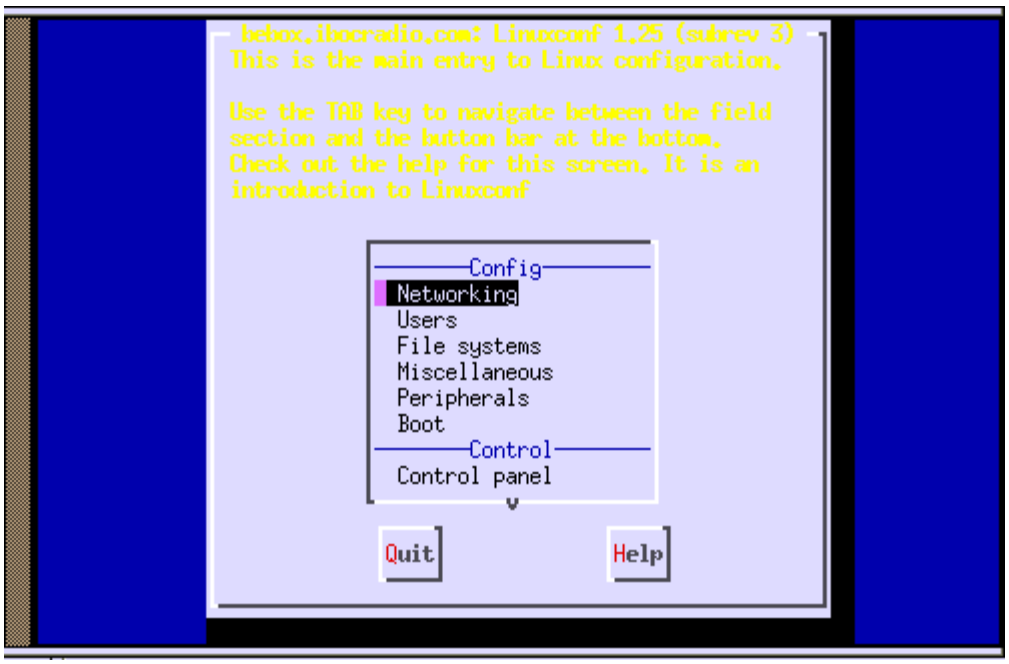


Figure 5-8 linuxconf Main Window

3. Press Enter on the keyboard. The following screen will open.

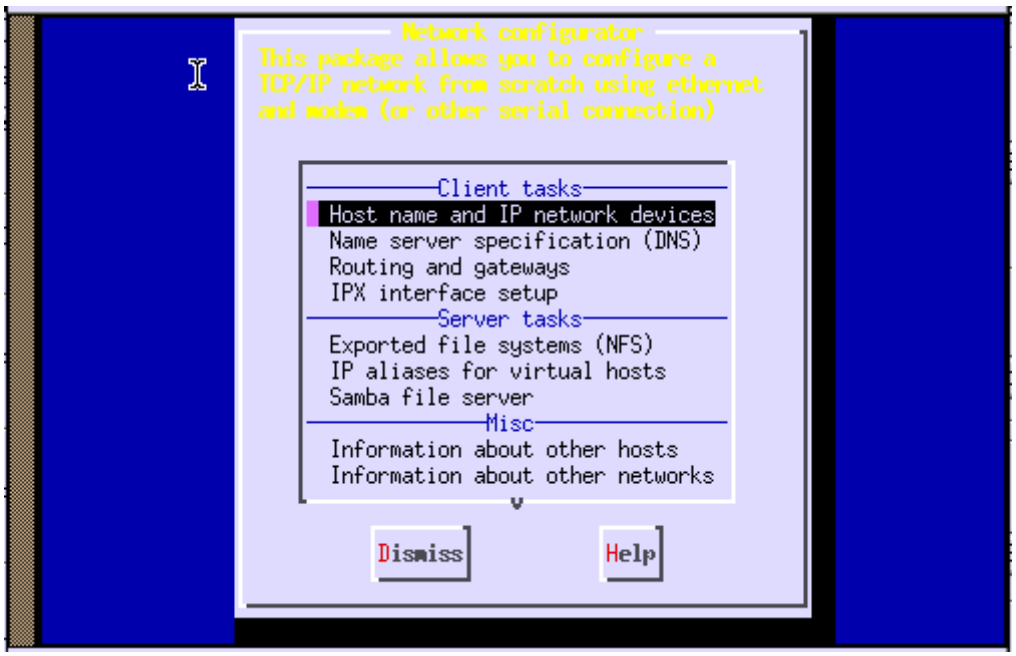


Figure 5-9 linuxconf Networking Window

4. Press Enter on the keyboard. The following screen will open

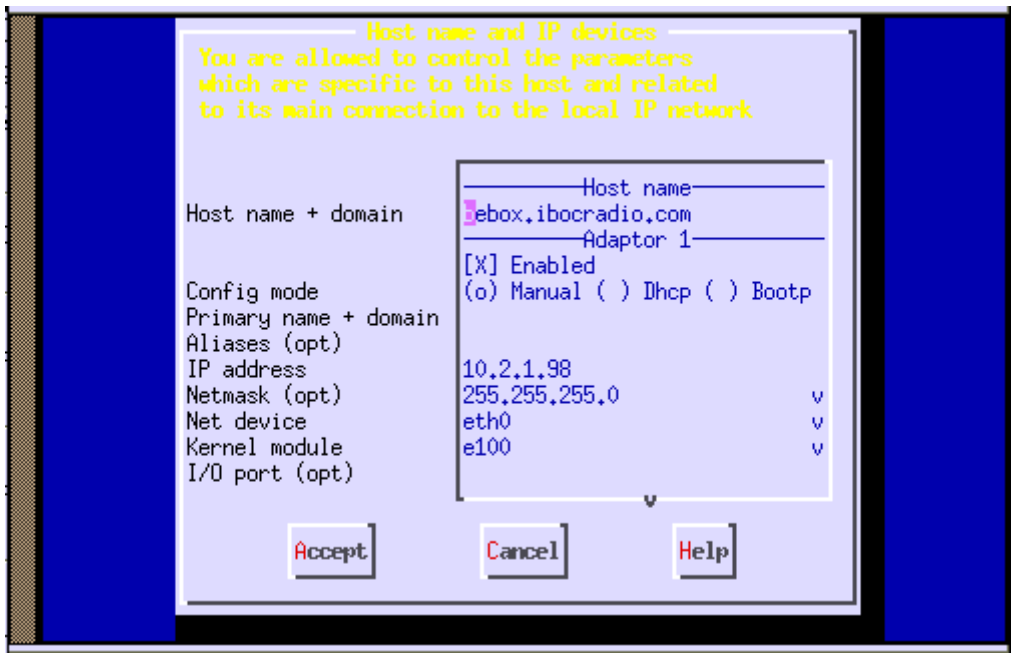


Figure 5-10 linuxconf IP Setup Window

5. Arrow down on the keyboard to the IP Address and type in the IP Address to be assigned to this unit.
6. Press TAB to Accept and then Enter on the keyboard. The following screen will open.

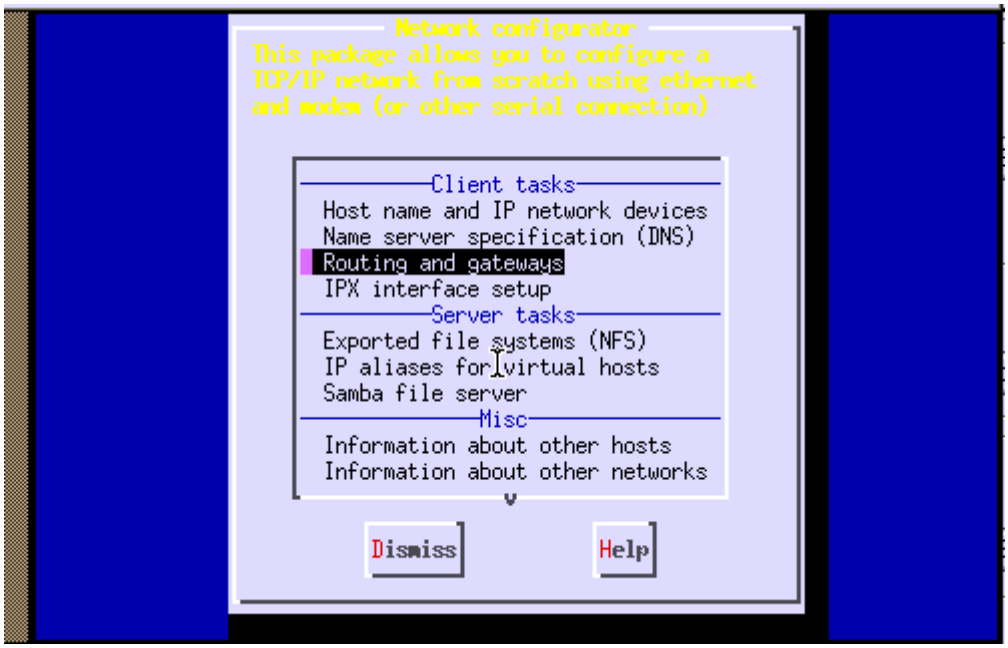


Figure 5-11 linuxconf Routing and Gateways Window

7. Arrow down to Routing and gateways.
8. Press Enter. The following screen will open.

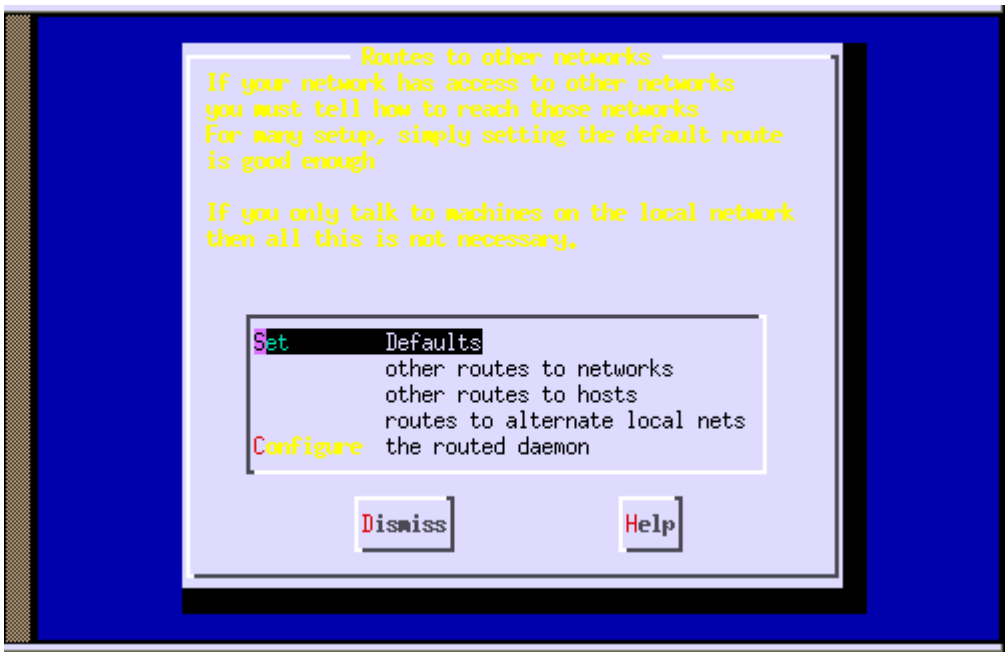


Figure 5-12 linuxconf 2nd page Routing and Gateways

9. Press Enter on the keyboard.

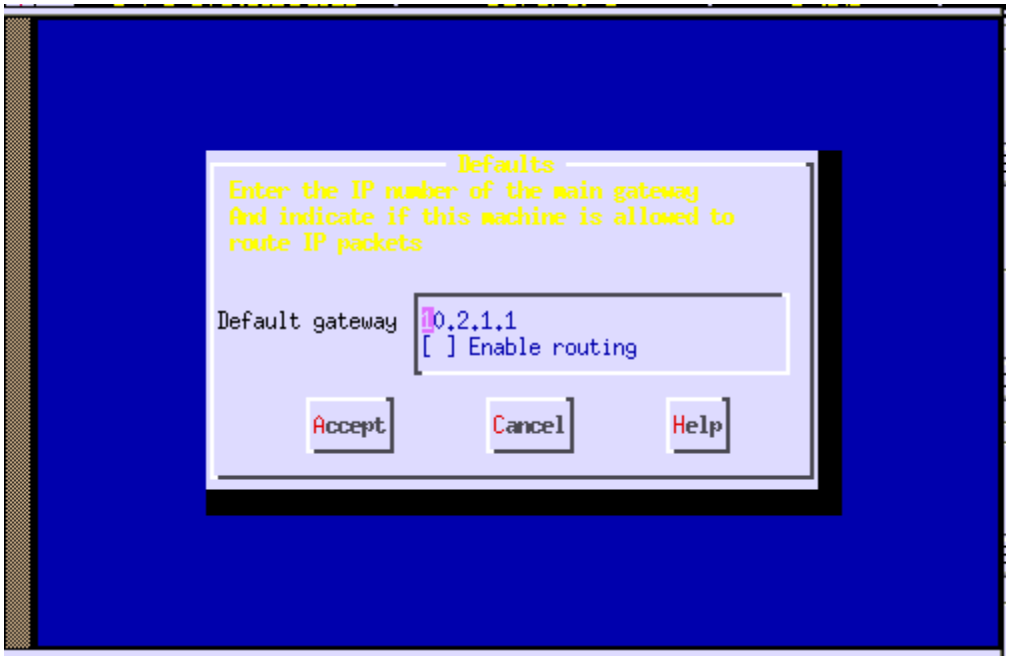


Figure 5-13 linuxconf Default Gateway Setup

10. Type in the Default Gateway.
11. Press Tab to Accept.

Figure 5-14 linuxconf Final Config Screen

12. Press Tab twice to highlight Do It. Press enter.
13. The Command window should now be displayed.
14. This completes the Network setup for the ASi 10.

After a network connection is established, type the IP address or machine name in the Address field of a web browser. The VNC Authentication screen will then be displayed, Figure 5-15 VNC Authentication Screen.

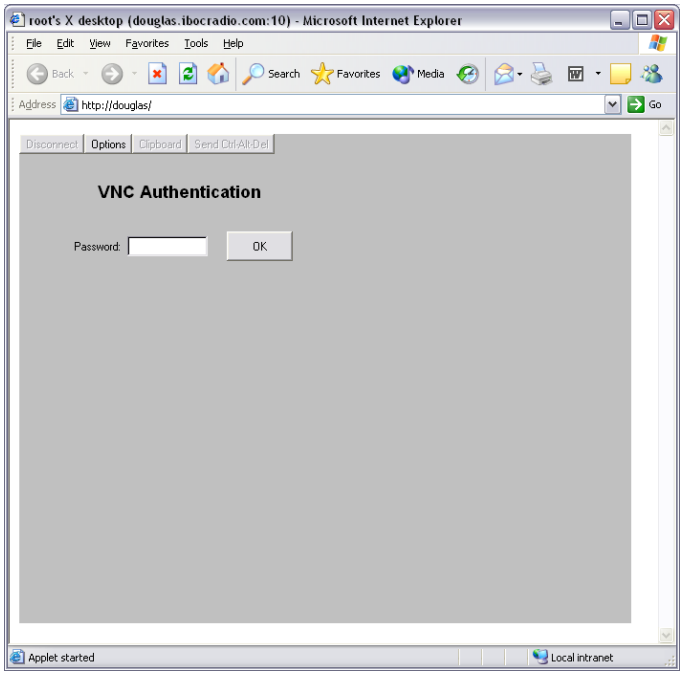


Figure 5-15 VNC Authentication Screen

Type *password* for the password and select OK. The ASi 10 Main Menu is displayed in the web-browser as shown in Figure 5-15 VNC Authentication Screen. The ASi 10 can now be controlled from the remote location, just as if you were at the console, without limitation.

Note: Any number of connections to the same ASi 10 is permitted (i.e. there is no lock-out for multiple users).

5.7 Telco Dialup

The same remote Ethernet VNC capabilities are available via modem connection. Perform the following procedures to access the ASi 10 via dialup connection.

1. On standard PC with Windows 95, 98, 2000, NT, or XP OS, set up a Dial-up Networking (DUN) account using the Windows OS Dial-up Networking Wizard.
2. Connect the ASi 10 Telco modem input jack to an analog phone line.
3. Connect the Windows PC modem to another analog phone line.
4. From the Windows PC, use the newly created DUN account to dial into the ASi 10.
5. Once the connection is established, use a web browser as described in Paragraph 5.6, and type http://10.0.0.1 in the address field. The VNC Authentication screen should now displayed (*Figure 5-15 VNC Authentication Screen*).

Note: Once the DUN connection is made, any TCP/IP-based client application can be run on the Windows PC to interact with the ASi 10 (e.g. telnet, ftp, Exceed, ssh, etc.).

Note: The DUN connection assigns IP addresses to both the ASi 10 and Windows PC. The IP address assigned to the ASi is 10.0.0.1 and the IP address assigned to the Windows host is 10.0.0.2

6 Software Upgrade

6.1 Software Upgrade Overview

CAUTION: This process removes all user software/data from the hard drive.

Obtain the proper version and place the CD into the rear CDROM and reboot the ASi 10. The iBiquity Digital Reference Platform Install screen is displayed.

The upgrade advances without interdiction.

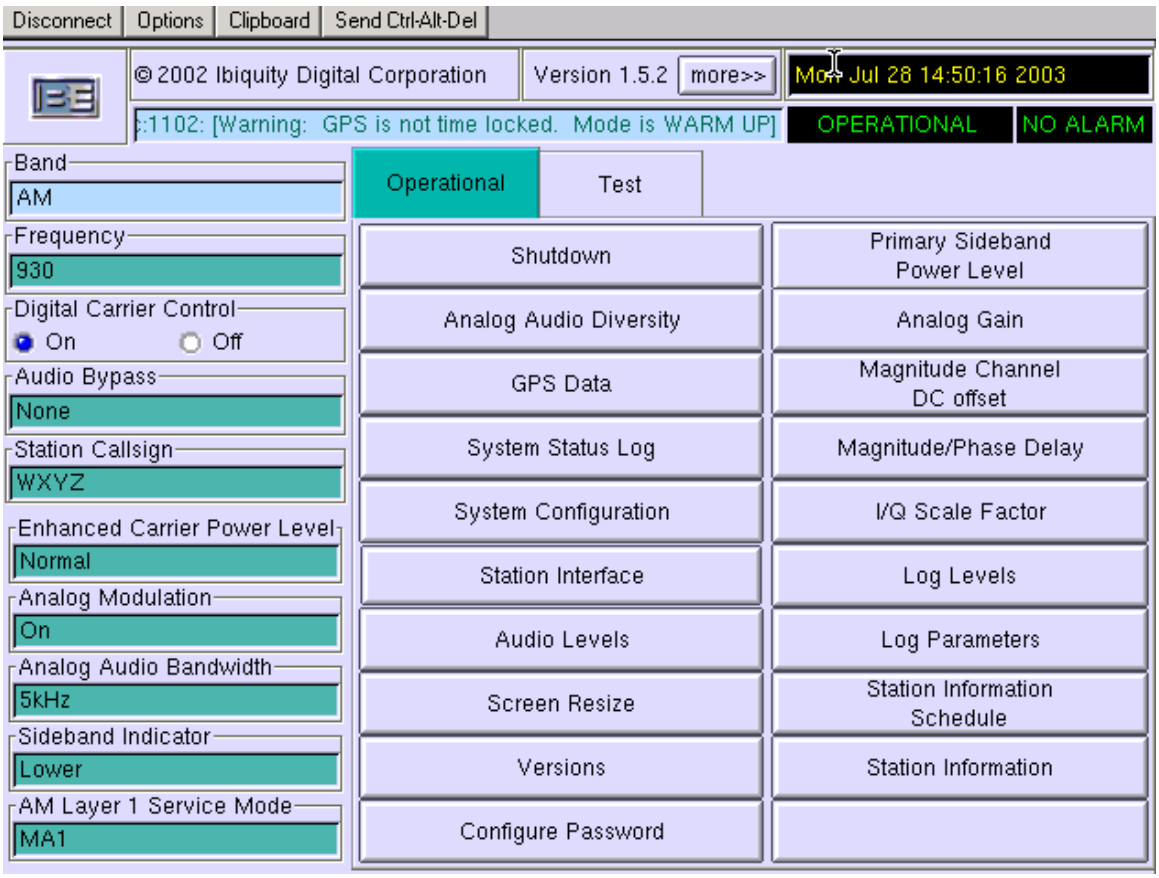
After approximately 9 minutes, the CD should eject and the ASi will reboot.

NOTE: All network configuration (name, ip number…) is saved and need not be reset.

6.1.1 Software Upgrade Detail

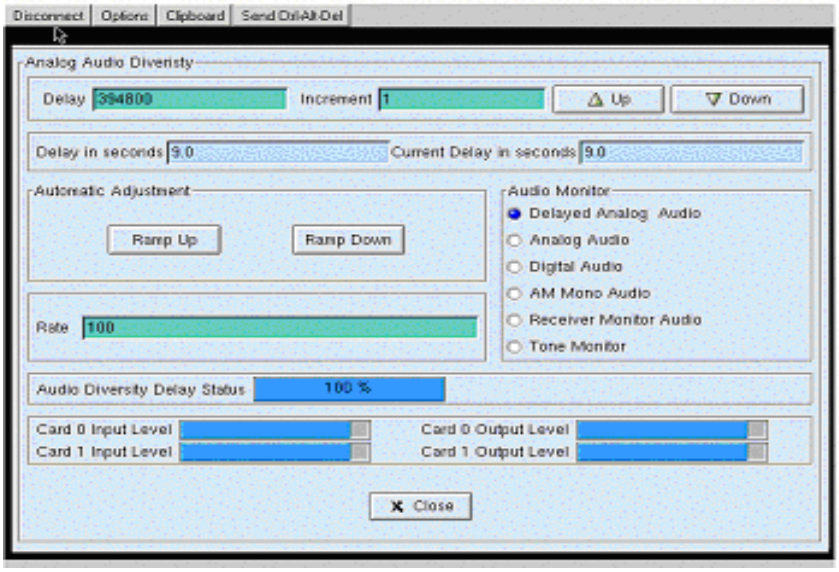
The update software for the ASi 10 is contained on a single CD-ROM that is placed in the ASi 10 CD-ROM drive. The internal hard drive will be overwritten.

1. Make sure transmitter is off.
2. Disconnect AM Phase Out coax from back of ASi 10 to Tx.
3. Turn on ASi -10 if not already on. Allow Exciter to fully boot as shown below.



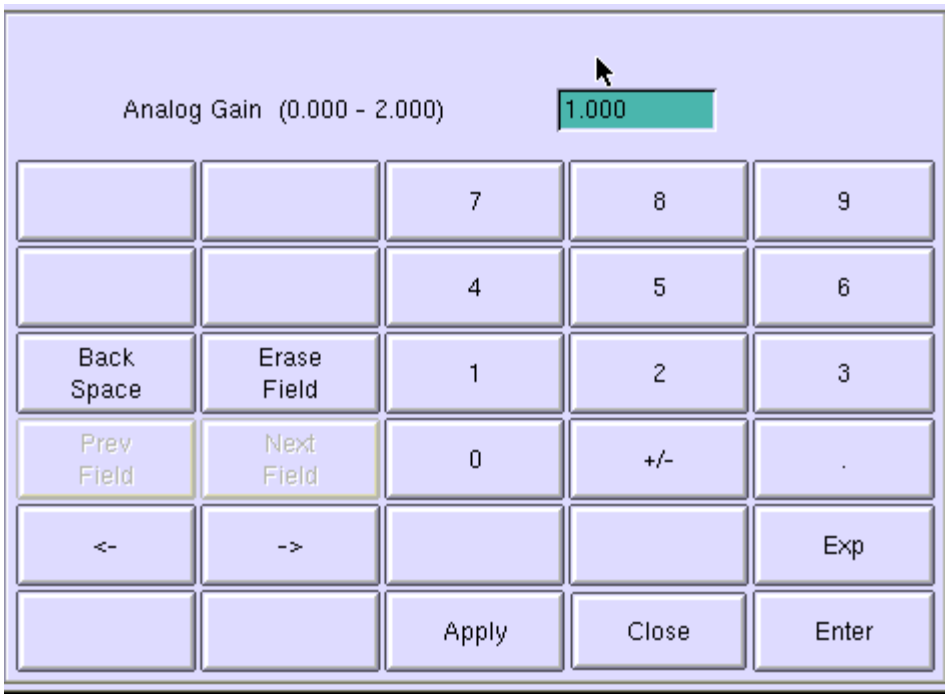
4. The software has default values of delay that should be close to the required delay to synchronize the analog and digital audio. You will need to readjust the Analog audio diversity delay on your actual system due to delays such as processing delay. Write the current delay down in case of needing to revert to the previous version

Audio Diversity Delay _____



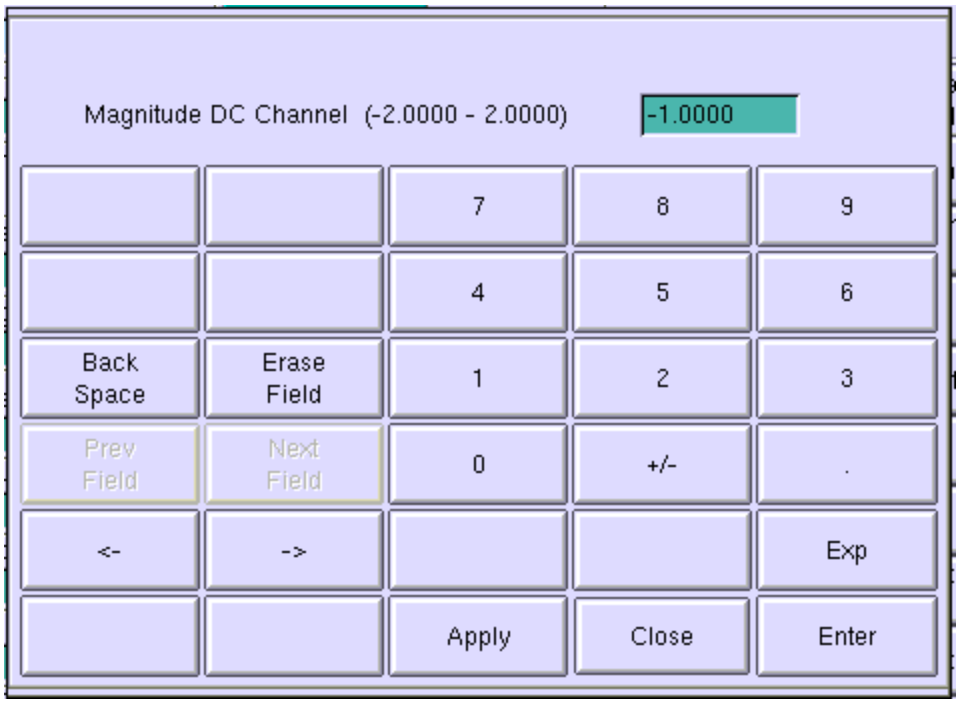
5. Record Analog Gain – Default (1.0)

Analog Gain_____



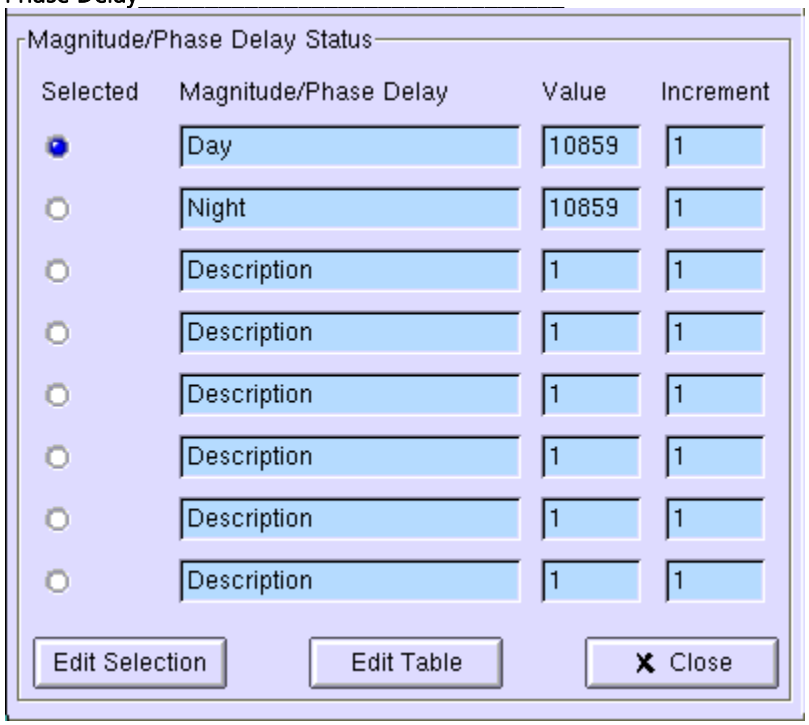
6. Please record Magnitude Channel DC Offset -Default (-1.0)

Magnitude Channel DC Offset _____



7. Record Magnitude/Phase Delay. Default value is 10859.

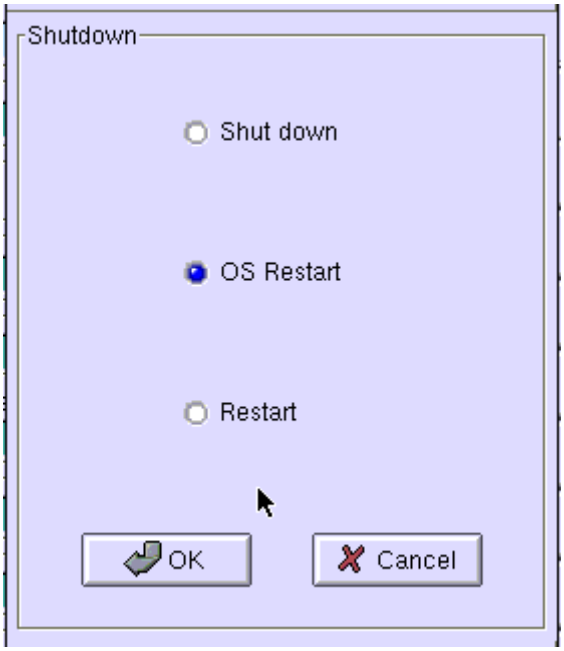
Magnitude/Phase Delay_____



8. Please record any other parameters or settings that you may have adjusted from the default settings such as Station Call Sign, and Analog Audio Bandwidth on the main screen. Defaults are WXYZ and 5 KHz respectively. _____
_____

9. Open CD ROM drive on back of unit (push button on CD tray) and place BE software CD in tray. For the ASi 10 use latest CD ROM. Ensure CD is snapped onto spindle of CD ROM drive.

10. Press "OS Restart" on "Shutdown" menu and then "OK".



11. The ASi 10 should automatically start reboot process.

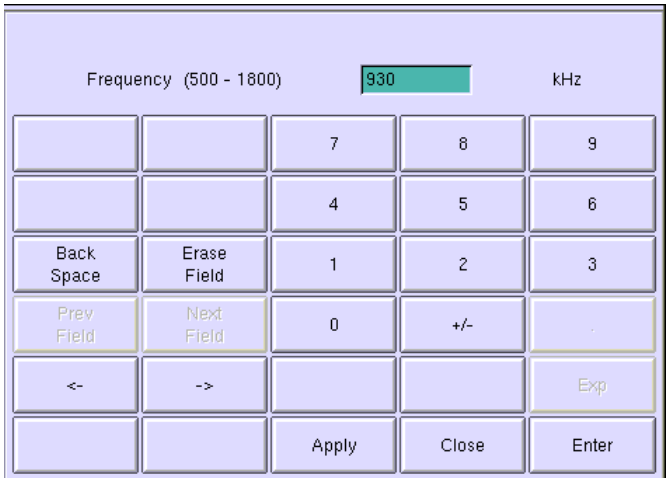
12. Software will automatically load in about 15 minutes.

