

LONE WORKER SYSTEM

Installation and Functionality Documentation

Federal Communications Commission (FCC) Statement

15.21

You are cautioned that changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.

15.105(b)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- 1) this device may not cause harmful interference and
- 2) this device must accept any interference received, including interference that may cause undesired operation of the device




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Wiring Diagram

Beep and Flash Code Chart

**Note – would like to use images for sound/red led/green led as bullet points – just figuring out the formatting (Steve)*

Function	Module	User Action	Feedback
Main Module powered up	Main	Plug in the main module	Single Flash external Red LED
Turning the Remote on after Sleep	Remote	Hold the bottom button down for 10 seconds and release when beeps are heard.	 The Green LED will flash rapidly while the button is pressed.  After 10 seconds you will hear 5 ascending tones  Both LEDs will flash and the Remote will turn on.
Plugging the Remote into the Charger.	Remote	Plug the remote into the charger	<ul style="list-style-type: none">• Alternating Green and Red LEDs will be displayed whilst charging is in progress.• When Charging is Complete, only the Green LED will flash once a second.
Pairing the Remote	Antenna	On Antenna Module, press the Call Button 3 times in quick succession	<ul style="list-style-type: none">• Red LED on the Antenna Module will start flashing
	Remote	Press the bottom button on the remote 3 times in quick succession	<ul style="list-style-type: none">• Green LED will illuminate for 2 seconds then off for 1 seconds• If pairing fails, the Red LED will flash Rapidly• If successful, the Green LED will flash Rapidly

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Remote check-in.	Remote	User in normal operation	<ul style="list-style-type: none"> • If check-in is successful and the Battery level is > 20%, the Green LED flashes once • If check-in is unsuccessful, the first time then the Red LED flashes twice • If check-in still unsuccessful after 20 seconds – see Remote Out of Range below.
Remote Out of Range	Remote	User is out of Range and is given 4 warnings with around 20 second gaps to return to range before alerts are sent.	<ul style="list-style-type: none"> • If check-in unsuccessful after 20 seconds then the Red LED flashes twice, the Remote will play 3 Long Beeps followed by a sequence of 3 Vibrations. • If check-in unsuccessful after another 20 seconds this is repeated • If check-in unsuccessful after a further 20 seconds this is repeated for the last time • If check-in unsuccessful on the 4th occasion (another 20 seconds), the Remote will Sound a sequence of rapid, high tone beeps for 10 seconds.
Remote Out of Range	Main	User is out of Range	<ul style="list-style-type: none"> • If no check-in is received from a Remote after 1 minute, then the Main Module will sound 3 long beeps. • If no check-in is received from a Remote after a further 25 seconds, then the Main Module will sound 3 long beeps.. • If no check-in is received from a Remote after a further 25 seconds, then the Main Module will sound 3 long beeps. • If after a further 25 seconds, no check-in is received from the Remote, then the Main Module sends an alert to the Qube and indicates this by a sequence of Rapid High Tones. It also pulses the horn output. • Every minute

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Functionality

REMOTE

Duress

User holds down top button for 1 second.

Response is either positive or negative sound, depending on RF acknowledgment

Fall down

Currently the warbling (siren) noise is played , then the user has three seconds to press the bottom button to cancel the alert.

During the three seconds, both LED's flash rapidly.

If the user presses the button the red LED is on while the button remains pressed

Note: can't cancel while the warbling sound is playing

Out – of – range

I think we have covered this adequately in the table above.

Secondary (low priority)

User holds down bottom button for 1 second.

Response is either positive or negative sound, depending on RF acknowledgment

Options

To engage Options, Press and hold both buttons until sound is played.

Sound is 4 ascending tones, repeated 3 times

Then Press the bottom button the required number of times to select the option.

Once you have reached the desired option number, leave for three seconds.

If the number was incorrect – the negative sound is played.

If the option is valid and is correct carried out, the Remote will play back the number of presses you did (eg 3 beeps if option 3 selected)

Note: Some options require the remote to be in range to execute the operation.

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Note: Some options will change functionality inside the remote.

