



# Comark Survey Kit Hardware Manual



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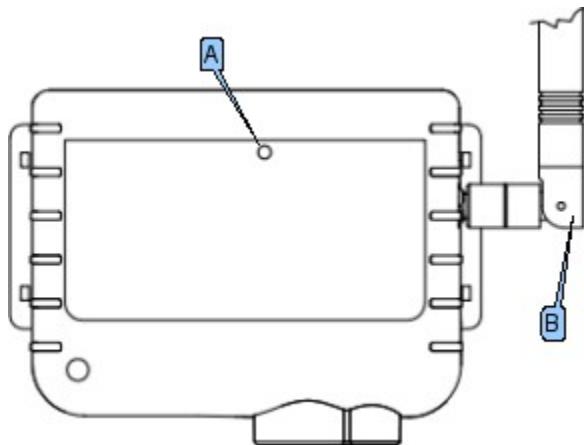
## **Survey Kit System Components**

### **Contents:**

- 1x RF505 Survey Gateway
- 1x USB Type A to B lead
- 1x USB Driver CD
- 1x Survey Forms CD
- 1x Surveying Guide
- 6x RF512 Survey Transmitters
- 6x Hi Gain Antenna's
- 7x Standard Antenna's
- 3x Spare C Size Lithium Batteries

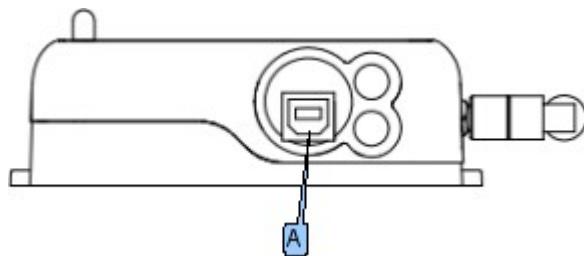
### **Know Your Survey Kit**

#### **RF505**



*Figure 1 – Front view of RF505 Survey Gateway*

- A. Activity LED
- B. Antenna. (Do not remove whilst in operation)



*Figure 2 – Connector view of RF505 Survey Gateway*

- A. USB Connector

## RF512 Survey Transmitter

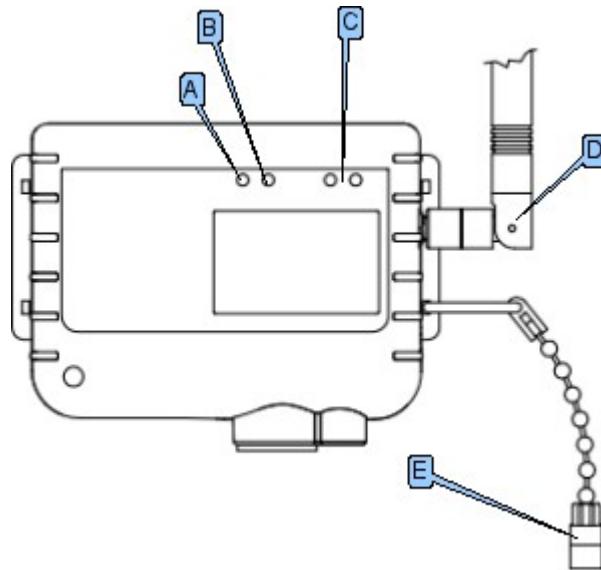


Figure 3 – Front view of RF512 Survey Transmitter

- A. Activity LED
- B. Activity LED
- C. Infra-Red interface. For Comark use only
- D. Antenna. (Do not remove whilst in operation)
- E. Survey Transmitter activation key

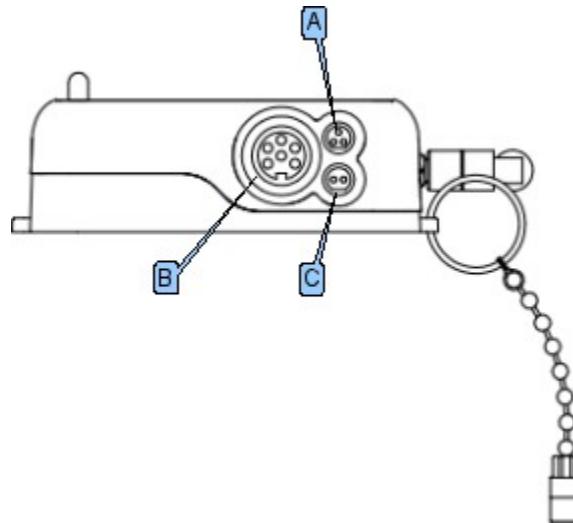


Figure 4 – Front view of RF512 Survey Transmitter

- A. Activation key receptacle
- B. Lumberg socket, NOT USED
- C. External power socket, NOT USED

## Safety Information

Under no circumstances may a user make any changes to the RF505 or RF512 survey transmitters in such a way that would alter their performance. Any modification would void the CE compliance and may invalidate any warranty.