13. CD will automatically eject when finished.

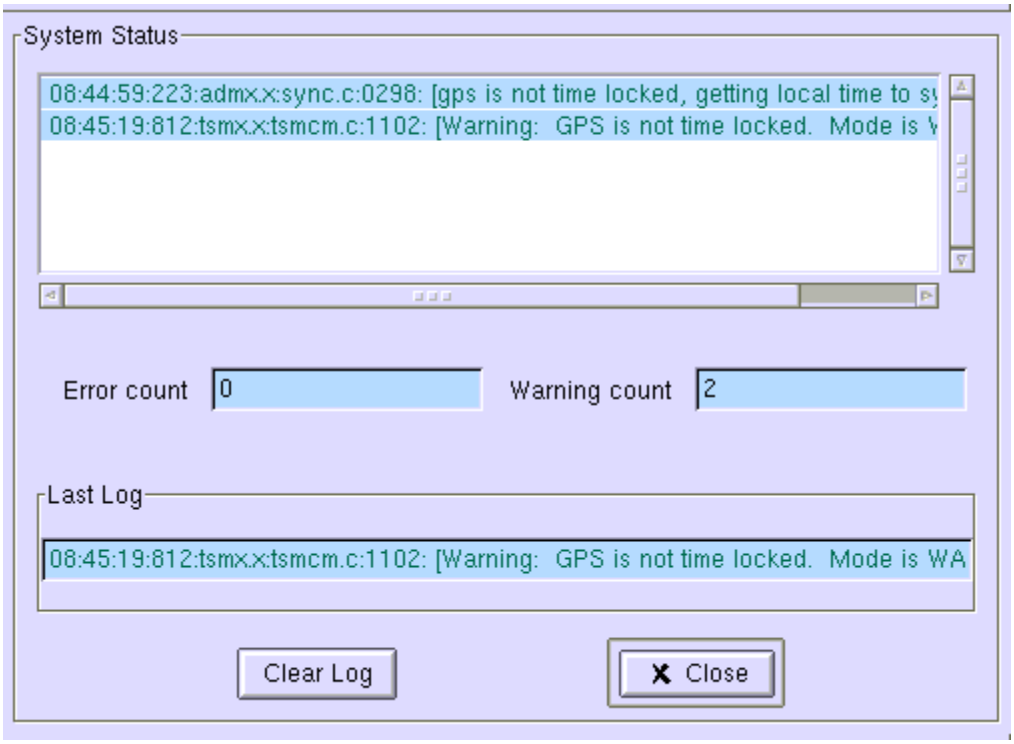
14. Remove CD and close tray.

15. Exciter will automatically reboot and start up the exciter program. This will take approximately 5 minutes.

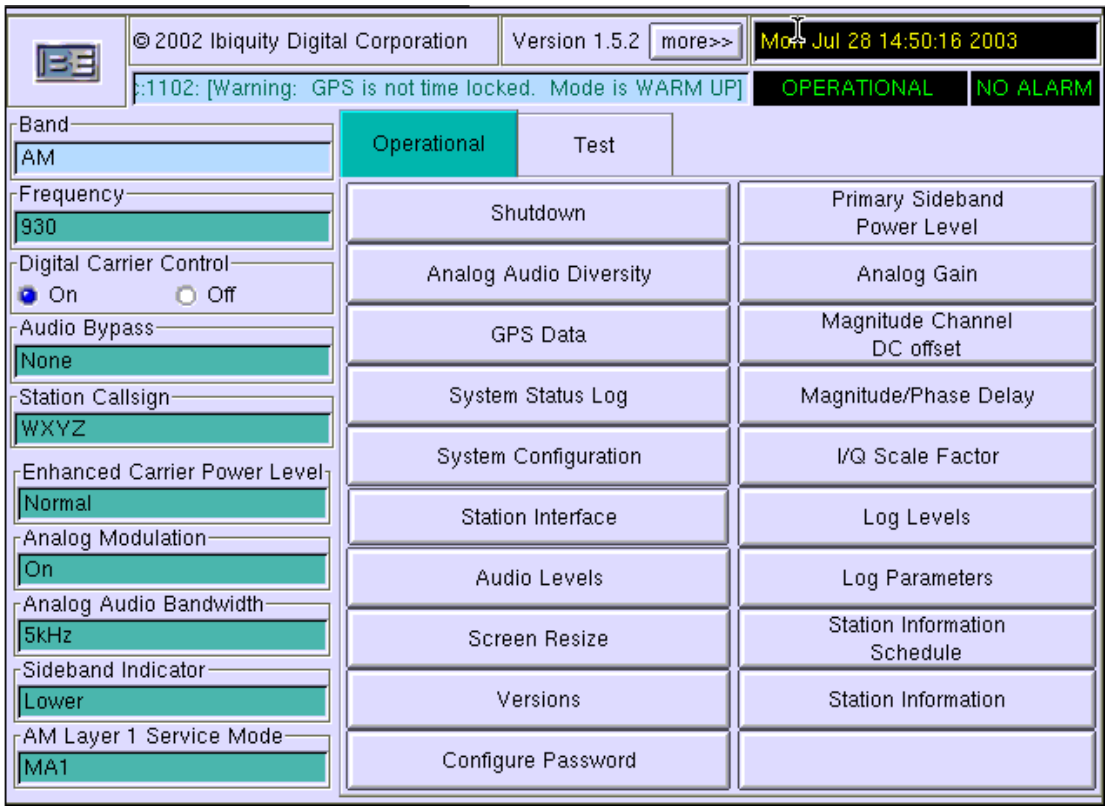
16. For the ASi 10 the default frequency is 930 KHz after reloading software. Press "Frequency" on the display and then enter the correct carrier frequency.

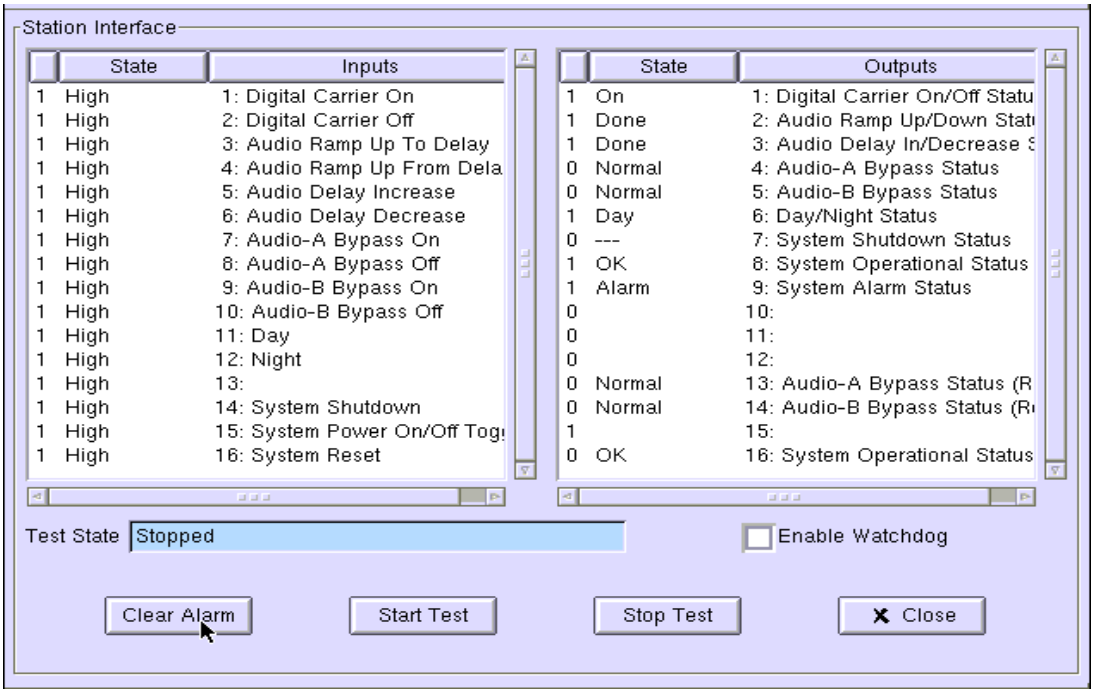


17. Unit should be running with no errors (errors show in red) on the System Status Log screen. If errors show up, please try to reinstall again starting at step 9. If errors persist, please call BE customer service.



18. Re-input values previously recorded.
19. If alarm display is flashing red, this is generally due to GPS not being locked. It is not necessary for GPS to be locked for the system to operate. To eliminate the flashing alarm display press "Station Interface" on the exciter front panel touch screen and then "Clear Alarm".





20. Reconnect AM Phase Out from ASi 10 to Tx.

21. Transmitter is ready to be turned on.

7 BE Part Numbers

This section provides parts lists for the ASi-10 IBOC Digital Signal Generator. The parts lists provide descriptions and part numbers of electrical components, assemblies, and selected mechanical parts required for maintenance. Each parts list entry in this section is indexed by reference designators appearing on the applicable schematic diagrams.

This bill of material uses an indented structure to show relationships of parts into sub assemblies. Example; all BOM LEVEL 2 parts are contained in the BOM LEVEL 1 part immediately above it.

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
0	909-6026-MB3	ASi-10,HD,DIGITAL SIGNAL GENERATOR,MB3		
..1	229-8085-003	IC,CPU,P4,3.0GHz FSB,FSi/ASi/XPi	1	
..1	380-0310	FAN,12v,150 CFM	1	
..1	380-4831	FAN,CPU COOLER & HEATSINK,INTEL P4	1	
..1	400-1725	STRIP,QUIET SHIELD,17.25x.394	1.08	
..1	401-0015	MTG,ADH BACK,SMS-A-15-PANDUIT	1	
..1	402-0000	TY-RAP	18	
..1	402-0005	PRESS CLIP,NYLON W/ADHESIVE BACK	4	
..1	402-0006	MT,ADH BACKED,FOR CBL TIES	7	
..1	402-0008	MTG DEVICE,FOR #6SCR,TIE CBL	1	
..1	402-0047	TY-WRAP, 14.6 LOOP, 40LBS, BLACK	1	
..1	402-0051	TY-RAP, W/FLAG	12	
..1	403-0008	BUMPER, RUBBER, RECESS STYLE, 11/32 TALL"	3	
..1	407-0176	FILTER, AIR, ELECTROMAZE ESF 5.500 X 8.500 X .25	1	
..1	409-5500	CARD GUIDE,BIVAR VERT-O-GUIDE VG3-6	1	
..1	410-0101-001	DISPLAY, COLOR LCD, FLAT PANEL, TOUCH SCREEN,XPi/ASi/FSi DSG	1	
..1	417-0017	RECP,BNC,BULKHEAD,UG-492A/U	1	
..1	420-0817	ASSY,FEMALE SCREWLOCK 205817-1	3	
..1	420-2104	SCREW,2-56X.250,S.S. PH SC	8	
..1	420-2704	SCREW,M2 X 4,PHILLIPS PAN HEAD,SS	4	
..1	420-3710	SCREW,M3 X 10,PHILLIPS PAN HEAD,SS	18	
..1	420-4103	SCREW,4-40X.187,S.S. PH	6	
..1	420-4105	SCREW,4-40X.312,S.S. PH	4	
..1	420-6002	SCREW,6-32X.437,S.S. PH FH UC	1	
..1	420-6112	SCREW,6-32X.750,S.S. PH	1	
..1	420-6514	SCREW,6-32X.875,S.S. PH FH	4	
..1	420-6605	SCREW,6-32X.312,S.S. PH FH UC	13	
..1	421-0102	10-32 KEP NUT	1	
..1	421-4008	4-40 KEP NUT	6	
..1	421-6005	6-32 ELASTIC STOP HEX NUT	5	
..1	421-6011	6-32 S.S. HEX THICK NUT	1	
..1	421-8028	NUT,JAM,1/2-28 UNEF-2B	5	
..1	422-6106	SCREW,SEMS 6-32 X 3/8 PAN PH. ST."	75	
..1	422-6107	SCREW,SEMS 6-32 X 7/16 PAN PH.ST."	12	
..1	423-2002	#2 LOCK SPLIT	20	
..1	423-4002	#4 LOCK S.S. SPLIT	24	

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
..1	423-6006	#6 FLAT, 0.75 O.D, 0.140 I.D., 0.062 THK, SST	3	
..1	423-6011	#6 FLAT .310 X .160 X .030	4	
..1	423-9002	WASH,INT TOOTH,1/2	5	
..1	441-0000	STOFF, #2-56 X .25 L, 5/32 HEX, MF, SST"	4	
..1	441-5402	STOFF,#4-40 ALUM 3/16HEX X 3/4"LONG"	6	
..1	453-0027	BRKT, SERIAL CARD, FSI-10	1	
..1	471-5333	ANGLE,FRONT PANEL MOUNT,DTC EXCITER	2	
..1	471-5336-100	PANEL,FRONT,NEW PCB,DIGITAL SIGNAL GENERATOR	1	
..1	471-5337-200	CHASSIS,NEW,DIGITAL SIGNAL GENERATOR	1	
..1	471-5338	PANEL,REAR,DIGITAL SIGNAL GENERATOR	1	
..1	471-5339-200	COVER,NEW,TOP,DIGITAL SIGNAL GENERATOR	1	
..1	471-5340	ANGLE,PCB MOUNT,DIGITAL SIGNAL GENERATOR	4	
..1	471-5341-200	BRACE,NEW,PCB SUPPORT,DIGITAL SIGNAL GENERATOR	1	
..1	471-5343	BRACKET, CD-ROM, DIGITAL SIGNAL GENERATOR	1	
..1	471-5453	ANGLE,DAUGHTER CARD BRACE SUPPORT,FSi10/ASi10/XPi10	1	
..1	500-210	Screw,SEMS 4-40x1/4 Phil Pan Head MS Blk Zinc(external lock)	22	
..1	586-149	9 inch Phone Jumper (SBCM)	1	
....2	550-279	Connector,Line Plug 6 Pos 4 Conn Adamtech #ADTMTP6-4-U	2	
....2	580-154	Cable,26 AWG/4C Silver Satin #M264SS	0.75	
..1	591-0036	LABEL,POWER,DTC EXCITER	1	
..1	591-0038	LABEL,GPS LOCK,DIGITAL SIGNAL GENERATOR	1	
..1	591-0039	NAMEPLATE,ASi10,AM DIGITAL SIGNAL GENERATOR	1	
..1	594-0073	LABEL,WARNING ROTATING FANS	2	
..1	594-0503	LABEL, DANGER-HAZARDOUS VOLTAGE	1	
..1	594-0505	LABEL, WARNING-ONLY AUTHORIZED PERSONNEL	1	
..1	611-1501	TUB,HT SHK,1-1/2ID,BLACK"	1	
..1	700-0148	TAPE,JOINING 3/4	0.001	
..1	849-0680	CBL, ASSY, COAX 18, OSX RT-OSX STRAIT"	5	
..1	849-0681	CBL, ASSY, COAX 18, OSX RT-BNC"	1	
..1	849-0682	CABLE, USB, 20 INCH	2	
..1	849-0683	CABLE, VGA, HDDB15M TO HDDB15M, 2 FOOT	1	
..1	849-6027	POWER SUPPLY CABLE MOLEX 4 PIN MALE TO FLOPPY DRIVE FEMALE	1	
..1	919-0548-002	PCB, ASSY, DIGITAL UPCONVERTER II (SBCM)	1	
....2	007-0018-006	CAP,0603,18pF,50V,5%	3	C10, C73, C132

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	007-0047	CAP,4.7uF,16v,20%,SMD,3216/Y	3	C9, C253, C254
....2	007-0056-006	CAP,56pF,50v,5%,0603	1	C75
....2	007-0082-006	CAP,82pF,50V,5%,0603	2	C74, C93
....2	007-0153	CAP,CER, .015uF,25V,10%,0603,SMD	1	C89
....2	007-0207-006	CAP,0.27uF,6.3v,10%,0603	1	C8
....2	007-0220-006	CAP,220pF,50v,5%,0603	1	C79
....2	007-0222	CAP,CER, 2.2uF, 16V, 10%, 1206, SMD	6	C136, C140, C156, C160, C174, C178
....2	007-0270-006	CAP,270pF,50v,5%,0603	1	C76
....2	007-0390-006	CAP,390pF,50v,5%,0603	1	C78
....2	007-0470-006	CAP,470pF,50v,10%,0603	1	C77
....2	007-1034-001	CAP,CER,.01UF,10%,50V,0603,SMD	40	C7, C125, C138, C142, C151, C152, C153, C154, C155, C158, C162, C169, C170, C171, C172, C173, C176, C180, C189, C190, C191, C192, C193, C199, C200, C201, C202, C203, C222, C223, C224, C225, C226, C240, C241, C242, C243, C244, C246, C248
....2	007-1040-025	CAP,CER,.1UF,+80,-20%,25V,0603,SMD	109	C1, C5, C12, C13, C14, C17, C60, C61, C62, C64, C66, C67, C68, C69, C70, C71, C80, C81, C84, C85, C86, C87, C88, C90, C91, C94, C96, C98, C99, C103, C105, C107, C109, C110, C111, C116, C118, C121, C122, C124, C127, C128, C129, C130, C131, C135, C137, C141, C146, C147, C148, C149, C150, C157, C161, C164, C165,
....2	007-1054	CAP,CER,1uF,50V,10%,SMD	1	C126
....2	007-1054-002	CAP,CER,1000PF,+80,-20%,50V,0603,SMD	9	C2, C4, C139, C143, C159, C163, C177, C181, C252
....2	007-1500	CAP,CER,1500pF,50V,10%,0603,SMD	1	C92
....2	007-1800-006	CAP,1800pF,50V,10%,SMD,0603	1	C113
....2	007-2724-500	CAP,CER,.0027uF,50V,10%,SMD	1	C101
....2	007-8213-500	CAP,CER,820pF,50V,5%,SMD	4	C100, C102, C108, C117

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	070-0335	CAP,TANT,3.3uF,20V,10%,B,SMD	17	C22, C25, C27, C29, C32, C36, C37, C38, C39, C47, C48, C49, C50, C52, C54, C255, C257
....2	070-1064	CAP,TANT,10uF,35V,20%,SMD	4	C3, C6, C16, C53
....2	070-1084	CAP,TANT,100uF,16V,10%,SMD	11	C21, C28, C33, C34, C45, C46, C133, C134, C182, C183, C256
....2	070-1564	CAP,TANT,15uF,35V,10%,SMD	3	C59, C83, C95
....2	070-6854	TANT CAP, 6.8 UF, 16V, SIZE C	14	C11, C15, C63, C65, C72, C82, C97, C104, C106, C112, C115, C119, C120, C123
....2	070-6864	CAP,TANT,68uF,25V,20%,SMD	6	C23, C24, C26, C30, C31, C51
....2	101-0003	RES,THICK FILM,0 OHM,1/8W,5%,SMD	1	R11
....2	102-2000	RES,CHIP,200 OHM,1/10 W,1% SMD	3	R81, R82, R93
....2	102-2353	RES,CHIP,23.7K OHMS,1/10W,1%,SMD	1	R77
....2	102-3001	RES,CHIP,30.1 OHMS,1/10W,1%,SMD	1	R80
....2	102-3090	RES,CHIP,309 OHMS,1/10W,1%,SMD	1	R92
....2	102-4705	RES,CHIP, 47.5 OHM, 1%, 1W, 2512, SMD	1	R74
....2	102-6191	RES, CHIP, 6.19K OHM, 1/10W, 1%	3	R12, R13, R76
....2	102-6409	RES,CHIP,64.9 OHMS,1/10W,1%,SMD	1	R91
....2	104-0000	RES,CHIP,0 OHM JUMPER,0603,SMD	7	R4, R84, R85, R86, R87, R94, R95
....2	104-0027	RESISTOR,27.4ohm,1%,1/16W,SMD,0603	4	R33, R34, R65, R66
....2	104-0034	RES,CHIP,34 OHM,1%,1/16W,0603,SMD	1	R18
....2	104-0047	RESISTOR,47.5ohm1%.1/16W,SMD,0603	4	R42, R43, R83, R73
....2	104-0051	RESISTOR,51.1ohm1%,1/16W,SMD,0603	12	R2, R14, R36, R39, R40, R41, R49, R57, R62, R68, R72, R99
....2	104-0100	RES,CHIP,100 OHM,1%,0.10W,0603,SMD	2	R70, R96
....2	104-0120	RES,CHIP,121 OHM,1%,1/16W,0603,SMD	1	R38
....2	104-0180	RESISTOR,182ohm,1/16W,1%,SMD,0603	2	R47, R51
....2	104-0183	RESISTOR,18.2Kohm,1%,1/16W,SMD,0603	1	R55
....2	104-0220	RESISTOR,221ohm,1/16W,SMD,0603	2	R63, R61
....2	104-0510	RESISTOR,511ohm,1%,1/16W,SMD,0603	3	R75, R100, R101
....2	104-0576	RES,CHIP, 576 OHM, 1%, 1/16W, 0603, SMD	1	R90
....2	104-0750	RES,CHIP,750 OHM,1%,1/16W,0603,SMD	1	R97
....2	104-0820	RESISTOR,825ohm,1%,1/16W,SMD,0603	2	R10, R29
....2	104-1001	RES,CHIP,1.0 K OHM,1%,1/16W,0603,SMD	3	R44, R54, R58
....2	104-1002	RES,CHIP,10.0 K OHM,1%,1/16W,0603,SMD	1	R79
....2	104-1201	resistor,1.21Kohm1/16W,1%,SMD,0603	5	R3, R6, R7, R8, R24
....2	104-1802	RESISTOR,1.82Kohm1/16W,1%,SMD,0603	7	R17, R19, R22, R23, R25, R26, R28
....2	104-2000	RESISTOR,2Kohm,1/16W,1%,SMD,0603	3	R9, R52, R56
....2	104-2701	RESISTOR,2.74Kohm,1%,1/16W,SMD,0603	2	R32, R64
....2	104-3301	RES,CHIP,3.32Kohm,1%,1/16W,0603,SMD	1	R27
....2	104-4321	RES,CHIP,4.32 K OHM,1%,1/16W,0603,SMD	2	R21, R20

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	104-4701	RES,CHIP,4.75KOHM,1%,1/16W,0603,SMD	1	R59
....2	104-5105	RESISTOR,5.1M,5%,1/10W,SMD,0603	1	R1
....2	104-5112	RES,CHIP, 51.1k OHM, 1%, 1/16W, 0603, SMD	1	R71
....2	104-5600	RES,CHIP,562 OHM,1%,1/16W,0603,SMD	8	R30, R35, R37, R48, R53, R60, R67, R69
....2	104-5602	RES,CHIP, 56.2 OHM, 1%, 1/16W, 0603, SMD	2	R89, R88
....2	104-6810	RES,CHIP,681 OHM,1%,1/16W,0603,SMD	1	R78
....2	104-8200	Chip Res, 8.25K 1% 1/16W 0603 SMD	1	R15
....2	104-8202	RESISTOR,82.5K,1%,1/16W,SMD,0603	1	R5
....2	198-0203-001	TRMR, 20K OHMS, SINGLE TURN, SIDE ADJUST,SMD	1	R45
....2	201-2801	DIODE,HOT CARRIER,MMBD701LT1,SMD	1	D13
....2	204-5100	DIODE,SCHOTTKY RECTIFIER, 5A, DO-201AD	1	D28
....2	216-0420	CLC420, High Speed Voltage Feedback Op Amp SMD	4	U15, U17, U28, U31
....2	216-0640	IC,FLASH MEMORY,64MB,3V,48-PIN,TSOP	1	U36
....2	216-1004	IC,HEX INVERTING DRIVER,SOIC-14	1	U4
....2	216-1021	IC,DSP,STRATIX,25KB,1020-PIN,FPGA	1	U33
....2	216-1206	IC,CURRENT FEEDBACK AMP,250MA,60MHz	2	U3, U32
....2	216-1355	LT1355 12MHz op amp	2	U19, U20
....2	216-1386	IC,TRANSCEIVER,3.3V,200uA,SOIC-16	1	U34
....2	216-1619	IC,REMOTE/LOCAL TEMP.SENSOR,QSOP16	1	U39
....2	216-1711	IC,RAIL TO RAIL COMPARATOR,MSOP8	1	U29
....2	216-1819	IC,MICROMONITOR,3V,10%,SOT-23-5	1	U37
....2	216-2524	IC, CGS74LCT2524M 3v Clock Driver SMD	1	U42
....2	216-3256	IC,EEPROM,EPM3256A,3.3V,7.5ns,TQFP144	1	U35
....2	216-3443	IC,RS-485/J1708 TRANSCEIVER,SOIC8	1	U30
....2	216-3861	IC,CMOS,10-BIT,BUS SWITCH,QSOP24	6	U21, U22, U23, U24, U25, U26
....2	216-3904	TSTR,MMBT3904LT1,NPN,SMD	2	Q1, Q2
....2	216-4590	IC, DUAL SPST N.O.,ANALOG SWITCHES 16-PIN SSOP SMD	1	U16
....2	216-5170	IC, MC145170DT2 PLL FREQUENCY SYNTHESIZER TSSOP-16 SMD	1	U2
....2	216-6531	IC, SN65LVDS31D HIGH SPEED DIFFENENTIAL LINE DRIVER SMD	1	U41
....2	216-9754	IC,AD9754ARU D/A Converter 14BIT 125MSPS SMD	3	U14, U18, U27
....2	226-0102	RES.NET, 1K,2%, ISOLATED, 16-PIN,SMD	1	RN3
....2	226-0103	RES.NET, 0K,2%, ISOLATED, 16-PIN,SMD	5	RN1, RN2, RN4, RN6, RN7
....2	226-0560	RES.NET, 56,2%, ISOLATED, 16-PIN,SMD	1	RN5
....2	227-2931	VR, LM2931,5v SMD	5	U6, U7, U10, U11, U40
....2	227-2937	VR, LM2937,8v SMD	1	U5
....2	227-2950	VR,LOW DROPOUT,5A,ADJ.VOLTS,TO-263-5	1	U38
....2	227-7955	Negative VR MC79M05BDT,-5v SMD	1	U12

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	325-0251	LED, GRN, SMD, 0805	11	D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12
....2	325-0252	LED,RED/ORN,1206,SMD	11	D15, D16, D17, D19, D20, D21, D22, D24, D25, D26, D27
....2	325-0254	LED,GREEN, 1206, SMD	1	D18
....2	325-0255	LED,BLUE, 0603, SMD	1	D23
....2	340-0004	SW,JUMPER PROGRAMMABLE	8	P1, P18, P19, P20, P21, P22, P25, P27
....2	342-0801	SW,DIP, 8-POS, SPST-N0,SMD	1	S2
....2	342-1001	SW,DIP, 10-POS, SPST-N0,SMD	1	S1
....2	342-3304	SW,TACT,SPST,N.O.,SMD,RECESSED	2	PB1, PB2
....2	366-0180-001	INDUCTOR, 180nH, 10%, SMD, 1008	2	L1, L2
....2	366-0821	INDUCTOR,820nH,10%,SMD,CH1010	2	L12, L13
....2	366-0910	INDUCTOR,910nH,10%,SMD,0805	1	L11
....2	366-1000	INDUCTOR,100uH,20%,SMD	5	L5, L6, L7, L8, L9
....2	366-3100	FERRITE, 600 OHMS, 1.5 AMP, 100MHz,1206 SMD	11	L17, L19, L22, L24, L26, L27, L28, L29, L30, L31, L32
....2	366-4100	FERRITE, 60 OHMS, 6 AMP, 100MHz,1806 SMD	1	L20
....2	366-4700	INDUCTOR,FIXED, 4.7uH, 1210,SMD	2	L14, L15
....2	390-5953	VCUGLA at 59.535MHz VCXO SMD	1	U1
....2	408-0300	HEADER,3-PIN,.100 CENTERS,SIP,note	2	J25, J27
....2	408-0801	HEADER, 8-PIN, .100 CENTERS, DIP, SMD	1	J5
....2	408-3800	CONN,HEADER,38-PIN,DIP,.025 CTR,SMD	2	J11, J12
....2	413-0106	TERM,TEST POINT,OVAL,RED	21	TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21
....2	417-0070	CONN,HEADER 4 PIN	1	J7
....2	417-0199	CONN,9PIN D,FEMALE,RTANG,PCBM	1	J28
....2	417-1020	CONN, HEADER 2-PIN VERTICAL SIP SMD	6	J1, J18, J19, J20, J21, J22
....2	417-1023	CONN HEADER,10-PIN RT ANGLE,PCB MAL	2	JP1, J13
....2	417-2284	CONN MCX RIGHT ANGLE JACK 50 OHM PCB MOUNT	6	J2, J4, J8, J38, J39, J40
....2	417-4040	CONNECTOR, HEADER STRAIGHT POST	2	J15, J17
....2	417-5565	CONN 8-PIN MODULAR JACK RT ANGLE PCB MOUNT SHIELDED	2	J41, J43
....2	417-9013	CONN,HEADER, SHROUDED, 12-PIN, RT.ANGLE	1	J16
....2	418-1108	SOCKET,OSCILLATOR,4-PIN,8-POS,DIP	1	J26
....2	453-0000	BRACKET,PC PCB,KEYSTONE 9203	1	H1
....2	479-0175	SHIELD,1.5x1.75"x1.0",PC MOUNT"	3	
....2	519-0548-002	PCB, MACH, DIGITAL UPCONVERTOR II	1	
..1	919-0549	PCB, ASSY, STATION INTERFACE, FM-IBOC & AM-IBOC, DSG(SBCM)	1	

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	007-0020-006	CAP,20pF,5%,50v,SMD,0603	2	C26, C27
....2	007-1044-025	CAP,CER,100 NFD,10%,25V,1206,SMD	13	C7, C8, C11, C13, C17, C18, C22, C23, C25, C30, C31, C33, C34
....2	007-4744-050	CAP, CER, .47UF, 50V, -20% TO +80%	3	C28, C29, C32
....2	070-0010	Cap,Lytic 10uF 16V SMD	2	C2, C35
....2	104-0039	RESISTOR,39ohm,5%,.1W,SMD,0603	1	R6
....2	104-0330	resistor,332ohm,1/8W,1%,SMD,1206	4	R20, R21, R22, R23
....2	104-1802	RESISTOR,1.82Kohm1/16W,1%,SMD,0603	4	R24, R25, R27, R28
....2	104-4701	RES,CHIP,4.75KOHM,1%,1/16W,0603,SMD	1	R18
....2	104-4701-001	RES,CHIP,4.75KOHM,1%,1/8W,1206,SMD	1	R32
....2	229-0705	IC, MAX705CSA Microprocessor Supervisor SMD	1	U5
....2	229-3221	IC,RS 232 TRANSCEIVER +3V TO +5V 1uA SUPPLY-CURRENT	1	U24
....2	320-1371	LED,LNJ306G5TRW GREEN SMD	2	D1, D2
....2	340-0004	SW,JUMPER PROGRAMMABLE	5	P3, P89, P90, P94, P95
....2	390-2000	XTAL,20MHz, CYL XTAL CA-301 Type	1	Y1
....2	417-0003	CONN,HEADER 3 PIN	1	J3
....2	417-0173	CONN,PCB,40-PIN,609-4037	1	J135
....2	417-1050	.100,10 pin double row terminal strip"	3	J113, J115, J116
....2	417-2524	SHROUDED HEADER 24 POS STRAIGHT	1	JP1
....2	417-4004	CONN,HEADER,2 PIN	5	J89, J90, J94, J95, J130
....2	417-5163	Mod Jack 6-6 low profile w/stops	1	J8
....2	418-1001-001	CONN, MALE, 10 PIN, LONG LATCH, PCB MT	1	J133
....2	418-1003	CONN,PCB 10PIN(DUAL 5)	1	J2
....2	453-0000	BRACKET,PC PCB,KEYSTONE 9203	1	
....2	500-210	Screw,SEMS 4-40x1/4 Phil Pan Head MS Blk Zinc(external lock)	2	
....2	519-0549	PCB, MACH, STATION INTERFACE, FM-IBOC & AM-IBOC, DSG	1	
....2	979-0549-U11	KIT,SOFTWARE,CPLD,U11,SIC	1	U11
.....3	229-4192	HIGH PERFORMANCE E*CMOS	1	U11
....2	979-0549-U4	KIT,SOFTWARE,EEPROM,U4,SIC	1	U4
.....3	229-0877	IC,EEPROM MCU LDS 20MHz 8K Flash TQFP SMD	1	U4
..1	919-0550	PCB,ASSY,SAMPLE RATE CONVERTER,ASi/XPi (SBCM)	1	
....2	007-0183	CAP CERAMIC,0.018uF,25V,10%,SMD 0805,X7R	1	C3
....2	007-0823	Cap, 0.082uF,50V ceramic SMD	1	C4
....2	007-1024	CAP,CER,.001uF,50V,10%,SMD	2	C9, C11
....2	007-1034	CAP,CER,0.01uF,50V,10%,SMD	3	C1, C23, C34
....2	007-1044	CAP,CER,0.1uF,50V,10%,SMD note	14	C13, C22, C27, C28, C30, C43, C45, C46, C47, C48, C49, C50, C51, C31
....2	007-2224-500	CAP,CER,.0022uF,50V,10%,SMD	1	C26

