

Type	Emetteur	Code Article	Indice	Format	Page
DEX	040	86338	A	4	0

Titre / Title :
User manual CSP-COM (spécial USA)
HISTORIQUE DES MODIFICATIONS / MODIFICATIONS CHRONOLOGY

Ind. Rev.	Date Date	Origine des modifications <i>Modifications origin</i>	Paragraphes concernés <i>Related sections</i>
A	30/06/08	Première édition / <i>First edition</i>	

Manuel utilisateur / User's manual

Ind.	Rédigé par / <i>Written by</i>	Vérifié par / <i>Verified by</i>	Approuvé par / <i>Approved by</i>
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USER MANUAL

COMMUNICATION MODULE

CSP-COM

CODES 83437, 83438, 83441, 83442, 82481

SUPERVISOR/REPEATER

CODE 86289



USER MANUAL

CSP-COM SUPERVISOR/REPEATER

June2008

WARNING

CANBERRA cannot be held responsible for any damage incurred by the buyer due to faulty use, connection to the wrong voltage, or non-observance of the instructions found in this manual.

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1. INTRODUCTION

Due to the innovative design of the CSP Probes, Canberra can now offer the CSP-COM.

CSP-COM modules are communication interfaces compatibles with all the CSP probes. They can be connected to the rear side of the probes by a locking system without any tools.

They are powered by rechargeable battery and a power level indicator is included. They can be used while connected to the mains (using the provided charger) or working on battery. The working time depends on the communication system used.

CSP-COM allows every CSP probe to communicate with a monitor equipped with a compatible receiver (Survey meter, PC etc. ...). The modules can be integrated into any system owned by customer thanks to the tools provided by Canberra (CSP DLL code 82800, CSPA code 78468).

One of the big advantage is for some of them to be able to work wireless.

These modules are available in several versions :

- Wireless :
 - Bluetooth (82481)
 - Wifi (83437)
 - RF 915MHz (83441) + Supervisor / repeater RF 915 MHz (86289)
- Wired :
 - Ethernet (83442)
 - RS485 (83438)



2. DECLARATION OF CONFORMITY (US-FCC)

Concerns CSP-COM Wireless Bluetooth, Wifi, RF915MHz and Wired Ethernet and RS485, and Supervisor/Repeater 915MHz.

These devices comply with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) these devices may not cause harmful interference, and (2) these devices must accept any interference received, including interference that may cause undesired operation.

These equipments have 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. These equipments generate use 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 these equipments do 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's by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and the 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.

The user may find the following booklet, prepared by the Federal Communications Commission, helpful: How to identify and Resolve Radio/TV Interference Problems. This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.

Pursuant to Part 15.21 of the FCC Rules, any changes or modifications to these equipments not expressly approved by CANBERRA may cause, harmful interference and void the FCC authorization to operate these equipments.

Concerning Wireless devices, operator may keep the equipment at more than 20 cm from the body.

Supervisor/Repeater 915MHz can be used with a Class B Personal Computer and is also certified under DoC "Declaration of Conformity" procedure.

3. CHARACTERISTICS

3.1.1. Mechanical characteristics

Length L	100mm (3.94 in)
Width W	55mm (2.16 in)
Weight	200g (0.44 lb)

3.1.2. Electrical characteristics

CSP-COM power supply: voltage range $\Rightarrow 4.5 < V_{ext} < 5.5$ VDC. Current Max 1800 mA

Cylindrical connector Jack type

Probe power supply : voltage output $\Rightarrow 4.75 < V_{sonde} < 5.25$ VDC.

Current output 20 mA $< I_{sonde} < 100$ mA

Female cylindrical connector code : D104 A066-130

Battery : Li-ion Technology

Charging time : 2 h

Life time : 300 cycles minimum

Caution : Explosion can occur if the battery is replaced by a battery of an incorrect type. Discard the used batteries according to the instructions.

In case of a long period of storage, the battery needs to be recharged after 6 months.

Ingress protection : IP 40.

Use only the power supply delivered with the CSP-COM :

- Manufacturer : MASCOT ;
- Model : SPU15A-102 (Mascot)
- Input : 100-240 V , 0.4 A, 47-63 Hz
- Output : 5 V, 2 A

Overvoltage class I device.

This device is also designed for working with an IT type power supply presenting a 230 V voltage between the phases.

3.2. ENVIRONMENTAL CHARACTERISTICS

Operating temperature: from -10°C (14°F) to + 50°C (122°F) without power supply; from 0°C (32°F) to +40°C (104°F) with power supply

Storage temperature : from -25°C to + 60°C (-13°F to 140°F)

Relative humidity: 0 % à 95 % at 35°C (95°F) without condensation.

