Connection Guide

of the MOTOTRBO radio to the radioserver as a control station

(using the PMKN4147A programming cable and a cable with the HLN9457 connector)

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1 Introduction

This guide explains how to connect the MOTOTRBO radio to the SmartPTT radioserver as a control station, using the PMKN4147A programming cable and a special cable with the HLN9457 Motorola accessory connector. In particular, the guide provides a detailed description of how to make the special cable with the HLN9457 connector and its check procedure.

The guide applies to the following radios: DM 1000 / XiR M3188, XiR M3688 / CM 200d, CM300d series and DM 2000 / XiR M6660 / XPR 2500 series.

2 Components

To connect a radio to the radioserver as a control station you will require two cables at the same time:

1. The PMKN4147A programming cable that is used for the front connector.
2. The special cable based on the HLN9457 connector that is used for the back connector.

The PMKN4147A programming cable is used for the connection "as is", and thus should not be modified. The external view of the PMKN4147A programming cable is shown in the Fig.1.

Fig. 1 The PMKN4147A programming cable

To make the cable based on the HLN9457 connector you will require the following components:

1. HLN9457 Motorola accessory connector	— 1 pce
2. Double shielded sound cable	— 1.6 m
3. Planar capacitor 2.2μF	— 1 pce
4. Planar resistor 100 Ohm	— 1 pce
5. Jack stereo connector 3.5 mm	— 2 pcs.
6. Black PVC shrink tube (diameter 5 mm)	— 20 cm
7. Red PVC shrink tube (diameter 10 mm)	— 2 cm
8. Green PVC shrink tube (diameter 10 mm)	— 2 cm
9. Printed circuit board blank (4 x 15 mm)	— 1 pce
10.Solder	— 3 g

The finished cable with the HLN9457 connector is shown in the Fig.2., its electrical schematic diagram — in the Fig.3.

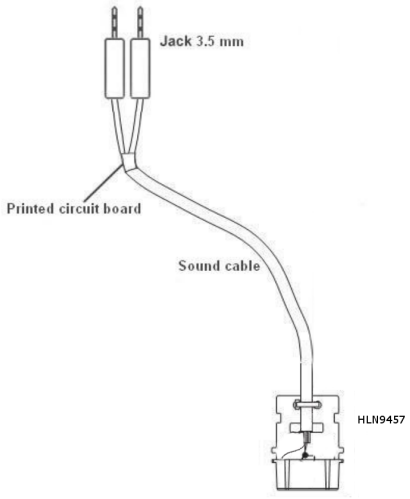

Fig. 2 Finished cable with HLN9457 connector

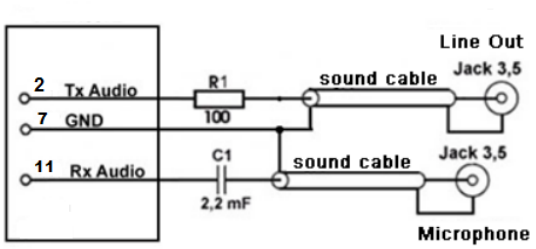

Fig. 3 Electrical schematic diagram of the HLN9457 connector based cable

During cable preparation, take special care to the connector's pinout. The numbering of the connector's pins is shown in the Fig.4.

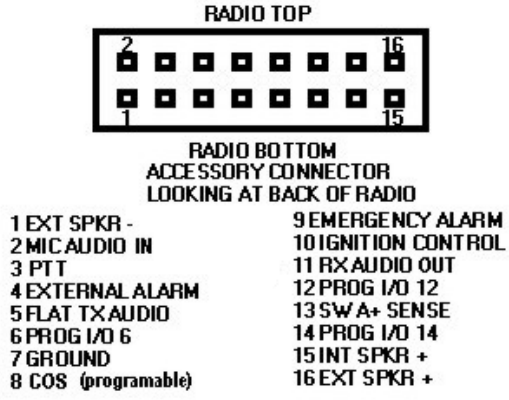

Fig. 4 Connector's pinout

Planar resistor and capacitor are soldered on the prepared textolite printed circuit board (4 x 15 mm). The external view of the printed circuit board is shown in the Fig.5.