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	007-3313	CAP,CER,330pF,50V,5%,SMD	5	C5, C6, C7, C8, C10
....2	007-4724	CAP,CER,0.047uF,50V,10%,SMD	1	C52
....2	070-1054	CAP,TANT,1uF,35V,10%,SMD	6	C2, C12, C24, C29, C44, C32
....2	070-1064	CAP,TANT,10uF,35V,20%,SMD	3	C14, C15, C16
....2	101-2432	RES,CHIP,24.3K OHM,1%,1/8W,1206,SMD	1	R11
....2	102-0000	RES,CHIP,0 OHM,0805,SMD	13	R68, FL1, FL2, FL3, FL4, FL5, FL6, FL7, FL8, FL9, FL10, FL11, FL12
....2	102-0100	RES,CHIP,10.0 OHMS,1/10W,1%,SMD	1	R15
....2	102-1000	RES,CHIP,100 OHMS,1/10W,1%,SMD	2	R16, R21
....2	102-1001	RES,CHIP,1.00K OHMS,1/10W,1%,SMD	16	R5, R22, R23, R24, R27, R33, R35, R36, R37, R38, R39, R49, R50, R57, R62, R66
....2	102-1002	RES,CHIP,10.0K OHMS,1/10W,1%,SMD	5	R4, R7, R8, R13, R34
....2	102-1003	RES,CHIP,100K OHMS,1/10W,1%,SMD	1	R60
....2	102-1004	RES,CHIP,1.00M OHMS,1/10W,1%,SMD	2	R2, R3
....2	102-1133	RES,CHIP,110 OHMS,1/10W,1%,SMD	3	R25, R40, R41
....2	102-1825	RES,CHIP,18.2 K OHM,1/10W,1%	1	R17
....2	102-2212	RES,CHIP,22.1K OHMS,1/10W,1%,SMD	2	R48, R64
....2	102-2410	RES,CHIP,243 OHMS,1/10W,1%,0805,SMD	5	R20, R32, R58, R61, R69
....2	102-2940	RES,CHIP,294 OHMS,1/10W,1%,SMD	2	R70, R71
....2	102-3011	RES,CHIP,3.01K OHMS,1/10W,1%,SMD	1	R26
....2	102-3012	RES,CHIP,30.1K,1/10W,1%,SMD	1	R9
....2	102-3321	RES,CHIP,3.32K OHMS,1/10W,1%,SMD	1	R6
....2	102-4711	RES,CHIP,475 OHMS,1/10W,1%,SMD	1	R14
....2	102-4755	RES,CHIP,47.5K OHM,1/10W,1%	9	R18, R28, R29, R30, R42, R43, R45, R46, R47
....2	102-4872	RES,CHIP,48.7K,1/10W,1%,SMD	1	R10
....2	102-5112	RES,CHIP,51.1 OHM,1/10W,1%	2	R1, R44
....2	102-7150	RES,CHIP,715 OHMS,1/10W,1%,SMD	1	R19
....2	179-2043	RES,TRMR,2K,15 TURN 3006	1	R72
....2	204-0914	DIODE,SWITCHING,MMBD914LT1,SMD	3	D1, D3, D4
....2	205-0833	VARIABLE CAPACITANCE DIODE, SOT-23 SMD	1	D2
....2	210-3906-001	TSTR,3906,SMD	1	Q2
....2	216-0634	IC, BUFFER, BUF634U, SO-8, SMD	1	U13
....2	216-3904	TSTR,MMBT3904LT1,NPN,SMD	2	Q1, Q3
....2	216-4013	IC,MC14013BD DUAL D FLIP FLOP,SMD	1	U12
....2	216-4111	IC,OPAMP,RAIL TO RAIL,300mA,SOIC-8	1	U7
....2	216-7002	IC,MOSFET,2N7002LT1,SMD	2	Q4, Q5
....2	216-7414	IC,74AC14,HEX INVERTER,SCHMITT TRIG,SO-14,SMD	1	U4
....2	220-1451	IC, CMOS PLL FREQUENCY SYNTHESIZER	1	U3
....2	220-8922	IC, Dual Differential Line Driver SMT	1	U2
....2	224-0708	IC, MICRO SUPERVISOR, 3V, SMD	1	U14
....2	224-8420	IC, SAMPLE RATE CONVERER 96 KHZ	1	U1

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	228-0161	IC,74ACT161,SYNCH. BINARY COUNTER,16-PIN SMD,SOIC	2	U10, U11
....2	231-3170	VR,LM317,SMD	1	U5
....2	270-0066	REL,DPDT,12VDC,DIP	1	K1
....2	270-470	Cap,monolithic chip,47 pf 50v 5% Kemet C1206C470J5GACTR	2	C53, C54
....2	325-0250	LED,DUAL RED/GREEN,LOW PROFILE,SMD	2	DS1, DS2
....2	340-0004	SW,JUMPER PROGRAMMABLE	4	P12, P13, P14, P15
....2	350-030	INDUCTOR, 3.0 - 7 UH W/SHIELD CAN #47271-023	1	L1
....2	366-0010-001	IND,10UH,1.5A	2	L3, L4
....2	366-0011	IND,10UH,SHIELDED,SMD	1	L2
....2	367-9370	XFMR,SMT,AES/EBU,SC937-02	3	T1, T2, T3
....2	408-0300	HEADER,3-PIN,.100 CENTERS,SIP,note	4	J12, J13, J14, J15
....2	413-1206	CHIP,TEST POINT,1206,SMD	3	TP9, TP10, TP11
....2	417-0265	CONN,BNC,JACK,THREADED,PC EDGE MOUNT,LOW PROFILE	1	J11
....2	417-0804	SOCKET,8-PIN DIP,BURNDY	1	XU6
....2	417-1550-002	CONN,HEADER,RT.ANGLE,2-PIN,3.81MM SPACING,PCB MOUNT	1	J3
....2	417-2284	CONN MCX RIGHT ANGLE JACK 50 OHM PCB MOUNT	2	J1, J16
....2	417-2838	HEADER 4-PIN .100 R.ANGLE LOCKING"	1	J2
....2	417-7188	CONN,RJ-45 JACK SINGLE PORT 8-PIN SHIELDED PCB MOUNT	1	J9
....2	418-0060	RECEPTACLE,XLR,3-PIN,FEMALE,RIGHT ANGLE,PCB MOUNT	2	J4, J10
....2	418-0061	RECEPTACLE,XLR,3-PIN,MALE,RIGHT ANGLE,PCB MOUNT	3	J6, J7, J8
....2	431-1600	SOCKET,16-PIN,DIP,SMD note	1	XK1
....2	479-0175	SHIELD,1.5x1.75"x1.0",PC MOUNT"	1	
....2	519-0550	PCB, MACH, AM, SAMPLE RATE CONVERTER	1	
....2	979-0550-U6	KIT,SOFTWARE,MICRO,U6,AM/SRC	1	U6
.....3	229-0519	Microprocessor 8pin DIP PIC12CE519-04/P	1	U6
..1	919-0551	PCB, ASSY, XLR-BNC I/O INTERFACE, FM & AM-IBOC, DSG(SBCM)	1	
....2	007-0047	CAP,4.7uF,16v,20%,SMD,3216/Y	1	C10
....2	007-1044	CAP,CER,0.1uF,50V,10%,SMD note	9	C1, C2, C3, C4, C5, C6, C7, C8, C9
....2	104-0020	RES,20ohm,.25W,1%, SMD, 1210	1	R11
....2	104-0036	RES,35.7ohm,. 25W, 1%, SMD, 1210	3	R9, R16, R17
....2	104-0051-063	RES,51.1ohm,.25W,1%,SMD,1210	1	R6
....2	104-0103	RES,10Kohm,.1W,1%, SMD, 0603	1	R12
....2	104-0122	res,1.2Kohm,.1W,5%, SMD, 0603	1	R2
....2	104-0165	RES,16.5ohm,. 25W, 1%, SMD, 1210	1	R18
....2	104-0200	RES,200ohm,.1W,5%, SMD, 0603	1	R1
....2	104-0242	RES,2.4Kohm,.1W,5%,SMD,0603	1	R13
....2	104-0303	RES,30.1Kohm,.1W,1%,SMD,0603	4	R4, R5, R7, R8
....2	104-0390	RES,390ohm,.25W,5%,SMD,1206	1	R14
....2	104-0620	RES,620ohm,.1W,5%,SMD,0603	1	R3

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	216-0111	IC,Closed loop buffer, Ultra high slew rate, 8 pin SMD	3	U1, U2, U3
....2	227-1128	IC,VR,8V,LOW DROPOUT,SOT23-5L,SMD	1	U4
....2	320-0603	LED GREEN SMD	1	D1
....2	340-0004	SW,JUMPER PROGRAMMABLE	16	P5A, P5B, P6A, P6B, P7A, P7B, P8A, P8B, P9A, P9B, P10A, P10B, P11A, P11B, P12A, P12B
....2	367-1128	XFMR, 5MHz-120MHz SMD	1	T1
....2	411-0103	Chip,EMI Filter,10,000pF 50V 20% SMD	1	L1
....2	411-0222	Chip EMI Filter, 2200pF 50V 20% SMD	8	L2, L3, L4, L5, L6, L7, L8, L9
....2	417-0037	BNC,R ANGLE PC MT 227161-1 AMP (NOTE)	5	J1, J2, J3, J4, J5
....2	417-1701	STRAIGHT JACK RECEPTACLE,SMB PCB MOUNT 50 OHM	1	J11
....2	417-2284	CONN MCX RIGHT ANGLE JACK 50 OHM PCB MOUNT	6	J6, J7, J8, J9, J10, J12
....2	417-2600	CONN,HEADER,26PIN	2	JP5, JP6, JP7, JP8, JP9, JP10, JP11, JP12
....2	417-2838	HEADER 4-PIN .100 R.ANGLE LOCKING"	1	JP3
....2	417-4209	CONN,DUAL-PORT D-SUB,9-PIN,MALE,PCB MOUNT	1	P1
....2	418-0058	RECEPTACLE XLR FEMALE RT. ANGLE PCB MOUNT	4	JR1, JR2, JR7, JR8
....2	418-0059	RECEPTACLE XLR MALE RT. ANGLE PCB MOUNT	4	JR3, JR4, JR5, JR6
....2	418-1003	CONN,PCB 10PIN(DUAL 5)	2	JP1, JP2
....2	519-0551	PCB, MACH, XLR-BNC I/O INTERFACE, FM-IBOC & AM-IBOC, DSG	1	
..1	919-0552	PCB, ASSY, RJ-45/USB/DB-9 I/O INTERFACE, FM&AM-IBOC,DSG	1	
....2	417-0318	CONN,USB TYPE A DOUBLE PCB MOUNT	1	JP13
....2	417-0319	Conn,USB Type B Single Right Angle PCB Mount	2	JP14, JP15
....2	417-6466	CONN,RJ-11 JACK SINGLE PORT 6-PIN SHIELD PCB MOUNT	2	JP11, JP12
....2	417-7187	CONN,RJ-45 JACK 4-PORT 8-PIN SHIELDED PCB MOUNT	1	P1
....2	417-7188	CONN,RJ-45 JACK SINGLE PORT 8-PIN SHIELDED PCB MOUNT	6	P2, P3, P4, P5, P6, P7
....2	418-1003	CONN,PCB 10PIN(DUAL 5)	1	JP1
....2	519-0552	PCB,MACH,RJ-45/USB/DB-9 I/O INTERFACE,FM-IBOC & AM-IBOC,DSG	1	
..1	919-0553	PCB,ASSY,TERMINAL STRIP I/O INTERFACE,FM & AM-IBOC,DSG(SBCM)	1	
....2	007-1044	CAP,CER,0.1uF,50V,10%,SMD note	3	C13, C14, C15
....2	063-1074	CAP,TANT,10UF,25V,20%	6	C7, C8, C9, C10, C11, C12
....2	101-0390	RES, 390ohm, 1W, 5%, SMD, 2512	2	R10, R11

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	104-3301	RES,CHIP,3.32Kohm,1%,1/16W,0603,SMD	2	R12, R13
....2	204-0052	Silicon Rectifier 2A 50V SMD	12	D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12
....2	204-0718	Diode Network Schottky Barrier Diodes	5	DN1, DN2, DN3, DN4, DN5
....2	216-0621	Multi-Channel Phototransistor Optocoupler	4	U1, U2, U3, U4
....2	216-7414	IC,74AC14,HEX INVERTER,SCHMITT TRIG,SO-14,SMD	3	U13, U14, U15
....2	226-3301	res net, 3.3Kohm, smd, 2512	2	R4, R5
....2	226-3900	res net, 390ohm, 10pin, SMD	6	R1, R2, R3, R6, R7, R14
....2	270-4111	IC,DUAL,SOLID STATE RELAY,8-PIN,DIP	8	U5, U6, U7, U8, U9, U10, U11, U12
....2	411-0223	EMI FILTER, 1000pF, SMD	6	C1, C2, C3, C4, C5, C6
....2	417-0173	CONN,PCB,40-PIN,609-4037	1	JP5
....2	417-1550-008	CONN,HEADER,RT.ANGLE,8-PIN,3.81MM SPACING,PCB MOUNT	8	JP1, JP2, JP3, PJ4, JP6, JP7, JP8, JP9
....2	519-0553	PCB,MACH,TERMINAL STRIP I/O INTERFACE,FM-IBOC & AM-IBOC DSG	1	
....2	540-0505	1.5W Modular DC/DC Converter	2	U17, U18
....2	540-1055	DC/DC Converter SMD	1	U16
..1	919-0557-001	ASSY, PCB, FRONT PANEL LED, FM-IBOC & AM-IBOC, DSG	1	
....2	103-4993	RES,499 OHM,1/4W,1%,METAL	2	R1, R2
....2	323-9224	IND,LED,GRN,521-9270	2	LED1, LED2
....2	340-0004	SW,JUMPER PROGRAMMABLE	1	P2
....2	417-4004	CONN,HEADER,2 PIN	2	J2, J3
....2	418-0255	CONN,MALE,4PIN	1	J1
....2	441-0009	SPR,PHENOLIC 1/4RND X 1/2 #6	2	
....2	519-0557	PCB, MACH, FRONT PANEL LED, DTG DIGITAL EXCITER	1	
..1	919-0558	PCB, ASSY, LCD POWER, FM-IBOC & AM-IBOC, DSG	1	
....2	020-4773	CAP,LYTIC,47UF,35V,STDUP	1	C1
....2	103-4741	RES,4.75K OHM,1/4W,1%,METAL	1	R1
....2	224-0200	IC, TWO TUBE DC TO AC CONVERTER, +12 VDC INPUT	1	U1
....2	417-0070	CONN,HEADER 4 PIN	1	J1
....2	431-0280	CONN,2PIN,HV,8MM,RT ANGLE,SMD	2	J2, J3
....2	519-0558	PCB, MACH, LCD POWER, FM-IBOC & AM-IBOC, DSG	1	
..1	949-0541-003	ASSY,WIRE HARNESS,FSi/ASi,MB3 (SBCM)	1	
....2	402-0051	TY-RAP, W/FLAG	36	
....2	417-0053	SKT,CONN 641294-1 AMP	3	
....2	417-0138	HSNG,MOD IV 4 POS 87499-7 AMP	2	
....2	417-0142	PIN,.050 DIA 26-22 745254-3	5	
....2	417-0143	SKT,PIN .050 26-22 745253-3	7	
....2	417-0165	HSNG,5POS MOD IV S.ROW 87499-9	1	
....2	417-0224	KEYING PLUG MOD IV 87077 AMP	4	
....2	417-0286	PLUG,2.5 MM FEMALE	1	

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	417-0323	CONNECTOR,TNC BULKHEAD,FOR RG316/U COAXIAL CABLE	1	
....2	417-0402	CONN,20 PIN,DUAL ROW,MINI-FIT,FEMALE	1	
....2	417-0405	CONTACT, CRIMP, 18-24 AWG, FEM	20	
....2	417-0407	CONTACT, MALE, 18-24 AWG, CRIMP	20	
....2	417-0408	CONN, 20 PIN, MALE,	1	
....2	417-0413	Contact FEM 22-28 AWG XHP Series	3	
....2	417-0414	Conn, FEM, 4 Pin	1	
....2	417-0415	Conn, FEM, 5 Pin	1	
....2	417-0900	PLUG,9 PIN STD 205204-3 AMP	1	
....2	417-0901	RCPT,9 PIN STD 205203-3 AMP	2	
....2	417-1003	SKT,CONN 10PIN ANSLEY 622-1030	6	
....2	417-1702	RIGHT ANGLE CRIMP TYPE PLUG,SMB,50 OHM	2	
....2	417-2011	CONN,SOCKET,10 POS, .100 POLARIZED WIREMOUNT"	1	
....2	417-2020	CONN,SOCKET,20 POS, .100 POLARIZED WIREMOUNT"	1	
....2	417-2021	CONN,SOCKET,24 POS, .100 POLARIZED WIREMOUNT"	1	
....2	417-2560	CONN,MINI-DIN,6-POS,SOCKET,PANEL MOUNT	2	
....2	417-2570	CONN,MINI-DIN,6-POS,IN-LINE PLUG	2	
....2	417-2814	PLUG, 8 POS ETHERNET 10BaseT	6	
....2	417-2815	CONN, 9-PIN, FEMALE, IDC, Dsub	2	
....2	417-8030	CONN,PLUG,RT ANG,SMA,HEX CRIMP	2	
....2	417-8766	CONTACT,CRIMP,MOD-IV 87809-1	8	
....2	417-8980	Male Crimp Terminal	4	
....2	417-8981	Male Crimp Housing	1	
....2	418-0034	PLUG,BNC DUAL CRIMP 1-227079-6	1	
....2	418-0240	PLUG,FEM,4PIN	1	
....2	418-4001	CONN,RIBBON CBL,40COND	2	
....2	600-0002	RIBBON CBL,3580-10 ALPHA	6.916	
....2	600-0040	CBL,40COND,28GA,100 ANSLEY	1.333	
....2	601-2209	WIRE,AWG22,19/34 WHT	48.853	
....2	602-2202	WIRE,TW,AWG22,PVC INS,BLK/RED	4.562	
....2	603-2200	WIRE,TW,AWG22,INS,RED-YEL-BLU	1.666	
....2	610-5096	CBL,6 CONDUCTOR,24 AWG,SHIELDED,PVC	3.1	
....2	610-8723	CBL,SH 4 COND #22 ST 8723 BELD	5.166	
....2	621-1359	CBL,COAX,RG316/U,50 OHM	7.166	
....2	622-1245	CBL,ETHERNET,10BASET,CAT5	5.874	
..1	949-0541-300	ASSY,CABLE,ADAPT PWR TO 959-4167-100	1	
....2	417-4303	CONN, CRIMP TERMINAL, FEMALE, 20-24 AWG	2	
....2	417-4364	CONN, RECEPTACLE 2 POS, HEADERS & WIRE HOUSINGS	1	
....2	418-0712	CONN, DC POWER 2.5MM ROUND W/NUT	1	
....2	601-2209	WIRE,AWG22,19/34 WHT	1.167	
....2	611-0938	TUBE, HEAT SHINK, 3/32, BLACK"	0.083	
....2	611-5000	TUB,HT SHK 1/2	0.062	
..1	949-0546	ASSY,CABLE,FAN,FSi/ASi (SBCM)	1	

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	417-8500	PLUG AND CORD ET,AM500 FAN	1	
....2	417-8980	Male Crimp Terminal	2	
....2	417-8981	Male Crimp Housing	1	
..1	949-0548	ASSY, HARN, KIT, AM-IBOC ADD ON (SBCM)	1	
....2	417-0138	HSNG,MOD IV 4 POS 87499-7 AMP	1	
....2	417-8766	CONTACT,CRIMP,MOD-IV 87809-1	2	
....2	417-8980	Male Crimp Terminal	2	
....2	417-8981	Male Crimp Housing	1	
....2	602-2202	WIRE,TW,AWG22,PVC INS,BLK/RED	1	
..1	949-4263-100	VGA CABLE FOR 959-4167-100	1	
..1	959-0252-001	3M SC4 TOUCH SCREEN CONTROLLER BD	1	
..1	959-0376-001	GPS,TIME & FREQUENCY MODULE,FSi/ASi	1	
..1	959-0377-001	MEMORY MODULE,512MB,184-PIN DDR SDRAM DIMM,FSi/ASi	1	
..1	959-0378	MODEM CARD,INTERNAL,56K,PCI,FM-IBOC & AM-IBOC DSG	1	
..1	959-0379-001	AUDIO CARD,2xAES/EBU I/O,ASi/FSi/XPi	1	
..1	959-0382-003	PS,SWITCHING PFC 485W UNIV. IN, FSi/ASi/XPi (NOTE)	1	
..1	959-0383-003	MOTHERBOARD,ATX,800MHz FSB SUPPORT,FSi/ASi/XPi	1	
..1	959-0384-001	HARD DRIVE,80GB,7200 RPM,ULTRA ATA/100,FSi/ASi,MB2	1	
..1	959-0385	SERIAL PORT CARD,PCI,FM-IBOC & AM-IBOC DSG	1	
..1	959-0386	CD-ROM DRIVE,SLIM 24X,INTERNAL MOUNT,BLACK,FM/AM-IBOC DSG	1	
..1	959-0386-001	ADAPTER,SLIMLINE CD TO 40-PIN IDE CONVERTER BOARD	1	
..1	959-0387	KIT,OSD ROTARY	1	
..1	959-4167-100	ALR-1400 FLAT PANEL INTERFACE CONTROLLER	1	
..1	979-0542-AM4	KIT,BINDER AND MANUAL,ASi	1	
....2	597-0542-003	INSTRUCTION MANUAL, ASI 10 GENERATOR, AM-IBOC	1	
....2	598-0010-001	BINDER,1 IN, BLUE,W CD POCKET	1	
....2	979-6025-433	KIT,SOFTWARE CDROM,ASI10,V4.3.2P1	1	
......3	579-0007	CD-CASE CLEAR PLASTIC	1	
......3	597-0125-002	APPLICATION GUIDE,ASI-10 SOFTWARE UPGRADE	1	
......3	701-0018	ANTISTATIC BAG ZIPLOC 9X12 4M	1	
......3	979-6025-AM9	CDROM,ASI10,V4.3.2p1	1	
..1	979-0544	KIT, ASi-10 INSTALLATION, AM-IBOC, DSG	1	
....2	003-1066	CAP,CER,MNLY,.1uF,50V,10% *NOTE*	1	
....2	417-0910	KIT,BACKSHELL FOR 9-PIN D CONN	1	
....2	418-1550-008	CONN,PLUG,8-PIN,CAGE CLAMP,3.81MM SPACING	7	
....2	420-0007	SCREW,12-24 X 3/4,NATURAL SST,TRUSS HD, PHILLIPS DRIVE"	4	
....2	420-0710	SCR,10-32 X 5/8,NATURAL SST,TRUSS HD,PHILLIPS DRIVE"	4	
....2	421-0002	12-24 SPEED NUT (NOTE)	4	

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
....2	550-112	Connector, D-Sub 9 pin male Keltron DN-09PYSH-G	1	
....2	608-1800	CBL,SHLD,AES/EBU,BELDEN 1800B (N)	50	
....2	622-8451	WIRE,BELD 8451,SHIELD,1PR	10	
....2	682-0001	CORD LINE,3 COND,DETACH 7.5FT	1	
....2	682-0003	CORD,PWR EUROPEAN RIGHT ANGLE, 6'	1	
....2	701-0019	ANTISTATIC ZIPLOC BAG 13X18 4M	1	
....2	829-4216	PLUG,FEM XLR, A3F (XLR-3-11C)	5	
....2	829-4217	PLUG,MALE XLR, A3M (XLR-3-12C)	5	
....2	949-0542	ASSY,CABLE,GPS DATA IN/OUT,FSi/ASi (SBCM)	1	
......3	402-0051	TY-RAP, W/FLAG	1	
......3	417-0142	PIN,.050 DIA 26-22 745254-3	4	
......3	417-0143	SKT,PIN .050 26-22 745253-3	4	
......3	417-0900	PLUG,9 PIN STD 205204-3 AMP	1	
......3	417-0901	RCPT,9 PIN STD 205203-3 AMP	1	
......3	417-0910	KIT,BACKSHELL FOR 9-PIN D CONN	2	
......3	610-8723	CBL,SH 4 COND #22 ST 8723 BELD	0.666	
....2	949-0543	ASSY,CABLE,1PPS IN/OUT,FSi/ASi (SBCM)	1	
......3	402-0051	TY-RAP, W/FLAG	1	
......3	418-0034	PLUG,BNC DUAL CRIMP 1-227079-6	2	
......3	621-1359	CBL,COAX,RG316/U,50 OHM	0.333	
....2	949-0547	HARN, KIT AM-IBOC (SBCM)	1	
......3	410-0065	LUG,TERM #6 RING CRIMP #22 AWG	1	
......3	417-0053	SKT,CONN 641294-1 AMP	5	
......3	417-2814	PLUG, 8 POS ETHERNET 10BaseT	1	
......3	418-0034	PLUG,BNC DUAL CRIMP 1-227079-6	4	
......3	418-0670	HOUSING,CONN,6PIN FEM	1	
......3	418-1550-002	CONN,PLUG,2-PIN,CAGE CLAMP,3.81MM SPACING	1	
......3	418-1550-008	CONN,PLUG,8-PIN,CAGE CLAMP,3.81MM SPACING	1	
......3	602-2202	WIRE,TW,AWG22,PVC INS,BLK/RED	1.43	
......3	611-0061	TUB,HT SHK CLEAR 3/64	0.383	
......3	621-1359	CBL,COAX,RG316/U,50 OHM	14.66	
......3	622-1245	CBL,ETHERNET,10BASET,CAT5	1.34	
......3	622-8451	WIRE,BELD 8451,SHIELD,1PR	27.6	
......3	829-4216	PLUG,FEM XLR, A3F (XLR-3-11C)	1	
....2	957-0100	KIT, AM XMTER IBOC CONVERSION	1	
......3	422-6107	SCREW,SEMS 6-32 X 7/16 PAN PH.ST."	2	
......3	441-0152	STOFF,#6-32,MALE/FEM 1/4	2	
......3	597-0125-001	APPLICATION GUIDE,AM TX/ASI,SETUP FOR HD OPERATION	1	
......3	597-0501-001	APPLICATION GUIDE,AM TRANSMITTER C90 REPLACEMENT	1	
......3	919-0560	PCB, ASSY, IBOC BYPASS	1	
........4	003-1066	CAP,CER,MNLY,.1uF,50V,10% *NOTE*	2	C2, C3
........4	003-4743	CAP,CER MNLY,.47uF,50V,10%	1	C1
........4	042-3912	CAP,MICA,39PF,500V,5%	2	C4, C5
........4	100-1041	RES,1K OHM,1/4W,1%	2	R2, R5
........4	103-1007	RES,1 MEG OHM,1/4W,1%,METAL	1	R1
........4	103-4741	RES,4.75K OHM,1/4W,1%,METAL	2	R3, R4

BOM LEVEL	PART NO.	DESCRIPTION	QTY	REF. DES.
.....4	178-5045	RES,TRMR,5K,20T,VERT	1	R6
.....4	203-4148	DIODE,1N4148	4	D1, D2, D3, D4
.....4	221-4132	IC,74HC132N QUAD SCHMITT NAND	1	U1
.....4	417-0259	CONN, BNC PCB MOUNT	2	J1, J3
.....4	417-0677	CONN,PCB MT,6PIN MALE	1	J2
.....4	519-0560	PCB, MACH, AM IBOC BYPASS	1	

8 RF TECHNICAL SERVICES CONTACT INFORMATION

RF Technical Service -

Telephone: **(217) 224-9617**
E-Mail: **rfservice@bdcast.com**
Fax: **(217) 224-6528**
web**:** **www.bdcast.com**

9 Drawings

9.1 Introduction

The following text provides assembly drawings, schematic diagrams, and additional information as indexed below for the ASI AM IBOC Digital Signal Generator.

FIGURE	TITLE	NUMBER
9-1	ASi 10 REAR PANEL CONNECTOR DESCRIPTIONS	597-0541-81
9-2	ASi 10 REMOTE CONTROL INPUTS/OUTPUTS	597-0541-82
9-4	IBOC CONNECTION DIAGRAM, BEI A-SERIES AM TRANSMITTERS	597-0541-77
9-5	IBOC CONNECTION DIAGRAM, BEI E-SERIES AM TRANSMITTERS	597-0541-78
9-6	ASi 10 REAR PANEL	597-0541-79
9-7	SCHEMATIC DIAGRAM, DIGITAL UPCONVERTER, CIRCUIT BOARD	SD919-0548-002
9-8	ASSEMBLY DIAGRAM, DIGITAL UPCONVERTER CIRCUIT BOARD	AD919-0548-002
9-9	SCHEMATIC DIAGRAM, STATION INTERFACE CIRCUIT BOARD	SD919-0549
9-10	ASSEMBLY DIAGRAM, STATION INTERFACE CIRCUIT BOARD	AD919-0549
9-11	SCHEMATIC DIAGRAM, AM SAMPLE RATE CONVERTER CIRCUIT BOARD	SD919-0550
9-12	ASSEMBLY DIAGRAM, AM SAMPLE RATE CONVERTER CIRCUIT BOARD	AD919-0550
9-13	SCHEMATIC DIAGRAM, XLR-TO-BNC I/O INTERFACE CIRCUIT BOARD	SD919-0551
9-14	ASSEMBLY DIAGRAM, AM SAMPLE RATE XLR-TO-BNC I/O INTERFACE CIRCUIT BOARD	AB919-0551
9-15	SCHEMATIC DIAGRAM, RJ-45/USB/DB-9 I/O INTERFACE CIRCUIT BOARD	SD919-0552
9-16	ASSEMBLY DIAGRAM, RJ-45/USB/DB-9 I/O INTERFACE CIRCUIT BOARD	AC919-0552
9-17	SCHEMATIC DIAGRAM, TERMINAL STRIP I/O INTERFACE CIRCUIT BOARD	SD919-0553
9-18	ASSEMBLY DIAGRAM, TERMINAL STRIP I/O INTERFACE CIRCUIT BOARD	AC919-0553
9-19	SCHEMATIC DIAGRAM, FRONT PANEL LED CIRCUIT BOARD	SA919-0557-001
9-20	ASSEMBLY DIAGRAM, FRONT PANEL LED CIRCUIT CIRCUIT BOARD	AA919-0557-001
9-21	SCHEMATIC DIAGRAM, LCD POWER CIRCUIT BOARD	SA919-0558
9-22	ASSEMBLY DIAGRAM, LCD POWER CIRCUIT CIRCUIT BOARD	AA919-0558

ASI REAR–PANEL CONNECTOR DESCRIPTIONS – 597–0541–81.