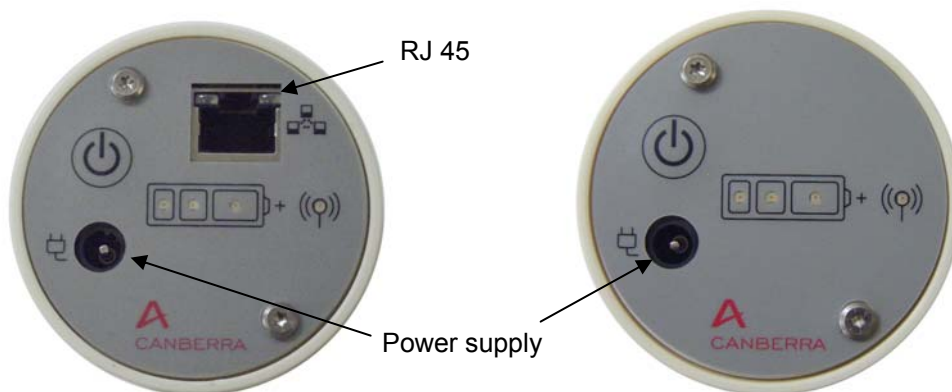
Maximum altitude of transportation : 12000 m (13123 yd).

Easily decontaminated case but not water tight, as a consequence cases must not get wet when being cleaned or decontaminated.

3.3. CONNEXIONS

3.3.1. Front side panels

There are 2 kinds of front side panel according to the communication mode.

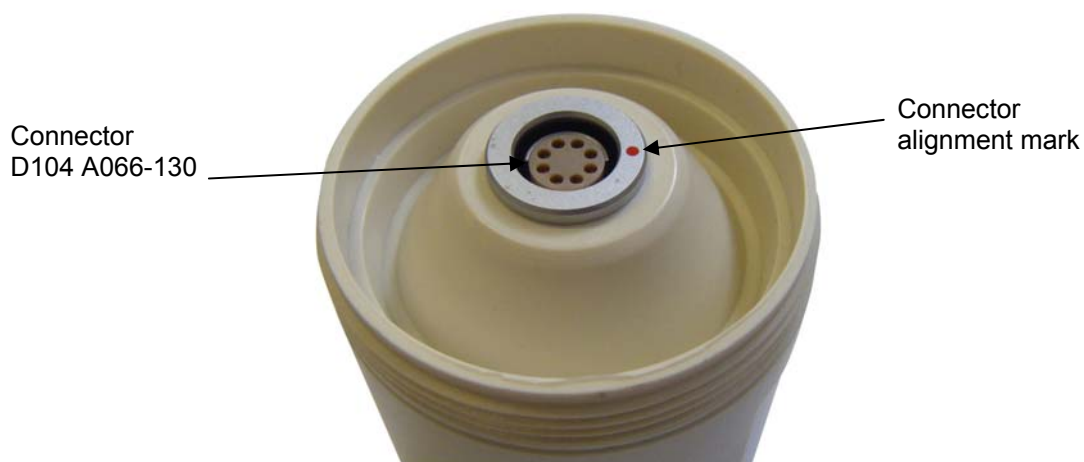


Ethernet and RS485

Wifi, Bluetooth, RF

3.3.2. Rear side

Rear side is the same for all the CSP-COM and presents only one 8-point connector to connect the probe.



3.4. CHARACTERISTICS DEPENDING ON COMMUNICATION MODE

Communication interface	Technical characteristics
Ethernet	<p>RJ45 Connector</p> <p>Power supply of CSP-COM:</p> <ul style="list-style-type: none"> – External power supply 5 V DC – Battery for power cuts. (battery life $\geq 1h$ communicating at 9600 bauds) <p>Maximum communication rate: 115200 bauds</p> <p>Communication range: 100m</p> <p>Max. nodes on the network = max. capacity of the used Ethernet Hub</p> <p>Use of shielded twisted pair Cat. 5 cable</p>
RS485	<p>RJ45 Connector</p> <p>Power supply of CSP-COM:</p> <ul style="list-style-type: none"> – External power supply 5 V DC – Battery for power cuts. (battery life $\geq 1h$ communicating at 9600 bauds) <p>Maximum communication rate: 115200 bauds.</p> <p>Communication range: 100 m at 115200 bauds, 600m at 9600 bauds</p> <p>Up to 200 nodes on the network.</p> <p>Use of shielded cable</p>
Blue Tooth	<p>Class II (2.5 mW)</p> <p>Power supply of CSP-COM:</p> <ul style="list-style-type: none"> – External power supply 5 V DC – Battery (battery life 24h at 9600 bauds) <p>Maximum communication rate: 115200 bauds.</p> <p>Communication range 15 to 20 m</p> <p>Up to 7 nodes on the network</p> <p>N° FCC ID: VPM-CSP-BT</p>

Wifi	<p>Compliant with standard 802.11g (FCC ID: VPM-CSP-WF)</p> <p>Power supply of CSP-COM:</p> <ul style="list-style-type: none"> – External power supply 5 V DC – Battery for power cuts. (battery life \geq 1 h at 9600 Bauds) <p>Maximum communication rate: 115200 bauds</p> <p>Communication range > 20 m</p> <p>Max. nodes on the network = max. capacity of the used Wifi interface</p>
Radiofrequency	<p>915 MHz Band - 500 mW (N° FCC : VPM-CSP915)</p> <p>Power supply of CSP-COM:</p> <ul style="list-style-type: none"> – External power supply 5 V DC – Battery for power cuts (Battery life \geq 1h communicating at 4800 bauds with probe) <p>Maximum communication rate: 4800 bauds</p> <p>Communication range</p> <ul style="list-style-type: none"> – 1 km in free-field – 300 m inside a building

4. USE OF THE MODULE

4.1. COMMUNICATION MODE

Whether for the CSP-COM using wireless communication mode (Blue tooth & Wifi) or whether for the ones using cable mode (Ethernet & RS485), the necessary interfaces (e.g.: Wifi or Ethernet network) need to be provided by the user to ensure an efficient communication.

