

Motorola™ Professional Portable Radio Conversion to LC828-Module Manual.

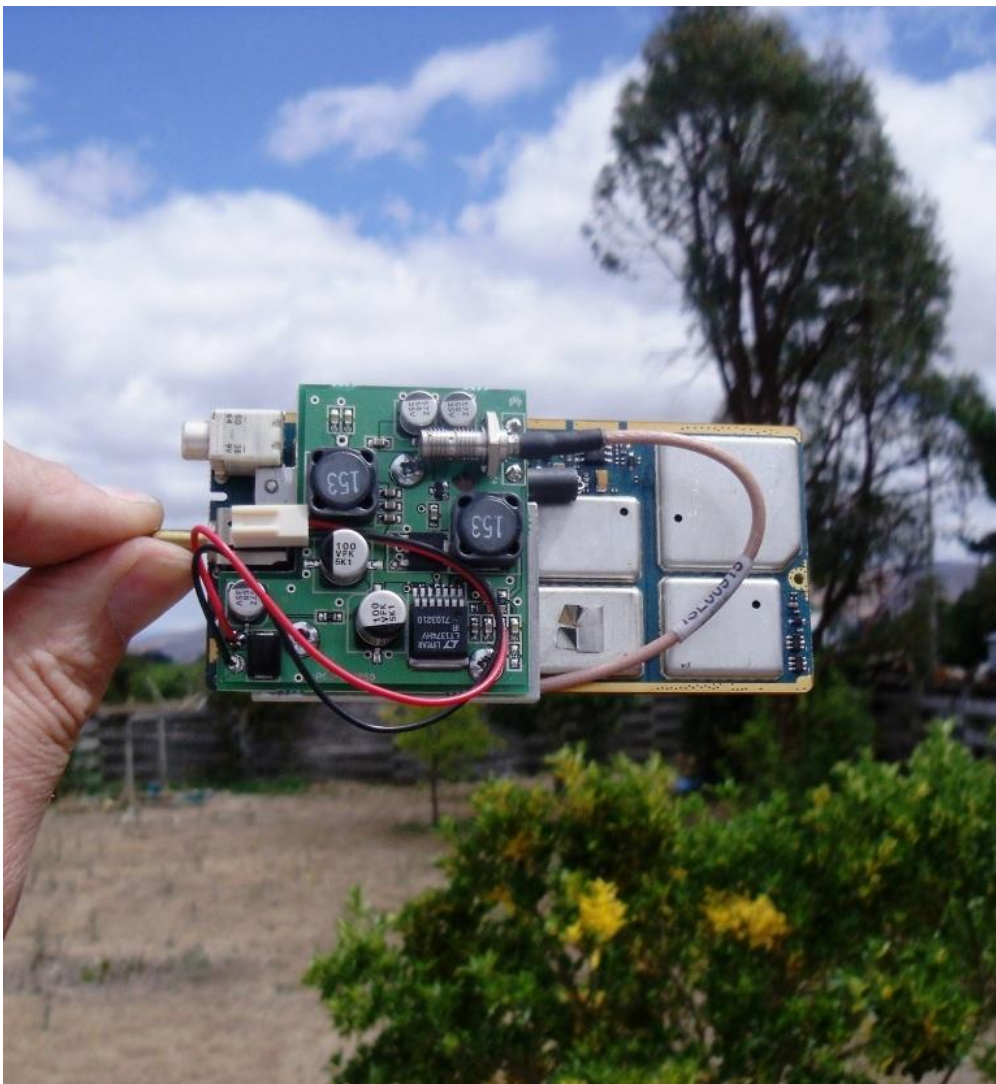


Table of Contents:

1	SUMMARY:	3
2.1	ASSOCIATED PROPRIETY DOCUMENTATION:	4
2.2	SUPPORTED PORTABLE RADIOS:	4
2.3	PUBLICATION RECORD:	4
2.4	ALERT NOTICES:	5
2.5	CONTACT DETAILS:	5
2.6	COPYRIGHT:	5
2.7	ABBREVIATIONS:	6
3.0	CONVERTING A MOTOROLA PORTABLE RADIO TO AN LC828:	7
3.1	PRELIMERY CHECKS:	7
3.2	PARTS NEEDED FOR CONVERSION:	7
3.3	MODIFICATIONS:	8

1 Summary:

The LC828 Radio-Module is a modified MOTOROLA Professional Portable Radio under control of a Rotronix Ltd. PROIS interface-board (IOB151208).

