Zaxcom Studio Diversity Receiver

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For Firmware Revision 44

This guide is intended to quickly initiate the user with the basic functions of the Zaxcom Digital Diversity Receiver. This guide assumes the firmware version displayed above has been installed. The firmware revision code is displayed shortly every time the receiver is turned on. The end of this document shows the changes made in each firmware revision.

*Note: This software revision requires a transmitter with a revision code of **33** or greater for the European format (Format 1) to be decoded properly. If Format #1 sounds severely distorted then check the transmitter software revision code. When using the US format selection (Format 0) this is not an issue.*

Receiver Connections

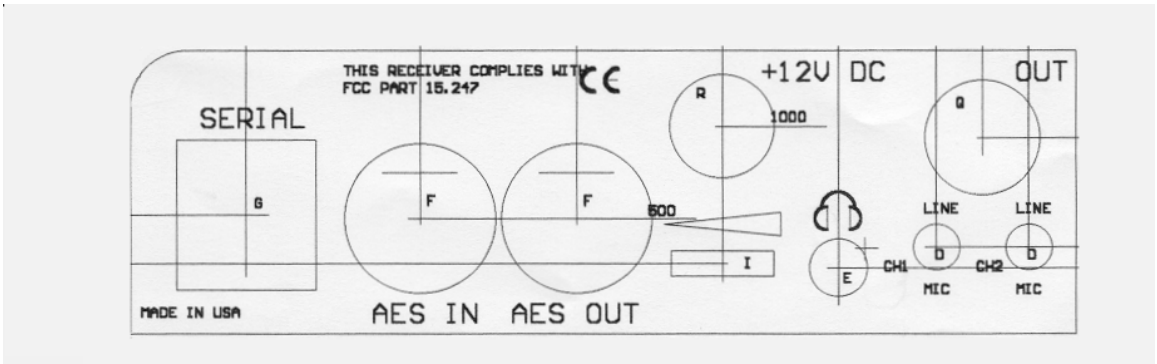
The receiver is powered by a bullet type connector supplying 12 VDC at 500ma (center pin is positive). A transformer is included in the wireless kit to provide this power. Both the receiver and the battery charger use the same power connector so ***be sure not to use the wall-type transformer since it will not supply the receiver with enough current***. This will result in AC hum and poor audio quality. The receiver can be powered by a battery system ranging from +9 VDC to +15 VDC. Voltages below 10V may degrade audio quality and receiver performance.

The serial connector is an RS-485 differential serial interface for the Cameo location mixer and/or a PC. This is not a USB port and should not be connected to a personal computer. Damage to your PC and receiver may result. The functions associated with this connector are described towards the end of this document.

The BNC connector labeled AES IN is designed for external AES audio sync and control data for multiple receiver configurations.

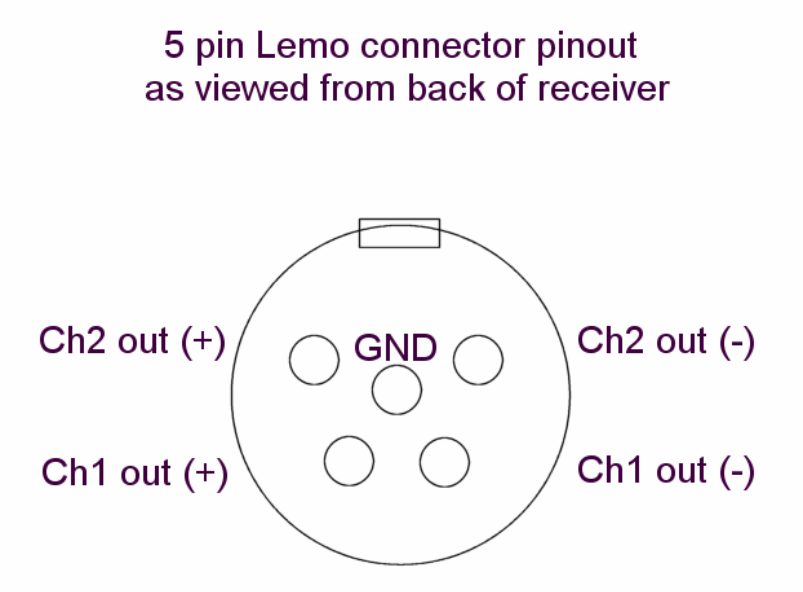
The BNC connector labeled AES OUT is an AES digital audio output.