ASI REAR–PANEL CONNECTOR DESCRIPTIONS (Sheet 1 of 2)			
Function	**Input/Output**	**Description**	**Connector**
1 PPS IN	Input	TTL level, 50 ohm	BNC Female
10 MHz OUT	Output	0 dBm, 50 ohm	BNC Female
SPARE 1	Input/Output	Not Connected	BNC Female
PHASE	Output (50 Ohm) Phase	500 – 1770 kHz	BNC Female
AM OUT	Output (50 Ohm)	–15 dBm FM – 10.7 MHz –25 dBm AM – 500 to 1770 kHz	BNC Female
GPS DATA IN	Input	RS–232	DB9 Male
GPS DATA OUT	Output	RS–232. The GPS data output provides data to the ASI via the GPS DATA IN connector in serial format at 19200 8 N 1. Upon startup, the GPS outputs a packet of information that includes the type and status of the device. The GPS can then be controlled by the ASI. Once the GPS is locked and stable, it provides timing and position information in one second bursts.	DB9 Female
IBOC DATA	Input	RS–232	DB9 Male
AM FM AES IN	Input	AES/EBU Audio	XLR Female
IBOC AES IN	Input	AES/EBU Audio	XLR Female
AM FM AES OUT	Output	AES/EBU Audio	XLR Male
IBOC MONITOR	Output	AES/EBU Audio	XLR Male
IBOC/AM MAG OUT	Output	Balanced Analog Audio 600 ohm pin 5+ ,4 –	RJ45 Female
Phase	Output	RS422 100 ohm	RJ45 Female
LVDS TO IBOC DATA	Output	LVDS ieee1596.3 BaseBand Digital I/Q data 100 ohm Pin 1=FS+, 2=FS–, 4=CLK+, 5=CLK– 7=Data+, 8=Data –	RJ45 Female
I/Q	Output	BaseBand analog I/Q 100 ohm Pin 5=I+, 4=I–, 3=Q+, 6=Q–	RJ45 Female
SPARE 2	Input/Output	Not Connected.	RJ45 Female
ETHERNET	Input/Output	100 MHz Network Connection.	RJ45 Female
MODEM	Input/Output	Two Wire Telephony connection.	RJ11 Female
USB	Input/Output	USB.	Dual USB Female
MOUSE	Input	PS2 Compatible.	PS2
KEYBOARD	Input	PS2 Compatible.	PS2
INPUTS 1 THRU 14	Input	Static Input+ 390 ohm pullup to 5V, All – tied together.	Phoenix 8 pin Female
INPUT15	Input	Static Input+ 390 ohm pullup to 5V, All – tied together. Short + to – for 3 seconds for system reset.	Phoenix 8 pin Female
INPUT 16	Input	Static Input+ 390 ohm pullup to 5V, All – tied together. Short + to – for 3 sec's for a system pwr down repeat for a pwr up.	Phoenix 8 pin Female

ASI REAR–PANEL CONNECTOR DESCRIPTIONS (Sheet 2 of 2)			
OUTPUT 1 THRU 12	Output	Static Output+ 390 ohm pullup to 5V, All – tied together.	Phoenix 8 pin Female
OUTPUT 13 AND 14	Output	Bypass A. Static Outputs SS relay from + to –. Connected to AUDIO BYPASS.	Phoenix 8 pin Female
OUTPUT 15 AND 16	Output	Static Outputs SS relay from + to –.	Phoenix 8 pin Female
AC Power Input	Input	115Vac @ 13 Amps or 230Vac @ 8 Amps	IEC AC input
GPS ANT IN	Input	Power is supplied to the antenna via the center conductor of the coaxial cable. This connection must be made with a single cable and not through any other devices such as an amplifier or splitter/combiner.	TNC
AUDIO BYPASS	Input	Pins 1–2 are connected to pins 13 +/– of the audio bypass A output connector. This provides exciter control of the Audio switching relay.	Phoenix 2 Position Female
STUDIO AES IN	Input	The source (unprocessed) AES signal is supplied via this connector. The AES signal is rate converted to the 44.1kHz sample rate and synchronized to system timing. After the signal is rate converted, it is distributed to 2 XLR males connectors labeled IBOC AES OUT and AM AES OUT.	XLR Female
IBOC AES OUT	Output	See STUDIO AES IN.	XLR Male
AM AES OUT	Output	See STUDIO AES IN.	XLR Male
IBOC/AM MAG IN	Input	An Input to Audio switch A. When the ASI is operating normally, the magnitude signal from the IBOC/AM MAG IN connector is routed to the transmitter via the AM TX AUDIO OUT connector. When an ASI failure ocurrs, the signal from the AM AUDIO IN connector is routed to the transmitter via the AM TX AUDIO OUT connector.	RJ45
AM AUDIO IN	Input	An Input to Audio switch A. When the ASI is operating normally, the magnitude signal from the IBOC/AM MAG IN connector is routed to the transmitter via the AM TX AUDIO OUT connector. When an ASI failure ocurrs, the signal from the AM AUDIO IN connector is routed to the transmitter via the AM TX AUDIO OUT connector.	XLR Female
1PPS OUT	Output	TTL level, one pulse per second signals from the GPS. Pulse width is defaulted to 2ms.	BNC
44.1 kHz WORDCLOCK	Output	Output supplies the *WORD* clock to external devices for synchronization purposes. TTL compatible and stable into 50 ohms.	BNC
10 MHZ OUT	Output	GPS 10MHz sine wave @+3dBm into 50 ohms.	BNC

ASI REMOTE CONTROL INPUTS/OUTPUTS – 597–0541–82.

ASI REMOTE CONTROL INPUTS		
INPUT #	**INPUT NAME**	**SIGNALING METHOD**
1	Digital Carrier On	high–to–low/negative edge
2	Digital Carrier Off	high–to–low/negative edge
3	Audio Ramp Up To Delay	high–to–low/negative edge
4	Audio Ramp Down From Delay	high–to–low/negative edge
5	Audio Delay Increase	high–to–low/negative edge
6	Audio Delay Decrease	high–to–low/negative edge
7	Audio–A Bypass On	high–to–low/negative edge
8	Audio–A Bypass Off	high–to–low/negative edge
9	Audio–B Bypass On	high–to–low/negative edge
10	Audio–B Bypass Off	high–to–low/negative edge
11	Day	high–to–low/negative edge
12	Night	high–to–low/negative edge
13	——	——
14	System Shutdown	high–to–low/negative edge
15	System Power On/Off Toggle	hold low for at least 2 seconds, then high
16	System Reset	hold low for at least 2 seconds, then high

Note: ”Low” or ”Low Voltage” refers to a nominal TTL low logic level (0 volts).
”High” or ”High Voltage” refers to a nominal TTL high logic level (+5 volts).

ASI REMOTE CONTROL OUTPUTS			
OUTPUT #	**OUTPUT NAME**	**LOW VOLTAGE OR CLOSED RELAY**	**HIGH VOLTAGE OR OPEN RELAY**
1	Digital Carrier On/Off Status	Digital Carrier Off	Digital Carrier On
2	Audio Ramp Up/Down Status	Ramping Not Done	Ramping Done
3	Audio Delay In/Decrease Status	In/Decrease Not Done	In/Decrease Done
4	Audio–A Bypass Status	Audio–A Bypass Off	Audio–A Bypass On
5	Audio–B Bypass Status	Audio–B Bypass Off	Audio–B Bypass On
6	Day/Night Status	Night	Day
7	System Shutdown Status	Shutdown Not Done	Shutdown Done
8	System Operational Status	System Not Operational	System Operational
9	System Alarm Status	No System Alarm	System Alarm
10	——	——	——
11	——	——	——
12	——	——	——
13	Audio–A Bypass Status (relay)	Audio–A Bypass Off	Audio–A Bypass On
14	Audio–B Bypass Status (relay)	Audio–B Bypass Off	Audio–B Bypass On
15	——	——	——
16	System Operational Status (relay)	System Operational	System Not Operational

Note: ”Low” or ”Low Voltage” refers to a nominal TTL low logic level (0 volts).
”High” or ”High Voltage” refers to a nominal TTL high logic level (+5 volts).

DIGITAL LINK

DATA OUT

AES/EBU OUT

SEE NOTE 2

GPS ANTENNA

1 PPS OUT

GPS ANT IN

GPS DATA OUT

GPS DATA IN

IBOC DATA

1 PPS IN

10 MHz TO FXi

AM PHASE OUT

10 MHz OUT

AM OUT

AM/FM AES IN

IBOC AES IN

AM/FM AES OUT

IBOC MONITOR

44.1 KHz WORDCLOCK

AUDIO BYPASS

CD ROM

AM AES OUT

IBOC AES OUT

STUDIO AES IN

IBOC/AM MAG IN

AM AUDIO IN

AM TX AUDIO OUT

AUDIO LEVEL ADJ

PHASE

I/Q

IBOC/AM MAG OUT

LVDS TO IBOC DATA

SPARE 2

ETHERNET

MODEM

USB

MOUSE

KEYBOARD

P3

P9

597-0541-77

ASI-10 SIGNAL GENERATOR

J3

J1

J2

J11 EXTERNAL STEREO RF INPUT

IBOC BYPASS CIRCUIT BOARD ASSEMBLY

A-SERIES AM TRANSMITTER ECU CHASSIS

AUDIO PROCESSING

IBOC AES/EBU IN

IBOC AES/EBU OUT

AM AES/EBU IN

AM AES/EBU OUT

AM ANALOG OUT

ANTENNA INTERLOCKS

A — 24

B — 25 +

C — 26 -

XMTR MUTE — 27 GND

LEFT INPUT

FROM AMTX AUDIO OUT ON ASi-10

+5V — 30 — GND

RED

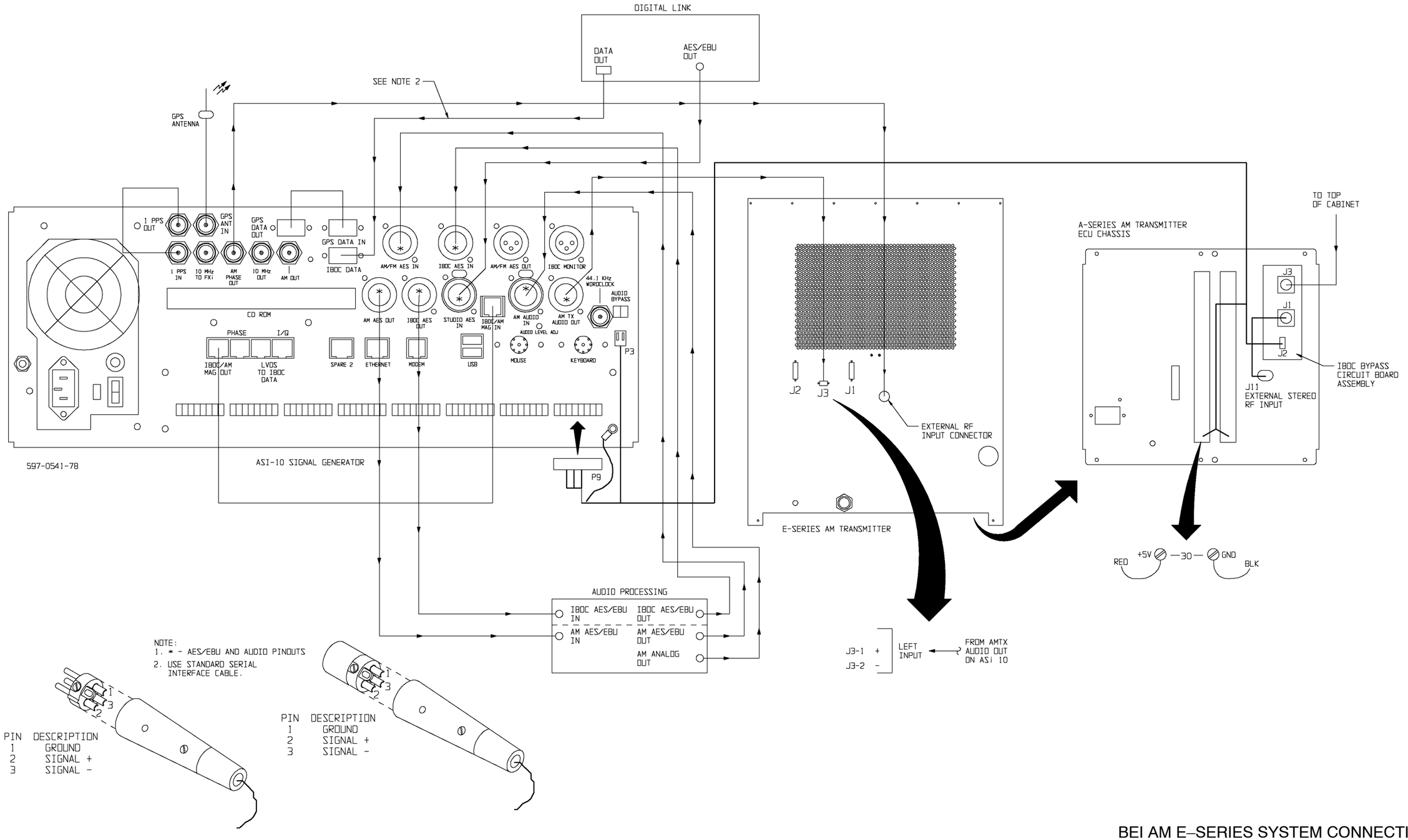
BLK

NOTE:
1. * - AES/EBU AND AUDIO PINOUTS
2. USE STANDARD SERIAL INTERFACE CABLE.

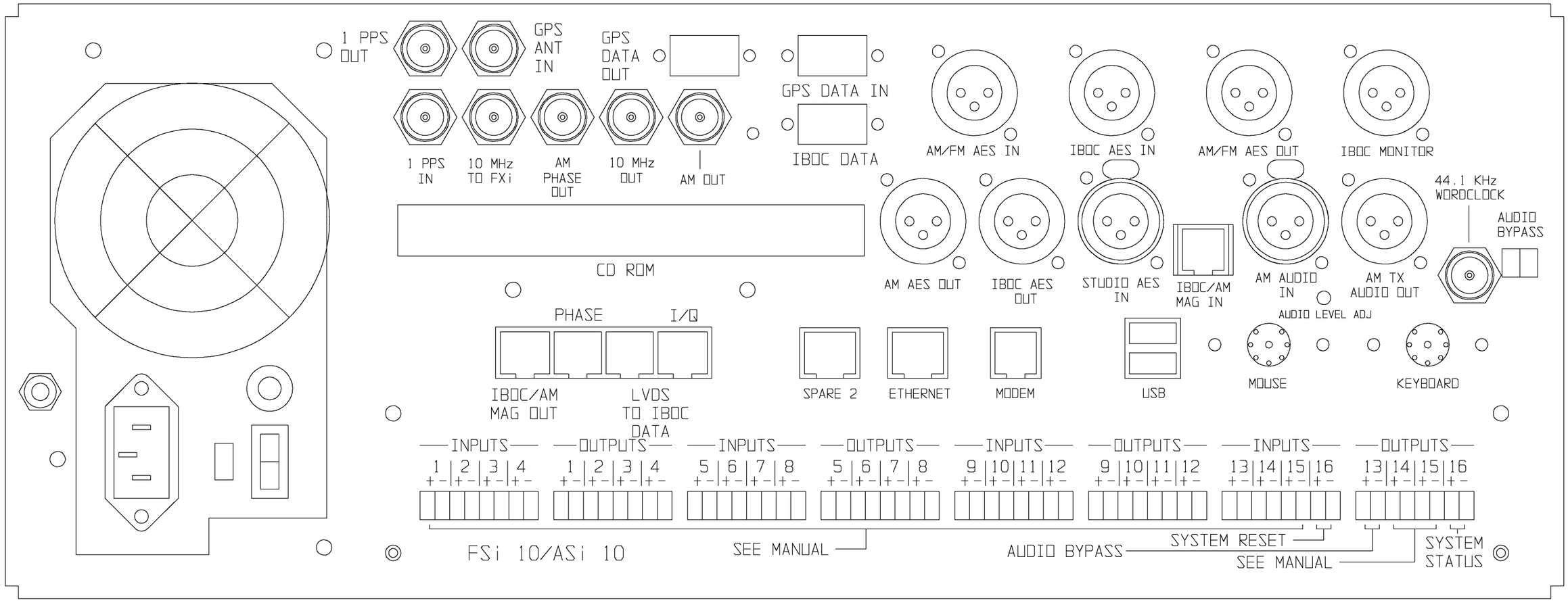
PIN	DESCRIPTION
1	GROUND
2	SIGNAL +
3	SIGNAL -

PIN	DESCRIPTION
1	GROUND
2	SIGNAL +
3	SIGNAL -

BEI AM A–SERIES SYSTEM CONNECTION DIAGRAM
597–0541–77



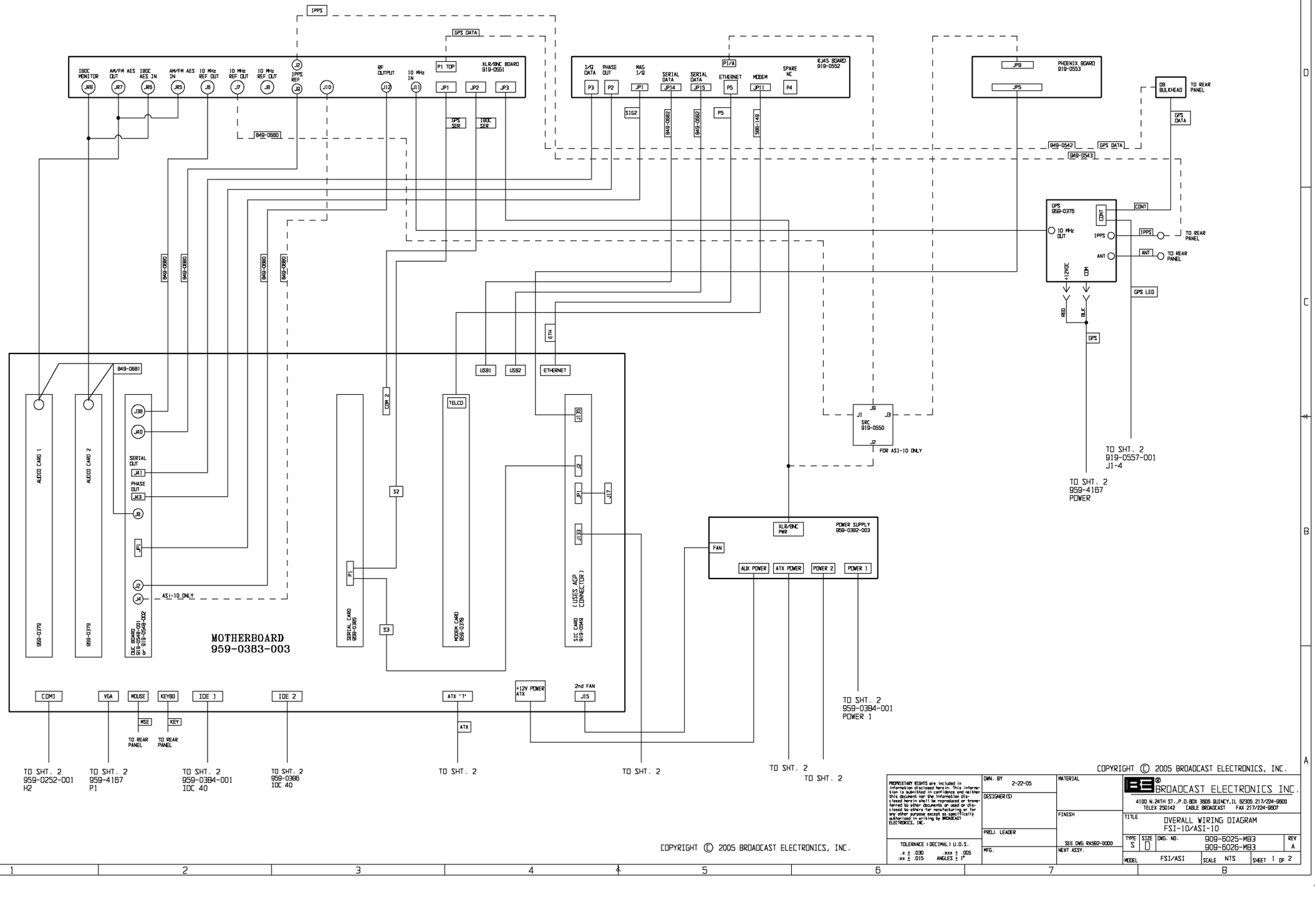
BEI AM E–SERIES SYSTEM CONNECTION DIAGRAM
597–0541–78



ASI-10 SIGNAL GENERATOR

ASI 10 REAR PANEL
597–0541–79

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN



TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY	2-22-05
DESIGNER(S)	
PROJ. LEADER	
MFG.	
MATERIAL	
FINISH	
	SEE DWG #A5812-0000
NEXT ASSY.	

BROADCAST ELECTRONICS INC.
4100 N.24TH ST.,P.O.BOX 3606 QUINCY,IL 62305 217/224-9600
TELEX 250142 CABLE BROADCAST FAX 217/224-9607

TITLE	OVERALL WIRING DIAGRAM FSI-10/ASI-10		
TYPE S	SIZE D	DWG. NO. 909-6025-MB3 909-6026-MB3	REV A
MODEL FSI/ASI	SCALE NTS	SHEET 1 OF 2	

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN

TO SHT. 1
959-0383-003
COM 1

TO SHT. 1
959-0383-003
VGA

TO SHT. 1
959-0383-003
IDE 1

TO SHT. 1
959-0383-003
IDE 2

TO SHT. 1
959-0383-003
ATX

TO SHT. 1
919-0549
SIC CARD
J133

TO SHT. 1
959-0382-003
ATX POWER

TO SHT. 1
959-0382-003
POWER 1

TO SHT. 1
959-0382-003
POWER 2

TO SHT. 1
959-0376
+12VDC/COM

TO SHT. 1
959-0376
CONT

S2

949-0383

TSC SER

DISPLAY 410-0101

H2
H4 TSC H1
959-0252-001

TSC PWR

949-4263

DISPLAY CONTROLLER 959-4157
CN2 CN3 P1 CN8 CN1A CN3J POWER

OSD 959-0387

LCD

J1
J3
J2
LCD PWR 919-0558

DSPY

IOC 40
POWER 1
HARD DRIVE 959-0384-001

IOC 40
POWER 1
CD-ROM 959-0386

LED 919-0557-001
J1
1 +5VSB
2 COM
3
4 GPS

RED
BLK
WHT

TYPICAL
RED
BLK
BLK
YEL
+5V
COM
COM
+12V
BLK
RED

380-0310 FAN
RED
BLK
+12V
COM

RED
BLK
BLK
RED
+5V
COM
COM
+12V
RED
BLK
BLK
YEL

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY 2-22-05
DESIGNER(S)
PROJ. LEADER
MFG.

MATERIAL
FINISH
SEE DWG RA582-0000
NEXT ASSY.

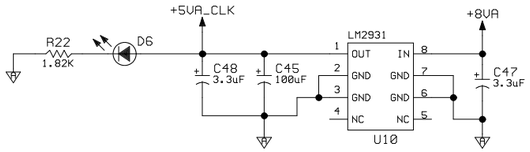
BROADCAST ELECTRONICS INC.
4100 N.24TH ST.,P.O.BOX 3606 QUINCY,IL 62305 217/224-9600
TELEX 250142 CABLE BROADCAST FAX 217/224-9607

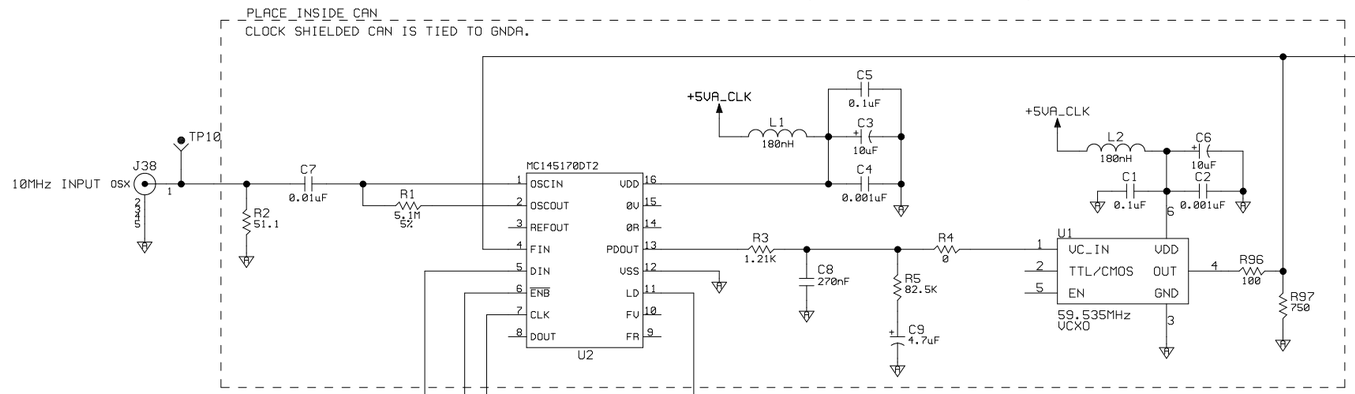
TITLE
OVERALL WIRING DIAGRAM
FSI-10/ASI-10

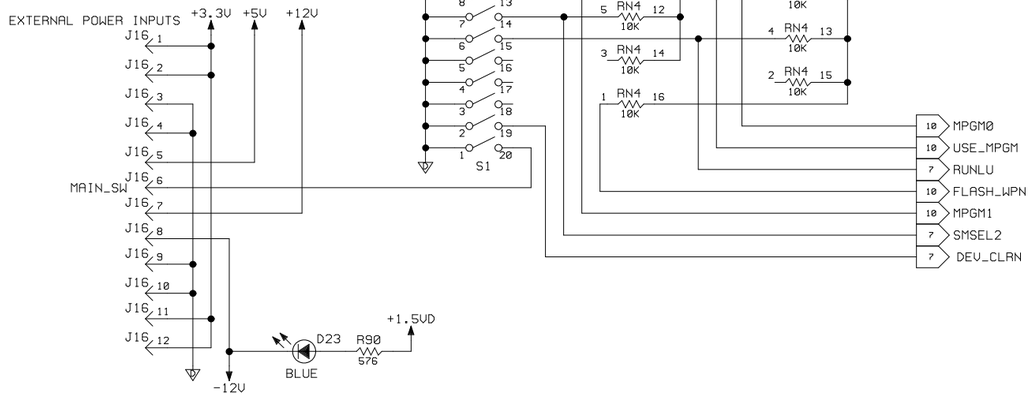
TYPE	SIZE	DWG. NO.	REV
S	D	909-6025-MB3	A
		909-6026-MB3	

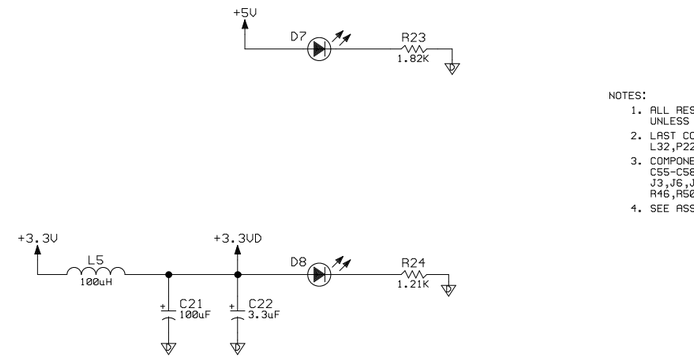
MODEL FSI/ASI SCALE NTS SHEET 2 OF 2

REVISIONS				
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
1	2-3-04	PROTOTYPE RELEASE	KT		----
2	8-25-04	ADD R96 & R97; SEE SHEETS 4,8,10,11 & 12 ALSO	KT		----
3	12-15-04	SEE SHEETS 9 & 12	KT		----
4	1-21-05	SEE SHEETS 3 THRU 12	KT		----
A	2-7-05	EGINEERING RELEASE WITHOUT CHANGE	KT		----
B	11-17-05	CHG'D C23,24,26,30,31,51 TO (070-6864)	JTB		11350









NOTES:

1. ALL RESISTORS IN OHMS; 1/16W, 1% UNLESS OTHERWISE SPECIFIED.
2. LAST COMPONENT USED: C268,D28,J43,JP1, L32,P22,PB2,Q2,RS9,RN7,S2,TP21,U42
3. COMPONENTS NOT USED: C18-C20,C35,C40-C44, C55-C58,C114,C144,C145,C233,C234,D1,D14, J3,J6,J9,J10,J14,J24,J29-J37,J42,L3,L4,L10, R46,R50,R98,P2-P17,U8,U9,U13
4. SEE ASSEMBLY:AC919-0548-002

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY KT 1-14-04
DESIGNER(S)
PROJ. LEADER
MFG.

MATERIAL SEE BOM 919-0548-002
FINISH
NEXT ASSY.

