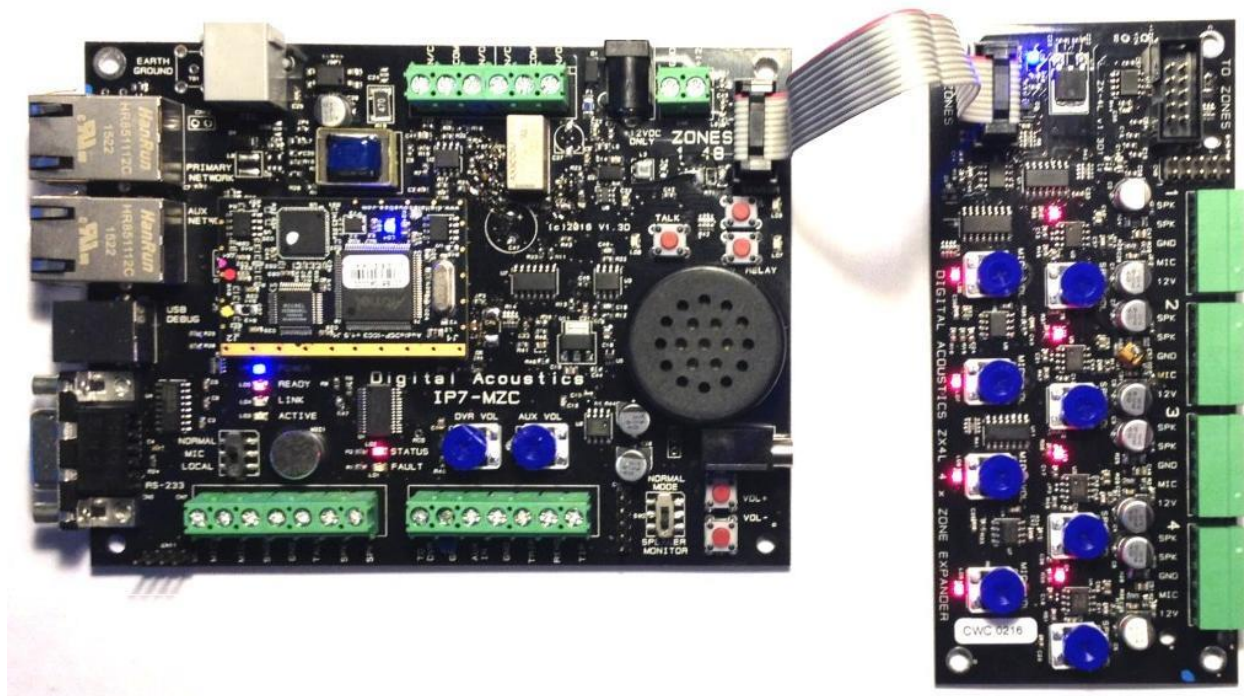


DIGITAL ACOUSTICS

IP7-MZC Multi Zone Controller ZX4L Zone Expansion

Hardware Installation Manual



IP7-MZC

ZX4L

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IP7-MZC Zone Controller System

Overview

The IP7-MZC (Multi Zone Controller) is an IP Endpoint with the ability for the caller to enable or disable microphone and speaker feeds in multiple full-duplex audio Zones during a session.

Up to 48 Zones are supported using the MZC using cascaded ZX4L Zone expander boards. Each ZX4L adds 4 Zones, with control of 4 microphones and 4 speaker connections

Zone control within the IP7-MZC is made through a SIP connection or with a custom TalkMaster FOCUS PC application. Please refer to the TalkMaster FOCUS SDK for information on software support.

