



SPINTSO Refcom II Pro, User Manual

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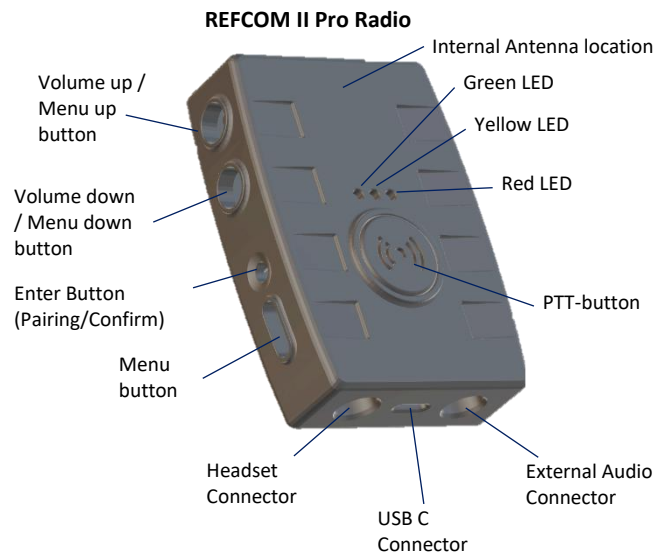
1. General

The Spintso Refcom II Pro radio system is developed by Referees for Referees and is optimized for use in both indoor and outdoor sports environments. The system handles six users speaking in full duplex and features functionality for VAR and PA system connections.

2. Sections

- 3. Overview
- 4. Generic functions/features
- 5. Initial Preparations
- 6. General Handling
- 7. Interfaces
- 8. Label
- 9. Charging cable
- 10. Charging Station
- 11. Refcom II match Set-up and handling
- 12. Battery replacement
- 13. Compliances

3. Overview



4. Generic functions/features

- Optimized for Referees
- Open speech conference with high performance wind & ambient noise reduction.
- Automatic whistle sound level limitation.
- Compatible with both the Spintso in-ear Swiftfit headsets and Twistlock premium headsets.
- Bluetooth 5.3 standard encryption.
- Customized high performance internal antenna solution to provide optimal range.
- 2-6 users with full duplex audio.
- Built-in Recording of the speech conference.
- Easy initial set-up by assigning each radio an individual id nr. or User Type. (1-6)
- Connects automatically at each match after power-on.
- Configurable Push to Talk button. For example used when speaking to PA system.
- External audio connector for connection of PA system, VAR, or Long range radio.
- Vibrator when used as Flag receiver.
- Extra Bluetooth Low Emission circuit for connection of Spintso Bluetooth accessories.
- License Free 2.4GHz radio band, CE, UKCA, FCC
- Battery level announcement at start-up (High, Medium, Low, Empty)
- Operational Time 12+h
- Operating Temperature -10 to + 45 °C
- Climatic environment IP54. Waterproof 3,5mm audio and USB-C connectors.
- Size: 59 x 25 x 82 mm (Including buttons)
- weight: 68g
- Future proof by SW upgrades through USB.

5. Initial Preparations

- Charge the radios using normal USB-C or the Refcom II Pro Charging station. Red LED indicates charging, and batteries are full when the green led activates.
- Test to fit your Swiftfit Pro or Twistlock headset to your ear. If needed, change the in-ear adapters to a different size until the headset fits properly and feels comfortable.



- Mark-up the radios using the included stickers. Choose the ones that suits your application best. In Ice Hockey it could for example be like below:

6. General Handling

6.1. Activation

- Radios are started up by pressing down Volume up and Volume down buttons at the same time for 1 second.
- Radios are turned off by pressing Volume up and Volume down buttons at the same time for 2 seconds.

6.2. Indications

6.2.1. LEDs

- At start-up and power off, all LEDs activates for 2 seconds. During normal operation the LEDs indicates the radio status.

6.2.2. Voice guide

- At start-up the current applicable settings and status is presented in the headset.
For example:
 - Radio designation number or User Type (Radio [1-6])
 - Battery Level (BATTERY [HIGH/NORMAL/LOW/EMPTY])
 - Headset type (SWIFTFIT HEADSET/TWISTLOCK HEADSET...)

6.3. Pairing

- Pairing procedure is performed using the confirm button and the audio Menu.
 - Connect the headsets and press the confirm button for 6 seconds on each radio to clear the pairing history and to set the radios into radio pairing mode.
 - Access the audio menu on each radio one at a time by pressing the MENU-button. Assign each radio an individual number or User Type (1-6) Change number or User Type by pressing the +/- buttons. Confirm the selected number or User Type by pressing down the confirm button. **The number or User Type shall match the number on the mounted sticker.**
 - The pairing can be started when all radios have been set-up with their individual number or individual User Type. Press the confirm button for 2 seconds on the radio assigned to "RADIO 1"/"PA". All radios will pair automatically in sequence.

Note! If for example instead pressing confirm button on “Radio 2”, only the radios with higher number will be paired.