4.2. CSP-COM/RF915 PARTICULAR CASE

The CSP-COM/RF915 needs the use of a complementary device added to the PC equipped with the acquisition software.

This device is a Supervisor/Repeater module. The Supervisor/Repeater (code 86289) modules relay information between the host computer and the CSP-COM devices deployed in the field. To extend the communication range of the system, additional Repeater modules may be inserted between the computer and Supervisor module.

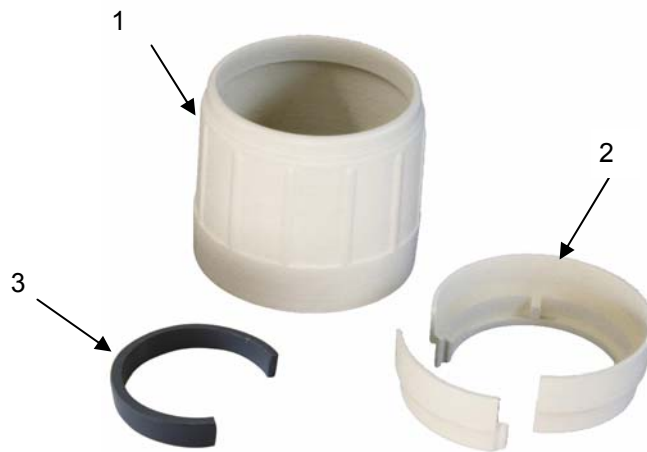
Refer to Chapter 5 for instructions about its installation and use.

4.3. ASSEMBLY OF THE CSP-COM WITH THE PROBE

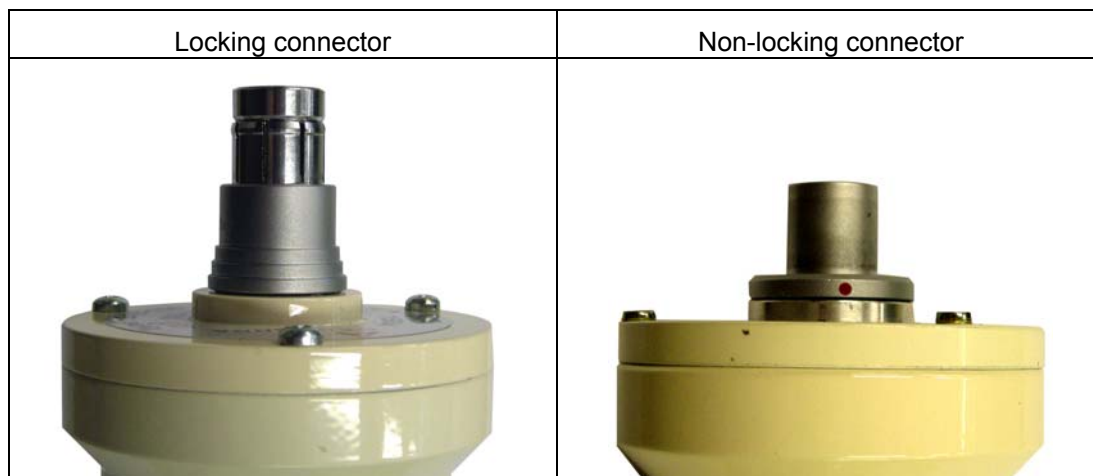
A fastening kit compatible with all the CSP probes is delivered with the CSP-COM.

It is made of:

- 1 nut (1)
- 1 two-pieces ring (2) and one adaptor ring (3).