Additional features include:

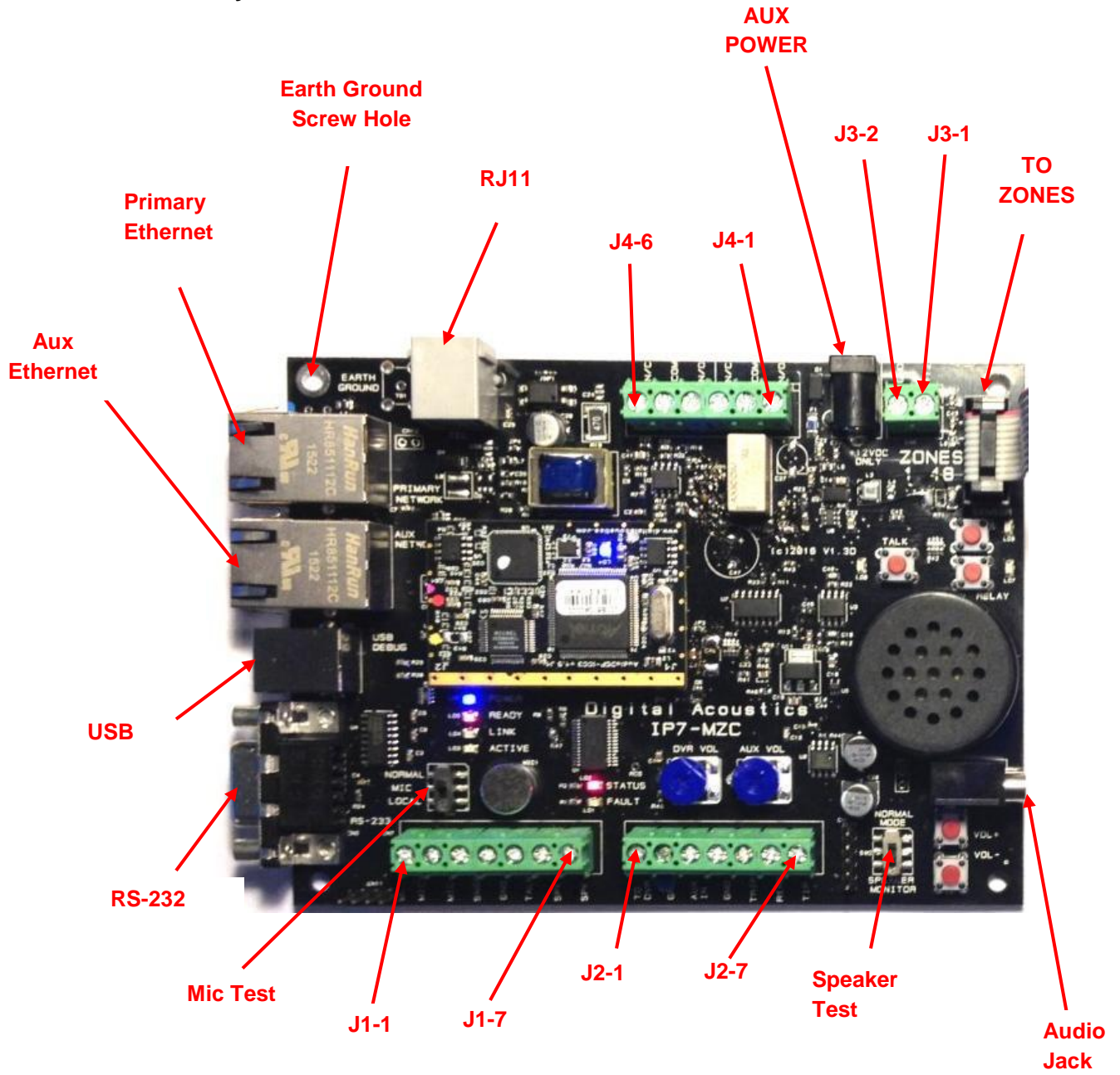
- **ANALOG TELEPHONE SUPPORT** - An RJ-11 jack for connection of a standard analog telephone to the IP7-MZC to communicate over the IP connection. Picking up the analog handset can optionally initiate a call and/or temporarily shut down the audio on the Zone Expansion Zones. Once connected, the handset provides full duplex communication with the caller
- **DVR RECORDING OUTPUTS**: A monitor audio access terminal that outputs an aggregate feed of all active audio zones to a DVR. Multiple monitor access points are also available on each ZX4L expander to allow every zone to have a unique DVR channel recording
- **INTEGRATED 10/100 PASS THRU PORT**: A high speed 10/100 LAN port is available to cascade IP connections to downstream devices, including additional Digital Acoustics IP endpoints or cameras
- **INSTALLER TESTPOINTS**: Onboard mini-speaker and microphones are included to allow service technicians to quickly diagnose, debug and test audio paths with local access.