If the equipment is used in a manner not specified by Comark, then the protection provided by the equipment may be impaired.

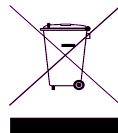
*No user serviceable parts are provided in Comark Wireless Survey (RF505 & RF512 survey transmitters) Equipment. Contact Comark or your local distributor for all service requirements.*

### Warning



- Before connecting or disconnecting the antenna, ensure anti-static precautions are observed.
- RF512 survey transmitters contain a C-size lithium cell. This cell must not be incinerated or subjected to temperatures in excess of 100°C. Do not deform, mutilate, crush, pierce, disassemble, recharge or short circuit. Such abuse can result in loss of seal, and/or cell explosion. Also exposure to humid conditions for long periods should be avoided.
- Do not insert metal objects into connectors.
- Ensure the antenna is securely connected before powering the equipment. Internal damage may result otherwise.
- The Transmitters have been designed to operate with the antenna supplied by Comark, and having a maximum gain of 7dBi. Antennas not supplied by Comark or having a gain of greater than 7dBi are strictly prohibited for use with this device. The required antenna impedance is 50 Ohms. If in doubt please contact Comark or Distributor for advice.
- The RF505 Gateway have been designed to operate with the standard antenna supplied by Comark, and having a maximum gain of 2dBi. Antennas not supplied by Comark or having a gain of greater than 2dBi are strictly prohibited for use with this device. The required antenna impedance is 50 Ohms. If in doubt please contact Comark or Distributor for advice.

### WEEE



The RF512 survey transmitters contain a non-rechargeable lithium battery. This battery must be disposed of in accordance with local regulations.

## Survey Kit Overview

The Survey Kit is designed to enable evaluation of a potential RF500 customer premises. The Kit enables the user to identify critical RF “choke points” and strategic locations for “meshing” units making the actual RF500 install a smooth and trouble free process.

## Equipment Use

### *Powering On and Off*



PLEASE ENSURE THE ANTENNAS HAVE BEEN FITTED.  
IT IS ESSENTIAL TO AVOID DAMAGE.

### **RF505**

The RF505 does not have an on/off button, simply plug it into a free USB port on your computer (Fig.5) and the device will power up and immediately begin to operate.

### **RF512 Survey Transmitters**

To activate the survey transmitters plug the attached 3 pin activation key into port A (Fig.4), the two activity LED's (Fig.3) should begin to flash. To deactivate the survey transmitters simply remove the activation key and the transmitter will shut down after a few moments.

### ***Equipment Setup***

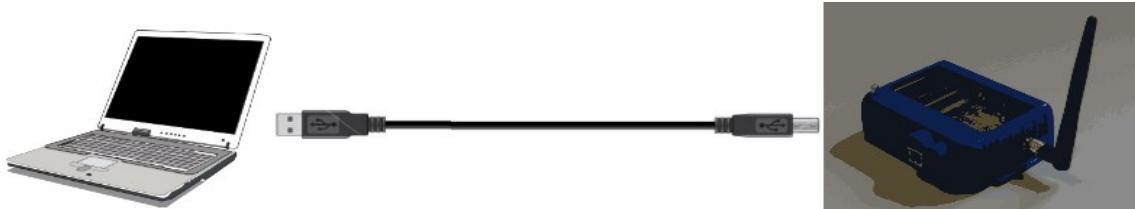


Figure 5 – RF505 → PC Connectivity

Using the cable provided connect the RF505 to a free USB port on your laptop PC. The green “Active” LED (Fig.1) will now illuminate and the gateway is ready for use. Start the Ember Studio software and proceed as the RF500 Survey Manual indicates.

## **Changing Batteries on Survey Transmitters**

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### **Battery Reordering**

RF512 survey transmitters are fitted as standard with a high power 3.6V Primary lithium-thionyl chloride C-size cell. Manufacturers part number **Saft LSH14 LIGHT**. Only replace with the same or equivalent type recommended by the manufacturer. Re-Order number from Comark 'RFBATT'.

### **Battery Change Procedure (Survey Transmitters Only)**

- Using a suitable screwdriver undo the two battery cover retaining screws and remove the battery cover.
- Remove the exhausted battery and replace with a fresh one taking care to snap the new battery in cleanly without making and breaking the contacts repeatedly.
- Observe the correct polarity when changing the lithium battery.
- Replace the battery cover and do up the two screws taking care not to over tighten them.
- Observe any local restrictions on disposal of the used cell.

### **Check for Transmitter Errors**

The removal of the battery will cause the internal clock on the survey transmitter to reset and so generate an Error-100 condition. This will not change the performance of the device in any way, as long as the error code does not end with the number **'4'** (e.g. Error-104) the device will continue to operate as intended. Verify that the transmitter display shows either no error or an "acceptable" error code. If any other error occurs the device will have to be returned to the Comark service department.