6.4. LED Indications

6.4.1. Radio pairing mode

Radio pairing mode state is indicated by Green and Red LEDs being continuously active.

6.4.2. Pairing

When pairing is successful, the red LED turns off and the green led indicates connected by blinking.

6.4.3. Connected state

- a. One connected radio is indicated by a single blink.
- b. Two connected radios are indicated by a double-blink.
- c. At low battery, the red LED activates instead of the green.
- d. The LED blinking is synchronized and moves from radio 1 to radio 6.

6.4.4. Not connected state

When not connected the green or red LED blinks 1 time per second at a 50% duty cycle.

6.4.5. PTT-button

The Yellow LED activates while Push to Talk is active. (Requires that the PTT-button is enabled)

6.5. Radio Connect

6.5.1. Connecting radios

Radios that have been previously paired, connects automatically after start-up. At connect the voice guide says CONNECT RADIO “X” on each radio.

All connected radios LEDs indicates connected mode in synchronization.

6.5.2. Disconnect in connected state

- Disconnect only occur when out of range, or if a radio is turned off. At disconnect, the voice guide says RADIO “X” LOST on the applicable radio, and the green LED indicates accordingly.

6.5.3. Automatic re-connect.

- If radios disconnect during normal operation because of poor radio connection or by being out of range, the radios automatically re-connect when the radios are back within operational range.

6.6. Volume control

The earphone volume can be adjusted in 12 steps. Changing of the volume level is indicated by beep sounds. A high pitch beep sound indicates reaching the highest volume, and a low pitch sound indicates reaching the lowest volume.

6.7. Audio Menu

- The radio features an audio menu for setting different options. For example, selection of preferred headset model or radio number.
- Menu button is pressed to access menu mode.
- Volume buttons are used to change a setting.
- Confirmation button is used to confirm the selected setting.
- Pressing the menu button several times, steps between the menu options.
- Exit menu to normal operation i.e. Volume buttons go back to changing volume, is done after confirming a selection, or automatically after three seconds if not pressing any buttons. A selected parameter is not stored if *exit menu* occurs automatically after the three second time-out.

6.7.1. Battery status

When in normal operation, pressing and releasing the Bluetooth button within 2 seconds activates a battery status message.

6.8. Radio Application

The radio can feature two operating modes. Default and Ice Hockey.

- The Default application can be configured to suit specific needs for each user such as Push to Talk.
- The Ice Hockey application is a fixed set-up that features a private speech conference for the Linesmen and also PA announcement access for the Referees.

6.9. Charging

- Charging is indicated by the red LED being active.
- Charging finished in radio off state is indicated by turning the red LED off and turning the Green LED on.
- Charging finished in radio on state is indicated by turning the red LED off. The green LED indicate status normally.
- Charging time is less than 4h.

6.9.1. Operational time

Operational time with a fully charged battery is at least 12h under the following conditions: Maximum radio transmission power, 10% speaking time, and 0 degrees Centigrade ambient temperature.

7. Interfaces

7.1. Headset

The headset interface features a waterproof 4-pole 3,5mm headset connector. It is compatible with the SPINTSO Swiftfit headset and the Spintso provided Twistlock headset.

Audio connection is according to the OMTP standard, but Ring 1 has an input detect that can activate when grounded. Ring 1 can be used for an external Push to Talk button.

3,5mm 4-pole, Waterproof (IP67 rating)	
	
Signal	Pin
Microphone	RING 2
Earphone	TIP
Ground	RING 3
Active low Input (Detect)	RING 1

7.1. External Audio

- Single ended input and output Line audio with 600 Ohm impedance.
- Open Collector output that can be used for keying an external radio.

3,5mm 4-pole, Waterproof (IP67 rating)	
	
Signal	Pin
Input Audio	RING 2
Output Audio	TIP
Ground	RING 3
Open collector output (PTT sign)	RING 1

7.2. Charging & Data

The charging interface features a Waterproof USB-C connector. This interface also handles upgrades of the radio firmware.

7.3. Antenna

The radio features a calibrated internal antenna that provides optimal radio range and signal quality.

8. Label

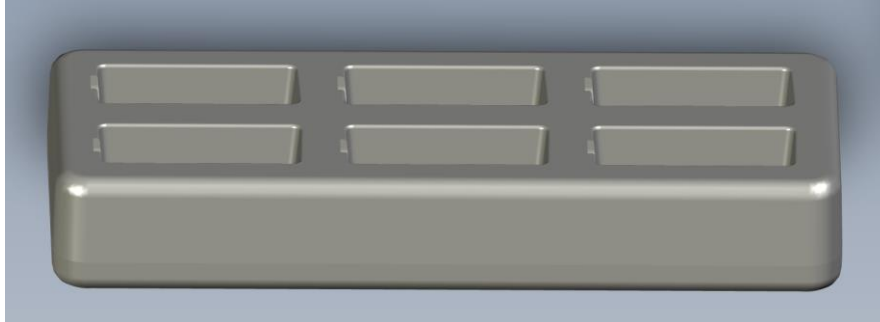
- The radio features a submerged area on the top where a label that displays the radio designated number and the Referee role can be attached. For example: "RADIO 1, AR2", "RADIO 2, REFEREE", "RADIO 3, AR1" and so on.