NOTE: This Hardware Guide refers to System Installer interconnects and wiring conventions. Refer to the ***IP7-MZC System User's Guide*** for operation and general product usage.

Technical Specifications

Item	Specifications
Hardware Protocols	TCP, UDP, SIP, RTP, ICMP, IGMP Multicast
Network Interface	10/100 Ethernet (Auto detection, Auto MDIX)
Command Protocols	Supported by TalkMaster™ command protocols
Audio Rate	64kbs
Audio Resolution	G.711 (8-bit PCM and 16-bit uLaw)
Audio Sample Rate	8K (Voice)
Diagnostics	LED Status, USB
Environmental	-10~70 C (Operating), -40 C~85 C (Storage), Humidity 10~90%

IP7-MZC Board Layout



IP7-MZC Status LEDs

The IP7-MZC has several LEDs which can be used to determine connection status.

LED	LED Name	Description	Notes
1	Power	Power Status	On - Board is powered on Off - Board is not powered on
2	Ready	Connection Status	Solid - Connected to Server 2 Second Flash - Connected to TalkMaster, but not to SIP 1 Second Flash - Not Connected to TalkMaster Fast Flash - 30 second IP7 Discovery confirmation
3	Link	Network Link Status	Solid - Connected to IP Network Blinking - RJ45-1 is connected, but no IP Network sensed Off - RJ45-1 is not plugged in
4	Active	Audio Status	Off - No Audio Flashing - Audio is in progress
5	Status	IP7-MZC Test Status	On - Normal Operation Fast Flash - The MIC Test or Speaker Test switch is enabled
6	Fault	MZC Fault Status	Off - Normal On - ZX4L Driver Error; Repower board
7	Sensor	IP7 Sensor Input Status	Off - Sensor is not active On - Sensor is engaged
8	Relay	IP7 Relay Output Status	Off - Relay is not active On - Relay is engaged
9	Talk	IP7 Talk Switch Status	Off - Talk switch is not active On - Talk switch is engaged

LAN Connector LEDs

LED	LED Name	Description	Notes
Primary Network	Green LED	Connection Status	Tracks LED 2 (Ready) Connection Status
Primary Network	Yellow LED	Audio Status	Tracks LED 4 (Active) Audio Status
Aux Network	Green LED	Network Transmit Activity	
Aux Network	Yellow LED	Network Receive Activity	

IP7-MZC J1 Connector

The J1 Connector is primarily available for compatibility with existing IP7s and is not typically used on the IP7-MZC.

Connector	Connection	Description	Notes
J1-1	MIC+	Standard IP7 Electret Microphone input	Reserved (Do not connect)
J1-2	MIC-		
J1-3	SNSR	IP7 Input Signal	Connect to GND to activate
J1-4	GND	Ground signal for J1-3, J1-5	Connected to system ground
J1-5	TALK	IP7 Talk Switch	Connect to GND to activate. TALK can be optionally activated by the Handset via software configuration
J1-6	SPKR+	Standard IP7 8 Ohm non-powered speaker. Polarity independent.	Reserved (Do not connect)
J1-7	SPKR-		

IP7-MZC J2 Connector

Connector	Connection	Description	Notes
J2-1	TO DVR	Line Level Audio output of either the Handset or a mix of the currently Active Zones 1-48	Must be combined with J2-1 GND to generate output audio signal
J2-2	GND	Ground signal for J2-1 TO DVR	Connected to system ground
J2-3	AUX IN	Line Level Audio input that can be mixed into J2-1	Must be combined with J2-4 GND to generate input audio signal
J2-4	GND	Ground signal for J2-3 AUX IN	Connected to system ground
J2-5	TRIP	Digital Input Signal for legacy 'off-hook' detection	Optional Handset off-hook or digital input signal. Normally unused
J2-6	RING	RJ11 Connector RING	Ring terminal (also on RJ11 jack)
J2-7	TIP	RJ11 Connector TIP	Tip terminal (also on RJ11 jack)