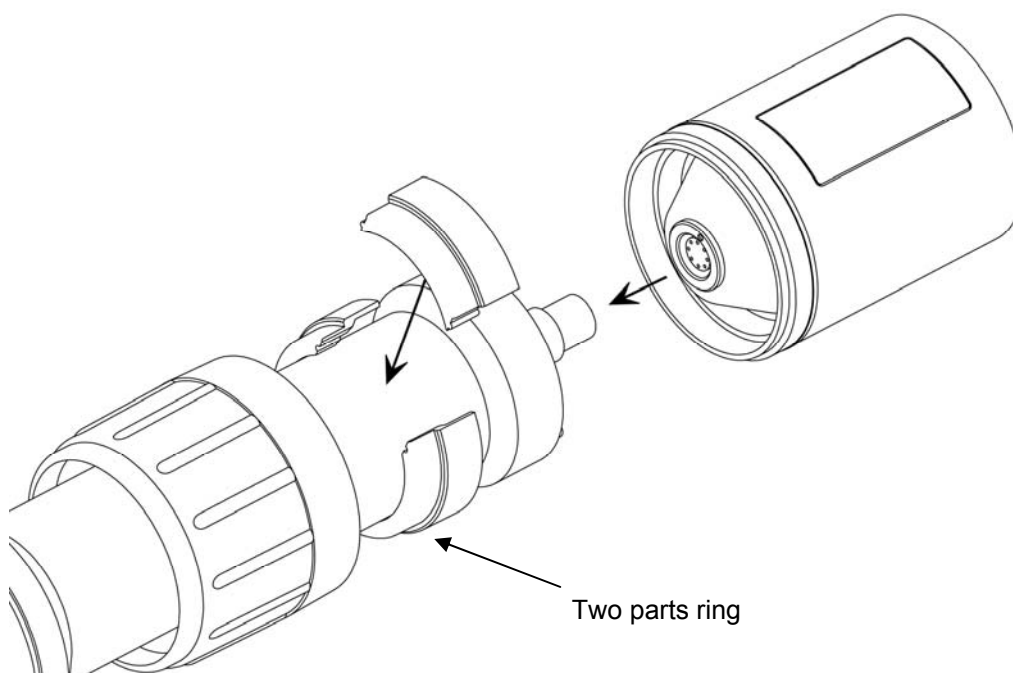


There are two kinds of probe, one with locking connector and the other with non-locking connector
This kit allows to connect these two kinds of probe.

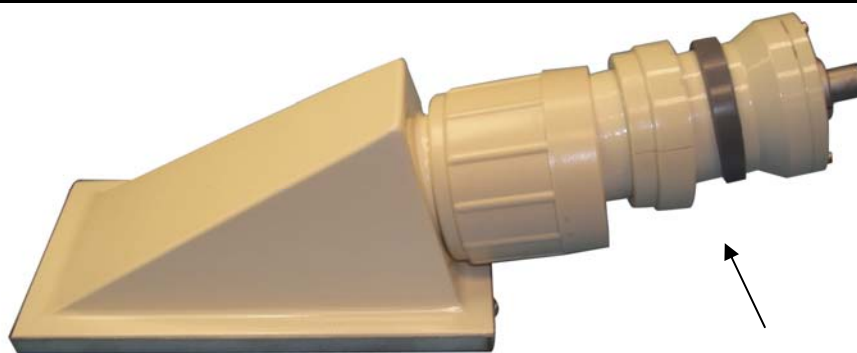


To assemble the probe with the CSP-Com:

- Place the nut on the handle of the probe.
- For the locking probes : assemble the two parts ring on the handle of the probe.



- For the non locking probes : assemble the two parts ring then place the adaptor ring.



Adaptor ring

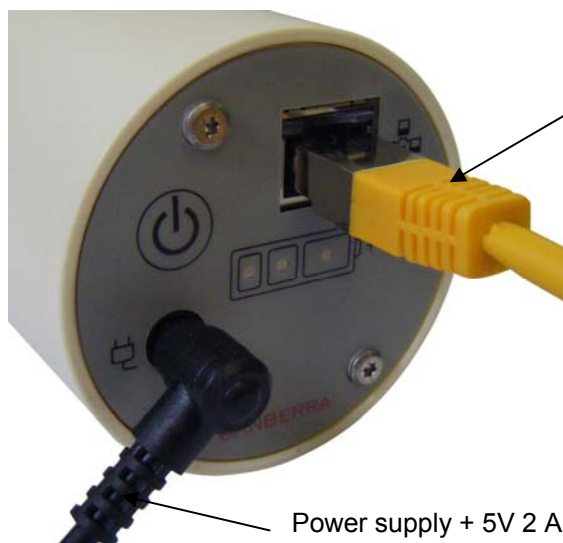
- Connect the probe to the module and be careful while connecting them, that connection's points situated on each connectors (module and probe) are faced.
- Screw the nut on the module.

4.4. PUTTING INTO SERVICE

Before the first use, plug the CSP_COM module to its power supply for 2 hours.

For the Ethernet and RS 485 CSP-COM:


- Plug the cable connecting the monitor to the CSP-COM.



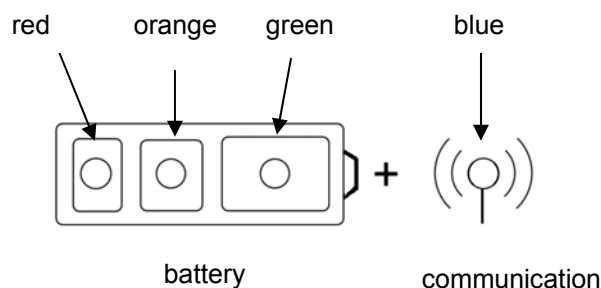
Network cable
RJ 45











Power supply + 5V 2 A

For all types of CSP-Com :


- Press  to power on the module.