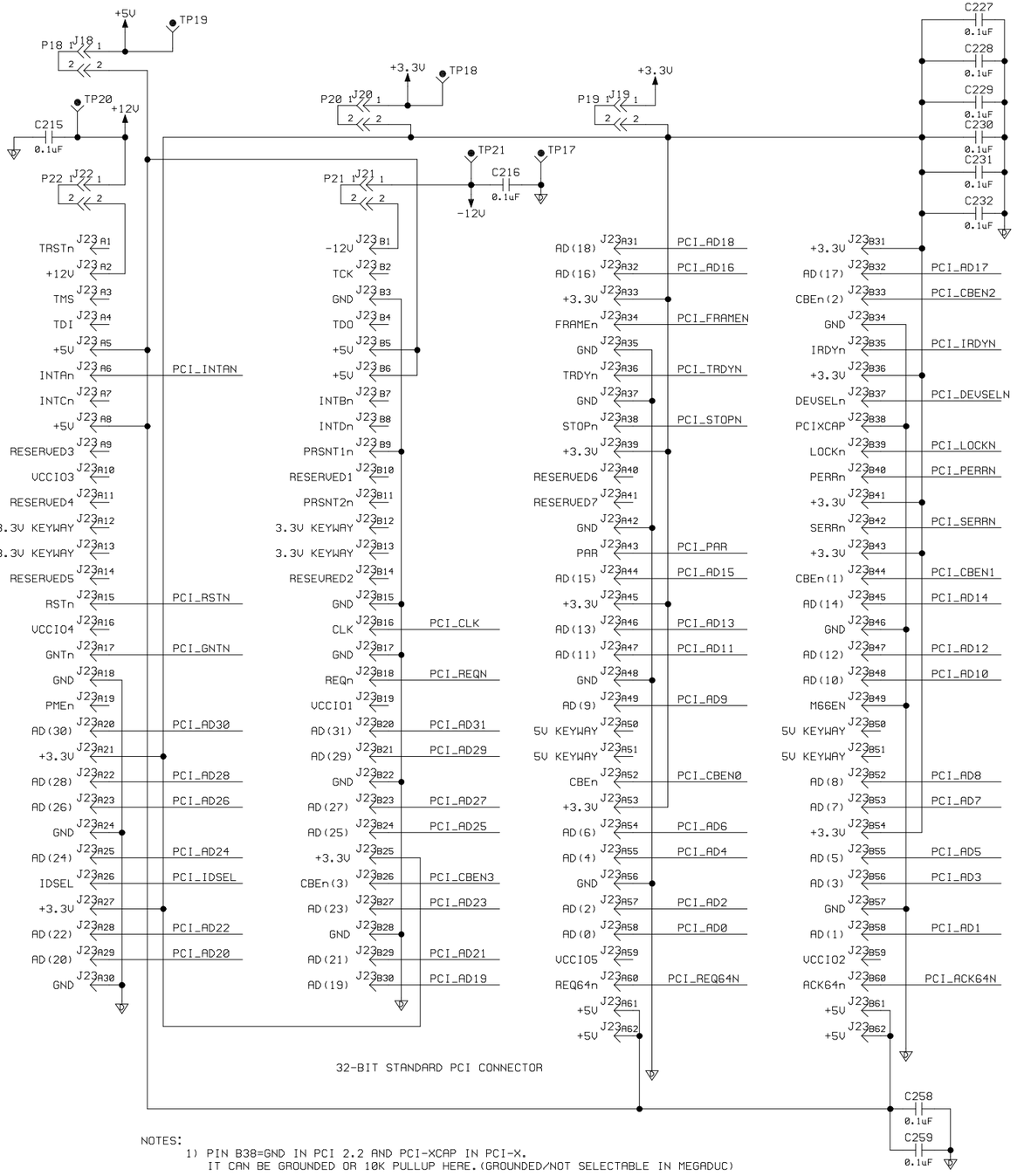
iBiquity Digital
8865 Stanford Boulevard, Suite 202, Columbia, MD 21045
(410) 872-1530 FAX (410) 872-1531

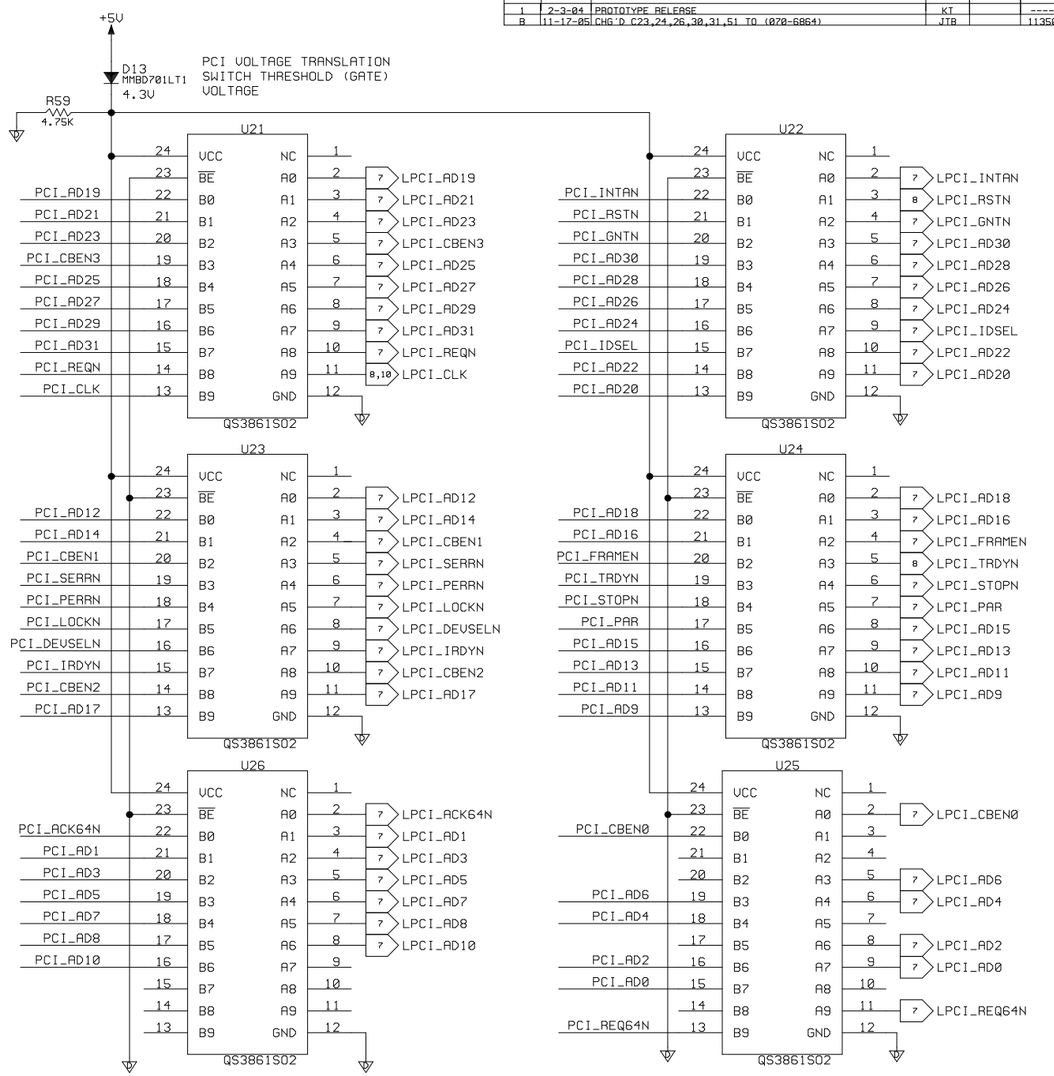
TITLE DIGITAL UPCONVERTOR II

TYPE S | SIZE | DWG. NO. 919-0548-002 | REV B

MODEL NNNN | SCALE NONE | SHEET 1 OF 12

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
1	2-3-04	PROTOTYPE RELEASE	KT		----
B	11-17-05	CHG'D C23,24,26,30,31,51 TO (070-6864)	JTB		11350





NOTES:

1) PIN B38=GND IN PCI 2.2 AND PCI-XCAP IN PCI-X.
   IT CAN BE GROUNDED OR 10K PULLUP HERE.(GROUNDED/NOT SELECTABLE IN MEGADUC)
2) PIN A14=3.3VAUX IN PCI 2.2 BUT IS UNUSED FOR OUR BOARD AND PCI CORE.
3) PINS B9 & B11 ARE POWER REQUIREMENT STRAPPING PINS. WE ARE STRAPPED FOR MAXIMUM 25W POWER.
4) PIN B49 IS M66EN AND IS SELECTABLE 33 OR 66MHz FOR PCI VIA DIP SWITCH (GROUNDED/NOT SELECTABLE IN MEGADUC)
5) PMEn PIN A19 NOT CONNECTED. BOARD DOES NOT SUPPORT POWER MANAGEMENT FEATURES.

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY KT 1-14-04
DESIGNER(S)
PROJ. LEADER
MFG.

MATERIAL SEE BOM 919-0548-002
FINISH
NEXT ASSY.

iBiquity Digital
8865 Stanford Boulevard, Suite 202, Columbia, MD 21045
(410) 872-1530 FAX (410) 872-1531

TITLE DIGITAL UPCONVERTOR II

TYPE S | SIZE | DWG. NO. 919-0548-002 | REV B

MODEL NNNN | SCALE NONE | SHEET 2 OF 12

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
1	2-3-04	PROTOTYPE RELEASE	KT		----
4	1-21-05	CHGD U33 FROM EP1S40F1020 TO EP1S25F1020	KT		----
B	11-17-05	CHG'D C23,24,26,30,31,51 TO (070-6864)	JTB		11350

BANK 1
(3.3V LVTTL)

U33/A

AG28	NC	DIFFIO_TX00n	AF25	12	MAG_DAC_CLK
AH29	NC	DIFFIO_TX00p	AF26		
AH31	NC	DIFFIO_TX01n	AF28	12	MAG_DAC_DATA0
AH32	NC	DIFFIO_TX01p	AF27	12	MAG_DAC_DATA1
AG26	NC	DIFFIO_TX02n	AE26	12	MAG_DAC_DATA2
AG25	NC	DIFFIO_TX02p	AE25	12	MAG_DAC_DATA3
AG29	DIFFIO_RX03n	DIFFIO_TX03n	AE27	12	MAG_DAC_DATA4
AG30	DIFFIO_RX03p	DIFFIO_TX03p	AE28	12	MAG_DAC_DATA5
AG32	DIFFIO_RX04n	DIFFIO_TX04n	AD25	12	MAG_DAC_DATA6
AG31	DIFFIO_RX04p	DIFFIO_TX04p	AD26	12	MAG_DAC_DATA7
AF29	DIFFIO_RX05n	DIFFIO_TX05n	AD27	12	MAG_DAC_DATA8
AF30	DIFFIO_RX05p	DIFFIO_TX05p	AD28	12	MAG_DAC_DATA9
AF31	DIFFIO_RX06n	DIFFIO_TX06n	AC28	12	MAG_DAC_DATA10
AF32	DIFFIO_RX06p	DIFFIO_TX06p	AC27	12	MAG_DAC_DATA11
AE29	DIFFIO_RX07n	DIFFIO_TX07n	AC26	12	MAG_DAC_DATA12
AE30	DIFFIO_RX07p	DIFFIO_TX07p	AC25	12	MAG_DAC_DATA13
AE31	DIFFIO_RX08n	DIFFIO_TX08n	AB26		
AE32	DIFFIO_RX08p	DIFFIO_TX08p	AB27		
AD29	DIFFIO_RX09n	DIFFIO_TX09n	AA26		
AD30	DIFFIO_RX09p	DIFFIO_TX09p	AA27		
AC30	DIFFIO_RX10n	DIFFIO_TX10n	AA24	11	IFRF_DAC_CLK
AC29	DIFFIO_RX10p	DIFFIO_TX10p	AA25		
AD31	DIFFIO_RX11n	DIFFIO_TX11n	Y24	11	IFRF_DAC_DATA0
AD32	DIFFIO_RX11p	DIFFIO_TX11p	Y23	11	IFRF_DAC_DATA1
AC31	DIFFIO_RX12n	DIFFIO_TX12n	W24	11	IFRF_DAC_DATA2
AB32	DIFFIO_RX12p	DIFFIO_TX12p	W23	11	IFRF_DAC_DATA3
PHASE_DAC_CLK 11	AA29	DIFFIO_RX13n/RDN1	DIFFIO_TX13n	Y27	11 IFRF_DAC_DATA4
	AA28	DIFFIO_RX13p/RUP1	DIFFIO_TX13p	Y28	11 IFRF_DAC_DATA5
PHASE_DAC_DATA0 11	AB30	DIFFIO_RX14n	DIFFIO_TX14n	Y25	11 IFRF_DAC_DATA6
PHASE_DAC_DATA1 11	AB31	DIFFIO_RX14p	DIFFIO_TX14p	Y26	11 IFRF_DAC_DATA7
PHASE_DAC_DATA2 11	AA30	DIFFIO_RX15n	DIFFIO_TX15n	V23	11 IFRF_DAC_DATA8
PHASE_DAC_DATA3 11	AA31	DIFFIO_RX15p	DIFFIO_TX15p	V24	11 IFRF_DAC_DATA9
PHASE_DAC_DATA4 11	Y29	DIFFIO_RX16n	DIFFIO_TX16n	W28	11 IFRF_DAC_DATA10
PHASE_DAC_DATA5 11	Y30	DIFFIO_RX16p	DIFFIO_TX16p	W27	11 IFRF_DAC_DATA11
PHASE_DAC_DATA6 11	Y31	DIFFIO_RX17n	DIFFIO_TX17n	W26	11 IFRF_DAC_DATA12
PHASE_DAC_DATA7 11	Y32	DIFFIO_RX17p	DIFFIO_TX17p	W25	11 IFRF_DAC_DATA13
PHASE_DAC_DATA8 11	W29	DIFFIO_RX18n	DIFFIO_TX18n	V27	
PHASE_DAC_DATA9 11	W30	DIFFIO_RX18p	DIFFIO_TX18p	V28	
PHASE_DAC_DATA10 11	W31	DIFFIO_RX19n	DIFFIO_TX19n	V25	
PHASE_DAC_DATA11 11	W32	DIFFIO_RX19p	DIFFIO_TX19p	V26	11 IFRF_ONOFF
PHASE_DAC_DATA12 11	V29	DIFFIO_RX20n	NC	Y22	
PHASE_DAC_DATA13 11	V30	DIFFIO_RX20p	NC	Y21	
	V31	DIFFIO_RX21n	NC	W22	
	V32	DIFFIO_RX21p	NC	W21	
	U27	DIFFIO_RX22n	NC	V22	
PHASE_ONOFF 11	U28	DIFFIO_RX22p	NC	U22	
			NC	AA22	
			NC	AB23	

EP1S25F1020

BANK 3
(3.3V LVTTL)

U33/C

A29	DQ9T0	FCLK0	F22
B29	DQ9T1	FCLK1	G22
B30	DQ9T2		
C29	DQ9T3	RDN3	L19
D29	DQ9T4	RUP3	F21
D28	DQ9T5		
C30	DQ9T6	GPIO_B3_0	K18
E28	DQ9T7	GPIO_B3_1	F19
C28	DQS9T	GPIO_B3_2	F20
		GPIO_B3_3	L18
C26	DQ8T0	GPIO_B3_4	K20
A28	DQ8T1	GPIO_B3_5	H19
A27	DQ8T2	GPIO_B3_6	G20
D26	DQ8T3	GPIO_B3_7	H20
C27	DQ8T4		
B28	DQ8T5		
D27	DQ8T6	GPIO_B3_8	G21
E26	DQ8T7	GPIO_B3_9	F23
B27	DQS8T	GPIO_B3_10	L20
		GPIO_B3_11	J21
D24	DQ7T0	GPIO_B3_12	K21
A25	DQ7T1	GPIO_B3_13	L21
C24	DQ7T2	GPIO_B3_14	H22
B25	DQ7T3	GPIO_B3_15	K22
C25	DQ7T4	GPIO_B3_16	J22
D25	DQ7T5	GPIO_B3_17	L22
A26	DQ7T6		
E24	DQ7T7		
B26	DQS7T	GPIO_B3_18	G23
		GPIO_B3_19	H23
B22	DQ6T0	GPIO_B3_20	F24
C22	DQ6T1	GPIO_B3_21	J24
B23	DQ6T2	GPIO_B3_22	G24
C23	DQ6T3	GPIO_B3_23	J23
A24	DQ6T4	GPIO_B3_24	K23
E22	DQ6T5	GPIO_B3_25	F25
B24	DQ6T6	GPIO_B3_26	F26
D23	DQ6T7	GPIO_B3_27	L23
D22	DQS6T	GPIO_B3_30	K24
		GPIO_B3_31	L24
A20	DQ5T0		
B20	DQ5T1		
C20	DQ5T2		
E20	DQ5T3		
B21	DQ5T4		
C21	DQ5T5		
D21	DQ5T6		
A22	DQ5T7		
D20	DQS5T		

EP1S25F1020

BANK 4
(3.3V LVTTL)

U33/D

A11	DQ4T0	FCLK6	G12
B12	DQ4T1	FCLK7	A14
C12	DQ4T2		
C13	DQ4T3	RDN4	J13
D13	DQ4T4	RUP4	G13
E13	DQ4T5		
A13	DQ4T6	GPIO_B4_0	H11
B13	DQ4T7	GPIO_B4_1	J12
D12	DQS4T	GPIO_B4_2	K12
		GPIO_B4_3	H12
E11	DQ3T0	GPIO_B4_4	K13
B9	DQ3T1	GPIO_B4_5	F12
D10	DQ3T2		
C10	DQ3T3	GPIO_B4_6	F13
A9	DQ3T4	GPIO_B4_7	L14
B11	DQ3T5	GPIO_B4_8	H13
C11	DQ3T6	GPIO_B4_9	C14
B10	DQ3T7	GPIO_B4_10	B14
D11	DQS3T	GPIO_B4_11	H14
		GPIO_B4_12	J15
B7	DQ2T0	GPIO_B4_13	J14
D8	DQ2T1	GPIO_B4_14	K14
B8	DQ2T2	GPIO_B4_15	K15
E9	DQ2T3	GPIO_B4_16	L15
A8	DQ2T4		
C9	DQ2T5	GPIO_B4_17	F7
C8	DQ2T6	GPIO_B4_18	K9
D9	DQ2T7	GPIO_B4_19	F8
A7	DQS2T	GPIO_B4_20	J9
		GPIO_B4_21	M10
D6	DQ1T0	GPIO_B4_22	G9
C6	DQ1T1	GPIO_B4_23	H9
B5	DQ1T2	GPIO_B4_24	L9
C7	DQ1T3	GPIO_B4_25	K11
A5	DQ1T4	GPIO_B4_26	L11
D7	DQ1T5	GPIO_B4_27	J11
A6	DQ1T6	GPIO_B4_28	F9
B6	DQ1T7	GPIO_B4_29	G10
E7	DQS1T	GPIO_B4_30	F10
D5	DQ0T0	NC	F11
C3	DQ0T1	NC	G11
E5	DQ0T2	NC	H10
C4	DQ0T3	NC	J10
D4	DQ0T4	NC	K10
A4	DQ0T5	NC	L10
B4	DQ0T6	NC	M11
B3	DQ0T7	GPIO_B4_38	L12
C5	DQS0T		

EP1S25F1020

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY	KT 1-14-04
DESIGNER(S)	
PROJ. LEADER	
MFG.	
MATERIAL	SEE BOM 919-0548-002
FINISH	
NEXT ASSY.	

iBiquity Digital
8865 Stanford Boulevard, Suite 202, Columbia, MD 21045
(410) 872-1530 FAX (410) 872-1531

TITLE: DIGITAL UPCONVERTOR II

TYPE	SIZE	DWG. NO.	REV
S		919-0548-002	B

MODEL NNNN | SCALE NONE | SHEET 3 OF 12

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
1	2-3-04	PROTOTYPE RELEASE	KT		----
2	9-29-04	ADDED R18,U41,C251,C252	KT		----
4	1-21-05	CHGD C251 TO 0.1uF TO MATCH BOM	KT		----
B	11-17-05	CHG'D C23,24,26,30,31,51 TO (070-6864)	JTB		11350

TEST HEADER

J15 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

U33/B

T31	DIFFIO_RX23n	NC	P22
T32	DIFFIO_RX23p	NC	N22
R29	DIFFIO_RX24n	NC	M22
R30	DIFFIO_RX24p	NC	M23
FIR_GATED_CLOCK 8	R31	DIFFIO_RX25n	DIFFIO_TX25n R26
R32	DIFFIO_RX25p	DIFFIO_TX25p	R25
P32	DIFFIO_RX26n	DIFFIO_TX26n	R24
P31	DIFFIO_RX26p	DIFFIO_TX26p	R23
44.1KHZ_CLK 12	P30	DIFFIO_RX27n	DIFFIO_TX27n P26
P29	DIFFIO_RX27p	DIFFIO_TX27p	P25
N32	DIFFIO_RX28n	DIFFIO_TX28n	R27
N31	DIFFIO_RX28p	DIFFIO_TX28p	R28
CLOCKSYNTH_DCLK 1	N30	DIFFIO_RX29n	DIFFIO_TX29n P27
CLOCKSYNTH_ENA 1	N29	DIFFIO_RX29p	DIFFIO_TX29p P28
CLOCKSYNTH_SDATA 1	M30	DIFFIO_RX30n	DIFFIO_TX30n N26
CLOCKSYNTH_LOCK 1	M31	DIFFIO_RX30p	DIFFIO_TX30p N25
L31	DIFFIO_RX31n	DIFFIO_TX31n	P24
L30	DIFFIO_RX31p	DIFFIO_TX31p	P23
M29	DIFFIO_RX32n/RDN2	DIFFIO_TX32n	N28
M28	DIFFIO_RX32p/RUP2	DIFFIO_TX32p	N27
L32	DIFFIO_RX33n	DIFFIO_TX33n	N23
K31	DIFFIO_RX33p	DIFFIO_TX33p	N24
SYS_RESETN_WATCHDOG 8	J31	DIFFIO_RX34n	DIFFIO_TX34n M25
J32	DIFFIO_RX34p	DIFFIO_TX34p	M24
K29	DIFFIO_RX35n	DIFFIO_TX35n	M27
K30	DIFFIO_RX35p	DIFFIO_TX35p	M26
J30	DIFFIO_RX36n	DIFFIO_TX36n	L26
J29	DIFFIO_RX36p	DIFFIO_TX36p	L27
H32	DIFFIO_RX37n	DIFFIO_TX37n	K25
H31	DIFFIO_RX37p	DIFFIO_TX37p	K26
G32	DIFFIO_RX38n	DIFFIO_TX38n	K27
G31	DIFFIO_RX38p	DIFFIO_TX38p	K28
H29	DIFFIO_RX39n	DIFFIO_TX39n	J26
H30	DIFFIO_RX39p	DIFFIO_TX39p	J25
G30	DIFFIO_RX40n	DIFFIO_TX40n	H26
G29	DIFFIO_RX40p	DIFFIO_TX40p	H25
F32	DIFFIO_RX41n	DIFFIO_TX41n	J28
F31	DIFFIO_RX41p	DIFFIO_TX41p	J27
F30	NC	DIFFIO_TX42n	H27
F29	NC	DIFFIO_TX42p	H28
E31	NC	DIFFIO_TX43n	G27
E32	NC	DIFFIO_TX43p	G28
F28	NC	NC	G26
E29	NC	NC	G25

EP1S25F1020

BANK 2
(3.3V LVTTL)

J39 29.7675MHz OUTPUT OSX 1 SMA

J40 1Hz INPUT OSX 1 SMA

R18 34.1

R14 51.1

J5 1 IDM_IFBC 2 IDM_IFWS 3 4 IDM_IFI1 5 6 IDM_IFQ1 7 8

TP1 TP2 TP3 TP4 TP5 TP6

+3.3VD

C252 0.001uF

C251 0.1uF

I & Q LVDS SERIAL OUTPUT

RJ-45 J41: 9 GND, 1 FS_POS, 2 FS_NEG, 3 START_POS, 4 CLK_POS, 5 CLK_NEG, 6 START_NEG, 7 DATA_POS, 8 DATA_NEG, 10 GND

SN65LVDS31D U41

16	VCC	1A	1
15	4A	1Y	2
14	4Y	1Z	3
13	4Z	G	4
12	$\overline{G}$	2Z	5
11	3Z	2Y	6
10	3Y	2A	7
9	3A	GND	8

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY KT 1-14-04
DESIGNER(S)
PROJ. LEADER
MFG.

MATERIAL SEE BOM 919-0548-002
FINISH
NEXT ASSY.

iBiquity Digital
8865 Stanford Boulevard, Suite 202, Columbia, MD 21045
(410) 872-1530 FAX (410) 872-1531

TITLE: DIGITAL UPCONVERTOR II

TYPE S | SIZE | DWG. NO. 919-0548-002 | REV B

MODEL NNNN | SCALE NONE | SHEET 4 OF 12

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
1	2-3-04	PROTOTYPE RELEASE	KT		----
B	11-17-05	CHG'D C23,24,26,30,31,51 TO (070-6864)	JTB		11350

BANK 5
(3.3V LVTTL)

U33/E

F5	NC	NC	G7
E4	NC	NC	G8
E2	NC	DIFFIO_TX46n	G6
E1	NC	DIFFIO_TX46p	G5
F3	NC	DIFFIO_TX47n	H8
F4	NC	DIFFIO_TX47p	H7
G3	DIFFIO_RX48n	DIFFIO_TX48n	H5
G4	DIFFIO_RX48p	DIFFIO_TX48p	H6
F1	DIFFIO_RX49n	DIFFIO_TX49n	J7
F2	DIFFIO_RX49p	DIFFIO_TX49p	J8
H3	DIFFIO_RX50n	DIFFIO_TX50n	J5
H4	DIFFIO_RX50p	DIFFIO_TX50p	J6
G1	DIFFIO_RX51n	DIFFIO_TX51n	K8
G2	DIFFIO_RX51p	DIFFIO_TX51p	K7
H1	DIFFIO_RX52n	DIFFIO_TX52n	K5
H2	DIFFIO_RX52p	DIFFIO_TX52p	K6
J3	DIFFIO_RX53n	DIFFIO_TX53n	L6
J4	DIFFIO_RX53p	DIFFIO_TX53p	L7
K4	DIFFIO_RX54n	DIFFIO_TX54n	M6
K3	DIFFIO_RX54p	DIFFIO_TX54p	M7
J2	DIFFIO_RX55n	DIFFIO_TX55n	M8
J1	DIFFIO_RX55p	DIFFIO_TX55p	M9
L1	DIFFIO_RX56n	DIFFIO_TX56n	N10
K2	DIFFIO_RX56p	DIFFIO_TX56p	N9
M4	DIFFIO_RX57n/RDN5	DIFFIO_TX57n	N5
M5	DIFFIO_RX57p/RUP5	DIFFIO_TX57p	N6
L2	DIFFIO_RX58n	DIFFIO_TX58n	P9
L3	DIFFIO_RX58p	DIFFIO_TX58p	P10
M2	DIFFIO_RX59n	DIFFIO_TX59n	N7
M3	DIFFIO_RX59p	DIFFIO_TX59p	N8
N3	DIFFIO_RX60n	DIFFIO_TX60n	P6
N4	DIFFIO_RX60p	DIFFIO_TX60p	P5
N1	DIFFIO_RX61n	DIFFIO_TX61n	R10
N2	DIFFIO_RX61p	DIFFIO_TX61p	R9
P3	DIFFIO_RX62n	DIFFIO_TX62n	R5
P4	DIFFIO_RX62p	DIFFIO_TX62p	R6
P1	DIFFIO_RX63n	DIFFIO_TX63n	P7
P2	DIFFIO_RX63p	DIFFIO_TX63p	P8
R3	DIFFIO_RX64n	DIFFIO_TX64n	R7
R4	DIFFIO_RX64p	DIFFIO_TX64p	R8
R1	DIFFIO_RX65n	NC	P11
R2	DIFFIO_RX65p	NC	N11
T2	DIFFIO_RX66n	NC	T11
T1	DIFFIO_RX66p	NC	R11

EP1S25F1020

+3.3VD +5VA +12VA

1	J17	EXGINE SYNC DAC CLOCK
2	J17	+12VA
3	J17	
4	J17	GNDA
5	J17	EXGINE SYNC DAC DATA0
6	J17	+5VA
7	J17	EXGINE SYNC DAC DATA1
8	J17	GNDA
9	J17	EXGINE SYNC DAC DATA2
10	J17	-5VA
11	J17	EXGINE SYNC DAC DATA3
12	J17	GNDA
13	J17	EXGINE SYNC DAC DATA4
14	J17	+3.3VD
15	J17	EXGINE SYNC DAC DATA5
16	J17	GNDD
17	J17	EXGINE SYNC DAC DATA6
18	J17	
19	J17	EXGINE SYNC DAC DATA7
20	J17	
21	J17	EXGINE SYNC DAC DATA8
22	J17	
23	J17	EXGINE SYNC DAC DATA9
24	J17	
25	J17	EXGINE SYNC DAC DATA10
26	J17	
27	J17	EXGINE SYNC DAC DATA11
28	J17	
29	J17	EXGINE SYNC DAC DATA12
30	J17	
31	J17	EXGINE SYNC DAC DATA13
32	J17	
33	J17	
34	J17	
35	J17	EXGINE SYNC CLOCK
36	J17	
37	J17	
38	J17	GNDA
39	J17	EXGINE SYNC PULSE
40	J17	GNDA

EXGINE_SYNC_CLOCK 8

-5VA

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY KT 1-14-04
DESIGNER(S)
PROJ. LEADER
MFG.

MATERIAL SEE BOM 919-0548-002
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TITLE DIGITAL UPCONVERTOR II

TYPE S | SIZE | DWG. NO. 919-0548-002 | REV B

MODEL NNNN | SCALE NONE | SHEET 5 OF 12

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
1	2-3-04	PROTOTYPE RELEASE	KT		-----
B	11-17-05	CHG'D C23,24,26,30,31,51 TO (070-6864)	JTB		11350

BANK 6
(3.3V LVTTL)

MICTOR TEST CONNECTOR 1

SCL	J11	2	V5	DIFFIO_RX67n	NC	W11	
SDA	J11	4	V6	DIFFIO_RX67p	NC	W12	
CLKO	J11	6	V2	DIFFIO_RX68n	NC	Y11	
DO15	J11	8	V1	DIFFIO_RX68p	NC	Y12	
DO14	J11	10	V4	DIFFIO_RX69n	NC	AB10	
DO13	J11	12	V3	DIFFIO_RX69p	NC	AA11	
DO12	J11	14	W2	DIFFIO_RX70n	DIFFIO_TX70n	W8	
DO11	J11	16	W1	DIFFIO_RX70p	DIFFIO_TX70p	W7	
DO10	J11	18	W4	DIFFIO_RX71n	DIFFIO_TX71n	V8	
DO9	J11	20	W3	DIFFIO_RX71p	DIFFIO_TX71p	V7	
DO8	J11	22	Y2	DIFFIO_RX72n	DIFFIO_TX72n	V5	
DO7	J11	24	Y1	DIFFIO_RX72p	DIFFIO_TX72p	V6	
DO6	J11	26					
DO5	J11	28	Y4	DIFFIO_RX73n	DIFFIO_TX73n	V9	
DO4	J11	30	Y3	DIFFIO_RX73p	DIFFIO_TX73p	V10	
DO3	J11	32	AA3	DIFFIO_RX74n	DIFFIO_TX74n	W10	
DO2	J11	34	AA2	DIFFIO_RX74p	DIFFIO_TX74p	W9	
DO1	J11	36	AB3	DIFFIO_RX75n	DIFFIO_TX75n	Y10	
DO0	J11	38	AB2	DIFFIO_RX75p	DIFFIO_TX75p	Y9	
			AA4	DIFFIO_RX76n/RDN6	DIFFIO_TX76n	W5	
5VDC	J11	1	AA5	DIFFIO_RX76p/RUP6	DIFFIO_TX76p	W6	
GND	J11	3	AC2	DIFFIO_RX77n	DIFFIO_TX77n	Y7	
CLKE	J11	5	AB1	DIFFIO_RX77p	DIFFIO_TX77p	Y8	
DE15	J11	7	AD2	DIFFIO_RX78n	DIFFIO_TX78n	Y5	
DE14	J11	9	AD1	DIFFIO_RX78p	DIFFIO_TX78p	Y6	
DE13	J11	11	AD3	DIFFIO_RX79n	DIFFIO_TX79n	AA9	
DE12	J11	13	AD4	DIFFIO_RX79p	DIFFIO_TX79p	AA8	
DE11	J11	15					
DE10	J11	17	AC3	DIFFIO_RX80n	DIFFIO_TX80n	AA6	
DE9	J11	19	AC4	DIFFIO_RX80p	DIFFIO_TX80p	AA7	
DE8	J11	21	AE2	DIFFIO_RX81n	DIFFIO_TX81n	AB7	
DE7	J11	23	AE1	DIFFIO_RX81p	DIFFIO_TX81p	AB6	
DE6	J11	25	AE4	DIFFIO_RX82n	DIFFIO_TX82n	AC7	
DE5	J11	27	AE3	DIFFIO_RX82p	DIFFIO_TX82p	AC8	
DE4	J11	29	AF2	DIFFIO_RX83n	DIFFIO_TX83n	AC5	
DE3	J11	31	AF1	DIFFIO_RX83p	DIFFIO_TX83p	AC6	
DE2	J11	33	AF4	DIFFIO_RX84n	DIFFIO_TX84n	AD8	
DE1	J11	35	AF3	DIFFIO_RX84p	DIFFIO_TX84p	AD7	
DE0	J11	37	AG1	DIFFIO_RX85n	DIFFIO_TX85n	AE6	
			AG2	DIFFIO_RX85p	DIFFIO_TX85p	AE5	
			AG4	DIFFIO_RX86n	DIFFIO_TX86n	AD6	
			AG3	DIFFIO_RX86p	DIFFIO_TX86p	AD5	
			AG7	NC	DIFFIO_TX87n	AE7	
			AG8	NC	DIFFIO_TX87p	AE8	
			AH2	NC	DIFFIO_TX88n	AF5	
			AH1	NC	DIFFIO_TX88p	AF6	
			AG5	NC	DIFFIO_TX89n	AF8	
			AH4	NC	DIFFIO_TX89p	AF7	
			AB9	NC	NC	AC10	

U33/F

EP1S25F1020

TIE MOUNTING PINS TO GNDD

MICTOR TEST CONNECTOR 2

2	J12	SCL	
4	J12	SDA	
6	J12	CLKO	
8	J12	DO15	
10	J12	DO14	
12	J12	DO13	
14	J12	DO12	
16	J12	DO11	
18	J12	DO10	
20	J12	DO9	
22	J12	DO8	
24	J12	DO7	
26	J12	DO6	
28	J12	DO5	
30	J12	DO4	
32	J12	DO3	
34	J12	DO2	
36	J12	DO1	
38	J12	DO0	
1	J12	5VDC	
3	J12	GND	
5	J12	CLKE	
7	J12	DE15	
9	J12	DE14	
11	J12	DE13	
13	J12	DE12	
15	J12	DE11	
17	J12	DE10	
19	J12	DE9	
21	J12	DE8	
23	J12	DE7	
25	J12	DE6	
27	J12	DE5	
29	J12	DE4	
31	J12	DE3	
33	J12	DE2	
35	J12	DE1	
37	J12	DE0	

TIE MOUNTING PINS TO GNDD

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY KT 1-14-04
DESIGNER(S)
PROJ. LEADER
MFG.

