

# **Zaxcom ENG Diversity Receiver**

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For ENG Firmware Revision 58 and Above

This guide is intended to quickly initiate the user with the basic functions of the Zaxcom Digital ENG 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.

## **Powering the Receiver**

The receiver can be powered either by internal batteries or external 12VDC power (positive center pin). When powered by internal batteries the unit should be powered by either Lithium AA batteries or by Nickel Metal Hydride (NiMH) AA batteries. Alkaline batteries may be used but their life will be quite short (about 30 to 60 minutes). Rechargeable NiMH batteries will last up to 3 hours, Lithium batteries will last about 6 hours. The power source is selected by the center-off power switch on the front panel. The "Int" position will power the unit from the internal AA batteries. The "EXT" position will power the unit from external 12 volts. If external power is lost, the unit must be manually switched to internal to restore power to the receiver.

The 4 AA batteries are accessed by pressing on the battery door by the words "this end" while sliding the door away from the center of the unit. Always be careful to observe the correct battery polarity. The battery should be loaded with the + and – as indicated by the text on the back panel. The battery negative should be connected to the battery spring contact on the battery door.

***Never use any battery that is missing insulation on its body. This can allow a short circuit in the battery compartment causing damage to the receiver.***

## **Receiver Connections**

The receiver is externally powered by a bullet type connector supplying 12 VDC at 300ma (center pin is positive). The receiver external power ranges from +9 VDC to +15 VDC. Voltages below 10V will degrade audio quality.

The 3 or 5-pin XLR type connector provides the user with a line level or mic level audio output. There are two audio channels available in stereo mode. In mono mode both channels supply the same audio. The audio output level is controlled on each of the 2 outputs by the mic/line switches on the rear of the receiver. In the "Line" position the output level is –6dB. In the mic position the output level is –42dB. The system headroom is 20dB. If the receiver was ordered as a mono type it will have a 3 pin XLR. If it was ordered as a 2 channel/stereo it will have a 5 pin XLR.

PIN#	Stereo 5 pin	Mono 3 pin
1	Ground	Ground
2	Left+	Mono+
3	Left-	Mono-
4	Right+	
5	Right-	

The front of the receiver contains two SMA thread-on connectors. These are 50-Ohm antenna connections designed to feed two external log-periodic (shark-fin) or whip antennas. It is recommended that the antennas be mounted 3 or more feet away from any transmitters. Such strong radio frequency sources will reduce the receiver's sensitivity. Be sure to use high quality 50-Ohm coax and only as much cable 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 range of the receiver when compared to log-periodic antennas.

## 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 unprocessed 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 SlimLine 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 long-term 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 and the LED on the receiver front panel will change from red to green. 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 the receiver 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.

## CHANNEL SCAN PAGE

A new feature was added to the ENG receiver software in firmware revision 055. This allows the user to scan an entire block of channels and quickly choose the quietest channel to operate on.

Note: at any time in the Channel Scan page, the MENU key may be pressed to exit the channel scan menu page. Using the MENU key to exit this page will always cause the receiver to revert back to the channel that was previously in effect.

The channel scan menu page will initially display "Scan:123" where 123 is the current channel code. Press INC to start a scan. The receiver will search every possible channel (one full scan takes about 8 seconds). The receiver will choose the quietest channel when the scan is completed. If the MENU key is pressed, the receiver will discard this new channel and exit to the home screen. If the DEC key is pressed, the receiver will accept this channel and exit to the home screen. If INC is pressed again, the scan will restart, but instead of performing a fresh scan, it will average the current scan with the previous scans so any channels that are temporarily occupied will tend to be remembered in the final channel choice. This allows the receiver to block out channels that contain intermittent RF interference. To perform a fresh scan, press the MENU key several times to cycle through the menu system back to the channel scan page.

An easy way to remember the proper key sequence is to note that a typical channel scan will involve pressing the MENU key to get to the scan page, pressing the INC key to start a scan and finally pressing the DEC key to accept the result, thus pressing the keys in a right to left sequence.

If several transmitters must be used at once the following procedure may be used to easily find the quietest channels. Turn all transmitters off and perform one or two scans. Accept the quiet channel by pressing the DEC key. Turn on the first transmitter and tune it to this channel. Place the transmitter 20 or more feet away from the scanning receiver and perform another scan or two. Since the most recently selected channel is now occupied, the next receiver to perform a scan will find the next quietest channel. Repeat this procedure for each transmitter.

### IP3 channel selection: (Intermodulation)

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	
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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	
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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	
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## **SPECIALIZED FUNCTION MENU PAGES**

To access the SPECIALIZED FUNCTIONS menu, turn off the Receiver and hold down the MENU key while powering up the receiver. This will increase the number of menu items available to the user.

### **BACKLIGHT MODE SELECTION**

This page controls the backlight on the LCD display.

### **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 mono/stereo 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). When the user exits this page the tone will automatically be disabled. Use the up and down arrow keys to control the tone amplitude.

### **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.

### **Power saver mode and receiver Heat dissipation**

The ENG receiver draws .2 amps at 12 Volts. This means that it must dissipate 2.4 watts of heat. While this is not a lot the unit must have some ventilation. Running multiple receivers in a sound bag with no ventilation may be a problem depending on the ambient temperature. If there is a problem the receiver power saver mode can be used. This mode will not effect operation in any way but it will cut the power consumption and heat dissipation by 25%. The receiver is 10% more power efficient when running from 12v external power. When possible, external power is the best choice. To get into the power saver menu, hold the "FNC " button down when powering up the unit. Press the Function key several times to get to the power saver menu. The "INC" and "DEC" keys can be used to enable and disable the mode.

## **Specifications**

External Power.....9-15VDC @ 200 ma (150 ma with power saver)  
Internal Power.....4 AA @ 470ma (350ma with power saver)  
Antenna.....50 ohm SMA connector  
Size..... 4.75" x 3.25" x 1.25"  
Weight.....9.7 oz less batteries  
Display..... Graphic LCD  
Receiver type .....Single conversion true diversity  
Modulation type.....Digital  
Modulation bandwidth.....200 KHz US mode / 125 KHz European mode  
Frequency range.....530 MHz to 850 MHz (30 MHz blocks)  
Frequency steps..... 100 KHz  
Minimum co-channel spacing.....500 KHz (700 KHz recommended)