4.5. MEANING OF THE LED LIGHTING DURING FUNCTIONING



	Comments	Events	
	4 fixed lit LEDs	Starting of CSP-COM	
	Brief lighting of the blue LED	Active communication	
	Very fast flashing of the red LED	First charge	
	Fixed lit green LED	Battery connected to the power grid, Battery charge \geq 100%	Missing battery, power supply connected to the power grid
	Slow flashing green LED	Working on battery, 100 % > battery charge> 33 %	
	Fixed lit orange LED	Battery connected to the power grid, 100 % > battery charge > 10 %	
	Slow flashing orange LED	Working on battery 33 % \geq batterie charge > 10 %	
	Fixed lit red LED	Battery connected to the power grid Battery charge \leq 10%	
	Slow flashing red LED	Working on battery Battery charge \leq 10%	
	Fast flashing green LED	Boot mode	

4.6. SWITCHING-OFF THE DEVICE

- Press  until all the LEDs simultaneously light then release.

4.7. FIRMWARE UPDATE

It is possible to update the firmware of CSP_COM by downloading it from a PC equipped with CSPS software.

CSPS (Canberra Smart Probe software): code 78468

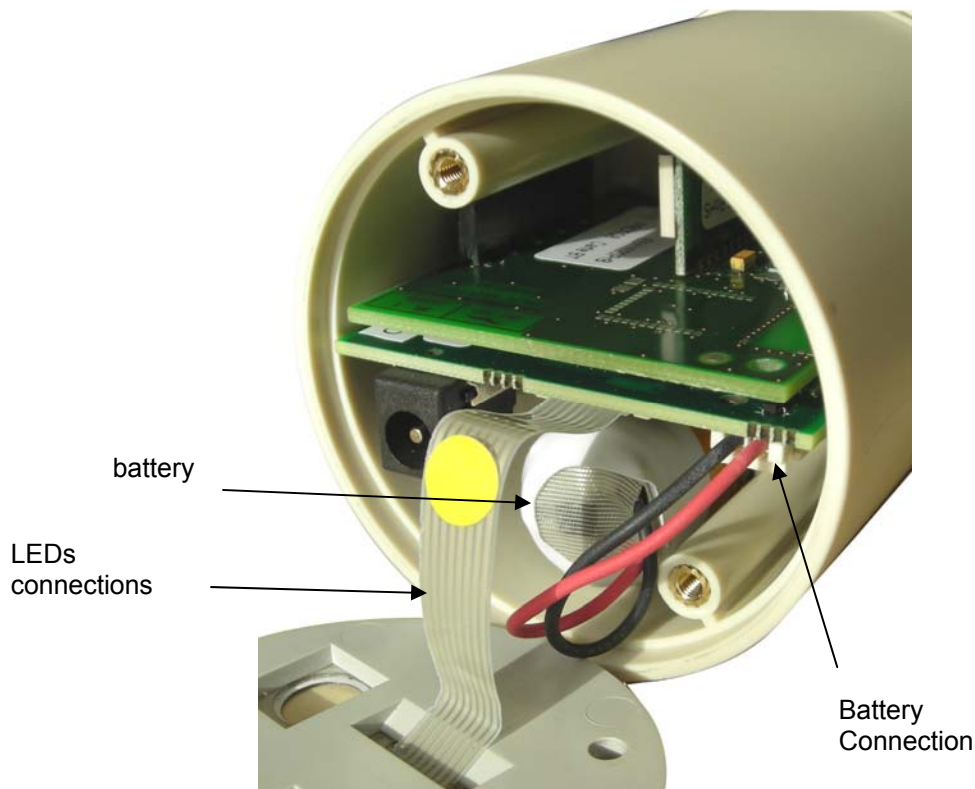
4.8. REPLACING THE BATTERY

The internal battery has a life time of around 300 cycles.

Beyond that, its performances may be significantly reduced. Therefore, It is recommended to replace the battery every 300 cycles.

For replacing the battery:

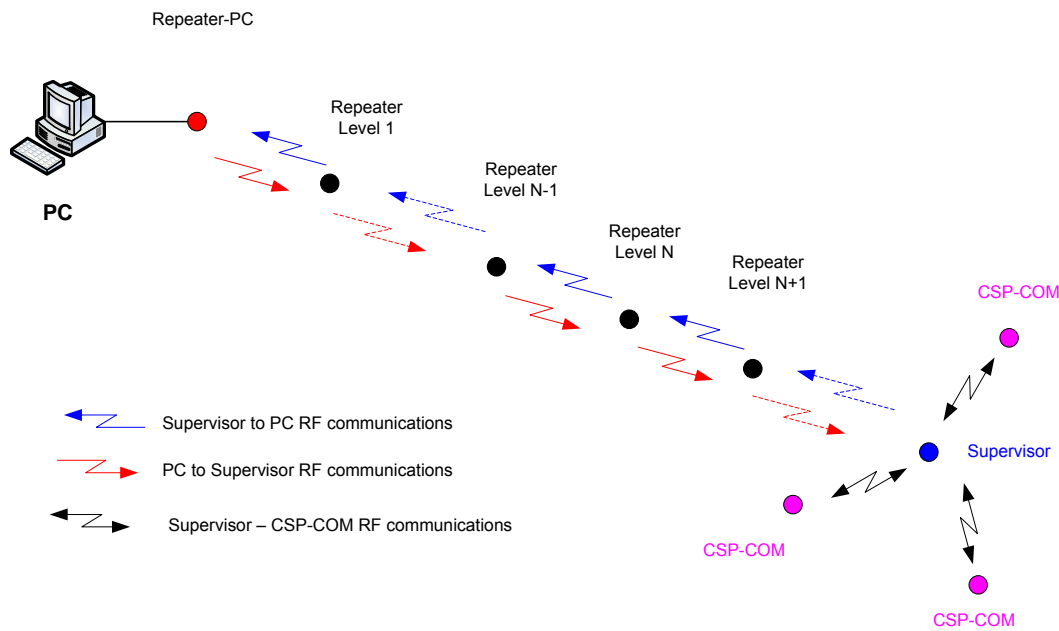
- Remove the 2 screws fixing the front panel,
- Move carefully the front panel apart from the case because of the LEDs connections,