MATERIAL SEE BOM
919-0548-002
FINISH
NEXT ASSY.

iBiquity Digital
8865 Stanford Boulevard, Suite 202, Columbia, MD 21045
(410) 872-1530 FAX (410) 872-1531

TITLE DIGITAL UPCONVERTOR II

TYPE S | SIZE | DWG. NO. 919-0548-002 | REV B

MODEL NNNN | SCALE NONE | SHEET 6 OF 12

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
1	2-3-04	PROTOTYPE RELEASE	KT		----
4	1-21-05	CHGD D15 & D16 TO RED TO MATCH BOM	KT		----
B	11-17-05	CHG'D C23,24,26,30,31,51 TO (070-6864)	JTB		11350

RS232 ACTIVITY LEDS

TX D15 RED

RX D16 RED

R81 200 1/10W

R82 200 1/10W

RS232 LEVEL SHIFTER

U34

LTC1386

C128 0.1uF

C127 0.1uF

C131 0.1uF

C130 0.1uF

C129 0.1uF

FEMALE RS232 DCE CONNECTOR

J28

RS232_DCE_RXD

RS232_DCE_TXD

GNDD

RS232_DCE_RTS

RS232_DCE_CTS

BANK 7

(3.3V PCI & 3.3V LVTTL)

U33/G

EP1S25F1020

LPCI_AD31 LPCI_REQN LPCI_AD26 LPCI_AD27 LPCI_AD30 LPCI_INTAN CPLD_USER0 LPCI_GNTN LPCI_AD28

LPCI_CBEN3 LPCI_IDSEL LPCI_AD29 LPCI_AD21

LPCI_AD20 LPCI_AD25 LPCI_AD24 LPCI_CBEN2

LPCI_AD22 LPCI_AD19 LPCI_AD23 LPCI_PERRN LPCI_AD18 LPCI_AD14 LPCI_LOCKN LPCI_AD17 LPCI_AD16

LPCI_AD7 LPCI_AD12 LPCI_DEVSELN LPCI_FRAMEN LPCI_AD13 LPCI_AD9 LPCI_AD8 LPCI_STOPN CPLD_CSN

LPCI_AD10 LPCI_AD3 LPCI_AD2

LPCI_AD1

FCLK4 FCLK5 RDN7 RUP7

GPIO_B7_0 LPCI_AD0

GPIO_B7_1 LPCI_REQ64N

GPIO_B7_2

GPIO_B7_3 LPCI_ACK64N

GPIO_B7_4 LPCI_AD4

GPIO_B7_5 LPCI_AD5

GPIO_B7_6 LPCI_CBEN0

GPIO_B7_7 LPCI_AD11

GPIO_B7_8 LPCI_AD6

GPIO_B7_9 LPCI_CBEN1

GPIO_B7_10

GPIO_B7_11 LPCI_AD15

GPIO_B7_12 LPCI_PAR

GPIO_B7_13 LPCI_SERRN

GPIO_B7_14

GPIO_B7_15

GPIO_B7_16

GPIO_B7_17

GPIO_B7_18

GPIO_B7_19

GPIO_B7_20 CPLD_USER1

GPIO_B7_21

GPIO_B7_22

GPIO_B7_23

GPIO_B7_24

GPIO_B7_25

GPIO_B7_26

GPIO_B7_27 LPCI_IRDYN

GPIO_B7_28

GPIO_B7_29

GPIO_B7_30

GPIO_B7_31

NC

RN1 10K

U33/I

EP1S25F1020

EP1S_CONF_DONE EP1S_NCONFIG EP1S_NSTATUS EP1S_INIT_DONE

DCLK

FLASH_D0 FLASH_D1 FLASH_D2 FLASH_D3 FLASH_D4 FLASH_D5 FLASH_D6 FLASH_D7

CLKUSR CONF_DONE nCONFIG nSTATUS INIT_DONE DCLK DATA0 DATA1 DATA2 DATA3 DATA4 DATA5 DATA6 DATA7

CS nCS nWS nRS RDYnBSY PORSEL nIO_PULLUP VCCSEL nCE

TRST TCK TDI TDO TMS PGM2 PGM1 PGM0 MSEL0 MSEL1 MSEL2 RUnLU CRC_ERROR DEV_CLRn/IO7 DEV_OE NC NC nCEO

JTAG_TCK JTAG_STATIX_TDO JTAG_TMS JTAG_MAX_TDO JTAG_MAX_TDI

R85 0

SPGM2 SPGM1 SPGM0

SMSEL0 SMSEL1 SMSEL2

R86 0

R87 0

RUNLU

CRC_ERROR

DEV_CLRN

PLL_ENA

BYTE BLASTER PROGRAMMING HEADER

J13

JTAG CHAIN DEVICE ORDER:
1) MAX 3K
2) STRATIX

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY KT 1-14-04

DESIGNER(S)

PROJ. LEADER

MFG.

MATERIAL SEE BOM 919-0548-002

FINISH

NEXT ASSY.

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8865 Stanford Boulevard, Suite 202, Columbia, MD 21045
(410) 872-1530 FAX (410) 872-1531

TITLE DIGITAL UPCONVERTOR II

TYPE S | SIZE | DWG. NO. 919-0548-002 | REV B

MODEL NNNN | SCALE NONE | SHEET 7 OF 12

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
1	2-3-04	PROTOTYPE RELEASE	KT		----
2	7-21-04	ADDED J1 & P1	KT		----
B	11-17-05	CHG'D C23,24,26,30,31,51 TO (070-6864)	JTB		11350

BANK 8
(3.3V PCI & 3.3V LVTTL)

U33/H

AM20	DQ5B0	FCLK2	AF21
AL20	DQ5B1	FCLK3	AE21
AK20	DQ5B2		
AH20	DQ5B3	RDN8	AC20
AL21	DQ5B4	RUP8	AH19
AK21	DQ5B5		
AJ21	DQ5B6		
AM22	DQ5B7	GPIO_B8_0	AB19
AJ20	DQS5B	GPIO_B8_1	AD20
		GPIO_B8_2	AG21
AL22	DQ6B0	GPIO_B8_3	AG20
AK22	DQ6B1	GPIO_B8_4	AE20
AL23	DQ6B2	GPIO_B8_5	AD19
AK23	DQ6B3	GPIO_B8_6	AJ18
AM24	DQ6B4	GPIO_B8_7	AH18
AH22	DQ6B5	GPIO_B8_8	AK18
AL24	DQ6B6		
AJ23	DQ6B7		
AJ22	DQ61B	GPIO_B8_9	AA21
		GPIO_B8_10	AB21
AM26	DQ7B0	GPIO_B8_11	AD22
AM25	DQ7B1	GPIO_B8_12	AC21
AK24	DQ7B2	GPIO_B8_13	AG23
AL25	DQ7B3	GPIO_B8_14	AD21
AK25	DQ7B4	GPIO_B8_15	AF22
AJ25	DQ7B5	GPIO_B8_16	AB20
AJ24	DQ7B6	GPIO_B8_17	AG22
AH24	DQ7B7		
AL26	DQS7B		
		GPIO_B8_18	AB24
AK26	DQ8B0	GPIO_B8_19	AC24
AM28	DQ8B1	GPIO_B8_20	AC23
AM27	DQ8B2	GPIO_B8_21	AD24
AJ26	DQ8B3	GPIO_B8_22	AD23
AK27	DQ8B4	GPIO_B8_23	AE24
AL28	DQ8B5	GPIO_B8_24	AE23
AJ27	DQ8B6	GPIO_B8_25	AF24
AH26	DQ8B7	GPIO_B8_26	AC22
AL27	DQS8B	GPIO_B8_27	AG24
		GPIO_B8_28	AB22
AM29	DQ9B0	GPIO_B8_29	AF23
AL29	DQ9B1		
AL30	DQ9B2	NC	AE22
AK29	DQ9B3		
AJ29	DQ9B4		
AJ28	DQ9B5		
AK30	DQ9B6		
AH28	DQ9B7		
AK28	DQS9B		

EP1S25F1020

FLASH_A21, FLASH_A20, FLASH_A19, FLASH_A18, FLASH_A17
FLASH_A16, FLASH_A15, FLASH_A14, FLASH_A13, FLASH_A12, FLASH_A11, FLASH_A10, FLASH_A9, FLASH_A8
FLASH_OEN, FLASH_WEN, FLASH_CEN, FLASH_A0, FLASH_A1, FLASH_A2, FLASH_A3, FLASH_A4, FLASH_A5
USER_LED7, USER_LED6, USER_LED5, USER_LED4, USER_LED3, USER_LED2, USER_LED1, USER_LED0
FLASH_A6, FLASH_A7
FLASH_D15, FLASH_D14, FLASH_D13, FLASH_D12, FLASH_D11, FLASH_D10, FLASH_D9, FLASH_D8
OVERTEMPN, ALERTN, SMB_CLK, SMB_DATA

SYS_RESETN

U37
DS1819A
RST, GND, PBRST, VCC, STROBE
+3.3VD

PB1
BUTTON RESETS BOARD AND RELOADS STRATIX FPGA FROM FLASH

PB2
BUTTON RESETS LOGIC INTERNAL TO STRATIX FPGA

SYS_RESETN_WATCHDOG
J1
P1

RN6 10K
RN7 10K

USER DIPSWITCH
S2
USER DIPSW0, USER DIPSW1, USER DIPSW2, USER DIPSW3, USER DIPSW4, USER DIPSW5, USER DIPSW6, USER DIPSW7

U33/J

T30	CLK0n	PLL7	PLL5_OUT0n A16
T29	CLK0p		PLL5_OUT0p B16
T28	CLK1n	PLL1	
T27	CLK1p		PLL5_OUT1n A17
U32	CLK2n	PLL8	PLL5_OUT1p B17
U31	CLK2p		
U30	CLK3n	PLL2	PLL5_OUT2n A18
U29	CLK3p		PLL5_OUT2p B18
AL19	CLK4n	PLL6	PLL5_OUT3n C18
AM19	CLK4p		PLL5_OUT3p D18
AJ19	CLK5n		
AK19	CLK5p		PLL6_OUT0n AM16
AJ15	CLK6n	PLL12	PLL6_OUT0p AL16
AK15	CLK6p		
AL15	CLK7n		PLL6_OUT1n AK16
AM15	CLK7p		PLL6_OUT1p AJ16
U3	CLK8n	PLL9	PLL6_OUT2n AK17
U4	CLK8p		PLL6_OUT2p AJ17
U1	CLK9n	PLL3	
U2	CLK9p		PLL6_OUT3n AM18
T5	CLK10n	PLL10	PLL6_OUT3p AL18
T6	CLK10p		
T3	CLK11n	PLL4	
T4	CLK11p		
A15	CLK12n	PLL11	
B15	CLK12p		
C15	CLK13n		
D15	CLK13p		
B19	CLK14n	PLL5	
A19	CLK14p		
D19	CLK15n		
C19	CLK15p		
AB29	NC		
AB28	NC		
L28	NC		
L29	NC		
L5	NC		
L4	NC		
AB4	NC		
AB5	NC		
AF19	PLL_ENA		
C17	PLL5_FBn		
D17	PLL5_FBp		
AM17	PLL6_FBn		
AL17	PLL6_FBp		

EP1S25F1020

59.535MHZ_CLK, FIR_GATED_CLOCK, EXGINE_SYNC_CLOCK, PLL_ENA
LPCI_RSTN, CLK_OSC_A, LPCI_TRDYN, LPCI_CLK
R80 30.1 1/10W

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY KT 1-14-04
DESIGNER(S)
PROJ. LEADER
MFG.

MATERIAL SEE BOM 919-0548-002
FINISH
NEXT ASSY.

iBiquity Digital
8865 Stanford Boulevard, Suite 202, Columbia, MD 21045
(410) 872-1530 FAX (410) 872-1531

TITLE: DIGITAL UPCONVERTOR II

TYPE S | SIZE | DWG. NO. 919-0548-002 | REV B

MODEL NNNN | SCALE NONE | SHEET 8 OF 12

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
1	2-3-04	PROTOTYPE RELEASE	KT		-----
3	12-15-04	DELETED L16,L18,L21,L23,L25; TIED GNDA TO GNDD	KT		-----
B	11-17-05	CHG'D C23,24,26,30,31,51 TO (070-6864)	JTB		11350

PLACE UNDER U33

C253 4.7uF
C254 4.7uF
C235 0.1uF
C236 0.1uF
C237 0.1uF
C238 0.1uF
C239 0.1uF
C240 0.1uF
C241 0.1uF
C242 0.1uF
C243 0.1uF
C244 0.1uF
C217 0.1uF
C218 0.1uF
C219 0.1uF
C220 0.1uF
C221 0.1uF
C222 0.1uF
C223 0.1uF
C224 0.1uF
C225 0.1uF
C226 0.1uF

+1.5VD

C134 100uF
L20 60_OHM 6A

+3.3VD

R91 64.9 1/10W
R92 309 1/10W
SB5100 D28
C133 100uF
U38 MIC29502BU
EN TAB VI ADJ GND VO
+1.5V @ 5A

C182 100uF
R93 200 1/10W
C185 0.1uF

U39 TEMPERATURE SENSE
MAX1619
NC STBY SMBCLK NC SMBDATA ALERT ADD0 OVERT
VCC GND1 DXP DXN NC ADD1 GND2 GND3
SMB_CLK 8
SMB_DATA 8
ALERTN 8,10
OVERTEMPN 8,10

U33/K

M12	VCCINT1	GND1	H24
M14	VCCINT2	GND2	AA16
M19	VCCINT3	GND3	AA17
M21	VCCINT4	GND4	AC1
N13	VCCINT5	GND5	AC32
N15	VCCINT6	GND6	AL1
N18	VCCINT7	GND7	AL2
N20	VCCINT8	GND8	AL31
P12	VCCINT9	GND9	AL32
P14	VCCINT10	GND10	AM10
P16	VCCINT11	GND11	AM2
P17	VCCINT12	GND12	AM23
P19	VCCINT13	GND13	AM31
P21	VCCINT14	GND14	B1
R13	VCCINT15	GND15	B2
R15	VCCINT16	GND16	B31
R18	VCCINT17	GND17	B32
R20	VCCINT18	GND18	K1
T14	VCCINT19	GND19	K32
T16	VCCINT20	GND20	M13
T17	VCCINT21	GND21	M15
T19	VCCINT22	GND22	M16
U14	VCCINT23	GND23	M17
U16	VCCINT24	GND24	AD17
U17	VCCINT25	GND25	AF17
U19	VCCINT26	GND26	J17
V13	VCCINT27	GND27	H18
V15	VCCINT28	GND28	M18
V18	VCCINT29	GND29	M20
V20	VCCINT30	GND30	N12
W14	VCCINT31	GND31	N14
W16	VCCINT32	GND32	N16
W17	VCCINT33	GND33	N17
W19	VCCINT34	GND34	N19
Y13	VCCINT35	GND35	N21
Y15	VCCINT36	GND36	P13
Y18	VCCINT37	GND37	P15
Y20	VCCINT38	GND38	P18

F18 TEMPDIODEn
E18 TEMPDIODEp

T25	VCCA_PLL1	GNDA_PLL1	T26
U25	VCCA_PLL2	GNDA_PLL2	U26
U8	VCCA_PLL3	GNDA_PLL3	U7
T8	VCCA_PLL4	GNDA_PLL4	T7
G17	VCCA_PLL5	GNDA_PLL5	F17
AG17	VCCA_PLL6	GNDA_PLL6	AH17
D31	NC	NC	D32
AJ31	NC	NC	AJ32
AJ2	NC	NC	AJ1
D2	NC	NC	D1
E16	NC	NC	E17
AG16	NC	NC	AH16
R22	VCCG_PLL1	GNDG_PLL1	T22
U24	VCCG_PLL2	GNDG_PLL2	T24
V11	VCCG_PLL3	GNDG_PLL3	U11
T9	VCCG_PLL4	GNDG_PLL4	U9
J16	VCCG_PLL5	GNDG_PLL5	L16
AD16	VCCG_PLL6	GNDG_PLL6	AB16
D30	NC	NC	E30
AJ30	NC	NC	AH30
AJ3	NC	NC	AH3
D3	NC	NC	E3
H16	NC	NC	H15
AF16	NC	NC	AE16

EP1S25F1020

L31 L32 L27 L29 L28 L30 600_OHM 1.5A

C174 C175 C176 C177 C178 C179 C180 C181 C136 C137 C138 C139 C156 C157 C158 C159 C140 C141 C142 C143 C160 C161 C162 C163
2.2uF 0.1uF 0.01uF 0.001uF

U33/L

P20	GND39	VCCIO1_1	AA32
B14	GND40	VCCIO1_2	AK31
R16	GND41	VCCIO1_3	AK32
R17	GND42	VCCIO1_4	U23
R19	GND43	VREF2B1	AB25
T12	GND44	VREF1B1	AA23
T13	GND45	VREF0B1	V21
T15	GND46		
T18	GND47	VCCIO2_1	C31
T20	GND48	VCCIO2_2	C32
T21	GND49	VCCIO2_3	M32
U12	GND50	VCCIO2_4	T23
U13	GND51	NC	R21
U15	GND52	VREF1B2	L25
U18	GND53	VREF0B2	F27
U20	GND54		
U21	GND55	VCCIO3_1	A21
V14	GND56	VCCIO3_2	A30
V16	GND57	VCCIO3_3	K17
V17	GND58	NC	E27
V19	GND59	VREF2B3	E25
W13	GND60	VREF1B3	E23
W15	GND61	VREF0B3	E21
W18	GND62		
W20	GND63	VCCIO4_1	A12
Y14	GND64	VCCIO4_2	A3
Y16	GND65	VCCIO4_3	K16
Y17	GND66	NC	E12
Y19	GND67	VREF2B4	E10
A10	GND68	VREF1B4	E8
A2	GND69	VREF0B4	E6
A23	GND70		
A31	GND71	VCCIO5_1	C1
		VCCIO5_2	C2
		VCCIO5_3	M1
		VCCIO5_4	T10
		NC	F6
		VREF1B5	L8
		VREF0B5	R12
		VCCIO6_1	AA1
		VCCIO6_2	AK1
		VCCIO6_3	AK2
		VCCIO6_4	U10
		VREF2B6	AA10
		VREF1B6	AB8
		VREF0B6	AG6
		VCCIO7_1	AC16
		VCCIO7_2	AM12
		VCCIO7_3	AM3
		NC	AH6
		VREF2B7	AH8
		VREF1B7	AH10
		VREF0B7	AH12
		VCCIO8_1	AC17
		VCCIO8_2	AM21
		VCCIO8_3	AM30
		NC	AH21
		VREF2B8	AH23
		VREF1B8	AH25
		VREF0B8	AH27

EP1S25F1020

+3.3VD

H17 VCC_PLL5_OUTA
L17 VCC_PLL5_OUTB
AE17 VCC_PLL6_OUTA
AB17 VCC_PLL6_OUTB

C146 C147 C148 C149 C150 C151 C152 C153 C154 C155 C164 C165 C166 C167 C168 C169 C170 C171 C172 C173 C184 C185 C186 C187 C188 C189 C190 C191 C192 C193 C194 C195 C196 C197 C198 C199 C200 C201 C202 C203
0.1uF

C183 100uF
C245 0.1uF
C246 0.01uF
C247 0.1uF
C248 0.01uF

PLACE C245 & C246 CLOSE TO VCCIO5

PLACE C247 & C248 CLOSE TO VCCIO6

L17 L19 L22 L24 L26 600_OHM 1.5A

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY KT 1-14-04
DESIGNER(S)
PROJ. LEADER
MFG.

MATERIAL SEE BOM 919-0548-002
FINISH
NEXT ASSY.

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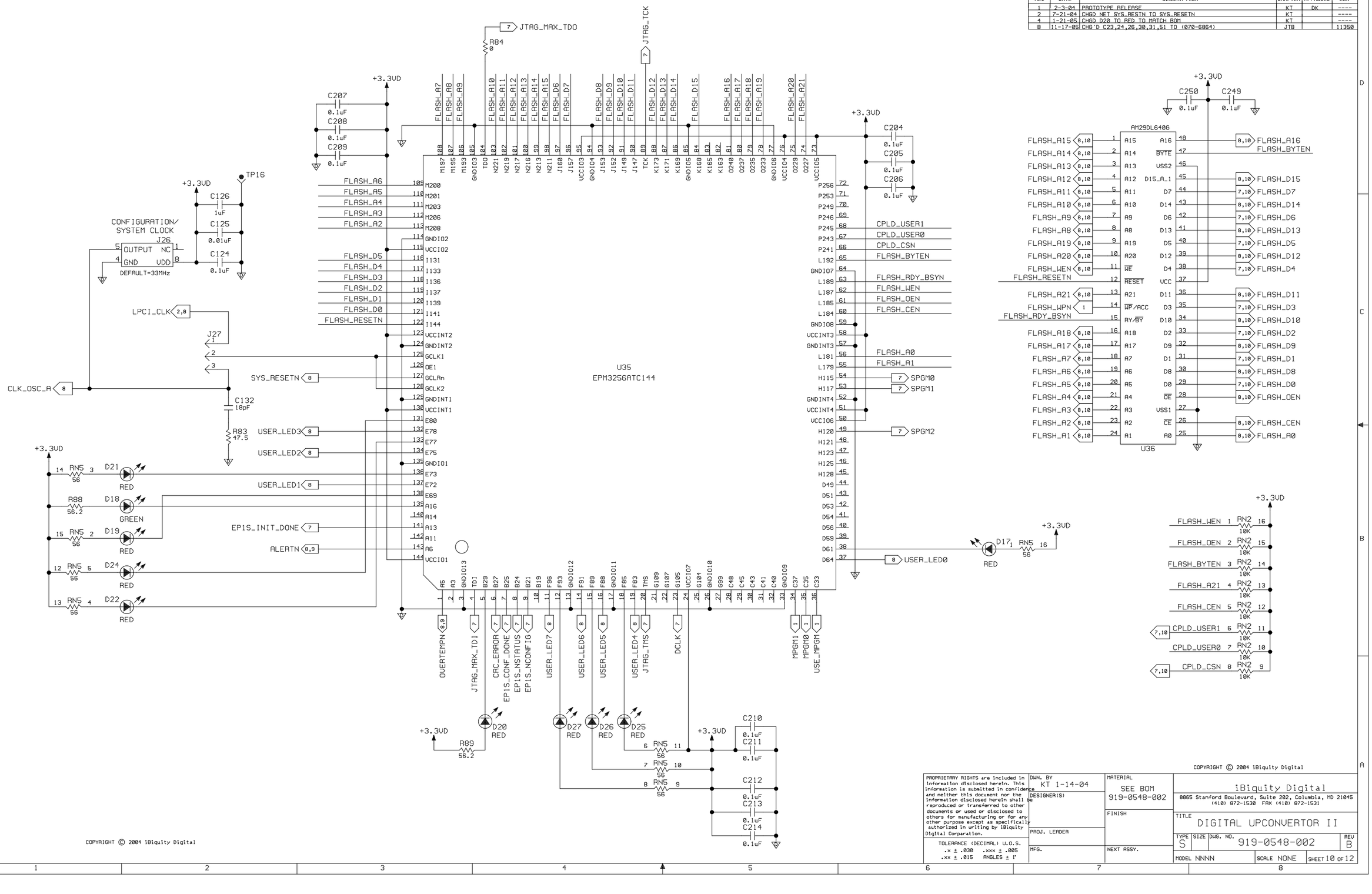
TITLE DIGITAL UPCONVERTOR II

TYPE S | SIZE | DWG. NO. 919-0548-002 | REV B

MODEL NNNN | SCALE NONE | SHEET 9 OF 12

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
1	2-3-04	PROTOTYPE RELEASE	KT	DK	----
2	7-21-04	CHGD NET SYS_RESTN TO SYS_RESETN	KT		----
4	1-21-05	CHGD D20 TO RED TO MATCH BOM	KT		----
B	11-17-05	CHG'D C23,24,26,30,31,51 TO (070-6864)	JTB		11350



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TOLERANCE (DECIMAL) U.O.S. .xx ± .030 .xxx ± .005 .xx ± .015 ANGLES ± 1°	DESIGNER(S)	FINISH	TITLE: DIGITAL UPCONVERTOR II
	PROJ. LEADER		TYPE S · SIZE · DWG. NO. 919-0548-002 · REV B
	MFG.	NEXT ASSY.	MODEL NNNN · SCALE NONE · SHEET 10 OF 12

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
1	2-3-04	PROTOTYPE RELEASE	KT		----
2	9-29-04	UNCOMMITTED U28 PIN 8; DEL C114,D14; ADD C260,R99; REVERSED DATA LINES 0-13 ON U27; CHGD R68,R75,R73,U4	KT		----
4	1-21-05	CHGD R72 TO 51.1 TO MATCH BOM	KT		----
B	11-17-05	CHG'D C23,24,26,30,31,51 TO (070-6864)	JTB		11350

PLACE ON TOP OF BOARD AND SHIELD.
NOTCH GROUND PLANE ON BOTH SIDES.
IFRF SHIELDED CAN IS TIED TO GNDA.

IFRF_DAC_CLK
IFRF_DAC_DATA13
IFRF_DAC_DATA12
IFRF_DAC_DATA11
IFRF_DAC_DATA10
IFRF_DAC_DATA9
IFRF_DAC_DATA8
IFRF_DAC_DATA7
IFRF_DAC_DATA6
IFRF_DAC_DATA5
IFRF_DAC_DATA4
IFRF_DAC_DATA3
IFRF_DAC_DATA2
IFRF_DAC_DATA1
IFRF_DAC_DATA0

AD9754ARU U14
DB13(MSB) DB12 DB11 DB10 DB9 DB8 DB7 DB6 DB5 DB4 DB3 DB2 DB1 DB0(LSB)
CLOCK DVDD DCOM NC AVDD ICOMP IOUTA IOUTB ACOM NC FS ADJ REFIO REFLO SLEEP

+3.3VD
+5VA_IFRF
C61 0.1uF
C59 15uF
C60 0.1uF
C67 0.1uF
C66 0.1uF
R32 2.74K
R33 27.4
R34 27.4
R35 562
C65 6.8uF
C64 0.1uF
-5VA

R31 TBD
R29 825
R30 562

CLC420AJE U15
NC -VIN +VIN -VCC NC VOUT NC
+5VA
C63 6.8uF
C62 0.1uF
R36 51.1

L11 910nH
L12 820nH
L13 820nH
C73 18pF
C74 82pF
C75 56pF
C76 270pF
C77 470pF
C78 390pF
C79 220pF
R40 51.1

LPF 12MHz CUTOFF
N=7
THETA=39
AMIN=73.15dB
RHO=10%

CLC420AJE U17
+5VA
C72 6.8uF
C71 0.1uF
C70 0.1uF
R37 562
R38 121
C82 6.8uF
C81 0.1uF
-5VA

+5VA
R39 51.1
10.7MHz IF OUTPUT
-15dBM
TP8
TP9
J2
IF/RF OUTPUT
OSX

MAX4590 U16
NO1 NC COM1 V+ VL COM2 NC NO2
NC IN1 NC V- GND NC IN2 NC
C69 0.1uF
C80 0.1uF
C68 0.1uF
-5VA
3 IFRF_ONOFF
3 PHASE_ONOFF

R41 51.1
C113 1.8nF

PLACE ON TOP OF BOARD AND SHIELD.
NOTCH GROUND PLANE ON BOTH SIDES.
PHASE SHIELDED CAN IS TIED TO GNDA.

PHASE_DAC_CLK
PHASE_DAC_DATA13
PHASE_DAC_DATA12
PHASE_DAC_DATA11
PHASE_DAC_DATA10
PHASE_DAC_DATA9
PHASE_DAC_DATA8
PHASE_DAC_DATA7
PHASE_DAC_DATA6
PHASE_DAC_DATA5
PHASE_DAC_DATA4
PHASE_DAC_DATA3
PHASE_DAC_DATA2
PHASE_DAC_DATA1
PHASE_DAC_DATA0

AD9754ARU U27
DB13(MSB) DB12 DB11 DB10 DB9 DB8 DB7 DB6 DB5 DB4 DB3 DB2 DB1 DB0(LSB)
CLOCK DVDD DCOM NC AVDD ICOMP IOUTA IOUTB ACOM NC FS ADJ REFIO REFLO SLEEP

+3.3VD
+5VA_PHASE
C99 0.1uF
C95 15uF
C98 0.1uF
C110 0.1uF
C105 0.1uF
R64 2.74K
R65 27.4
R66 27.4
R67 562
C104 6.8uF
C103 0.1uF
-5VA

R63 221
R61 221
R60 562

CLC420AJE U28
NC -VIN +VIN -VCC NC VOUT NC
+5VA
C97 6.8uF
C96 0.1uF
R62 51.1

AM LOW PASS FILTER (2MHz)
L14 4.7uH
L15 4.7uH
C100 820pF
C101 2700pF
C102 820pF

PHASE SELECT
NOT INSTALLED
R94 0
R95 0
R99 51.1
C260 0.1uF
R68 51.1
R73 47.5
R69 562
C119 6.8uF
C118 0.1uF
-5VA

CLC420AJE U31
+5VA
C112 6.8uF
C111 0.1uF

+5VA
C106 6.8uF
C107 0.1uF
C108 820pF
LT1711CMS8 U29
V+ +IN -IN V- QN Q GND LE
C115 6.8uF
C116 0.1uF
C117 820pF
-5VA
R71 51.1K
R72 51.1

+5VA
C109 0.1uF
MAX3443E U30
RO RE DE DI VCC B A GND
TP13
TP12
R70 100
R16 TBD
J43
GND GND
RJ-45
PHASE OUTPUT (DIFFERENTIAL)
PHASE OUT POS
PHASE OUT NEG

FULL SCALE FM

TTL/50 OHM
J25
R74 47.5 1W
TP11
PHASE OUTPUT (UNBALANCED)
J4
SMA

+5VA_PHASE
R17 1.82K
D3
LM2931 U11
OUT GND GND NC IN GND GND NC
C50 3.3uF
C46 100uF
C49 3.3uF
+8VA

+5VA
J7
TO TOTX176 LED DRIVER
R15 8.25K
PHASE_OUT_OPTICAL
U4/B 74ACT04
U4/D 74ACT04
U4/C 74ACT04

+12VA
C120 6.8uF
C121 0.1uF
R75 510
R78 681
LT1206CS8 U32
V+ OUT V- COMP -IN +IN S/D
R77 23.7K 1/10W
+12VA
Q2 MMBT3904
R76 6.19K 1/10W
R79 10K
C123 6.8uF
C122 0.1uF
-12VA

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY KT 1-14-04
DESIGNER(S)
PROJ. LEADER
MFG.

