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# **EWS 5150**

## **Radio Emergency Warning System**



ACMA Supplier Code N468  
ERAC Responsible Supplier Number E1287

**ISO9001 Certified**

***Blast Tone Generator***

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# EMERGENCY WARNING SYSTEM

## MODEL EWS-5150 Blast Tone Generator

### DESCRIPTION & USER INSTRUCTIONS

The EWS-5150 is an Emergency Warning System (EWS) for a radio network. It is also referred to as a Blast Tone Generator that plays a warning tone or voice message over the radio network prior to the commencement of blasting at mine sites.



It utilizes a Motorola MTM700/MTM800 TETRA ZEON mobile radio, an XTL2500/XTL5000 ASTRO APCO P25 mobile radio DM4601 MOTOTRBO™ or APX 8500 mobile radio. The radio is connected to the EWS-5150 directly to the rear Control Port.







A mining operator can place a private call to the radio (MTM) or page/alert the radio (XTL) which triggers the External Alarm function, activating the Emergency Warning System blast tone. There is also the option of using a momentary push button switch to start and stop the blast tone.

By default the EWS, when triggered by a private call or page to the radio, will transmit a two-tone warning for about 10 seconds. The default two-tone warning alert consists of alternating frequencies of 420 Hz & 700 Hz each of 500 ms duration. The EWS then stops transmitting for 20 seconds (by default) before transmitting the two-tone alert again.

This sequence is repeated until manually cancelled by another private call or page to the radio, or automatically after the Master Timer of 10 minutes (programmable) expires.

The EWS can also play a routine awareness/comfort tone that lets miners know they have radio contact. This is not often used.

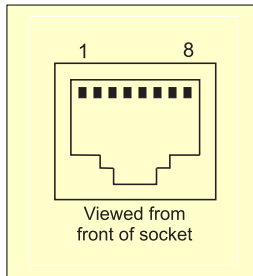
The EWS has its own internal Homepage. Using a Web browser, authorized installers and operators can change various operational parameters and these include:

-  DHCP
-  Email Alerts
-  Delay/interval between Warning (Blast) Tone transmissions
-  Total master timer for Warning (Blast) Tone cycle
-  Awareness Tone timer (Setting 0 = off)
-  Warning Tone volume level

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## ETHERNET COMMS

On the EWS-5150 back panel is an Ethernet jack which is the TCP/IP interface to the LAN/WAN and the Internet. A standard CAT5 patch cable (supplied) is used to connect the EWS-5150 to an Ethernet Switch, Router or Broadband modem.



PIN	DESCRIPTION
1	TXD + Pair 3 (T568A)
2	TXD - Pair 3(T568A)
3	RXD+ Pair 2 (T568A)
4	Not connected
5	Not connected
6	RXD- Pair 2 (T568A)
7	Not connected
8	Not connected

### Changing the Warning Tone and Awareness Tone files using an External Card Reader

The SD Card can be ejected from the EWS-5150 by applying gentle pressure, causing it to pop out of the slot. It can then be inserted into a Card reader and be seen as a mass storage device. New MP3 files can simply be 'dragged' across to the Card but you will need to erase existing files by re-formatting the card as a FAT or FAT16 file system before new files are 'dragged and dropped' within Windows. You must also copy 1.mp3 first, then 2.mp3, then 3.mp3.

Notes:

- Files **must** be named as follows in the correct order:
  1. Awareness Tone: 1.mp3
  2. Alarm Tone 1: 2.mp3
  3. Alarm Tone 2: 3.mp3
- It is highly recommended that MP3 recordings have their volume normalized to 96.0 using the MP3Gain freeware program. The default tones come from the Factory at the correct volume.
- The MP3 files can be voice announcements rather than tones, or a combination.
- SD Cards are 'hot swappable'. There is no need to remove power from the EWS-5150. Playing automatically commences when another loaded SD Card is inserted and an Alarm call is received.

### Configuration over the Local Area Network

The integrated Homepage Control Panel allows you to configure your DHCP, Username, Password and other settings. This internal configuration can only be done on your LAN.