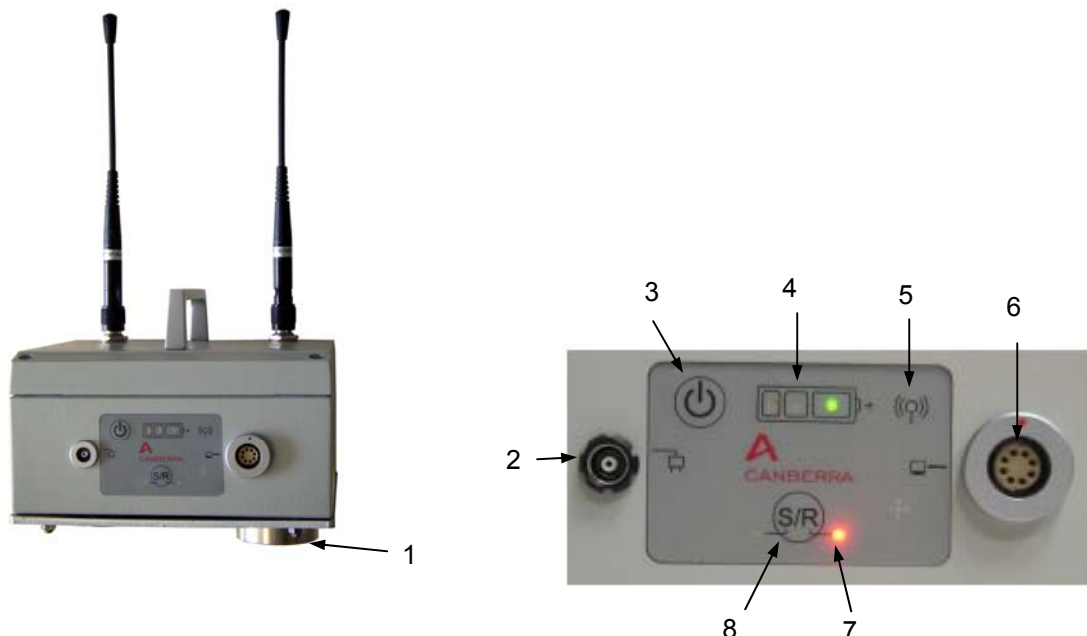
- Unplug the battery,
- Remove the battery,
- Put the new battery in its socket,
- Plug the battery,
- Put back the front panel,
- Screw the screws.

5. SUPERVISOR / REPEATER RF 915MHZ

A standard CSP-COM RF system includes a set of CSP-COM, up to 200 devices maximum per system, and one or more Supervisor/Repeater modules. The Supervisor/Repeater modules relay information between the host computer and the CSP-COM devices deployed in the field. To extend the communication range of the system, additional Repeater modules may be inserted between the computer and Supervisor module.



5.1. DESCRIPTION



1. Magnetic Feet:

The three feet on the base of the module allow it to be magnetically mounted to most common steel or other ferromagnetic structures.

2. External Power Connector:

This connector accepts external power from the supplied 5V-5A AC/DC adapter to charge the internal battery.

3. Power Button:

Pressing and holding the power button momentarily will switch the Supervisor/Repeater module on or off alternately.

4. Green, Orange, and Red "Battery" Status LEDs:

When the Supervisor/Repeater is in operation and is not connected to its external power adapter, the appropriate colored LED will blink to indicate the remaining capacity of the internal battery. When the GPSCOM is connected to its external power adapter, the appropriate colored LED will turn on steady to indicate the battery charging status.

5. Blue “Link” Status LED:

The Blue status LED indicates when the Supervisor/Repeater module has been successfully connected to the CSP-COM network, either by direct connection to the host computer or through RF link to another S/R module.

6. Data connector:

The data connector is a serial interface, which communicates with the host computer through the supplied Serial-to-USB data cable.

7. Red “S/R” Status LEDs:

A corresponding Red status LED adjacent to the “S/R” button will turn on to indicate the module operating mode as either a Supervisor or a Repeater.

8. “S/R” Button:

Pressing and holding the power button momentarily will switch the Supervisor/Repeater module operating mode between Supervisor or Repeater.

5.2.