MATERIAL SEE BOM 919-0548-002
FINISH
NEXT ASSY.

iBiquity Digital
8865 Stanford Boulevard, Suite 202, Columbia, MD 21045
(410) 872-1530 FAX (410) 872-1531

TITLE DIGITAL UPCONVERTOR II

TYPE S | SIZE | DWG. NO. 919-0548-002 | REV B
MODEL NNNN | SCALE NONE | SHEET 11 OF 12

REVISIONS				
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
1	2-3-04	PROTOTYPE RELEASE	KT		----
2	8-25-04	CHGD U3,U4,R11,R56,R50; DEL R46,R50; CHGD PWR TO U19	KT		----
3	12-15-04	CHGD C11,C15,C89,C92,C93,R11,R12,R44,U3; ADD R100,R101	KT		----
4	1-21-05	CHGD R100 & R101 TO 511 TO MATCH BOM	KT		----
B	11-17-05	CHG'D C23,24,26,30,31,51 TO (070-6864)	JTB		11350

+12VA
C11 6.8uF
C12 0.1uF
R100 511
R101 511
44.1KHZ
TP7
44.1kHZ OUTPUT
J8 OSX
R11 0 1/8W
LT1206CS8
U3
R12 6.19K 1/10W
R13 6.19K 1/10W
C15 6.8uF
C14 0.1uF
-12VA
+5VA
C13 0.1uF
U4/E 74ACT04
U4/F 74ACT04
U4/A 74ACT04
44.1KHZ_CLK

C23 100uF
L6 100uH
C24 100uF
C25 3.3uF
D2
R21 4.32K
-12V
-12VA

+12V
L8 100uH
+12VA
D5
R20 4.32K
C30 100uF
C31 100uF
C32 3.3uF

PLACE ON TOP OF BOARD AND SHIELD.
NOTCH GROUND PLANE ON BOTH SIDES.
MAG SHIELDED CAN IS TIED TO GNDA.

MAG_DAC_CLK
MAG_DAC_DATA13
MAG_DAC_DATA12
MAG_DAC_DATA11
MAG_DAC_DATA10
MAG_DAC_DATA9
MAG_DAC_DATA8
MAG_DAC_DATA7
MAG_DAC_DATA6
MAG_DAC_DATA5
MAG_DAC_DATA4
MAG_DAC_DATA3
MAG_DAC_DATA2
MAG_DAC_DATA1
MAG_DAC_DATA0
AD9754ARU U18
DB13(MSB) DB12 DB11 DB10 DB9 DB8 DB7 DB6 DB5 DB4 DB3 DB2 DB1 DB0(LSB)
CLOCK DVDD DCOM NC AVDD ICOMP IOUTA IOUTB ACOM NC FS ADJ REFIO REFLO SLEEP
+3.3VD
+5VA_MAG
C85 0.1uF
C83 15uF
C84 0.1uF
C87 0.1uF
C89 0.015uF
C86 0.1uF
R44 1K
R43 47.5
R42 47.5
R45 20K
FULL SCALE FM
R51 182
R47 182
R53 562
R48 562

18KHz LOW PASS FILTER
CHEBYSHEV 3rd ORDER

+5VA
C90 0.1uF
U20/A LT1355CS8
C94 0.1uF
-5VA
R54 1K
C93 82pF
R55 18.2K
C92 1500pF
U20/B LT1355CS8

+5VA_MAG
C88 0.1uF
U19/A LT1355CS8
C91 0.1uF
-5VA
R49 51.1
TP14
JP1 MAGNITUDE OUT NEGATIVE
JP1 MAGNITUDE OUT POSITIVE
JP1 JP1 JP1 JP1 JP1 JP1 JP1 JP1

BASEBAND OUTPUT
+10dBM AT 100%
MODULATION

R58 1K
R56 2K
U19/B LT1355CS8
R57 51.1
R52 2K
TP15

+5VA_MAG
R19 1.82K
D4
LM2931 U7
C39 3.3uF
C34 100uF
+8VA
C38 3.3uF

+5VA
R25 1.82K
D9
LM2931 U40
C257 3.3uF
C256 100uF
+8VA
C255 3.3uF

L9 100uH
-12V
C51 100uF
C52 3.3uF
MC79M05BDT U12
IN OUT GND
C53 10uF
C54 3.3uF
-5VA
D10
R26 1.82K

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY KT 1-14-04
DESIGNER(S)
PROJ. LEADER
MFG.

MATERIAL SEE BOM 919-0548-002
FINISH
NEXT ASSY.

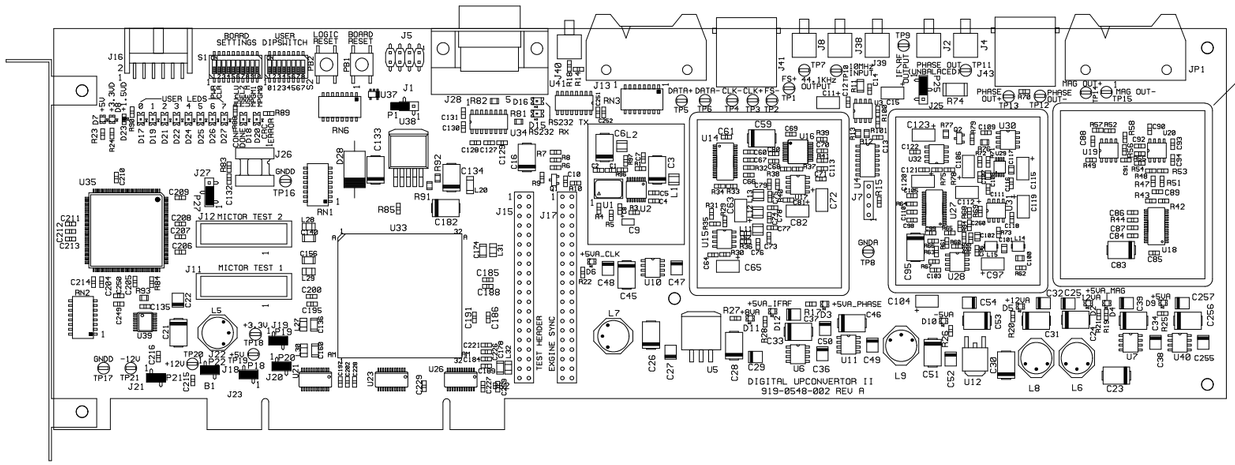
iBiquity Digital
8865 Stanford Boulevard, Suite 202, Columbia, MD 21045
(410) 872-1530 FAX (410) 872-1531

TITLE DIGITAL UPCONVERTOR II

TYPE S | SIZE | DWG. NO. 919-0548-002 | REV B

MODEL NNNN | SCALE NONE | SHEET 12 OF 12

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
1	2-25-04	PROTOTYPE RELEASE	KT		-----
2	10-6-04	SEVERAL PROTOTYPE CHANGES	KT		-----
3	12-16-04	CHGD C11,C15,C89,C92,C93,R12,R44,U3; ADD R100,R101; DEL L16,L18,L21,L23,L25	KT		-----
4	1-21-05	CORRECTED FOOTPRINT FOR J1,J18-J22	KT		-----
A	2-7-05	ENGINEERING RELEASE WITHOUT CHANGE	KT		-----
B	11-11-05	ADD P25,27; ADD FENCE NOTE (479-0175) QTY 3	JTB		11338
C	11-17-05	CHG'D C23,24,26,30,31,51 TO 070-6864)	JTB		11350



TOLERANCE (DECIMAL) U.O.S.
.X ± .030 .XXX ± .005
.XX ± .015 ANGLES ± 1°

DWN. BY KT 2-25-04
DESIGNER(S)
PROJ. LEADER
MFG.

MATERIAL SEE BOM 919-0548-002
FINISH
NEXT ASSY.

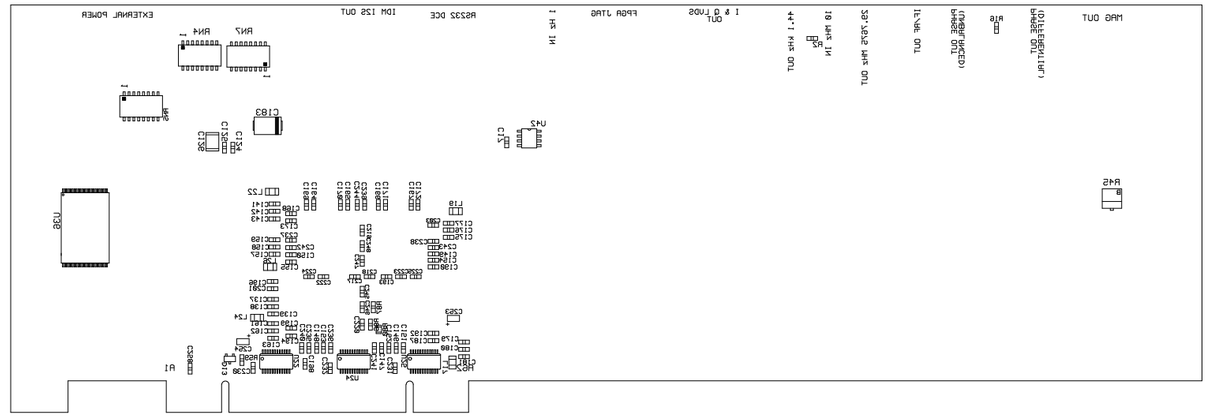
iBiquity Digital
8865 Stanford Boulevard, Suite 202, Columbia, MD 21045
(410) 872-1530 FAX (410) 872-1531

TITLE DIGITAL UPCONVERTOR II

TYPE	SIZE	DWG No.	REV
A	C	919-0548-002	C

MODEL NNNN | SCALE 1/1 | SHEET 1 OF 2

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
1	2-25-04	PROTOTYPE RELEASE	KT		-----
2	10-6-04	SEVERAL PROTOTYPE CHANGES	KT		-----
3	12-16-04	SEVERAL PROTOTYPE CHANGES	KT		-----
A	2-7-05	ENGINEERING RELEASE WITHOUT CHANGE	KT		-----
B	11-11-05	ADD P25,27: ADD FENCE NOTE (479-0175) QTY 3	JTB		11338
C	11-17-05	CHG'D C23,24,26,30,31,51 TO (070-6864)	JTB		11350



TOLERANCE (DECIMAL) U.O.S.
.X ± .030 .XXX ± .005
.XX ± .015 ANGLES ± 1°

DWN. BY KT 2-25-04

DESIGNER(S)

PROJ. LEADER

MFG.

MATERIAL SEE BOM 919-0548-002

FINISH

NEXT ASSY.

iBiquity Digital
8865 Stanford Boulevard, Suite 202, Columbia, MD 21045
(410) 872-1530 FAX (410) 872-1531

TITLE
DIGITAL UPCONVERTOR II

TYPE	SIZE	DWG No.	REV
A	C	919-0548-002	C

MODEL NNNN SCALE 1/1 SHEET 2 OF 2

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REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
A	10-31-02	REDRAWN IN P-CAD	KT	DK	----
C	8-10-05	SEE SHEET2	KT	DK	11319

U11
M4-192/96-10UC

J135 1 +5VD
J135 2 GND
J135 3 RELAY_1
J135 4 RELAY_2
J135 5 RELAY_3
J135 6 RELAY_4
J135 7 RELAY_5
J135 8 RELAY_6
J135 9 RELAY_7
J135 10 RELAY_8
J135 11 RELAY_9
J135 12 RELAY_10
J135 13 RELAY_11
J135 14 RELAY_12
J135 15 RELAY_13
J135 16 RELAY_14
J135 17 RELAY_15
J135 18 RELAY_16
J135 19 +5V
J135 20 GND
J135 21
J135 22
J135 23 OPTO_1
J135 24 OPTO_2
J135 25 OPRO_3
J135 26 OPTO_4
J135 27 OPTO_5
J135 28 OPTO_6
J135 29 OPTO_7
J135 30 OPTO_8
J135 31 OPTO_9
J135 32 OPTO_10
J135 33 OPTO_11
J135 34 OPTO_12
J135 35 OPTO_13
J135 36 OPTO_14
J135 37 OPTO_15
J135 38 OPTO_16
J135 39 +5VD
J135 40 GND

R27 1.82K
R28 1.82K
RESET
POWER

C8 0.1uF
C7 0.1uF
C11 0.1uF
C17 0.1uF
C22 0.1uF
C23 0.1uF
C13 0.1uF
C18 0.1uF

NOT PLACED R29 TBD
R32 4.7K
R31 TBD NOT PLACED

WRITE
S0
S1
S2
READ
RST
RLOAD
SELECT
WR
SDO
SDA
RELAY_14
RELAY_6
RELAY_8

J115 1 2 3 4 5 6 7 8 9 10
J116 1 2 3 4 5 6 7 8 9 10

JTAG
J89 P89
J90 P90
J94 P94
J95 P95
J113 1 2 3 4 5 6 7 8 9 10
TRST TP8
ENABLE TP9

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY KT 10-31-02
DESIGNER(S)
PROJ. LEADER
MFG.

MATERIAL SEE BOM 919-0549
FINISH
NEXT ASSY.

BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O.BOX 3606 QUINCY, IL. 62305
217/224-9600 FAX 217/224-9607

TITLE: STATION INTERFACE

TYPE S | SIZE D | DWG. NO. 919-0549 | REV C
MODEL NNNN | SCALE NONE | SHEET 1 OF 2

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
A	10-31-02	REDRAWN IN P-CAD	KT	DK	----
B	2-9-05	CHGD J133	KT	DK	11250
C	8-10-05	ADDED NOTES FOR P3	KT	DK	11319

+5V
+5VD
D1 GREEN
D2 GREEN
R24 1.82K
R25 1.82K
J133
PS_ON_OUT
PS_ON_IN
+5V=ALWAYS ON
+5VD=SWITCHED
C2 10uF
C35 10uF
ATX INTERFACE
J140
NOT PLACED
JP1
POWER_LED
POWER_FAULT
POWER_SWITCH
RESET
PW_OK
SDO
SDA
CLKIN
U4
PIC16F877
RC6/TX/CK
RC5/SDO
RC4/SDI/SDA
RD3/PSP3
RD2/PSP2
RD1/PSP1
RD0/PSP0
RC3/SCK/SCL
RC2/CCP1
RC1/T1OSI/CCP2
NC
RC7/RX/DT
RD4/PSP4
RD5/PSP5
RD6/PSP6
RD7/PSP7
VSS
VDD
RB0/INT
RB1
RB2
RB3/PGM
RC0/T1OSO/T1CKI
SC2/CLKOUT
OSC1/CLKIN
RE2/AN7/CS
RE1/AN6/WR
RE0/AN5/RD
RA5/AN4/SS
RA4/T0CKI
RA0/AN0
RA1/AN1
RA2/AN2/VREF-
RA3/AN3/VREF+
RB4
RB5
RB6/PGC
RB7/PGD
RC0/VPP
C26 20pF
C27 20pF
Y1 20MHz
R6 39
C34 0.1uF
TP6
WR
RD
WRITE
RESET
POWER
S0
S1
S2
C33 0.1uF
SELECT
RLOAD
RST
READ
J130
RESET
MAX705TCSA
R18 4.75K
C25 0.1uF
U5
PIC ICD PROGRAM
J8
TEST PURPOSES ONLY
NORMAL OPERATION
J3
P3
MAX3221CAE
C28 0.47uF
C29 0.47uF
C30 0.1uF
C31 0.1uF
C32 0.47uF
R20 332
R21 332
R22 332
R23 332
U24
J2

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY KT 10-31-02
DESIGNER(S)
PROJ. LEADER
MFG.

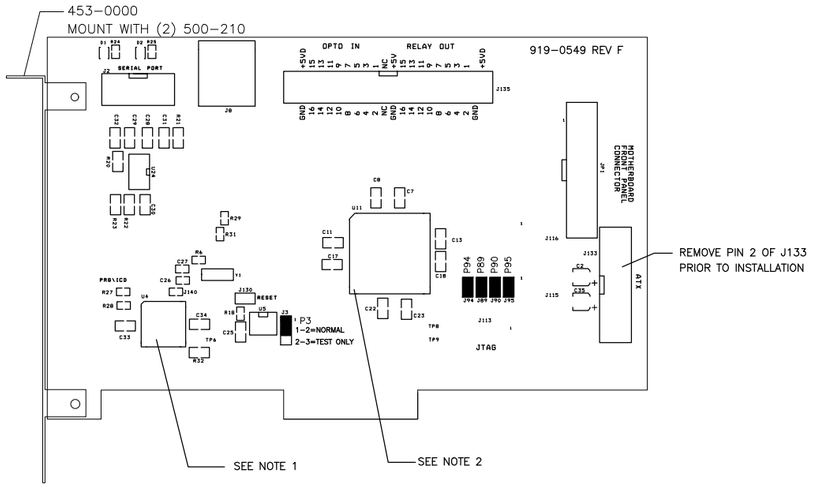
MATERIAL SEE BOM 919-0549
FINISH
NEXT ASSY.

BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O.BOX 3606 QUINCY, IL. 62305
217/224-9600 FAX 217/224-9607

TITLE: STATION INTERFACE

TYPE S | SIZE D | DWG. NO. 919-0549 | REV C
MODEL NNNN | SCALE NONE | SHEET 2 OF 2

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
A	5-31-02	MODEL RELEASE	KT	DWK	----
B	10-1-02	ADDED 453-0000 & 2 500-210	KT	DWK	10797
C	10-29-02	ADDED P3,P89,P90,P94 & P95	KT	DWK	10809
D	11-8-02	ADDED SOFTWARE NOTES	KT	DWK	10823
E	2-3-03	ADDED NOTE TO REMOVE PIN 2 OF J133	KT	DWK	10895
F	2-9-05	CHGD TAB & J133, MOVED JP1	KT		11250
G	8-10-05	ADDED JUMPER TABLE & ADDED NOTES TO P3			



NOTES:
1) INSTALL 979-0549-U4 VER 1.0
2) INSTALL 979-0549-U11 VER 1.0
3) ADD LABELS TO U4 & U11 INDICATING U# AND VER#.

JUMPER TABLE		
	NORMAL OPERATION	TEST PUPOSES ONLY
P3	1-2	2-3
P89	INSTALLED	N/A
P90	INSTALLED	N/A
P94	INSTALLED	N/A
P95	INSTALLED	N/A

TOLERANCE (DECIMAL) U.O.S.
.X ± .030 .XXX ± .005
.XX ± .015 ANGLES + 1°

DWN. BY: KT 5-31-02
DESIGNER(S):
PROJ. LEADER:
MFG.:

MATERIAL: SEE BOM 919-0549
FINISH:
NEXT ASSY.:

BROADCAST ELECTRONICS INC.
4100 N. 24TH ST. P.O.BOX 3606 QUINCY,IL. 62305
217/224-9600 FAX 217/224-9607

TITLE: STATION INTERFACE BOARD

TYPE	SIZE	DWG No.	REV
A	C	919-0549	G

MODEL NNNN | SCALE 1/1 | SHEET 1 OF 1

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REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
1	10-7-02	PROTOTYPE RELEASE	KT		----
A	11-15-02	TIED U5-OUT NET TO +5V; MODEL RELEASE	KT	DK	----
B	1-28-03	CHGD C25,C26,R26: ADDED C53,C54: FIXED J4	KT	DK	10877
C	12-29-04	CHGD R26 TO 3.01K	KT	DK	11215

NOTES:
1. ALL RESISTORS IN OHMS: 1/10W, 1% UNLESS OTHERWISE SPECIFIED.
2. LAST COMPONENT USED:C54,D4,DS2,J16, K1,L5,P15,Q5,R84,T3,TP11,U14
3. COMPONENTS NOT USED:C17-C21, C38-C42,J5,R31,R53-R56,R63,R65, R59,TP1-TP8,U8,P1-P11
4. SEE ASSEMBLY:AC919-0550
5. * INDICATES NOT PLACED: R31,R51,R52,R67,C25,U9 C33,C35,C36,C37,R12
6. # DENOTED XP1 FUNCTION

REV	DESCRIPTION	DRAFTER	APPROVED	ECN
G	4-20-07 CHG'D R44 (102-5112) MADE FL1-FL12 (102-0000)	JTB		11529
F	6-23-06 CHG'D U7 TO(216-4111):ADD L3,L4(366-0010-001)	JTB	DK	11451
E	5-17-05 CHGD NOTES: SEE SHEET 2 ALSO	KT	DK	11289
D	2-14-05 CHGD NOTES: SEE SHEET 2 ALSO	KT	DK	11259

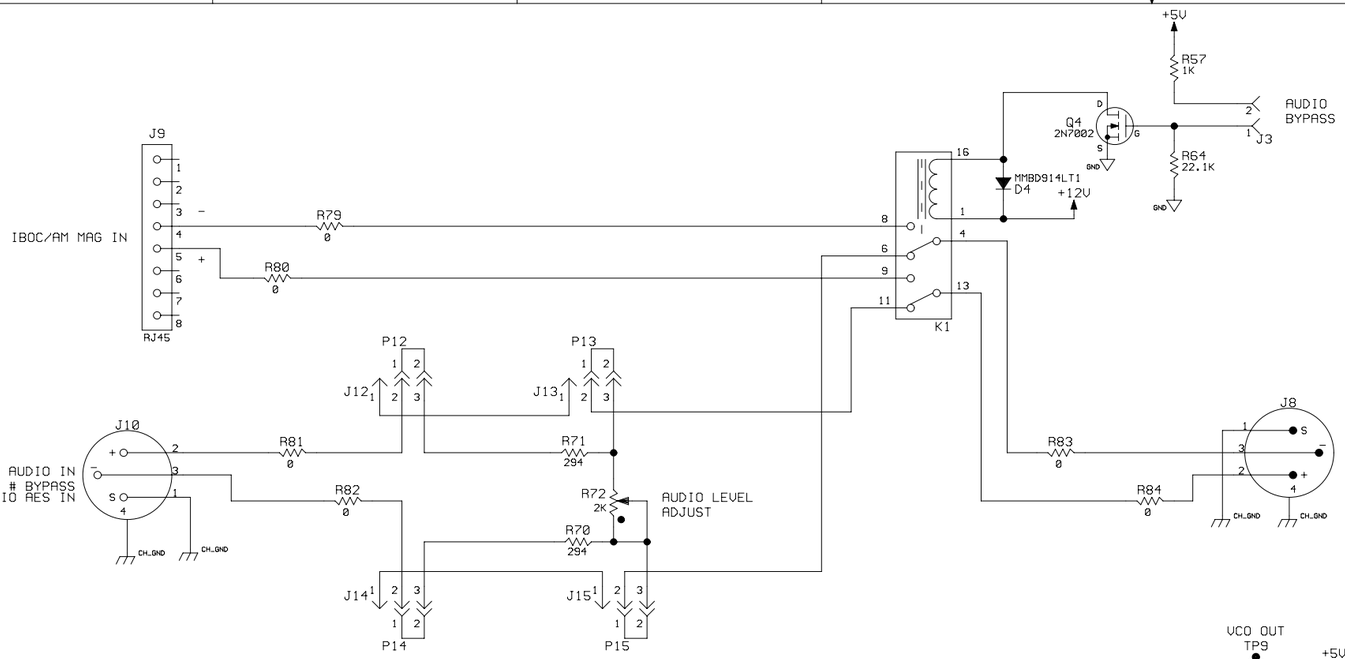
TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY KT 8-2-02
DESIGNER(S)
PROJ. LEADER
MFG.
MATERIAL SEE BOM 919-0550
FINISH
NEXT ASSY.

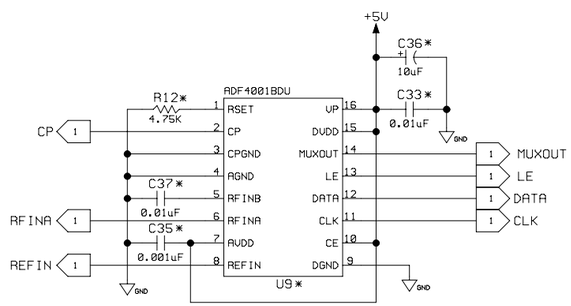
BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O.BOX 3606 QUINCY, IL. 62305
217/224-9600 FAX 217/224-9607

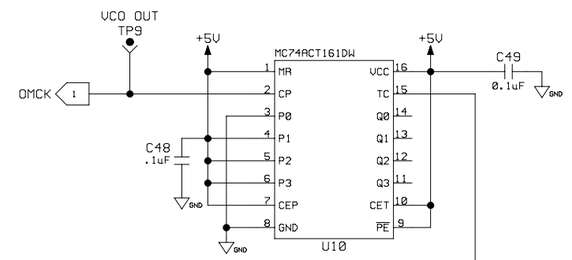
TITLE: SRC CARD
TYPE S | SIZE D | DWG. NO. 919-0550 | REV G
MODEL AS1/XP1 | SCALE NONE | SHEET 1 OF 2

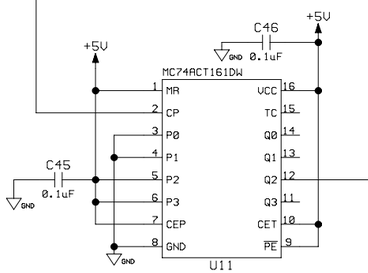
REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
1	10-7-02	PROTOTYPE RELEASE	KT		----
A	11-15-02	DEL C41 & C42; TIED U13-4 & R67 TO GND	KT	DK	----
B	1-28-03	ADDED R70,R71,R72; FIXED J10	KT	DK	10877
C	2-14-05	ADDED J12-J15,P12-P15 & JUMPER TABLE	KT	DK	11259
D	5-17-05	ADD C31-C33,C35-C37,J16,R12,R27,R31,R44,U7,U9	KT	DK	11289
F	6-23-06	CHG'D U7 TO (216-4111)ADD L3,L4(365-0010-001)	KT	DK	11451
G	4-20-07	CHG'D R44 (102-5112) MADE FL1-FL12 (102-0000)	JTB		11529

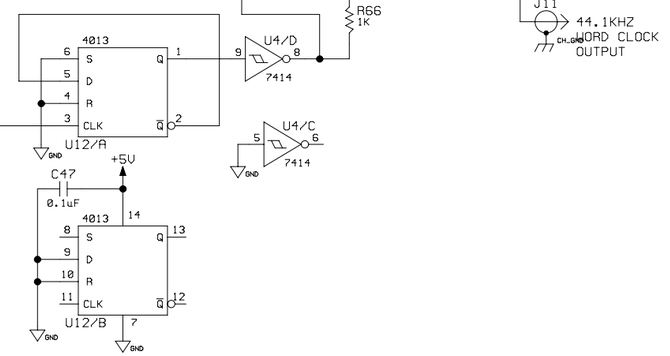


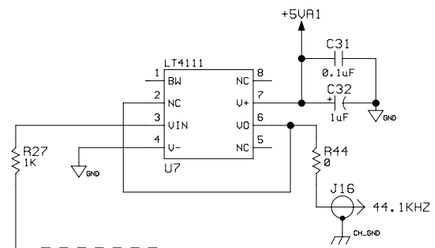
JUMPER SETTINGS		
	XP1-10	AS1-10
J12	1-2	2-3
J13	1-2	2-3
J14	1-2	2-3
J15	1-2	2-3











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TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY KT 8-2-02
DESIGNER(S)
PROJ. LEADER
MFG.

MATERIAL SEE BOM 919-0550
FINISH
NEXT ASSY.

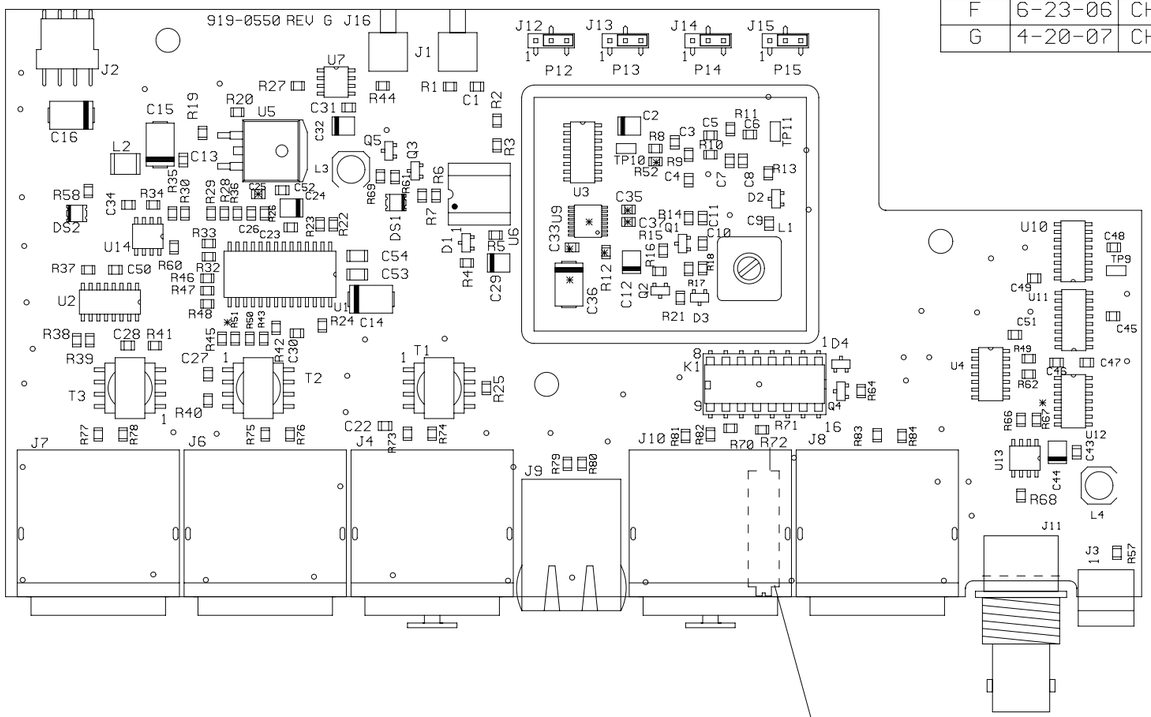
BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O.BOX 3606 QUINCY, IL. 62305
217/224-9600 FAX 217/224-9607

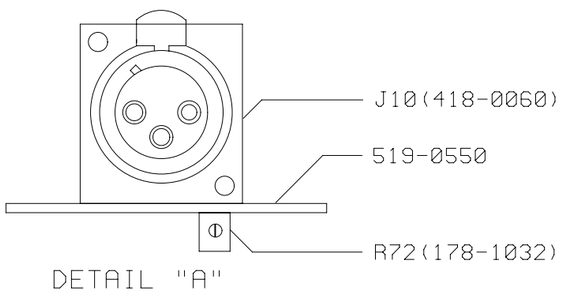
TITLE: SRC CARD

TYPE S | SIZE D | DWG. NO. 919-0550 | REV G

MODEL AS1/XP1 | SCALE NONE | SHEET 2 OF 2

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
1	9-26-02	PROTOTYPE RELEASE	KT		----
A	11-15-02	FIXED L1; DEL C41 & C42, CHGD NETS: MODEL BUILD	KT	DK	----
B	1-29-03	ADDED R70-R72,C53,C54; CHGD C26,R26; MARKED C25 AS NOT PLACED; FIXED J4 & J10	KT	DK	10877
C	12-29-04	CHGD R26 TO 102-3011	KT	DK	11215
D	2-15-05	ADDED J12-J15,P12-P15; MADE BOARD 0.300" WIDER	KT	DK	11259
E	5-18-05	ADDED C31-C37,J16,R12,R27,R31,R44,U7,U9	KT	DK	11289
F	6-23-06	CHG,D U7 TO (216-4111):ADD L3,L4(366-0010-001)	JTB	DK	11451
G	4-20-07	CHG'D R44 (102-5112)CHG'D FL1-FL12 TO(102-0000)	JTB		11529





DETAIL "A"

NOTES:

1) * INDICATES PART NOT PLACED (C25,C33,C35-C37,R12,R51, R52,R67,U9)
2) INSTALL SOFTWARE 979-0550-U6 VER 1.0, BEFORE ASSEMBLY
3) INSTALL R72 ON SOLDER SIDE BEFORE INSTALLING J10.

TOLERANCE (DECIMAL) U.O.S.
.X ± .030 .XXX ± .005
.XX ± .015 ANGLES + 1°

DWN. BY KT 8-19-02

DESIGNER(S)

PROJ. LEADER

MFG.