IP7-MZC J3 Connector

Power Connectors

Connector	Connection	Description	Notes
J3-1	+12	+12VDC Input Power	J3 is parallel connected to the 2.1 mm power connector. J3 may be optionally used for 12VDC powering when the 2.1 mm power jack is not used.
J3-2	GND	Ground signal for J3-1	

IP7-MZC J4 Connector

Dry Contacts

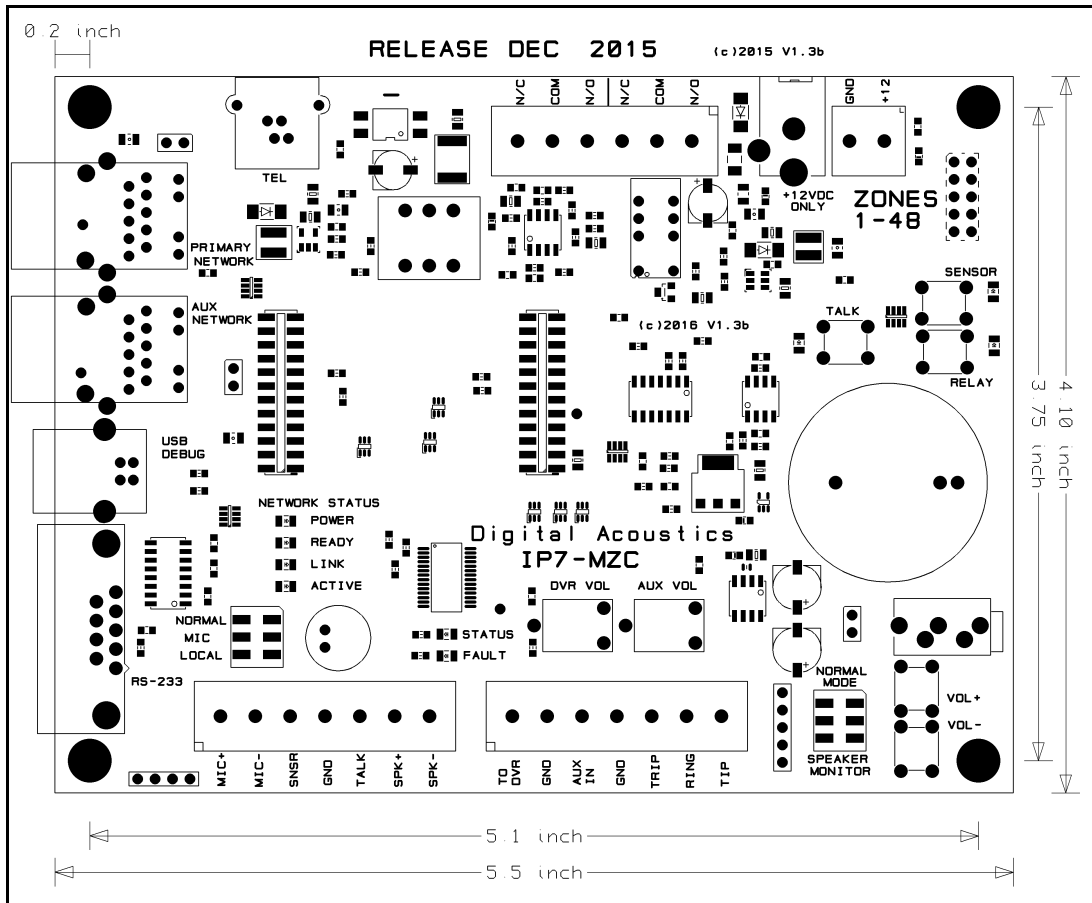
Connector	Connection	Description	Notes
J4-1	N/C	Normally Closed	Isolated Dry Contact Relay switches Activated simultaneously with J4-4 - J4-6 switching
J4-2	COM	Common for J4-1 or J4-3	
J4-3	N/O	Normally Open	
J4-4	N/C	Normally Closed	Isolated Dry Contact Relay switches Activated simultaneously with J4-1 - J4-3 switching
J4-5	COM	Common for J4-4 or J4-6	
J4-6	N/O	Normally Open	