Launch your Internet Browser and enter Browser Config Address WX[serial number] eg. WX1514. You'll find the Browser Config Address (NetBIOS name) on the base of your EWS-5150. The internal Homepage control panel will appear (see next page):



Firmware Version: v1.00    Firmware Build Date: Feb 05 2010 19:45:42

**Network Settings**

<b>DHCP:</b>	<input checked="" type="checkbox"/> Enabled	Usually enabled. Only disable this option if you need to assign a fixed IP. Your hostname is: WAVECUBE
<b>IP Address:</b>	<input type="text" value="192.168.1.8"/>	Be careful to set this to a valid network IP or you may lose connection.
<b>Subnet Mask:</b>	<input type="text" value="255.255.255.0"/>	Usually 255.255.0.0 or 255.255.255.0
<b>Gateway:</b>	<input type="text" value="192.168.1.1"/>	Usually your router's IP (eg. 192.168.0.1)
<b>MAC Address:</b>	<input type="text" value="00:50:C2:7B:80:00"/>	The last two bytes of MAC are automatically derived from the Serial No.
<b>Serial Number:</b>	<input type="text" value="0"/>	The Serial No. is preset at the factory and cannot be changed.

**Server Settings**

<b>Email Alerts:</b>	<input type="checkbox"/> Enabled	Enable this option to allow the Wavecube to send alert e-mails.
<b>Email Address:</b>	<input type="text"/>	Email address for alerts. (35 chars max)
<b>Email Server:</b>	<input type="text" value="www.wavecube.com"/>	This is the email server. (eg. mail.wavecube.com) (35 chars max)
<b>Server Username:</b>	<input type="text"/>	This is your server Username. (35 chars max)
<b>Server Password:</b>	<input type="text"/>	This is your server Password. (20 chars max)
<b>Server Port:</b>	<input type="text" value="25"/>	Usually 25. Do not change this without good reason.

**Alarm Settings**

<b>Alarm Repeat Delay:</b>	<input type="text" value="20"/>	Seconds between alarm repeats (default: 20)
<b>Total Alarm Time:</b>	<input type="text" value="10"/>	Total alarm time in minutes (default: 10)
<b>Awareness Tone Repeat Delay:</b>	<input type="text" value="120"/>	Seconds between awareness tone repeats (default: 120)
<b>Channel Activity Silence Time:</b>	<input type="text" value="7"/>	Seconds of silence required before alarm can sound (default: 7)
<b>Retry Timeout:</b>	<input type="text" value="2"/>	Minutes to retry to play alarm before sending failure email (default: 2)

http://wavecube/ (1 of 2) [30/04/2010 2:05:25 PM]  
Wavecube Configuration System

**Sound Settings**

<b>Volume:</b>	<input type="text" value="8"/>	This is the sound level of your Wavecube. Enter a value in the range of 1 (softest) to 10 (loudest).
----------------	--------------------------------	--

**Security Settings**

<b>Password:</b>	<input type="text"/>	Enter a case-sensitive password (10 digits max) used to access this configuration page. It can be upper and lowercase letters and numbers. Leave blank for no password. When requested, enter this password and the username "admin".
------------------	----------------------	---

Save Changes & Reboot Wavecube

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Check the appropriate boxes and set the required parameters then click on 'Save Changes & Reboot'.

## EWS AUTO-MAILER EMAIL SUCCESS/FAILURE NOTIFICATION

If the EWS is prevented from transmitting the blast tone, it can send an alert email to the email address set in the configuration system:

Eg. "EWS Wavcube X-Stream serial no.1514 (IP:114.77.102.19) failed to deliver message 2.mp3 (blast tone) on Thursday, November 10, 2009 at 1:15PM.  
Channel still busy after five attempts  
Input 1 (COS) is Low (active).  
Output 2 (PTT) is Low (inactive).  
Volume is set to 8.  
Note: This is an auto-generated email and cannot be replied to."