Available Options:

Option 3

Set the main module to wait for an application ACK

If the unit does not receive an application ACK within 3 minutes it will send the high priority alert again.

It will repeat this for 120 minutes 40 cycles.

Option 4

Set the main module to not retry if an application ACK fails to come through.

Option 5

Set the high priority outputs to be on separate output pins

Option 6

Set the high priority outputs to be on the same output pin (output 1)

Option 7

Turn handheld unit internal accelerometer on

Option 8

Turn handheld unit internal accelerometer off

Option 9

Un-pair a remote control.

Option 10

Show the current firmware version running in the remote control. Display the version number on the LED's. it will be a three digit number e.g. 1.2.3

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Option 11

Change G-Force for Impact component of Fall-over algorithm to 2.5G

Option 12

Change G-Force for Impact component of Fall-over algorithm to 3.0G

Option 13

Change G-Force for Impact component of Fall-over algorithm to 3.5G

Un-pair a remote control

It is necessary to un-pair a remote control from it's antenna module, otherwise the antenna module will no longer see the check-in signals, and an out-of-range alert will result.

Complete Shutdown

*Note: This completely turns the Remote off. It should only be done in the case where the Remote is not being used as a safety device in any way (for example traveling on an airplane) and is therefore a very deliberate event.

Current Operation: press and hold bottom button until green LED goes out for approximately 10 seconds.

Release the button and the speaker will play 1 long beep (3 seconds).

The remote is now in low power sleep mode. It will not check-in.

Press the top button to wake.

Note: This is about to change in function to use the Bottom button and held for more time...

Alert To User

This is an audible alert triggered by the Vehicle system sending out an outbound alert to the Remote.

This will occur when the remote next checks in

Will result is a continuous ascending siren-like sound, repeated three times, followed by 3 vibrations.

Will occur for the next three check-in's

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Application ACK

This is an audible alert in the Remote to signify that an Application Acknowledgement (ACK) from the actual back-end system has occurred and that the initial message sent by the remote has been received and acknowledged.

A tune is played to the user upon receiving an application ACK.

Note: This currently only plays once. – Andy would like it to play twice.

MAIN MODULE

Duress Alert

A warbling sound will be heard on the internal speaker.

The external (red) LED will flash once, signifying a panic/duress event

Output 1 will go high in multi-output mode for 2 seconds

Output 1 will go high in single output mode

The Horn output (4) will go high for 5 seconds

Fall down

A warbling sound will be heard on the internal speaker.

The external (red) LED will flash twice signifying a fall down event

Output 2 will go high in multi-output mode for 2 seconds

Output 1 will go high in single output mode

Horn output (4) will go high for 5 seconds

Out-of-range

See above table for initial sound alerts.

A warbling sound will be heard on the internal speaker.

The external (red) LED will flash three times, signifying an out-of-range event

Output 3 will go high in multi-output mode for 2 seconds

Output 1 will go high in single output mode

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Horn output (4) will go high for 5 seconds

High Priority Retries

This occurs when the Main module does not receive its application ACK from the Qube.
If the option the ignore ACKs is selected is selected, this is ignored.
Every 3 minutes, the high priority output associated with the event will go high.
This process will be repeated until the application ACK is received.
This will continue for a max of 40 cycles (120 minutes)

Secondary (low priority)

The main module will sound a single Beep and then Output 5 will go high for 2 seconds.

Alert To User

The main module will sound a single Beep.

Application ACK

The main module sounds 2 Beeps .

Changing Options

When an output is changed via the remote control, the internal speaker of the Main Module will beep once to acknowledge the change of an option.

Firmware Version Display

Hold down the switch in the Main Module and apply power to the module.
The red LED will flash the version number and the speaker will beep for each digit.

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A 2 second pause will signify the end of the decimal point.

Firmware will be represented by a 3 decimal places to signify major/minor/point release number eg 1.2.3

No Communication with Antenna Module

If the Main Module has no communication with the Antenna module, this will result in the Main module performing a clean reset of communication in an attempt to resurrect its connection.

If there are 5 consecutive resets, it will then send an out-of-range high priority alert.