IP7-MZC Onboard connectors and controls

Connector	Connector/ Control	Description	Notes
	MIC Test	Microphone Test switch. <i>Set to NORMAL for standard operation</i>	Two position switch <ul style="list-style-type: none"> • Normal - Normal Operation • MIC LOCAL - onboard Mic audio <u>for testing only</u>. The Status LED will flash rapidly in this position
	Electret MIC	Onboard microphone used to verify that audio is being sent by the IP7	Enabled when MIC Test is set to MIC LOCAL. The Zone Controller must be re-powered without any Zone Extenders before testing begins
	DVR VOL	Controls Volume to J2-1 and J2-2 connectors	Adjust as needed to set DVR volume
	AUX VOL	Controls volume coming into the J2-3 AUX IN connector	Adjust as needed to set input level
	SPKR TEST	Speaker Test switch. <i>Set to NORMAL for standard operation</i>	Two position switch <ul style="list-style-type: none"> • Normal - Normal Operation • SPEAKER MONITOR - Onboard Speaker <u>for testing only</u>. The Status LED will flash rapidly in this position
	SPEAKER	Onboard speaker used to verify that audio is being received by the IP7	Enabled when SPKR Test is set to SPEAKER MONITOR
	Audio Jack	3.5mm Audio Jack for monitoring J2-1 TO DVR	Use a self-amplified speaker to monitor and verify the audio signal to the DVR Normally connects to common “earbuds”, PC multimedia speakers or mobile phone headphones for listening tests.
	TALK	Same as J1-5	Test button for activating TALK
	RELAY	Activates J4 Relay	Test button for activating RELAY
	SENSOR	Same as J1-3	Test button for activating SENSOR
	Zones 1-48	Connect Zone Extender Boards	Keyed connector to attach to the first ZX4L Zone Extender boards.

	AUX POWER	2.1mm power connector with center tip positive. 12VDC	Warning: Connecting power to both the 2.1mm Power jack and the J3-1 and J3-2 power connectors at the same time will damage the unit
	RJ11	Standard analog telephone connector. Two-way audio is supported. The ringer on the analog phone is not supported	Software Config Options <ul style="list-style-type: none"> • Lift Handset may disable existing zones/Hang-up Handset & re-enable zones if set in software • Lift Handset to initiate a call
	Ground Screw Hole	Ground Screw Hole	If "hum" is heard in the audio, then connect the Ground Screw Hole or any GND connector to an earth ground
	Primary Network	Ethernet 10/100 Network Connector	Supports Auto Negotiation and MIDX
	Aux Network	Port 2 for connecting another network device	The Primary Network Connector must be connected to a network switch in order to use the Aux Network connector
	USB Debug	IP7 information display terminal	See information below for operation
	RS-232	Serial Port	Reserved

IP7-MZC Dimensions



Troubleshooting

Eliminating Audio Hum

The IP7-MZC uses a “floated” ground. If the speakers attached to the Zone Extenders have “hum”, then connect the IP7-MZC’s **Earth Ground Screw Hole** or any one of the **GND** connectors to an earth ground.