## CONNECTION MTM, XTL, TRBO and APX Series

### EWS-5150 EXTERNAL CONTROL TO MTM700/MTM800/MTM5400 ACCESSORY CONNECTOR

Connections between the External Control connector on the EWS-5150 and the Accessory connector on the MTM700, MTM800 or MTM5400 provide the signal paths required for the EWS to operate. These are listed in the table below:

Signal Description	EWS-5150 Isolated Audio & External Control	MTM800 Accessory Connector	MTM5400 Accessory Connector
Analogue ground	3	7	16
Audio out to radio	4	2	13
PTT Common	3		8
External Alarm(s) from radio	4, 5, 6	4	26
PTT to radio	2	3	17
Rx Carrier from radio	7	5	N/A
Digital Ground	8	8	8
SWB+	1	13	7
EWS-5150 power	2.1mm concentric Centre positive		

- A special cable, part number CA-5154MTM. The EWS-5150 internally contains relays K1 and K2, transistor Q1 and protection diodes D1 & D2.
- The MTM700/800/5400 radio should be modified to provide Rx carrier indication on pin 5.

### EWS-5150 EXTERNAL CONTROL INTERFACE CABLE COLOR CODING FROM THE MTM800 AND MTM5x00 RADIOS

Signal Description	MTM800	MTM5400	Wire Colour
Audio Out to Radio	2	13	Green
Analogue Ground	7	16	Green/White
Ground	8	8	Brown/White
Channel Activity Input (Rx Carrier)	5	Remote CH Pin 1*	N/A
Alarm Input 1 (External Alarm)	4	26	Brown
Alarm Input 2 (SWB+)	13	7	Orange
Spare Input	N/A	N/A	N/A
Relay Common (GND)	8	8	Blue/White
Relay Out (PTT)	3	17	Blue
SWB+	13	N/A	N/A

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## **ACTIVATING THE BLAST TONE**

### **MTM**

For the blast tone to sound, the External Alarm (pin 4) of the MTM800 needs to go low (0V) for more than 1 second and then go high (12V) within about 10 seconds. (There is a built in delay of 2 seconds before PTT is activated).

The sequence of low and high (as described above) is then repeated to stop the blast tone.

### **XTL and APX**

For the blast tone to sound, VIP OUT 1 (pin 18) of the XTL2500 needs to go low (0V) for more than 1 second and then go high (12V) within about 10 seconds. This sequence is then repeated to stop the blast tone. Please note that a momentary push button can be used for the activation and deactivation of the blast tone – see next page.