The 1/8-inch stereo headphone jack is for monitoring the main channel of audio. The volume of the headphone is adjusted by the variable potentiometer located next to the headphone jack.



Connector diagram of rear of Receiver

The 5-pin Lemo type connector provides the user with a line level or mic level audio output. There are two audio channels available but currently both channels supply the same audio.



The front of the receiver contains two SMA thread-on connectors. These are 50-Ohm antenna connections designed to feed two external log-periodic or dipole antennas. It is recommended that the antennas be mounted 8 or more feet in the air to prevent transmitters from coming into close proximity to the antennas. Such strong radio frequency sources will reduce the receiver's sensitivity. Be sure to use high quality 50-Ohm coax and only as much coax as is needed otherwise the receiver's sensitivity may suffer. This receiver is optimized for properly tuned external antennas. Whip antennas will noticeably reduce the sensitivity of the receiver.

Receiver Menu System

The receiver's basic menu system consists of four pages plus three hidden pages.

HOME STATUS PAGE

The home page is designed to provide the user with several pieces of information at a glance. The display will read something similar to "A---usT9". The first letter will be an "A" or a "B" to indicate which antenna diversity channel is being used.

The next two characters are signal strength meters for each of the antenna inputs. When these characters turn into a checkered pattern it indicates a strong RF input level from the transmitter.

The fourth character indicates the audio level. When this character turns into a checkered pattern the transmitter is limiting the gain of its mic preamp due to excessive audio input levels. If this occurs, reduce the audio gain on the transmitter. This will insure the highest level of un-processed audio quality.

The next two characters indicate the current reception format. “us” indicates US mode format #0, “eu” indicates European (narrow-band format #1) mode, and “st” indicates US mode stereo (format #2). This display feature was added in software revision 40. Previous software revisions indicated “R9” in this location.

The last two characters represent the transmitter's battery level. This will range from T0 to T9. When the battery level reads zero, the transmitter has only a few minutes left before it fails. When a transmitter fails due to a low battery in the Slim Line or SPY, remove the battery from the transmitter to prevent a total discharge of the Lithium Ion battery. **Full discharge of any Lithium Ion cell *will* reduce the overall performance of the battery.**

CHANNEL CODE SELECT PAGE

This page allows the user to change the channel while observing the signal strength of each antenna input. This channel code is identical to the transmitter's channel code. See the transmitter's guide for a full description of the channel code. When a valid, error-free transmitter has been detected on a given channel the "ch" characters will become capitalized. The user may hold the INC or DEC key to scan through all channels. To change channels more quickly the user may hold the INC key and press the DEC key repeatedly to skip forward in 5MHz steps.

The channel code is merely the last 3 digits of the channel frequency. So a channel code of 321 represents a frequency of 532.1 MHz (or 732.1 MHz depending on which block your transmitter is operating on).

If receiver the unit has European software the channel code of 321 will represent 832.1 MHz. The exact frequency will read out directly in the next menu page selection on the receiver

CHANNEL FREQUENCY SELECT PAGE

This allows the user to view and change the frequency of the channel in MHz instead of the channel code.

LOW NOISE AMPLIFIER PAGE

The receiver contains a sensitive low-noise amplifier (LNA) on each antenna input**.** This Page allows the user to turn this amplifier on or off.