Reset to Factory Defaults

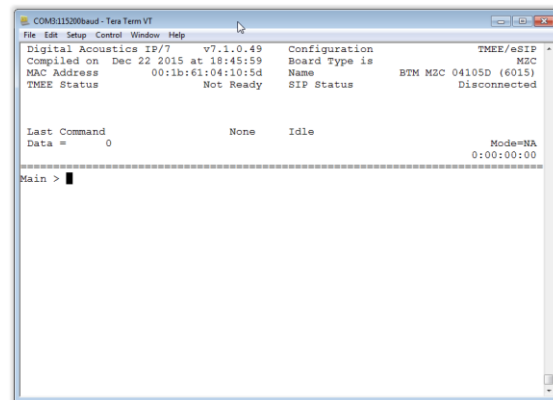
The IP Address information and all Intercom options can be reset to factory defaults by the following procedure:

- Unplug the Power
- Press and hold the “Vol +” and “Vol -“ buttons
- Power the unit
- Wait till the unit plays a 3 tone beep (about 8-10 seconds)
- Release the “Vol +” and “Vol -“ buttons
- Refer to the software manuals for instructions on configuring the IP address information

Viewing tech support info via the USB port

If requested by Digital Acoustics Support, a USB cable can be attached to the IP7-M-ICC to capture additional information.

- Attach a USB cable to the USB-B connector on the IP7-MZC and a PC running Windows®
- If an “Install Hardware” prompt is displayed, the USB Virtual Com port driver can be found in the main directory of the Software install
- Open the Windows Device Manager to determine the virtual Serial port that has been assigned
- Use a terminal emulation program (such as TeraTerm) to access the ‘virtual’ serial port. Assign the settings to 115kbs, 8,N,1, no flow control and ANSI Terminal
- Press the **Enter** key to refresh the display
- If the IP7 is restarted:
 - Disconnect the Com port in the Terminal Emulation program
 - Unplug/Replug the USB cable to re-enumerate the Com port
 - Reconnect the Com port in the Terminal Emulation program
 - Press the Enter key to refresh the display



Setting Volume Levels

The IP7-MZC's Volume Level is automatically set and the Vol+ and Vol- buttons are disabled in firmware. Set the volume of the individual zones using the zone's Speaker and Mic volume controls on the zone expansion board.