SPECIFICATIONS

Environmental:

Operating Temperature Range	-20°C to +60°C (on battery) -20°C to +50°C (battery charging)
Storage Temperature Range	-40°C to +80°C
Humidity	0 to 95% at +35°C
Altitude	12000m (in transport only)
Specification	IP66

Input Voltage:

Operating Range	+4.5 to +5.5VDC
Maximum current	5A
Protection	Polarity inversion Overvoltage (up to 24VDC)
Connector	Fischer DEU 104 A066

Use only the power supply provided with the SUPERVISOR/REPEATER MODULE:

Manufacturer: CINCON ELECTRONICS CO., LTD

Model: TR30RA050

Input: 100-240 V, 47-63 Hz, 0.8 A

Output: 5 Vdc, 5 A

Caution: The plug of the direct plug-in power supply is used as the disconnect device, it shall remain accessible after installation.

Internal Battery:

Type	Lithium-Ion
Operating time	70 hours minimum
Charging time	13 to 17 hours
Lifetime	300 cycles

CAUTION: Risk of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions

Communication:

Frequency	915 MHz (US)
Range	1000 m (unobstructed) 300 m (inside building)

Dimensions

Length	160 mm
Width	160 mm
Height	80 mm
Material	Aluminium alloy
Color	beige
Cleaning Resistance	Alcohol (90% solution)

Certifications & Approvals:

CEM/Radio 915MHz	FCC 15-247 (US) FCC ID: VPM-RS-915
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5.3. NORMAL POWER ON/OFF SEQUENCE

The following procedure outlines the normal operating sequence of the Supervisor/Repeater module.

- For a Supervisor-PC or Repeater-PC, connect the Supervisor/Repeater module to the host computer USB port using the supplied data communication cable. Note that a Secondary-Repeater or Supervisor is operated as a standalone module, and would not be connected to a PC.
- Switch on the Supervisor/Repeater module by pressing and briefly holding the power button until all four status LEDs turn on.
- If external power is connected to the module, the Blue status LED will turn on briefly and the Supervisor/Repeater module will indicate its charging status by turning on the appropriate color LED as follows:
 - Green = 100% capacity (charge complete)
 - Orange = less than 99% capacity
 - Red = less than 10% capacity

If no external power is connected, all “Battery” and “Link” status LEDs will turn on briefly, followed by the battery level indicated by a blinking status LED as follows:

Green: greater than 33% capacity
Orange: less than 33% capacity
Red: less than 10% capacity

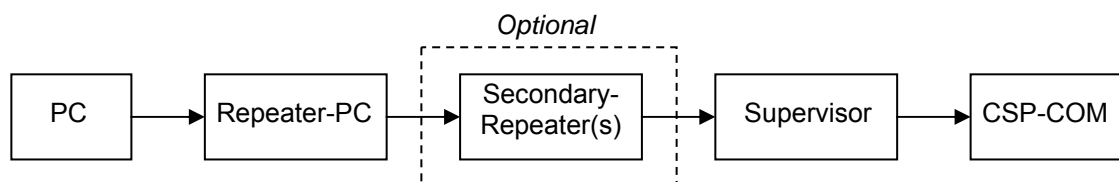
- The Supervisor/Repeater module will now also indicate its operating mode before it was last switched off, by turning on the corresponding Red “S” or “R” status LED next to the “S/R” button.
- To change the mode between Supervisor or Repeater operation, press and momentarily hold the “S/R” button. All “Battery” and “Link” status LEDs will turn on briefly, then the status LEDs will indicate the battery level or charging status along with the new operating mode. (Note that when external power is connected, changing the S/R mode will also reset the module back to Charge mode and it will be necessary to switch power on again. When switched back on, the S/R module will be in the newly selected operating mode.)
- The Blue status LED will only turn on after a “Start Network” command has been issued by the host computer and the S/R module has been successfully linked to the network, either by direct connection to the host computer or through RF link to another S/R module.
- To switch off the S/R module, press and briefly hold the power button again until all four “Battery” and “Link” status LEDs turn on. After releasing the button, all status LEDs will be off and the S/R will be powered off.
- If the external power adapter is connected, the S/R module will automatically enter Charge mode and the charging status will be indicated by a Red, Orange, or Green status LED according to the battery capacity as described above.

5.4. DYNAMIC SUPERVISOR/REPEATER MODULE CONNECTIONS

The network allows for removal and insertion of Repeater modules if necessary to extend the communication range of the system. The sections below describe the response of the system and the required user interaction for different configurations and events.

5.4.1. Installing or Removing Repeater Modules

In a system utilizing at least one Repeater module (Repeater-PC) and a Supervisor module, the communication link established between CSP-COM devices and the Supervisor module is not affected by adding or removing the Repeater-PC or Secondary-Repeater modules. All communication data for the system is stored in the Supervisor, which will remain linked with the CSP-COM devices. Data flow from the CSP-COM devices to the host computer will be momentarily interrupted if a Repeater module is removed, but system operation will restore itself automatically once the communication chain has been re-established.