9. Charging Cable

- The Refcom radios can be charged from a normal USB-C cable. The cable provides for charging and data communication. Supported feeding Voltage is 5VDC.

10. Charging station

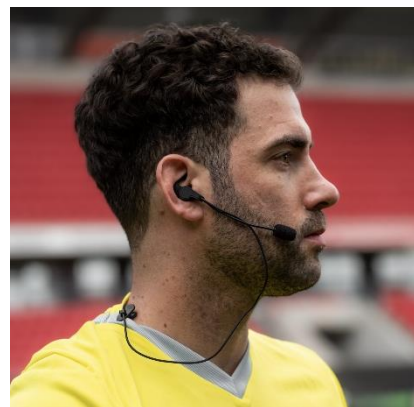
- Up to six Refcom radios can be charged simultaneously by placing them in the Refcom II Pro charging station.
- Charging status is indicated on the radios themselves. Red for charging and Green for charging ready.



11. Refcom II match Set-up and handling

11.1. General

- Make sure the radios are fully charged before use.
- Start-up all radios and wait for a short moment until they have automatically connected.
- Assign each referee with the applicable radio and a headset. For example: “Radio 2, Referee 1” is handed to Referee 1.
- Use SPINTSO arm-bag, waist pouch, or a shirt with dedicated arm-bag pocket when carrying REFCOM II® Pro. The radio shall preferably not be worn behind your back. The backside of the radio shall face the skin, and the connectors shall point downwards or sideways.
- Mount the headset to the ear, and make sure a secure and comfortable fitting is achieved. The microphone shall be positioned in high with the mouth and be placed close to the cheek. Use transparent medical tape to secure the microphone position if needed.
- Adjust and attach the cable clip to the sweater collar to avoid cable tension.
- Speak between each other to check that all communication is working properly. Adjust if needed your personal earphone volume to a comfortable level.



11.2. Ice Hockey Application

11.2.1. Set-up

- Connect “Radio 1 / PA” to the PA system. Connection is made at the Refcom II Pro “Ext” connector.
- Headsets are connected to “RADIO 2/REFEREE 1”, “RADIO 3/REFEREE 2”, “RADIO 4 LM 1”, “RADIO 5/LM 2”, and Earpieces are connected to “RADIO 6/SUPERV.”
- Referees and LM users carry their radios in their respective waist pouch.

11.2.2. Handling

- Supervisor always listen-only to radio 2,3,4,5.
- LM1 and LM2 has an open speech channel between themselves. When they need to speak to Referee 1 and 2, they press and hold the PTT-button on their respective radio.
- Referee 1 and 2 has an open speech channel to all radios except the PA radio. When either of the Referees need to speak out on the PA system, they double-press on their respective PTT-button to open a PA audio channel. A single press on the PTT-button closes the PA channel.

12. Battery Replacement

- There are two options to handle a change of the battery. Contact SPINTSO to have the battery exchanged for you, or exchange the battery yourself by ordering a spare battery from Spintso.

12.1. How to replace the battery

- Make sure the radio is turned off, and that nothing is connected to the radio USB-C and Audio ports.
- Disassemble the back lid by removing the six screws. Use a standard small Philips screwdriver for this and turn counterclockwise.
- Carefully disconnect the battery from the circuit board battery connector.
- Carefully and slowly pull the tab of the removable double adhesive tape strip until the battery falls off.
- Remove the tape protection of the new battery and mount it to the Lid in the same position as the old battery.
- Press and hold the battery for a few seconds to make sure it sticks to the lid properly.
- Gently connect the new battery to the battery connector on the circuit board. Note that the connector will only fit in one direction.
- Place the lid on the table with the battery facing upwards. Check that the sealing gasket is in its correct position. Mount the unit to the lid and make sure you have a good fit.
- Turn the radio with lid around and insert the six screws. Make sure to not use too much force when tightening the screws. When a small resistance is felt, and there is no gap between the lid and unit, the tightening is ok.

13. Compliances

- CE
 - RED
 - EMC
 - LVD
 - RoHS
 - Battery Regulation 2023/1542
- UKCA
- FCC

CE Statement:

Hereby, SPINTSO AB declare that the radio equipment type Bluetooth Intercom Headset is compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address: xxxxxx



Caution:

For Battery: Risk of explosion battery is replaced by an incorrect type, dispose of used batteries according to the instructions.

This product allowed to be used in all EU member states.

Technology	Frequency MHz		Maximum Output Power (dBm)
	From	To	
BR_EDR (For Module QCC 3084)	2402	2480	7.57
BR_EDR (For Module QCC 3024)	2402	2480	1.47
BLE (For Module QCC 3084)	2402	2480	7.67
BLE (For Module QCC 3024)	2402	2480	3.47

FCC Statement:

NOTE: 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.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.