Note: Software revision 40 and above contain a new software RF decoding algorithm which dramatically improves close-in performance. As a result, the setting of the LNA is less crucial due to the fact that the receiver can now easily decode signals that are too strong. The multi-coupler box also contains an LNA which may be turned on or off via a switch on the front panel. Below is a list of recommended operating conditions and their corresponding LNA settings:

Receiver LNA Setting	***Quad Box LNA setting***	
Off	***Off***	***Not Recommended***
Off	***On***	***Ok for near and far transmitters***
On	***Off***	***Ok for near and far transmitters***
On	***On***	***Ok for very distant transmitters***

If an IFB or intercom transmitter is located close to the receiver then the IFB must be transmitting in a different block than the receiver is operating in. If any transmitter within the receiver's frequency block is within 10 feet, the receiver will suffer poor range when trying to listen to other transmitters that are far away. If the IFB or intercom transmitter is operating in a different block, then the receiver's front-end filter will remove the strong interference from the IFB.

IP3 channel selection:

The latest generation of Zaxcom receivers has such high Intermodulation (IP3) performance that the following table is no longer needed. If using other manufacturers' wireless mics in the same

area as the Zaxcom wireless, then proper IP3 channel selection must be ensured. Two FM transmitters can interfere with each other such that they actually transmit noise on other channels. The following table reduces this problem by forcing the interfering signals to land on channels that are not in use. The Zaxcom transmitters use a linear power amplifier that does not suffer from this problem.

Below are lists of frequencies that can be chosen to reduce the potential for IP3 related interference which can occur when a transmitter gets too close to a receiver or another transmitter. (These frequencies are in MHz and assume that your receiver is operating in block 21)

536.0	536.9	538.4	540.5	543.2	546.5	550.4	555.5	561.2	

If your receivers are on a different block, then pick a low starting frequency and add these offsets to it:

0.0	0.9	1.5	2.1	2.7	3.3	3.9	5.1	5.7	

For example, if you picked a starting channel of 800 MHz, the result would be:

800.0	800.9	802.4	804.5	807.2	810.5	814.4	819.5	825.2	

SPECIALIZED FUNCTION MENU PAGES

To access the SPECIALIZED FUNCTIONS menu, make sure the Receiver is turned off. Hold down the FUNCTION key while powering up the receiver. This will increase the number of menu items available to the user.

DIMMER PAGE

The display brightness can be changed in this page. The brighter the display, the more current the receiver will consume. Keep the display only as bright as necessary.

TRANSMISSION FORMAT SELECTION

The display will show the current format selection. ***If this item is not set correctly the receiver will not be able to receive any audio from the transmitter.*** This item allows the user to choose between US mode and European/ mode. ***This user selection will not take effect until the unit has been powered down and restarted.*** See the Transmitter's guide for a further description of the available transmission formats.

TEST TONE PAGE

This page allows a 1 kHz test tone to be generated by the receiver. The tone amplitude is +0 dB (20 dB less than full scale) or full scale. When the user exits this page the tone will automatically be disabled.

ID CODE 0 PAGE

This code should be set to 000 for normal operation. See the Transmitter's guide for a description of the security mode.

ID CODE 1 PAGE

This code should be set to 000 for normal operation. See the Transmitter's guide for a description of the security mode.

Rx Number PAGE

This setting should normally be set to 1 or higher. When set to 0 the receiver will automatically scan the channel spectrum when in the first channel select page. The receiver has an RS485 serial port that allows communication with a personal computer or a Cameo Digital Location Mixer. This feature allows several receivers to be remotely controlled by a PC or a Cameo. This facilitates large installations where manually adjusting and monitoring the status of each receiver may be cumbersome.

The PC or Cameo must also be running the proper software in order to recognize the receiver's serial data. The RxNumber page allows the user to give each receiver a unique address for serial networking purposes. To enable a group of receivers to operate with a Cameo, number each receiver incrementally starting from 0. The special case of Master mode is engaged when a receiver is given an RxNumber equal to zero. This causes that receiver to poll the network and ask all other receivers for their respective data. Cameo listens in on the network passively and displays the appropriate status on its screen.

When attaching multiple receivers to a PC use the ZaxLan software (sold separately by Zaxcom). A special adaptor is required that allows the receivers to be attached to a PC's RS232 port. Number the receivers starting at RxNumber 1. ***When using a PC do not set any of the receivers to RxNumber 0***. The PC is the master and all other receivers are slaves on the RS422 network. If any receiver on this network is assigned an RxNumber of zero, the network will become unreliable. Receiver software version 019 or greater is required for this networking feature. The software version is displayed shortly during a receiver's power-up sequence.