The standard operation voltage is 7.5 Volt. Adding a optional custom-made switch-mode power-supply will change the operation voltage from 11 to 28 Volts.



Portable Radio with PSU and PROIS option
board in die-cast housing

2.1 Associated Propriety Documentation:

Motorola service manual: (Part No: 6804110J64-H)

Motorola PROIS 2.03 Manual

Motorola PROIS 2.03 Electrical Manual: (Part No: 1202899J28)

Rotronix Ltd DC-DC converter manual (Part No: PSU-322859©)

Rotronix Ltd LC828 interface-module Manual (Part No: RTRNX-GP328-V4)

Rotronix Ltd Professional Portable Radio Interface Option-Board
Manual (Part No: IOB151208) ©

2.2 Supported Portable Radios:

PRO5150, PRO5350, GP140, GP318, GP328, GP328 LS,
HT750, HT750.LS, MTX850LS, HT1250, HT1250.LS+,
MTX8250LS, PRO7150, PRO7350, GP338, GP338 LS,
PRO9150, HT1550XLS

2.3 Publication Record:

Issue	Publication Date	Author	Description
1.01	January 2009	Hans de Roode	First issue

2.4 Alert Notices:

Within this manual, four types of alerts are given to the reader: warning, caution, important and note. The following paragraphs illustrate each type of alert and its associated symbol.



Warning!!

This alert indicates a potential risk of death or serious injury.



Caution

This alert indicates a risk of minor or moderate injury to people.



Important

This alert indicates the risk of equipment damage or malfunction.



Note

This alert highlights information that is required to ensure that procedures are performed correctly.

2.5 Contact details:

Rotronix Ltd
135 Darnley Road
RD3 Amberley, New Zealand
Commercial e-mail: sales@rotronix.co.nz
Technical e-mail: hans@rotronix.co.nz

2.6 Copyright:

Copyright protects original works, regardless of whether the work is published or unpublished. Under the Copyright Act 1994, copyright automatically applies as soon as the work is put into material form – whether in print, stored on computer or recorded in some way. New Zealand is a signatory to the Berne convention, and therefore New Zealand protects the rights of copyright owners from other countries in the same way it does for our own copyright owners. It is unlawful to copy all or part of this manual without a license or without approval from the copyright owner, unless there is a statutory exception to such infringement.

2.7 Abbreviations

Abbreviation	Description
3DK	Third-Party Developer's Kit
ASCII	American Standard Code for Information Interchange
AVL	Automatic Vehicle Location
CCRI	Computer Controlled Radio Interface
CRC	Cyclic Redundancy Check
CTCSS	Continuous Tone Coded Squelch System
CTS	Clear to Send
DCE	Data Circuit-Terminating Equipment
DCS	Data Carrier System
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi-Frequency
FEC	Forward Error Correction
FFSK	Fast Frequency Shift Keying
GPIO	General Purpose Input/Output
IPN	Internal Part Number
LED	Light-Emitting Diode
MSD	Most Significant Digit
MPPR	Motorola Professional Portable Radio
NMEA	National Marine Electronics Association standard. Combined electrical and data specification for communication between marine electronics and GPS
IOB	Interface Option Board
PC	Personal Computer
PTT	Press To Talk
PCB	Printed Circuit Board
PROIS	Motorola proprietary Professional Radio Option Interface Specification
RMC	Recommended Minimum sentence C. NMEA GPS message type for the minimum recommended
RTS	Request to Send
Rx	Receive mode
RXD	Receive Data
SDM	Short Data Message
SMC	Switched Mode Converter (12 to 7.5V)
TX	Transmit mode
TXD	Transmit Data
UART	Universal Asynchronous Receiver-Transmitter
XON	Data Transmitter On
XOFF	Data Transmitter Off
ZIF	Zero Insertion Force Connector

3.0 Converting a Motorola Portable Radio to an LC828:

3.1 Prelimery checks:



Before modifying the radio, make sure that the radio meets all specifications. Remove the radio from its housing with the appropriate tool (Motorola part number: 668070220) and check functionality of the PROIS interface. Test this by programming the radio with a PROIS test personality, connect the PROIS interface-board and check the channel-change function. If PROIS is functional, than rotating the channel-change knob on the radio will not change the radio channel, it will stay on channel one (pin J3.5 is not connected and has 3.3 Volt). If any of the Prelimery checks fails, than send the radio back to your Motorola representative with a warranty-claim.