**The RF505 does not contain a battery.**

## **FCC Approvals**

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

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.
- To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropic radiated power (e.i.r.p.) is not more than that permitted for successful communication.



**Transmitters must be placed greater than 20cm from the body.**

## **Equipment Ratings**

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### ***Environmental Conditions***

The Comark Wireless Survey equipment is designed for indoor use only.

### **RF505 Storage/Operating Conditions**

Temperature –30 to +70°C

Humidity 10-90% RH (Non-condensing)

### **RF512 Survey Transmitter Operating Conditions**

Temperature –30 to +70°C

Humidity 10-90% (Non-condensing)

### **RF512 Survey Transmitter Storage Conditions**

Temperature –40 to +85°C

Humidity 10 to 90% RH (Non-condensing)

## **Maintenance and Cleaning**

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No specific maintenance is required for the Survey equipment. Should service be required then a “return to base” service is provided by Comark. Please contact Comark or your local distributor to make arrangements for return of any items for repair.

Cleaning of the equipment should be limited to a dry lint free cloth to remove dust and debris. A damp cloth may be used in the event that a more stubborn mark needs to be removed. At no time should a wet cloth or any detergent agent be used to clean the RF505 or RF512 survey transmitters.

## **Declaration of Conformity**

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DofC Survey Kit

Comark Limited  
Bury Mead Road  
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### **Comark Wireless Survey Equipment Comprising Part Numbers: RF505 & RF512**

Is in conformity with the requirements of the following documents (Directives):

EMC Directive 89/336/EEC.  
The Low Voltage Directive (73/23/EEC) as amended 93/68/EEC  
Radio & Telecommunications Terminal Equipment Directive (R&TTE) 1999/5/EC

Standards:  
EN 61010-1:2001  
ETSI EN 301 489-17 V1.2.1 (2002-08)

Signed for on behalf of  
Comark Limited



at:  
Comark Limited,  
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David Goulden

Development Manager

## RF505 & Survey Transmitter Specification

RF Frequency	2.4GHz using IEEE 802.15.4
Operating Range: RF505 RF512 Survey Transmitter	–30 to +70°C –30 to +70°C
Power Sources: RF505 RF512 Survey Transmitter	Supplied By USB Port Saft LSH14 Light
Standard Antenna  High-Gain Antenna (optional)	External, removable, Omni directional with pivot. Length: 90mm from pivot Length: 235mm from pivot
Case Material	Over molded food safe clear Polycarbonate with BioCote® antimicrobial
Dimensions	L 134mm x W 83mm x D 34mm
Weight: RF505 RF512 Survey Transmitter	142g 270g

## Glossary

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**Antenna** – The Gateway and associated transmitters are provided with an antenna. The antenna is designed for both transmit and receive and is configurable for either horizontal or vertical mounting.

**FCC** – Federal Communications Commission.

**Firmware** – The micro-processor program that runs in each transmitter.

**Frequency** – Number of cycles-per-second of the radio signal.

**License free** – Term used to describe a radio frequency band in terms of license to broadcast. RF500 uses the license free band of 2.4GHz where there is no requirement to purchase any kind of license in order to use the product. Also refer to the FCC approvals.

**Meshing** – The technology used in the RF500 system provides a unique operating environment for the transmitters. Transmitters are setup to be either part of the Backbone or to be Leaf Transmitter. Those designated as part of the Backbone remain in RF contact with each other. By doing this the system is able to dynamically adapt to changing conditions automatically ensuring the integrity of the system at all times. The meshing technology allows the system to determine the best route for any data packets to be transmitted from the transmitters back to the Gateway or vice-versa.

**RF** – An abbreviation of the words Radio Frequency. Commonly used to describe “wireless radio communication”.

**RH** – Relative Humidity. The amount of water vapor present in the atmosphere expressed as a percentage of the maximum that could be present at the same temperature.

**IEEE 802.15.4** – is a standard which specifies the physical layer and medium access control for low-rate wireless personal area networks (LR-WPAN's). It is maintained by the IEEE 802.15 working group.

**IEEE** – The Institute of Electrical and Electronics Engineers is an international non-profit, professional organization for the advancement of technology related to electricity. It has the most members of any technical professional organization in the world, with more than 365,000 members in around 150 countries.

**EIRP** – **Effective Isotropic Radiated Power** is the amount of power that a theoretical isotropic antenna (that evenly distributes power in all directions) would emit to produce the peak power density observed in the direction of maximum antenna gain.

**dB<sub>i</sub>** – dB(isotropic) is the forward gain of an antenna compared to the hypothetical isotropic antenna, which uniformly distributes energy in all directions.

## **Document Revision History**

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**Release-1 2008xxxx**

Original Release.