5.4.1.1. Removal of a Repeater-PC or Secondary-Repeater Module

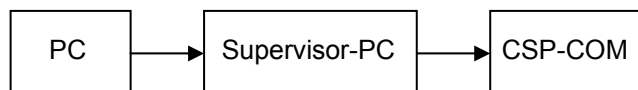
- Follow the steps in section 5.3 above to switch off and remove either a Secondary-Repeater or Repeater-PC module.
- All Repeater modules between the computer and the Repeater that has been removed will remain in the network, and their Blue “Link” status LEDs will stay on. All Repeater modules after this point, along with the Supervisor, will become disconnected and their “Link” status LEDs will turn off.

5.4.1.2. Insertion of a Repeater-PC or Secondary-Repeater Module

- Follow the steps in section 5.3 above to install a new Secondary-Repeater module.
- The Blue “Link” status LED of the newly installed Secondary-Repeater module will turn on to indicate when it has been successfully synchronized and linked to the network.
- If any downstream Repeaters and the Supervisor had been previously disconnected, their Blue “Link” status LEDs will turn back on once they have automatically reconnected to the network.

5.4.2. Installing or Removing Supervisor Modules

In a system containing only a Supervisor-PC module, it is not possible to insert additional Repeater modules once the system is in operation without restarting and reconfiguring the system to some extent. In this case, proper functionality of the system requires the system operating data and CSP-COM communication table stored in the Supervisor to be reset. This occurs whenever the serial data cable is disconnected from the Supervisor-PC, and the role of the module changes from Supervisor-PC to standalone Supervisor.



5.4.2.1. Removal of a Supervisor-PC or Supervisor Module

- Follow the steps in section 5.3 above to switch off and remove either a Supervisor-PC or Supervisor module.
- Any Repeater modules in the system will remain connected in the network, and their Blue “Link” status LEDs will stay on. The Supervisor however will become disconnected from the network once it has been switched off, and all system data in the Supervisor will be lost.

5.4.2.2. Insertion of a Supervisor-PC or Supervisor Module

- Follow the steps in section 5.3 above to install a new Supervisor module.
- To restart the CSP-COM network, there are three possible procedures:
 - a) Shutdown and restart all the CSP-COM devices. Place the Supervisor module into network scan/search mode, then scan and connect all CSP-COM devices, as described above. This solution is the most straightforward, but may require a significant length of time if the system contains a large number of CSP-COM devices.
 - b) If all of the identifiers of the CSP-COM devices previously connected are known are still stored in the PC, the following procedure may be used: Place the Supervisor module into standby mode. Send a “connect” frame from the PC to each CSP-COM previously connected. This solution is quick, but requires that the PC has stored the identifiers of the connected CSP-COM devices.
 - c) Change the network number ID of the new Supervisor and all of the Repeaters in the system. This solution requires the reconfiguration of all the Repeaters and Supervisor, and imposes the retrieval of all of the deployed modules. It is therefore only practical in a network which contains only one or two Repeaters maximum.

5.5. ENABLING THE PROGRAM MODE

The following procedure outlines the steps necessary to change the internal firmware of the Supervisor/Repeater module.

- Connect the S/R module to the host computer USB port using the supplied data communication cable.
- Switch on the S/R by pressing and briefly holding the power button until all four “Battery” and “Link” status LEDs turn on.
- Press and hold the power button again until the Green status LED blinks rapidly, and the Red “S” or “R” status LED turns off. This indicates that the S/R is now ready to receive a firmware change through the computer connected to the serial data connector.
- When programming is completed, press and briefly hold the power button again until all four “Battery” and “Link” status LEDs turn on. The S/R module will now return to its normal operating mode, and the status LEDs will indicate the battery level or charging status along with the present operating mode.
- To switch off the S/R module, press and briefly hold the power button again until all four “Battery” and “Link” status LEDs turn on. After releasing the button, all status LEDs will be off and the S/R module will be powered off.

5.6. CHARGING THE BATTERY

The following procedure outlines the steps to charge the S/R internal battery. Note that it is possible to interrupt the charging process at any time by disconnecting the external power adapter, and no damage to the internal battery will result.

- Connect the supplied AC/DC power adapter to the S/R, and connect the adapter to a 100-240V 50/60Hz outlet using the appropriate plug.
- The S/R will automatically begin charging its internal battery, and will indicate the charge status with the appropriate color LED as follows:
 - Green = 100% capacity (charge complete)
 - Orange = less than 99% capacity
 - Red = less than 10% capacity

- When charging is complete, the Green LED will turn on and the external power adapter may be disconnected.

5.7. NOTES ON COMMUNICATION OPERATIONS

Supervisor must not be turned off once communicating with CSP-COM, otherwise entire network must be restarted.

Blue status LED must remain on at all times – if LED turns off, indicates communication fault.

If software is closed, Supervisor will continue to communicate with CSP-COM – it is not required to re-scan and re-start network.

Connection or disconnection of data cable will force reset of S/R microcontroller.

5.8. REPLACEMENT COMPONENTS

The following components are available for direct replacement through the Canberra Service department:

- AC/DC Power Adapter (5V@5A): TR30RA050 from CINCON ELECTRONICS CO., LTD
- RF Antenna: code 85969
Antenna must not be removed nor replaced by another one