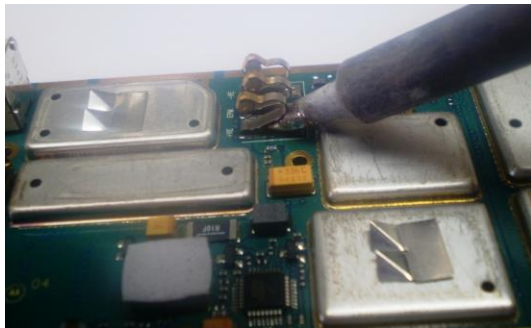
3.2 Parts needed for conversion:

Description:	Part-number	Number
PROIS interface option board	RTRNX-GP328-V4	1
Teflon antenna cable	RO-ISL00915	1
Radio connections for DC-DC converter power supply	RO-18746	1
heatsink	RO-18735	1
nylon spacer	RO-18737	3
DC-DC converter	PSU-322859	1
spacers	RO-18752	3
DC-DC converter screws	RO-18755	3
DC-power-supply cable	RO-18739	1
Radio mounting-screws	RO-18754	3
die-cast housing	RO-18740	1
9-pin D-range screws	RO-18742	2
Heatsink retaining screws	RO-18753	4

3.3 Modifications:



Prepare to remove battery contacts.



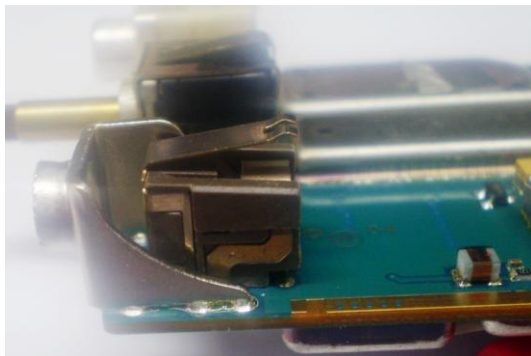
Remove battery contacts, using a suitable soldering iron.



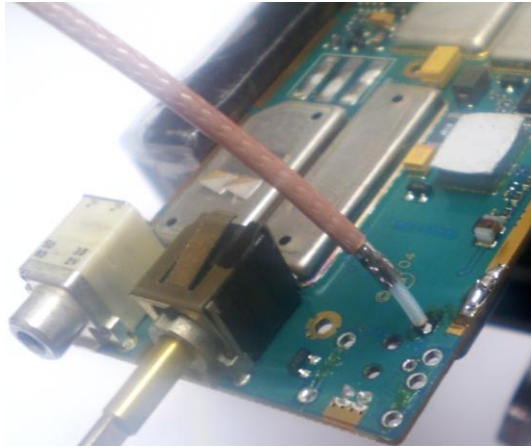
Be careful not to damage the PCB.



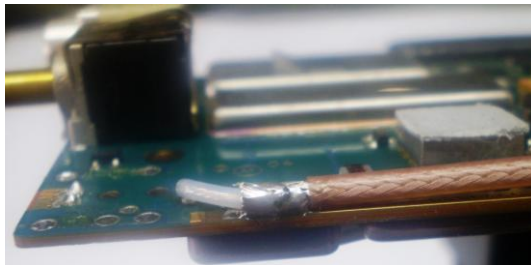
Remove the volume-control shaft by gently prizing the shaft out of the volume-control housing with a side-cutter. Make sure that the on/off switch is in the on position.



Remove the antenna socket and the internal/external antenna-switch using a solder sucker and soldering iron or an hot-air solder station.



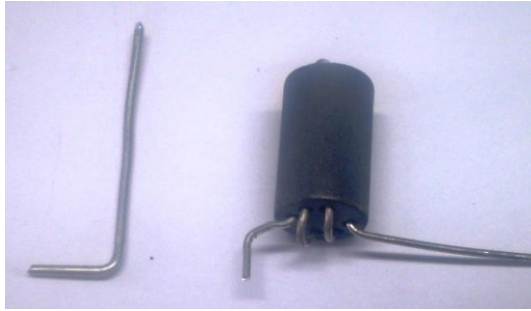
Fit the Teflon antenna cable (Part number RO-ISL00915) on the place of the internal/external antenna-switch.



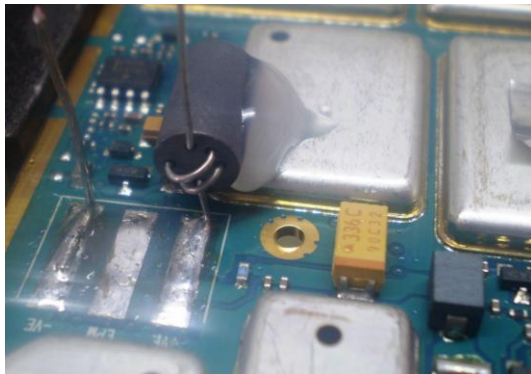
Solder the shielding onto the PCB grounding.



