	REV.	DESCRIPTION	DATE	APPROVED
	X3	Initial Production		

			Linear	CARLSBAD, CA
			TITLE	**SPECIFICATIONS, CX-LRC, CX-65**
		DRAWN D. Sanderson / DATE 06/28/2013		
NEXT ASSY	USED ON	ENGINEER D. Sanderson / 06/28/2013	SCALE NONE / SIZE A / DRAWING NO. **234998** / REV. **X3**	
APPLICATION		CHECKED	FILE NAME	SHEET 1 OF 4

1.0 DESCRIPTION

The CX-LRC and CX-65 are low power emergency alarm transmitters operating at a frequency of 433.92 MHZ. They are designed as compatible transmitter replacements for Climax Signaling Protocol V2 transmitters for an Alert One Emergency response system. The RF signal is a binary coded, pulse-width type A1 modulated transmission which has an information rate of approximately 540 bits per second (bps). The CX-LRC is tested for water-resistance at the factory. The CX-65 is designed to be wall mounted in a single location and as such is not tested for water resistance.

The CX-LRC model is designed to be worn on the wrist when fitted with the wrist strap or around the neck with the nylon cord provided.
The CX-LRC transmitter is designed to work with Climax Protocol V2 code compatible receivers, primarily the Alert One console.
The CX-65 is the wall-mounted version of the CX-LRC. Aside from a different housing for wall-mounted operation and no water-resistant properties, the overall functionality of the CX-65 is exactly the same as the CX-LRC.

2.0 OPERATION

The transmitter is activated by depressing switch S1. Light emitting diode (LED), DS1, is illuminated during transmission. The LED illumination stops when the switch is released. The complete transmission length is 1.65 seconds consisting of 9 messages which are composed of 6 data packets each.

A green LED indicates a good battery, a red LED indicates the battery is low and the transmitter needs to be replaced. When the battery voltage goes below 2.5 volts under load at the start of a transmission, the LED color will be red.

The microprocessor wakes up and tests the battery every two hours. Transmissions will be sent if the button is manually pressed or if the battery shows a low battery during one of the automatic (every 2 hour) tests.

When the battery is close to its end of life, the LED can be Green when the button is pressed indicating the battery passed the test at the start of the transmission, if the voltage falls below 2.5V by the end of the transmission, the LED will flash Red 3 times after the button is released to indicate the battery is close to a low battery condition. No low battery transmission signal is sent until the battery is low on the first test and the LED is Red for the whole time the button is pressed.

BT1 - 3.0V Lithium Battery is always connected to the circuit to enable timer operations. Expected life is over 3 years under normal use before the Low Battery signal is sent and the transmitter should be replaced.
S1 - Allows manual activation of the transmitter for up to 30 seconds per press.
U1 - Microprocessor controls the data output, timer operations, LED, etc.
An internal, factory calibrated clock provides timing reference for the microprocessor and RF data stream. Internal non-volatile memory is programmed with a unique ID for each transmitter.
A Watch Dog timer is always enabled internally.
Power brown-out detect (BOD) is enabled only when the microprocessor is awake and active. BOD is disabled during sleep mode to conserve battery life.
U2 - Low voltage detector controlled by U1 measures the battery voltage under the maximum transmitter current draw. Less than 2.5V under test load conditions will report a low battery.
DS1 - Green / Red Dual LED indicates transmitter operation and battery status during user initiated transmissions (button presses).
Y1 - Crystal provides a PLL frequency reference to U3 for the RF center frequency of 433.92 MHZ. The Y1 crystal frequency RF/32 =13.560 MHZ.
U3 - RF transmitter IC Generates the RF output signal which is pulse coded by the data from the microprocessor U1.
C12 - adjustable capacitor tunes the antenna for maximum RF output.

Once the microprocessor is awake for a status transmission or a manually activated transmission. The Low Battery Test is performed first by turning the transmitter output on and transmitting a 5mS RF pulse to bleed off any surface charge and put the battery under the highest load that will be applied during normal operation. The LED is disabled during the actual data pulse to minimize the peak load on the battery.
This test is done 2mS before the first data word is sent to avoid conflicting with the data pulse timing. Once the battery status is determined all data words and the LED color are set the same for as long as the transmitter button is pressed (or status messages are sent).

Battery Life: The battery life is calculated from the production date to the low battery indication.
The battery shall have a three year battery life with low battery test, reporting every 2 hours and with a 2 second button press once per week.
The transmitter should be replaced once the battery reports a low battery.
Based on current measurements and a de-rated battery capacity of 120mAHr (vs. the 190mAHr listed capacity) due to high peak currents, and accelerated life testing, we expect a typical transmitter to last 4.7 years before a low battery message is sent.

3.0 SPECIFICATIONS

Model Names:	CX-LRC, CX-65
Function	Emergency transmitter, Climax Version 2 Signaling Code Compatible Protocol
Encoding Technique:	RTZ Pulse-Width Modulation @ 540 bits/sec
Number of Codes:	16,777,200
RF Carrier Frequency:	433.92 MHz +/- 50 ppm (+/- 22KHz)
Data Timing:	Internal uP clock, 1 MHz +/- 2% over temp
Power Requirements:	3.0 VDC battery (Lithium Type 2032 with leads)
DC Current loads:	3uA sleep / standby, 10 mA typical, average while transmitting, (12mA maximum, average, while transmitting) 28mA peak during RF data pulses
Low Battery Test Threshold:	2.5V +/- 0.1V under firmware controlled peak load test.
LED operation:	The LED is on when the transmitter is manually activated. The LED is green if the battery test is good, red if the battery test is low. (replace transmitter)
Battery marginal indication	Green LED during transmission followed by 3 red flashes after button is released if battery is low. This does not send a Low battery message with the data signal, it is only a visual indication to the user that there may be only several weeks to a couple months of battery life left.
Expected Battery Life:	Greater than 3 years under normal operation and conditions
Operating Temperature:	20º to +70°C.
Transmission Time:	1.65 seconds/transmission
Size:	PCB only 1.2" x 1.05" x 0.24" (approximately).
Other Specifications:	The CX-LRC is designed to be body worn and is factory tested for water resistance. The CX-65 is wall-mounted is not tested for water resistance.

All Specifications are nominal.