AES MODE PAGE

This page allows the user to choose between *OFF*, *Starter* and *Follower* mode. When the AES audio system is off, power consumption and heat generation is substantially reduced. ***When not using the AES audio modes, leave this menu item off***.

Receiver software version 020 or greater contains an AES audio mixing feature used to mix AES audio from two separate receivers onto a single AES cable. To acquire AES audio from a receiver an external AES audio reference must be present. This can be any AES audio channel from a digital recorder or digital mixer. Once an AES reference is fed into a receiver in *Starter* mode it will lock onto the sample rate of that reference signal. The starter receiver will place its audio onto the *left* channel of its AES audio output and mute the *right* channel of its AES audio output. This audio can be fed back to the mixer/recorder or may be fed into a *Follower* receiver. The *Follower* receiver will accept the AES audio from the starter and apply its audio onto the right AES audio channel while leaving the left channel intact. The AES audio that comes out the follower receiver contains the two separate channels of audio on one cable.

Receiver Software Revision History

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04-02-02 rom14: beta voting software
05-21-02 rom15  internal changes
06-12-02 rom16  fixed SS metering spill over (minor change)
07-12-02 rom916 European mode changes
07-18-02 rom17  changed European mode to higher quality (don't use with old transmitters)
08-15-02 rom18  started to rs485 remote control - partial
08-23-02 rom19  added remote commands (change freq,idcode from rs485)
         rom19  swapped menus for ID0,ID1 for better intuitiveness
09-19-02 rom20  added AES L/R merge mode (added page_aes =start/follow)
         rom20  changed voting rxer to 31 (from 5)
09-27-02 rom21  fixed toneon==1 at boot bug (from rom20)
10-01-02 rom22  fixed AES ext ref bug (in starter mode)
10-25-02 romE22 (no sw changes) made CHANNELEU version (860MHz)
11-20-02 rom323 internal mods
12-03-02 rom324 changed AES menu: "off/follow/start/vote"
12-11-02 rom325 scaled meters, tested with AES_OFF mode
01-10-03 romE25 (no sw changes) made CHANNELEU (RF2G) version (860MHz)
01-17-03 rom326 changed tvchannelmax to 78 to match txer
04-19-03 rom327 made AUTO LNA mode work with new RF boards
                doubled dropout fadeout rate to make dropouts sound quieter
05-10-03 rom328 menus for testing faderate and drop count (reduced faderate even further)
05-11-03 rom329 changed fader rate even faster
05-27-03 rom330 added support for cameo freq indicator status

07-23-03 romE30 ---- (EU version of 330)
         ---- must be paired with Tx version 033 or newer for EU to work from now !!----
07-29-03        added major stereo upgrade: fmt#2=stereo
08-09-03 romE31 swapped menu positions so id0 comes 1st
                added new channel scheme for EU (100khz steps then ch 1..14)
09-17-03 rom032 fixed tone bug  (debug tone table was installed)
09-18-03 rom033 fixed new init channel bug EU versions
09-27-03 rom034 removed LNAB debug toggle (was in last 3 versions)

10-01-03 r40 ---------------major RF software changes ----------------------
              added close-in dropout protection software
10-20-03 r41 limited VCO (5V to 3.3V) which flaked EU mode periodically at TX bootup
10-27-03 r42 changed lock VCO mode back to 1.6V
10-30-03 r43 changed Block 33 channels to proper EU bands
                 (ths EU channel scheme matches with rom 36 or greater in TXer)
10-31-03 r44 re-added LNA page for EU version

-------------------------------------------------------------------------
VERSION  equ $44 ; (last 2 digits of rom number)
-------------------------------------------------------------------------
 prefix code:
               0xx=normal rxer (both mono and stereo) (new RF boards)
               4xx=rxer with an old style RF board

               2xx=European channel scheme
               6xx=European channels with OLD RF board

               Fxx=all menu pages active all the time (debug)
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