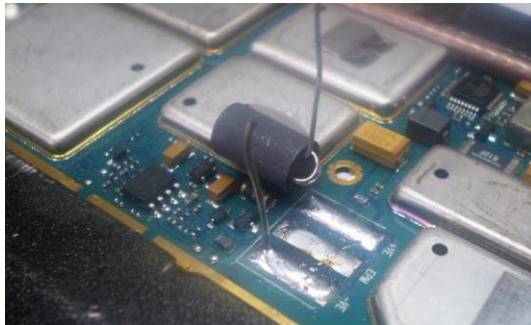
Guide the cable facing the back of the radio-PCB



Prepare connections for the DC-DC converter power supply (part-number RO-18746). This can be omitted if the radio is used for receive only.



Solder the wire on the minus connection and the ferrite filter on the plus of the battery connections of the radio.





Apply some heatsink compound onto the heatsink of the radio, (not necessary for a receive-only radio).



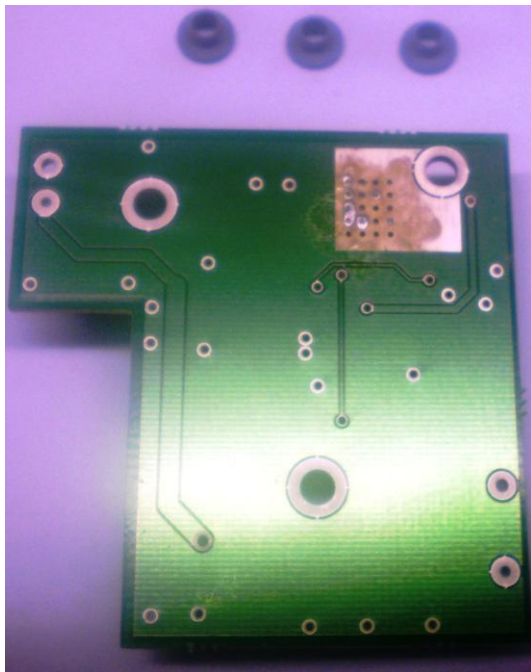
Prepare the heatsink (part-number RO-18735) with nylon spacers (part-number RO-18737) as seen on the photos.



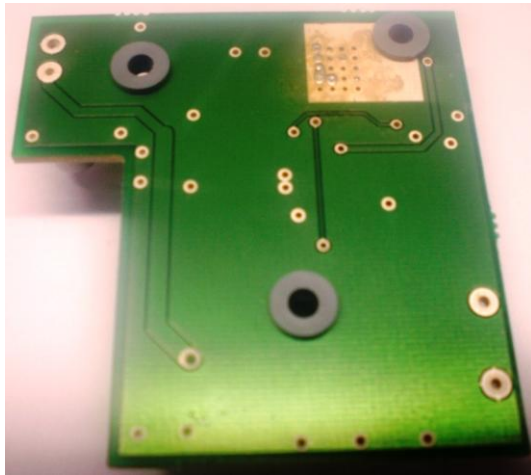
(Heatsink layout)



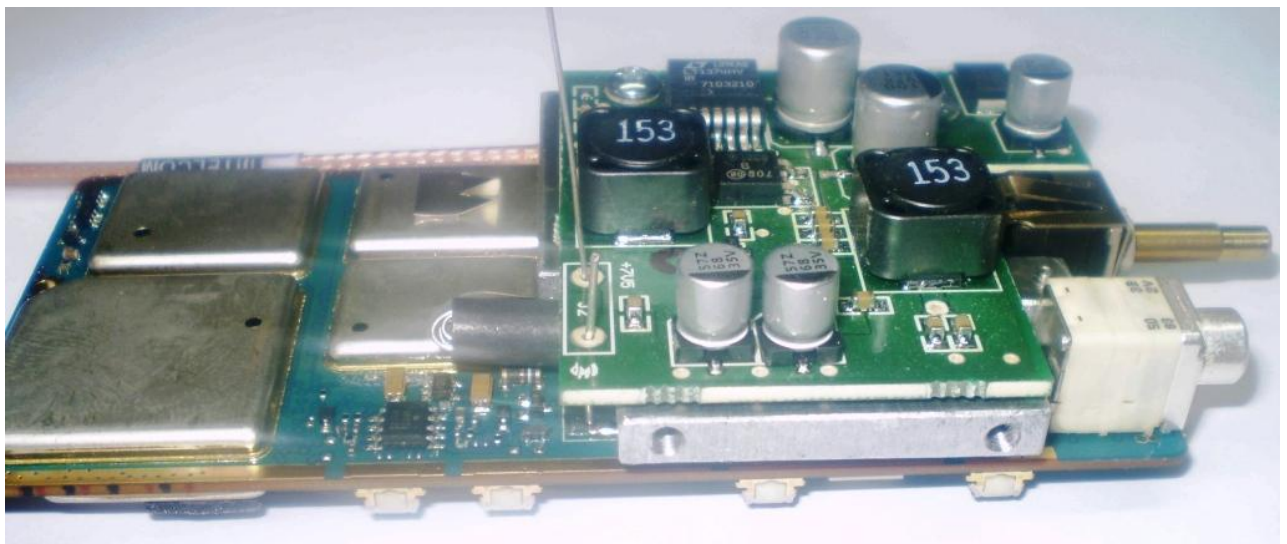
Mount the radio on the heatsink.