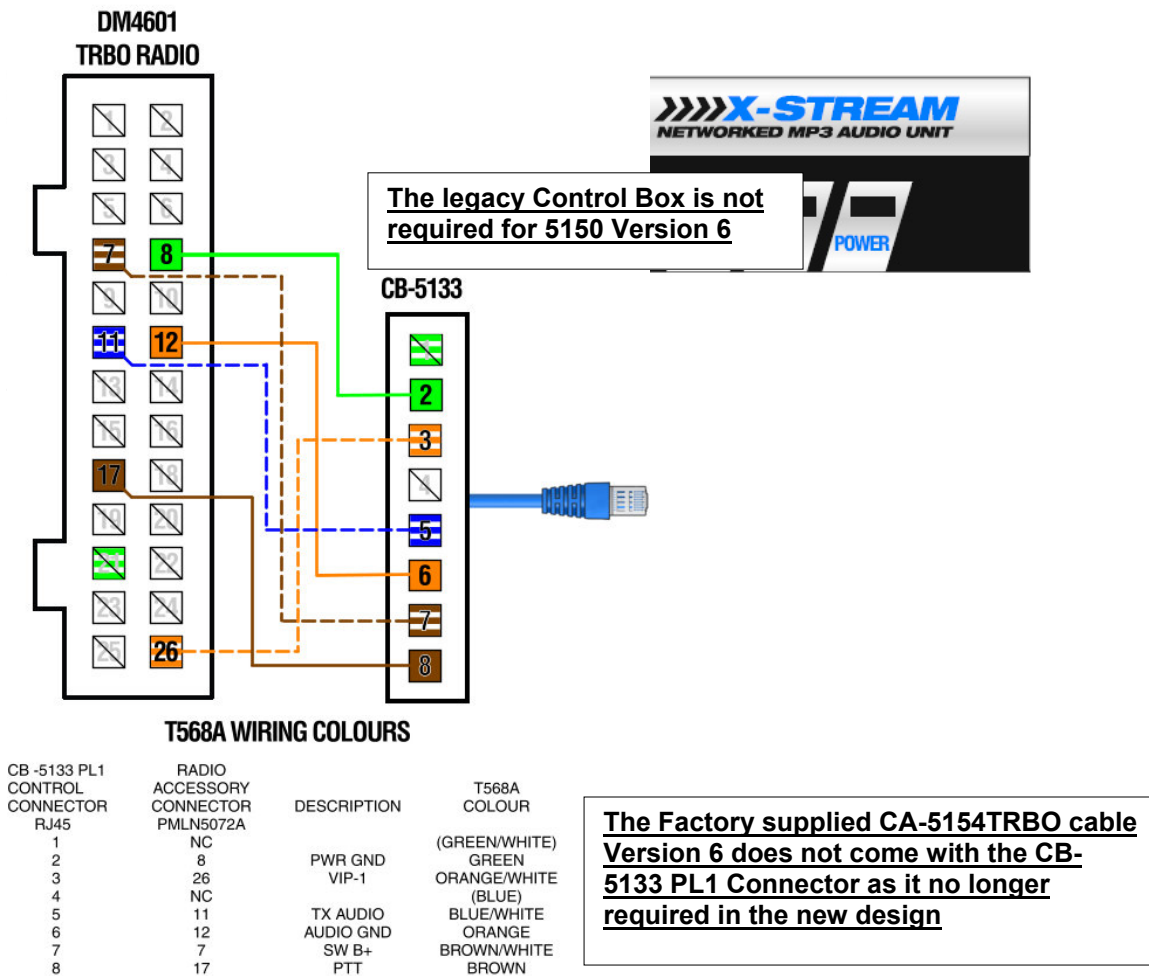
## EWS-5150 EXTERNAL CONTROL TO XTL2500/5000/APX850 ACCESSORY CONNECTOR

Connections between the External Control connector on the EWS-5150 and the Accessory connector on the XTL2500 or XTL5000 or APX8500 provide the signal paths required for the EWS to operate. These are listed in the table below:

Signal Description	EWS-5150 Isolated Audio & External Control	XTL2500 Accessory Connector
Analogue ground	3	23
Audio out to radio	4	1
PTT Common	3	
External Alarm(s) from radio	4, 5, 6	18
PTT to radio	2	16
Rx Carrier from radio	7	N/C (13)
Digital Ground	8	14
SWB+	1	24
EWS-5150 power	2.1mm concentric Centre positive	

## EWS-5150 EXTERNAL CONTROL TO MOTOTRBO™ DM4601

### CB-5133 TO TRBO RADIO INTERFACE CABLE



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## FRONT PANEL INDICATORS



### Power

The red **POWER** LED indicates that 12V d.c. power is connected.

### Play

The green **PLAY** LED indicates that the file(s) on the SD Card are currently playing. When the SD Card is ejected, this LED will flash.

Steady: An SD Card is inserted and an MP3 audio file is playing.

Slow flash: No SD Card is inserted.

### Load

The yellow **LOAD** LED indicates that the **EWS-5150** is in the process of downloading a new MP3 file from wavecube.com. When the SD Card is ejected, this LED will flash.

On: A new MP3 file is downloading & being written to the SD Card (future feature).

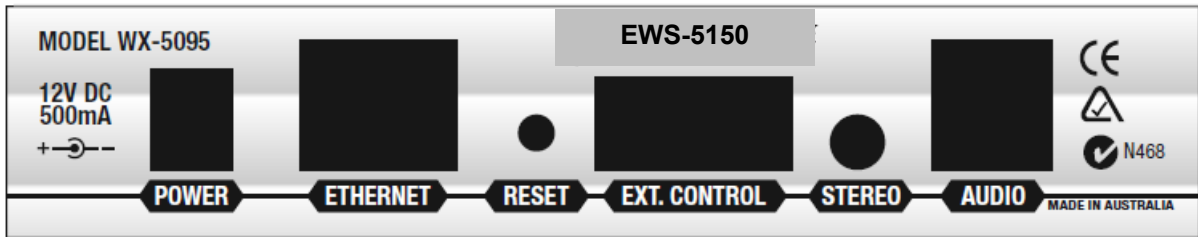
Off: An SD Card is inserted and an MP3 audio file is playing.

Slow flash: No SD Card is inserted.