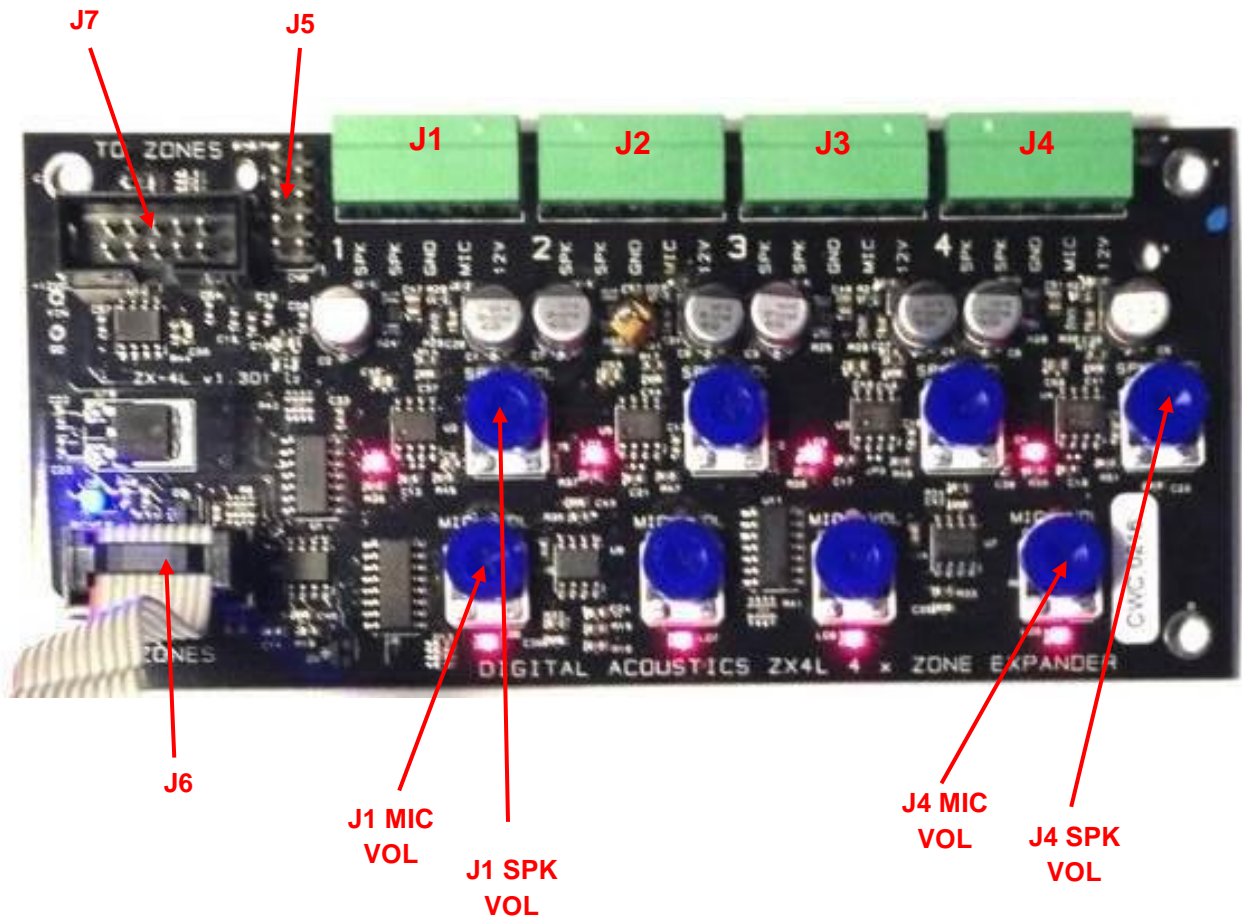
ZX4L - Four Zone Expansion Board

ZX4L Overview

Up to twelve ZX4Ls can be daisy chained to an IP7-MZC. Each ZX4L has four:

- Microphone connections
- Microphone Volume Control
- Speaker Connections
- Speaker Volume Control
- DVR Output pins

The ZX4L is designed to work with 2-wire or 3-wire 12V powered Microphones and speakers connected to an amplifier or amplified speakers. The speaker connections can also drive an 8 Ohm speaker at 1 watt.



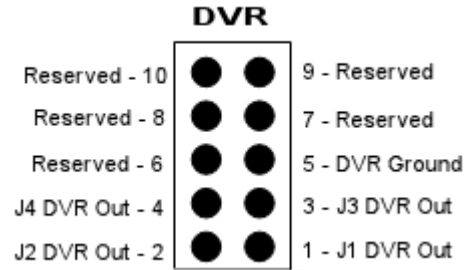
ZX4L J1, J2, J3, J4 Connector

(Note this represents 1 of 4)

Connector	Connection	Description	Notes
1	SPKR +	Line Level Audio signal to drive an amplifier or amplified speaker. Optionally may be used to directly drive a speaker	Capable of directly driving 1 Watt into a max of one 8 Ohm speaker per ZX4L. Max of four 8 Ohm Speakers attached to an IP7-MZC. Contact factory for attaching more than four 8 Ohm speakers to a IP7-MZC
2	SPKR -	Balanced signal feed to amplified speaker or balanced amplifier input. Optionally may be used to directly drive a speaker	Connect to balanced systems or isolated powered speakers only. Do not used as a connection to ground in unbalanced amplifier connections. Use pin 3 for unbalanced ground connections
3	GND	MIC/Speaker Ground	Microphone Ground / Speaker Ground for unbalanced connections
4	MIC	MIC Signal (+) audio / with integrated 'phantom' 12V power	Microphone signal "+" Audio and 20ma maximum feed for 2 wire 'powered' line microphones.
5	12V	MIC Power (optional)	12V power for 3-wire microphones. Not used for 2-wire powered microphones. USE ONLY TO POWER APPROVED 3 WIRE MICROPHONES. DO NOT CONNECT TO GROUND
	SPK Vol	Turn clockwise to increase the Speaker Volume	Nominally set this at 75% clockwise and adjust level at downstream amplifier to suit needs.
	MIC Vol	Turn clockwise to increase the microphone pickup	Set to 75% nominally to suit needs. If caller hears an "echo", decrease the MIC Vol and/or SPK Vol to suit needs.