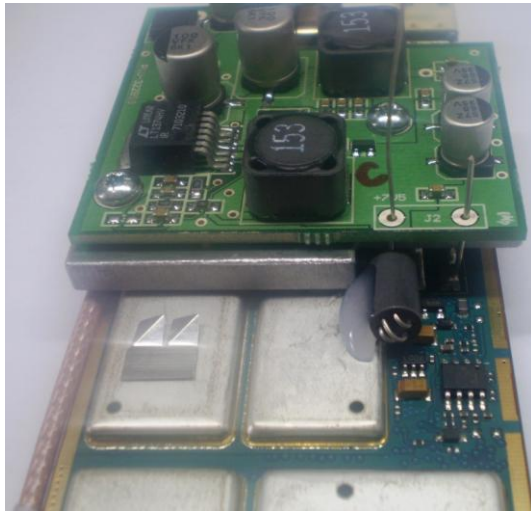
Prepare the DC-DC converter (Part No: PSU-322859) for mounting on the heatsink.



Place the spacers (part-number RO-18752) in the holes.



Radio and Power-supply mounted on the heatsink.



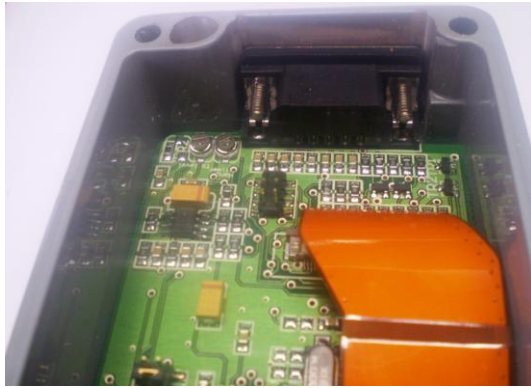
Solder the power-supply connections.



Fit the DC-power-supply cable (part-number RO-18739).



Check polarity!



Fit the PROIS interface option board in the die-cast housing (part-number RO-18740).



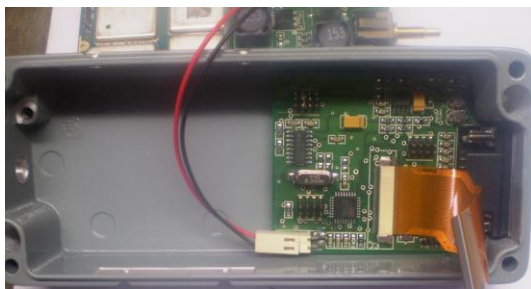
Take care not to over-tighten the screws (part-number RO-18742) of the 9-pin D-range connector.



Fit the SMA socket.



Take care not to over-tighten the SMA retaining nut.



Connect the power-supply cable (part-number RO-18742) from the DC-DC converter to the Interface Option-Board.



Connect the 40-way flat-cable to the radio accessory socket.



Check Polarity



This is a Zero Insertion Force Connector.



Gently move the radio into the die-cast housing, taking care that no cables are pinched and that the mounting- holes in the heatsink line up with the holes in the die-cast housing.





Fit the four retaining screws.
(Part-number RO-18753)

This concludes the conversion of the Motorola Professional radio into the LC828 Radio module. The Radio module is now ready for electrical and RF testing, after-which the audio-levels and the TX-hang-timer need to be set up and finally screw the lid on, take care to tighten the four lid-screws evenly.