### SD Card Slot backlight

The blue LED backlight glows steadily to indicate the proper insertion of a FAT16 (FAT) formatted SD Card

## REAR PANEL CONNECTIONS



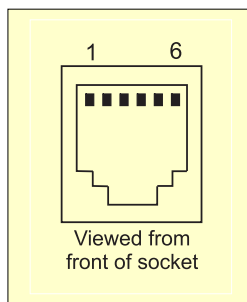
### 3.1 Power

The EWS-5150 runs from a 12V d.c. power source. It draws less than 300mA. As standard, the unit is supplied with an approved 240Vac / 12V d.c. 350mA power adaptor with a concentric dc power plug, 2.1mm centre pin positive. Power from the Radio supply can alternatively be used.

### 3.2 Audio Out

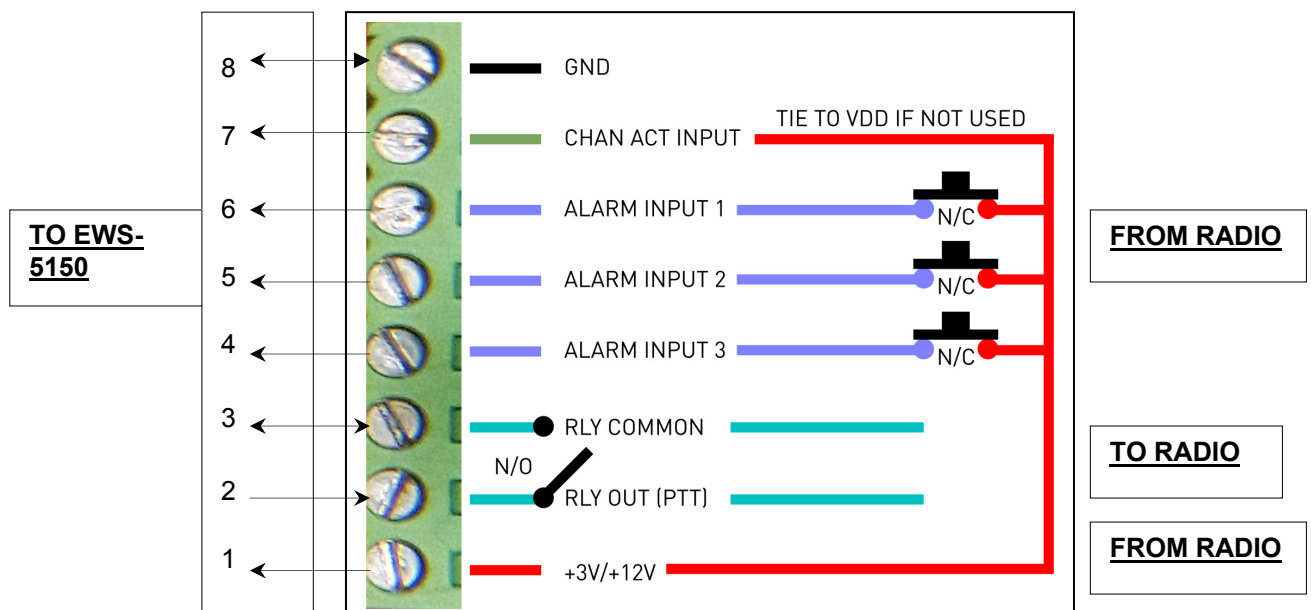
The isolated audio is output on the RJ12 jack for connection to the radio external mic audio in. The default output is nominally 500mV p-p however this can be adjusted on the EWS-5150 web page. There is an inbuilt Line Isolation Unit (LIU) so there is no need to have an external LIU.

Audio Feed – use the RJ12 jack with the inbuilt LIU. It sends isolated mono (or stereo combined to mono) audio.



PIN	DESCRIPTION
1	Not connected
2	Not connected
3	Ring (Lb) – Sleeve, ground return
4	Tip (La) – Signal, left & right audio mixed to mono
5	Not connected
6	Not connected

### 3.3 External Control I/O Pin-outs (Momentarily connect pin 1 to the required Alarm input to start and stop the Alarm audio)



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## MP3 VOLUME NORMALIZATION

MP3 files should be 'normalized' prior to uploading. This is to maintain consistent output levels. An MP3 normalization program called MP3Gain is recommended for this purpose. It is freeware however it would be appreciated if you made a donation to the authors:

Download page:

<http://mp3gain.sourceforge.net/download.php>

Direct link to download current version:

[http://optusnet.dl.sourceforge.net/sourceforge/mp3gain/mp3gain-win-1\\_2\\_5.exe](http://optusnet.dl.sourceforge.net/sourceforge/mp3gain/mp3gain-win-1_2_5.exe)

Tip! Use the setting 'Volume 96.0' when applying track gain to MP3 files. Use 'Track Gain' rather than 'Constant Gain'.