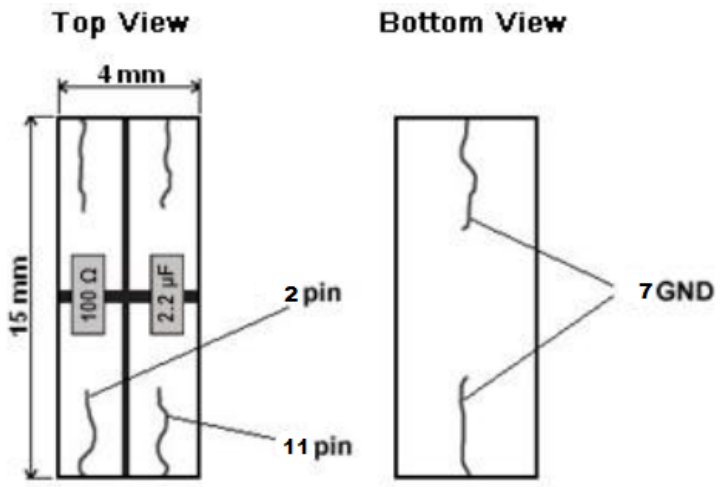

Fig. 5 Printed circuit board

3 Steps to make the cable

1. Cut out textolite printed circuit board (4 x 15 mm).
2. Mark the board in accordance with the Fig.5. Finally there must be 4 insulated metallized areas. Bottom side of the board must be fully metallized.
3. Solder planar resistor and capacitor in accordance with the Fig.5.
4. Cut out 140 cm of doubled sound cable.
5. Split it on both sides (approximately by 12 mm) and twist the armature of both cables.
6. Press out the cable (both central wires and twisted armature) by means of MOTOTRBO contacts.
7. Put 2 cm of black PVC shrink tube (diameter 5 mm) on the cable.
8. Fix the cable into the the MOTOTRBO connector housing in accordance with the electrical diagram: armature wire to contact 7, one of central wire to contact 2, another one to contact 11.
9. Shrink PVC shrink tube on the cable as close as possible to the the MOTOTRBO connector housing (for better reliability).
10. Solder corresponding central wires on top of the board. Solder twisted armature to the bottom of the board.
11. Take rest 20 cm of sound cable. On the one side of the cable solder stereo connectors as following: central wire to the first channel of the connector. The armature to the ground of the connector.
12. Prepare 2 pieces of black PVC shrink tube (diameter 5 mm) = 4 cm and put them on the cable for later heat shrinking on the board.
13. Solder prepared cable to the board. Central wires to the top of the board and the armature to the bottom of the board.

14. Shrink both pieces of PVC shrink tube on the board in two layers.
15. Use green PVC shrink tube to mark stereo connector connected to contact 2.
16. Use red PVC shrink tube to mark stereo connector connected to contact 11.
17. Shrink PVC shrink tube on the cable as close as possible to the MOTOTRBO connector housing (for better reliability).
18. Use plastic clamp to fix sound cable.

4 Cable check procedure

Preliminary cable check is done by multimeter:

1. Check for absence of short circuits between armature and central wire of each sound cable.
2. Measure full (over the whole length of cable) resistance of central wire of the cable connected to contact 2 (marked by green) of the MOTOTRBO connector housing. It must not exceed 110Ω.
3. Check presence of electrical connection on contact 11 (marked by red) of the MOTOTRBO connector's housing as follows: set multimeter to measure maximum possible resistance and measure the resistance over the whole length of cable. The resistance must grow together with the capacitor charge.
4. Check that all the connectors are reliably fixed in the MOTOTRBO connector housing.