MATERIAL SEE BOM 919-0550

FINISH

NEXT ASSY.

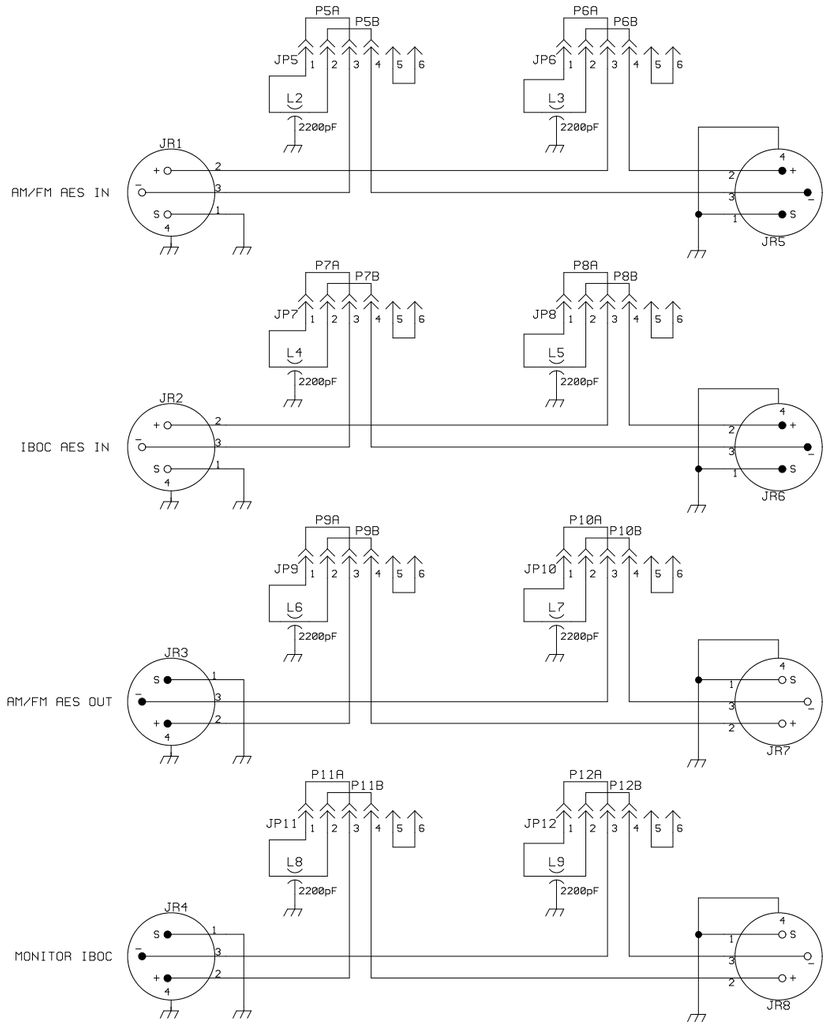
BROADCAST ELECTRONICS INC.
4100 N. 24TH ST. P.O.BOX 3606 QUINCY,IL. 62305
217/224-9600 FAX 217/224-9607

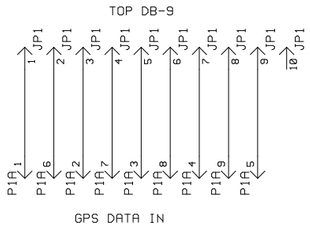
TITLE: SRC CARD

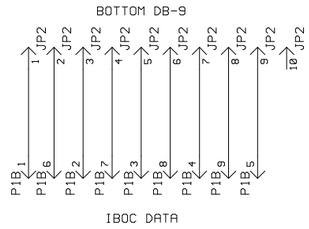
TYPE	SIZE	DWG No.	REV
A	B	919-0550	G

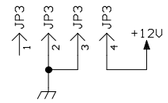
MODEL ASi/XPi | SCALE 1/1 | SHEET 1 OF 1

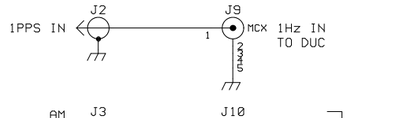
REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
A	5-31-02	MODEL RELEASE	KT		----
B	10-3-02	TIED J4 & J11 TO T1 PIN 1; CHGD J11 TO A 417-1701	KT	JW	10799
C	10-29-02	ADDED NOTES & P5A-P12B & CLEANED UP TO MATCH BOARD	KT	DK	10811
D	1-28-03	DEL R10 & R15	KT	DK	10870
E	5-16-05	CHGD JR1-JR8	KT	KS	11285

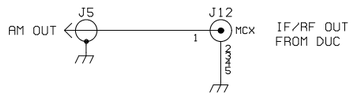


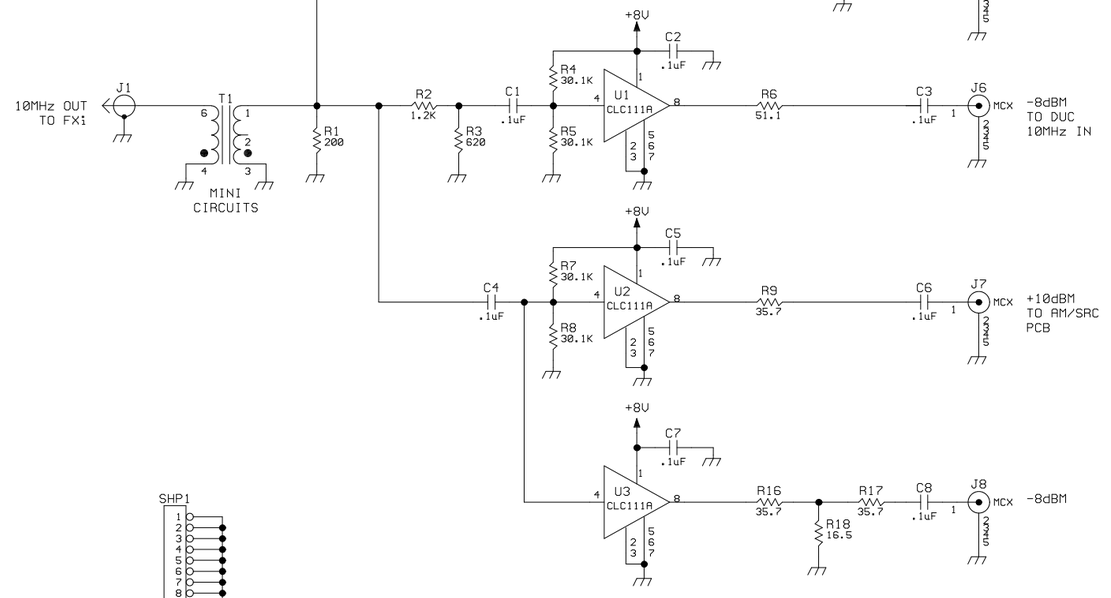


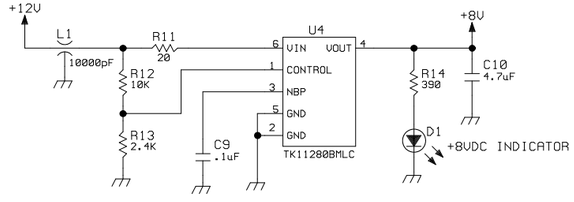


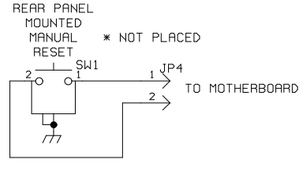


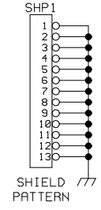












TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY	KT 5-31-02
DESIGNER(S)	
PROJ. LEADER	
MFG.	
MATERIAL	SEE BOM 919-0551
FINISH	
NEXT ASSY.	

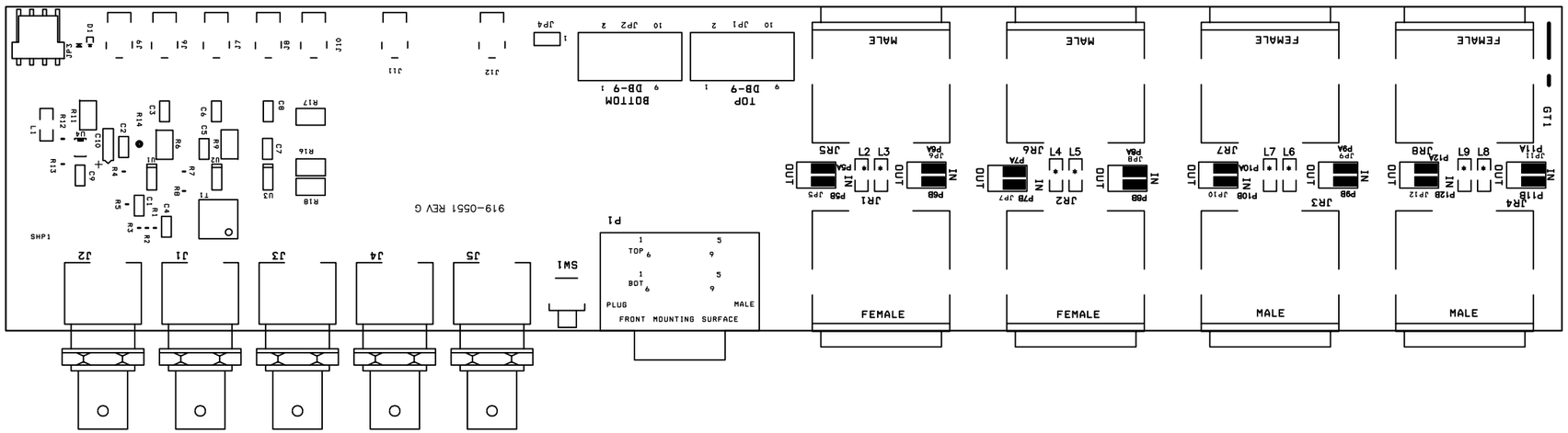
BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O.BOX 3606 QUINCY, IL. 62305
217/224-9600 FAX 217/224-9607

TITLE: XLR-BNC I/O INTERFACE

TYPE	SIZE	DWG. NO.	REV
S	D	919-0551	E

MODEL NNNN | SCALE NONE | SHEET 1 OF 1

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
A	5–30–02	MODEL RELEASE	KT	JW	---
B	10–3–02	ADDED 4 .028 HOLES & TRACE : CHANGED J11 TO A 417–1701	KT	JW	10799
C	10–29–02	ADDED P5A–P12B; INDICATED L2–L9 & ADDED NOTES	KT	DK	10811
D	1–29–03	DEL R10 & R15	KT	DK	10870
E	5–16–03	CHGD JP5–JP12 TO 417–2600	KT	DK	10965
F	3–15–05	ADDED 4 0.171 HOLES	KT	DK	11265
G	5–16–05	CHGD JR1–JR8	KT		11285



NOTES:
1) * INDICATES COMPONENT STUFFED ON SOLDER SIDE (L2–L9)

TOLERANCE (DECIMAL) U.O.S.
.X ± .030 .XXX ± .005
.XX ± .015 ANGLES + 1°

DWN. BY KT 5–31–02

DESIGNER(S)

PROJ. LEADER

MFG.

MATERIAL SEE BOM 919–0551

FINISH

NEXT ASSY.

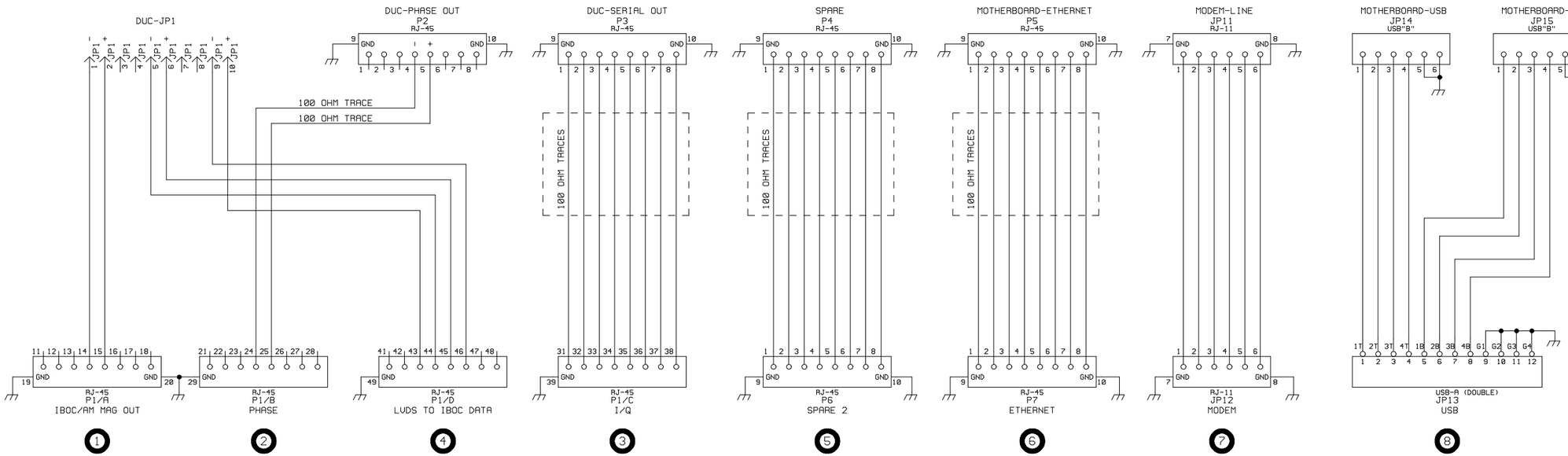
BROADCAST ELECTRONICS INC.
4100 N. 24TH ST. P.O.BOX 3606 QUINCY,IL. 62305
217/224-9600 FAX 217/224-9607

TITLE: BNC XLR BOARD

TYPE	SIZE	DWG No.	REV
A	B	919–0551	G

MODEL NNNN | SCALE 1/1 | SHEET 1 OF 1

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
A	10-24-02	REDRAWN IN P-CAD; ENGINEERING RELEASE	KT		----



#2 MOUNTING HOLES

MH1 MH2 MH3 MH4

= PCB/PANEL SEQUENCE LOCATION

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY: KT 10-24-02
DESIGNER(S):
PROJ. LEADER:
MFG.:

MATERIAL: SEE BOM 919-0552
FINISH:
NEXT ASSY.:

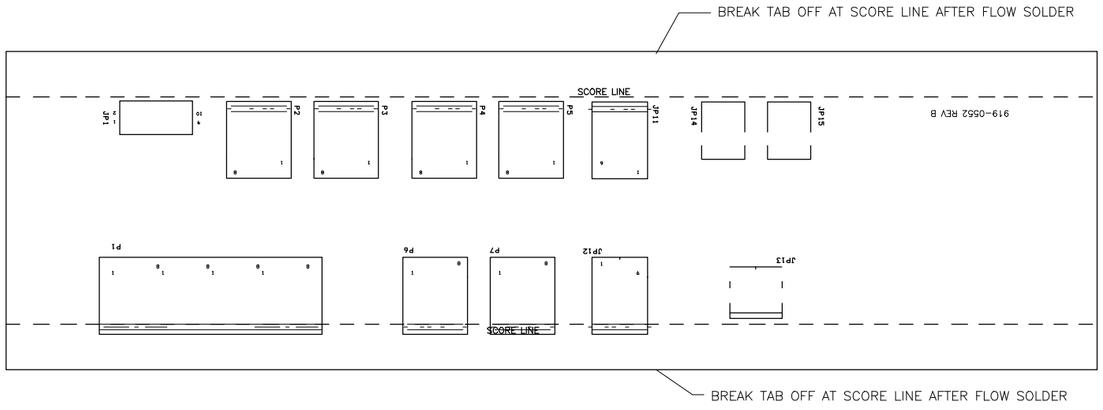
BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O.BOX 3606 QUINCY, IL. 62305
217/224-9600 FAX 217/224-9607

TITLE: RJ-45/USB/DB-9 I/O INTERFACE

TYPE: S | SIZE: D | DWG. NO.: 919-0552 | REV: A

MODEL NNNN | SCALE NONE | SHEET 1 OF 1

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
A	5-29-02	MODEL RELEASE	KT	DK	----
B	3-2-05	ADDED 2 0.500 INCH BREAKAWAY TABS	KT	DK	11263



TOLERANCE (DECIMAL) U.O.S.
.X ± .030 .XXX ± .005
.XX ± .015 ANGLES + 1°

DWN. BY KT 5-29-02

DESIGNER(S)

PROJ. LEADER

MFG.

MATERIAL SEE BOM 919-0552

FINISH

NEXT ASSY.

BROADCAST ELECTRONICS INC.
4100 N. 24TH ST. P.O.BOX 3606 QUINCY,IL. 62305
217/224-9600 FAX 217/224-9607

TITLE RJ USB

TYPE	SIZE	DWG No.	REV
A	C	919-0552	B

MODEL NNNN SCALE 1/1 SHEET 1 OF 1

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
A	10-23-02	REDRAWN IN P-CAD; ENGINEERING RELEASE	KT		------

MB1 MB2 MB3 MB4

5V_ISO1 +5V

R3 390 U7391CT-ND

R5 3.3K U733CT-ND

INPUT 1 (DIGITAL CARRIER ON)
INPUT 2 (DIGITAL CARRIER OFF)
INPUT 3 (AUDIO RAMP UP TO DELAY)
INPUT 4 (AUDIO RAMP DOWN FROM DELAY)
INPUT 5 (AUDIO DELAY INCREASE)
INPUT 6 (AUDIO DELAY DECREASE)
INPUT 7 (AUDIO-A BYPASS ON)
INPUT 8 (AUDIO-A BYPASS OFF)

JP1 JP3 C2 ILQ621 U1 U2

R6 390 U7391CT-ND R4 3.3K U733CT-ND

INPUT 9 (AUDIO-B BYPASS ON)
INPUT 10 (AUDIO-B BYPASS OFF)
INPUT 11 (DAY)
INPUT 12 (NIGHT)
INPUT 13
INPUT 14 (SYSTEM SHUTDOWN)
INPUT 15 (SYSTEM POWER ON/OFF TOGGLE)
INPUT 16 (SYSTEM RESET)

JP6 JP8 C3 C5 ILQ621 U3 U4

STBY_ISO R10 390 R11 390 STBY R12 3.3K R13 3.3K

+5V JP5

STBY C13 .1uF U13/A U13/B U13/C U13/D U13/E U13/F SN74AC14

STBY C14 .1uF U14/A U14/B U14/C U14/D U14/E U14/F SN74AC14

STBY C15 .1uF U15/A U15/B U15/C U15/D SN74AC14

U15/E U15/F SN74AC14

STBY DSPIN55 U16 C11 10uF C12 10uF STBY_ISO

+5V DRIPS-05S05 U17 C9 10uF C10 10uF 5V_ISO1

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY KT 10-23-02
DESIGNER(S)
PROJ. LEADER
MFG.

MATERIAL SEE BOM 919-0553
FINISH
NEXT ASSY.

BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O.BOX 3606 QUINCY, IL. 62305
217/224-9600 FAX 217/224-9607

TITLE TERMINAL STRIP, I/O INTERFACE

TYPE S SIZE D DWG. NO. 919-0553 REV A
MODEL NNNN SCALE NONE SHEET 1 OF 2

REVISIONS				
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
A	10-23-02	REDRAWN IN P-CAD; ENGINEERING RELEASE	KT		

+5V
DR1P5-05S05
C7 10uF
U18
5V_ISO2
C8 10uF

R1 330 U7391CT-ND
R2 330 U7391CT-ND
DN1 MA718
DN2 MA718
DN3 MA718
AD4C111
U5
U6
U7
U8
U9
U10
U11
U12

R7 330 U7391CT-ND

C1
C4
C6
S2A D5
S2A D6
S2A D7
S2A D8
D4 S2A
D3 S2A
D2 S2A
D1 S2A
D12 S2A
D11 S2A
D10 S2A
D9 S2A
DN4 MA718
DN5 MA718
R11 330 U7391CT-ND

JP2 OUTPUT 1 (DIGITAL CARRIER ON/OFF STATUS)
JP2 OUTPUT 2 (AUDIO RAMP UP/DOWN STATUS)
JP2 OUTPUT 3 (AUDIO DELAY IN/DECREASE STATUS)
JP2 OUTPUT 4 (AUDIO-A BYPASS STATUS)
JP4 OUTPUT 5 (AUDIO-B BYPASS STATUS)
JP4 OUTPUT 6 (DAY/NIGHT STATUS)
JP4 OUTPUT 7 (SYSTEM SHUTDOWN STATUS)
JP4 OUTPUT 8 (SYSTEM OPERATIONAL STATUS)
JP7 OUTPUT 9 (SYSTEM ALARM STATUS)
JP7 OUTPUT 10
JP7 OUTPUT 11
JP7 OUTPUT 12
JP9 OUTPUT 13 (AUDIO-A BYPASS STATUS (RELAY))
JP9 OUTPUT 14 (AUDIO-B BYPASS STATUS (RELAY))
JP9 OUTPUT 15
JP9 OUTPUT 16 (SYSTEM OPERATIONAL STATUS)

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY KT 10-23-02
DESIGNER(S)
PROJ. LEADER
MFG.

MATERIAL SEE BOM 919-0553
FINISH
NEXT ASSY.

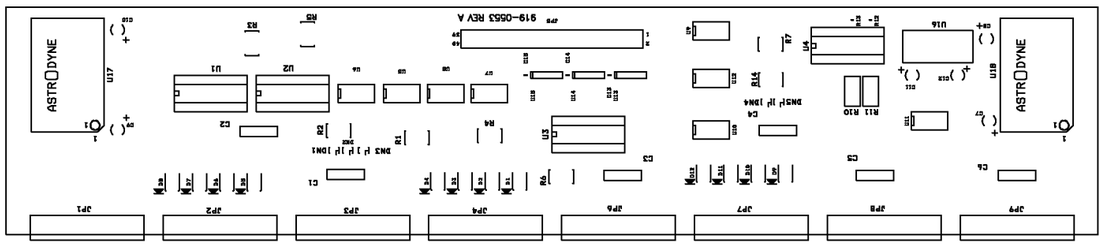
BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O.BOX 3806 QUINCY, IL. 62305
217/224-9600 FAX 217/224-9607

TITLE: TERMINAL STRIP, I/O INTERFACE

TYPE S | SIZE D | DWG. NO. 919-0553 | REV A

MODEL NNNN | SCALE NONE | SHEET 2 OF 2

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
A	5-29-02	MODEL RELEASE	KT		----



TOLERANCE (DECIMAL) U.O.S.
.X ± .030 .XXX ± .005
.XX ± .015 ANGLES + 1°

DWN. BY	KT 5-28-02
DESIGNER(S)	
PROJ. LEADER	
MFG.	
MATERIAL	SEE BOM 919-0553
FINISH	
NEXT ASSY.	

BROADCAST ELECTRONICS INC.
4100 N. 24TH ST. P.O.BOX 3606 QUINCY,IL. 62305
217/224-9600 FAX 217/224-9607

TITLE: PHOENIX BOARD

TYPE	SIZE	DWG No.	REV
A	C	919-0553	A

MODEL NNNN | SCALE 1/1 | SHEET 1 OF 1

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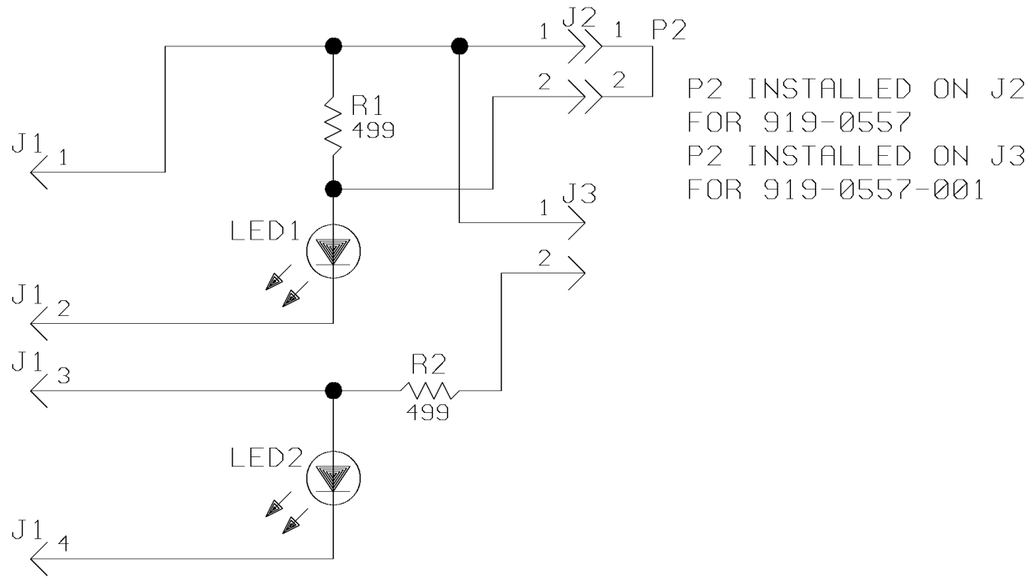
REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
A	5-23-02	MODEL RELEASE	KT	RH	----
B	9-18-02	ADDED R1,R2,P2,J2 & J3; ENGINEERING RELEASE	KT		10782



P2 INSTALLED ON J2
FOR 919-0557
P2 INSTALLED ON J3
FOR 919-0557-001

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY KT 5-23-02

DESIGNER(S) RH 5-23-02

PROJ. LEADER

MFG.

MATERIAL SEE BOMS
919-0557
919-0557-001

FINISH

NEXT ASSY.

BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O.BOX 3606 QUINCY, IL. 62305
217/224-9600 FAX 217/224-9607

TITLE
FRONT PANEL LED BOARD

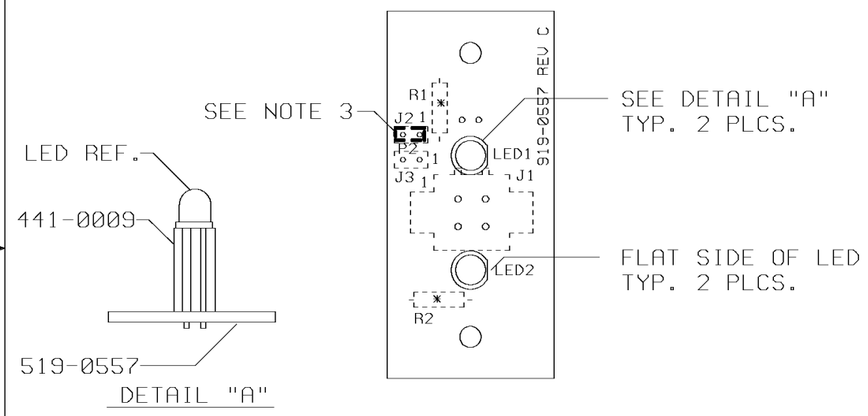
TYPE	SIZE	DWG. NO.	REV
S	A	919-0557/-001	B

MODEL FM-IBOC | SCALE NONE | SHEET 1 OF 1

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
A	5-23-02	MODEL RELEASE	KT		----
B	8-15-02	CORRECTED DETAIL	KT		----
C	9-18-02	ADDED R1,R2,J2,J3,P2; ENGINEERING RELEASE	KT		10782

NOTES:

1: J1,J2,J3,R1,R2 ARE MOUNTED ON THE SOLDER SIDE.
2: * INDICATES R1,R2 ARE NOT MOUNTED ON 919-0557.
3: P2 IS INSTALLED ON J2 FOR 919-0557.
P2 IS INSTALLED ON J3 FOR 919-0557-001.



COMPONENT	919-0557	919-0557-001
LED1	323-9224	323-9224
LED2	323-9217	323-9224

TOLERANCE (DECIMAL) U.O.S.
.X ± .030 .XXX ± .005
.XX ± .015 ANGLES + 1°

DWN. BY KT 5-23-02

DESIGNER(S)

PROJ. LEADER

MFG.

MATERIAL SEE BOMS
919-0557
919-0557-001

FINISH

NEXT ASSY.

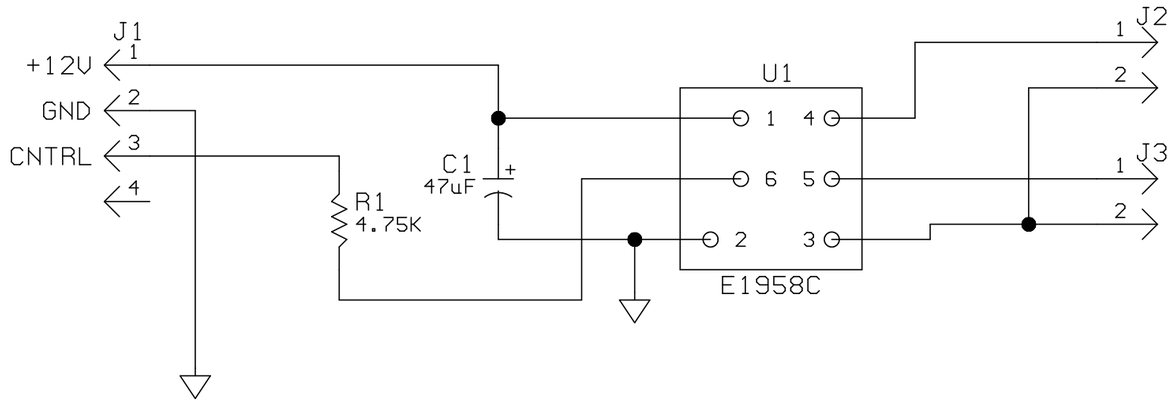
BROADCAST ELECTRONICS INC.
4100 N. 24TH ST. P.O.BOX 3606 QUINCY,IL. 62305
217/224-9600 FAX 217/224-9607

TITLE
FRONT PANEL LED BOARD

TYPE	SIZE	DWG No.	REV
A	A	919-0557/-001	C

MODEL NNNN SCALE 1/1 SHEET 1 OF 1

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
A	7-2-02	PROTOTYPE RELEASE/MODEL RELEASE	KT	JT	----
B	2-9-05	ADDED R1	KT		11251



TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY KT 7-2-02

DESIGNER(S)

PROJ. LEADER

MFG.

MATERIAL SEE BOM 919-0558

FINISH

NEXT ASSY.

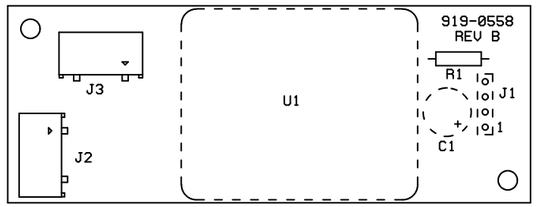
BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O.BOX 3606 QUINCY, IL. 62305
217/224-9600 FAX 217/224-9607

TITLE LCD POWER

TYPE	SIZE	DWG. NO.	REV
S	A	919-0558	B

MODEL NNNN | SCALE NONE | SHEET 1 OF 1

REVISIONS					
REV	DATE	DESCRIPTION	DRAFTER	APPROVED	ECN
A	7-3-02	MODEL RELEASE	KT		----
B	2-10-05	ADDED R1	KT		11251



NOTES:

1) DASHED OUTLINE COMPONENTS PLACED ON SOLDER SIDE: (C1,J1,U1)

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TOLERANCE (DECIMAL) U.O.S.
.X ± .030 .XXX ± .005
.XX ± .015 ANGLES + 1°

DWN. BY KT 7-3-02

DESIGNER(S)

PROJ. LEADER

MFG.

MATERIAL SEE BOM 919-0558

FINISH

NEXT ASSY.

BROADCAST ELECTRONICS INC.
4100 N. 24TH ST. P.O.BOX 3606 QUINCY,IL. 62305
217/224-9600 FAX 217/224-9607

TITLE LCD POWER SUPPLY

TYPE	SIZE	DWG No.	REV
A	A	919-0558	B

MODEL NNNN SCALE 1/1 SHEET 1 OF 1