ZX4L J5 - DVR Connector

The IP7-ZX4L provides a continuous mixed output of the Speaker and Microphone for each zone for recording to a DVR. It may be used directly with inline pinout or used with optional personality connector supplied by Digital Acoustics.



Connection	Description	Notes
J5 Pin 1	MIC and Speaker Line Level Audio output for 1st zone (always active).	Must be combined with J5-5 DVR ground to generate output audio signal
J5 Pin 2	MIC and Speaker Line Level Audio output for 2nd zone (always active).	Must be combined with J5-5 DVR ground to generate output audio signal
J5 Pin 3	MIC and Speaker Line Level Audio output for 3rd zone (always active).	Must be combined with J5-5 DVR ground to generate output audio signal
J5 Pin 4	MIC and Speaker Line Level Audio output for 4th zone (always active).	Must be combined with J5-5 DVR ground to generate output audio signal
J5 Pin 5	DVR Ground	
J5 Pin 6-10	Reserved	Reserved

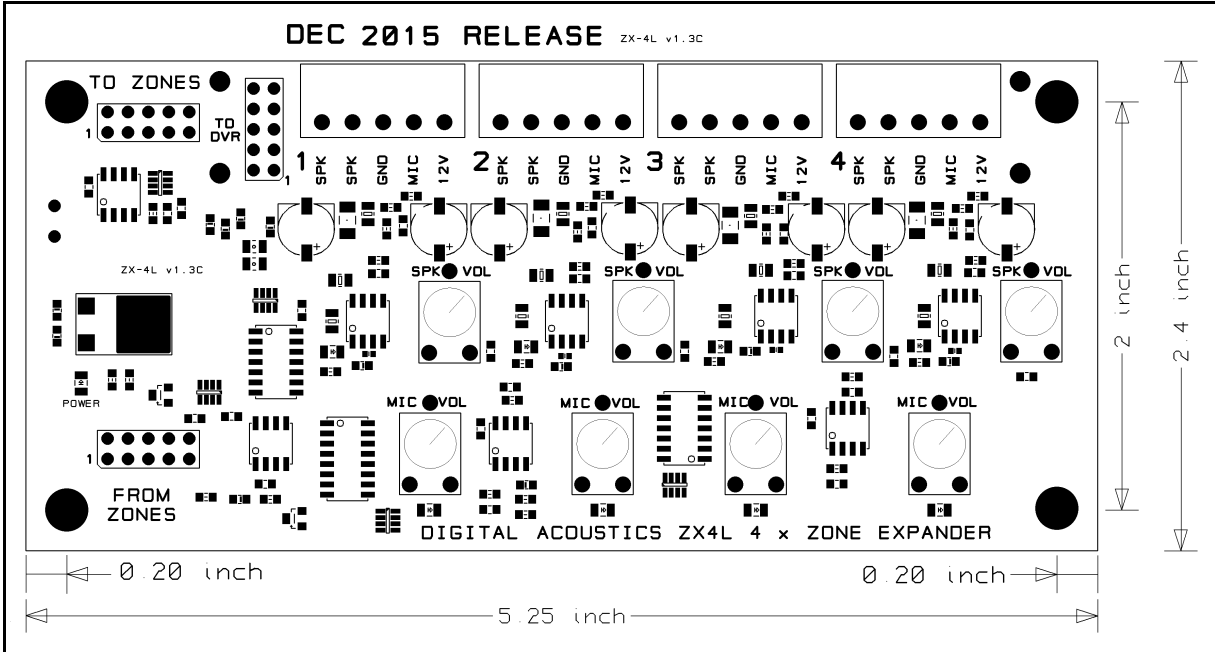
ZX4L J6 – From Zones

Keyed connector from an IP7-MZC or inline IP7-ZX4L

ZX4L J7 – To Zones

Keyed connector to another IP7-ZX4L

ZX4L Dimensions



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