## EWS-5150 SPECIFICATIONS



### Indicators

Displays Power LED (Red), Load LED (Yellow), Play LED (Green), SD card slot backlight (Blue).

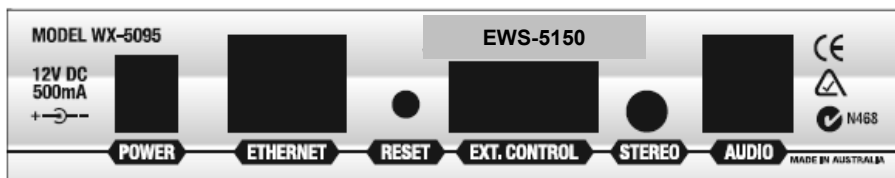
### Message Upload/Playback

Message upload	PC Card reader.
MP3 decoder	MPEG-1 Audio Layer 3 (ISO11172-3), supports MPEG 1 & 2 and 2.5 extensions.
Sample & bits rates	Mono or stereo.
MP3 Encode Rate	8 kbits/s to 320 kbits/s CBR (Constant Bit Rate), supports VBR (Variable Bit Rate) to a peak of 320 kbits/s.
Recommended MP3 bit rates	64 kbits/s mono for messages, $\geq 128$ kbits/s for music.
Low Pass Filter	10 kHz.
Message retention	> 100 years.
Upload cycles	> 100, 000 writes to any one memory cell.
Read cycles	Unlimited.
Messages length	SD/MMC Card dependent, encode rate dependent.
Memory Card support	SD or MMC up to 1GB capacity, FAT16 (FAT) file system format.

### Processor

Type	PIC18F97J60
Processor Speed	25 MHz XTAL, internally multiplied to 41.667 MHz.
On Board RAM	3.7KB.
On Board Ethernet Buffer	8KB.
On Board FLASH	128KB.
External EEPROM for settings and internal web page storage	32KB.

### Back



### Analogue Audio Out

Audio Out connectors	3.5 mm stereo phone jack for headphones RJ-12 6P2C socket (isolated) for radio / line level out
Output level	< 2V p-p, 500mV p-p default (software adjustable)
Frequency range	40 Hz $\rightarrow$ 10 kHz (on stereo connector) 300 Hz $\rightarrow$ 3.4 kHz (on isolated audio socket)

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## Data Communication

Ethernet 10Mbps

## External Control

Pin 1 +3V or +12V (link selectable) (+12V default)  
Pin 2 Relay out (PTT) Normally open  
Pin 3 Relay Common  
Pin 4 Alarm input 3  
Pin 5 Alarm Input 2  
Pin 6 Alarm Input 1  
Pin 7 Input for Carrier detect from radio, active low (not connected for XTL series, generally not used at all)  
Pin 8 Ground

**Note: Output from the Radio to the Input of the EWS-5150 is momentary active low for Alarm to sound. Repeat to stop the Alarm from playing**

## General

### Operating Environment

Operating Temperature Range	-10 → +70° C
Storage Temperature Range	-20 → 80° C ambient
Humidity, Storage and Operating	To 98% non-condensing
Mean Time Between Failure	> 20 years
Safety	Complies with AS/NZS 60950
EMC	Complies with AS/NZS CISPR22
ACMA Supplier Code Number	N468
ERAC Responsible Supplier No.	E1287
Warranty	Two years

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## PART NUMBERS

EWS-5150	EWS Unit (Blast Tone Generator)
CA-5154MTM	Interface Cable
CA-5154XTL	Interface Cable
CA-5154TRBO	Interface Cable
MTM700/MTM800	Motorola TETRA Radio
MTM 5400	Motorola TETRA Radio
XTL2500/5000/APX85000	Motorola P25 Radio
DM4601	MOTOTRBO™ Radio

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