This will only be sent on the 5th reset

ANTENNA MODULE

Duress

Hold down the Call button for 2 seconds.

Pairing

Press the Call button three times in quick succession (each press to be no longer than 2 seconds)

Erase All paired remotes from memory

Press the Call button ten times in quick succession (presses to be no longer than 2 seconds)

Firmware Version Display

Hold down the Call button and apply power to the antenna module.

The red LED will flash the version number for each digit. A 2 second pause will signify the decimal point.

Firmware will be represented by a 3 decimal places to signify major/minor/point release number eg 1.2.3

No communication with Main Module

If there is no communication with the main module, this will result in the Antenna module performing a communications reset.

If there are 5 consecutive resets, the Antenna module will turn off it's RF circuitry for 3 minutes which will give all Remotes an out-of-range alert.

Lone Worker – Technical Specification v1.1

Main Module

Physical

- | | |
|-----------------------------------|-------------------------|
| • Main Module Weight | ~ 150 g |
| • Main Module Weight with harness | ~ 350 g |
| • Case Material surround | Anodised aluminium |
| • Case Material end-caps | ABS/Polycarbonate blend |

Power Supply

- | | |
|-----------------------------|---------------|
| • Nominal operating voltage | 12V to 24V DC |
| • Minimum operating voltage | 9V DC |
| • Maximum operating voltage | 36V DC |

Current Consumption

- | | <u>At 13.8V</u> | <u>At 27.6V</u> |
|--|-----------------|-----------------|
| • Main module in Receive mode | 20 mA | 12 mA |
| • Main module in Transmit mode | 75 mA | 41 mA |
| • With remote plugged in for battery charging, will draw additional current trending towards zero when fully charged | +100 mA | +62 mA |

Digital Inputs

- | | |
|-------------------|-----------------------|
| • Input Low | ~ 0V |
| • Input High | > 1V or not connected |
| • Maximum Voltage | 50V |

Environmental

- | | |
|---------------------------|------------------|
| • Storage Temperature | -40 to +85 Deg C |
| • Operational Temperature | -20 to +70 Deg C |

Serial Interface

R232 (full duplex with handshaking)

Temperature Sensors

Inbuilt in CPU

3D Accelerometer

3 axis accelerometer

CanBus

Canbus 2.0B

Version Control

- | | |
|----------------------------------|---------|
| • PCB Motherboard Hardware | v 3.3 |
| • PCB SPS Daughterboard Hardware | v 1.2 |
| • Software | v 4.1.4 |

Antenna Module

Physical

- Antenna Module Weight with harness ~ 80 g
- Case material ABS/Polycarbonate blend

Power Supply

- Nominal operating voltage 5V DC
- Minimum operating voltage 5V DC
- Maximum operating voltage 6V DC

Current Consumption

- Included in main module as above

RF Frequencies

915Mhz / 868Mhz ISM Band
(different hardware versions)

Electronic Testing & Compliance

- FCC: Part 15 class A & B in progress
- C-Tick in progress

Version Control

- PCB Hardware v 1.2
- Software v 4.1.2

Remote

Physical

- Remote Weight ~ 50 g
- Case material ABS/Polycarbonate blend

Power Supply

- Battery Operated Lithium ion polymer rechargeable
- Battery current capacity 340 mAh
- Nominal operating voltage 3.7V DC

Charging

- Via USB 5V
- Current if connected to USB 200 mA trending towards zero once charged
- Current if connected to Main Module 100 mA trending towards zero once charged

Environmental

- Operational Temperature -20 to +50 deg C
- Charging Cutout Temperature 40 deg C
- Battery Storage Temperature For 80% recovery

Less than 1 month	-20 to +60 deg C
Less than 3 months	-20 to +45 deg C
Less than 1 year	-20 to +20 deg C



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Electronic Testing & Compliance

- | | |
|----------------------------|-------------|
| • FCC: Part 15 class A & B | in progress |
| • C-Tick | in progress |

Version Control

- | | |
|----------------|---------|
| • PCB Hardware | v 3.5 |
| • Software | v 4.2.2 |