Junction Box Installation
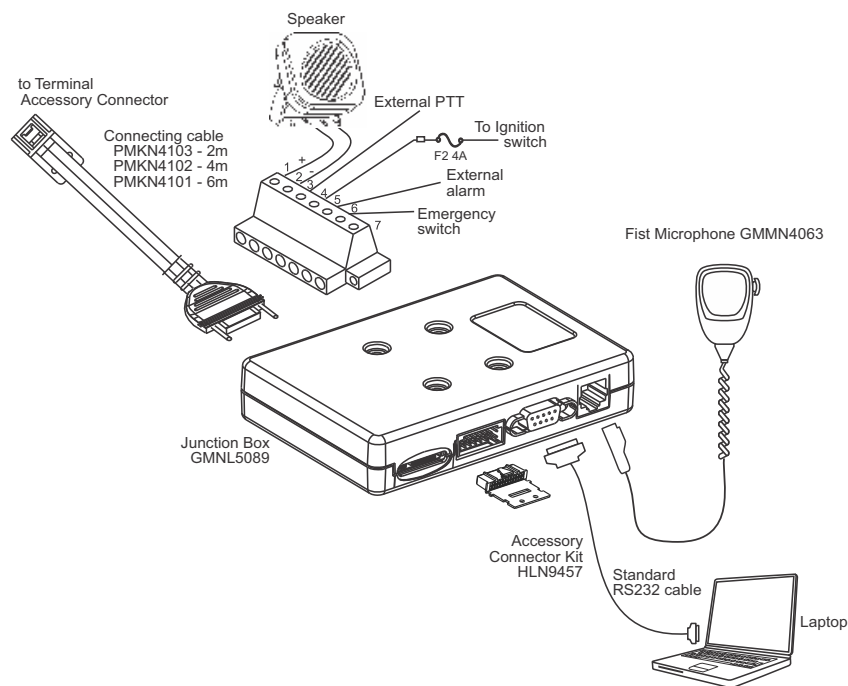

Figure 22 Remote Mount Installation with Junction Box

General

The junction box (GMLN5089) assists the easy installation for dash and remote mount configurations. It furthermore provides access to the radio for flashing and keyloading of Universal Crypto Module (UCM) encryption keys.

The junction box enables the customer adding a laptop to the remote configuration, connecting a visor microphone, various accessories or fist microphone.

Installation

The junction box can be installed horizontally and vertically. Secure the junction box by screwing the four supplied screws straight into the location as shown in the figure below. Use the connecting cable (1) for installation purposes.
Ingress Protection (IP) Code: IP30
The junction box has no connector sealing and is designed for use in dust and water protected location only.

1. Secure the junction box (GMLN5089) with the four screws supplied with kit.

2. Connect the connection cable PMKN4101 (length = 6 m), PMKN4102 (length = 4 m) or PMKN4103 (length = 2 m) from the junction box to the accessory connector on the rear side of the transceiver and fasten it with the plug-screws.
    The cable which will be used for installation purposes only must be ordered separately.

3. All other devices should be adapted as shown in Figure 22.

Service

The junction box PCB is not repairable. Please order a new junction box as necessary.

Connections

1. Connect all accessories to the junction box. If it is required please see "Re-crimp Procedure" on page 61to be able to connect your accessory.

2. Connect the mobile-terminal-to-Junction box cable to the junction box.

3. Connect the programming cable to the junction box (if required).
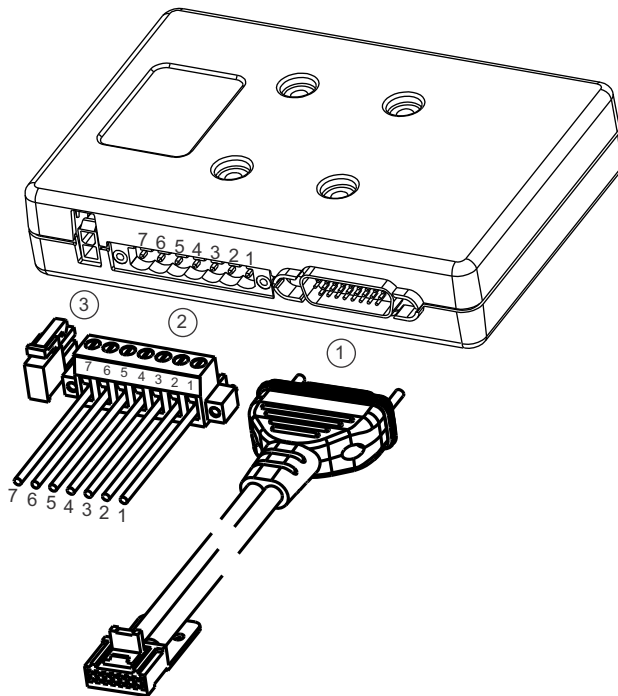
1 = Connecting cable from Junction Box to MTM5400 (rear side 26-pin accessory connector) for installation purpose only.

  PMKN4101A (length 6 m)
 PMKN4102A (length 4 m)
  PMKN4103A (length 2 m)

2 = Connector for accessory terminal
  pin 1 SPEAKER +
  pin 2 SPEAKER -
  pin 3 EXT_PTT
  pin 4 IGNITION SENSE
  pin 5 EXT_ALARM
  pin 6 EMERGENCY
  pin 7

3 = Connector for visor microphone

Figure 23 Connectors on the Junction Box - Front Panel

| CAUTION | PIN 4: Use an adapter between the radio and the accessory connector to short the ignition to ground. Interference can cause radio to hang. |
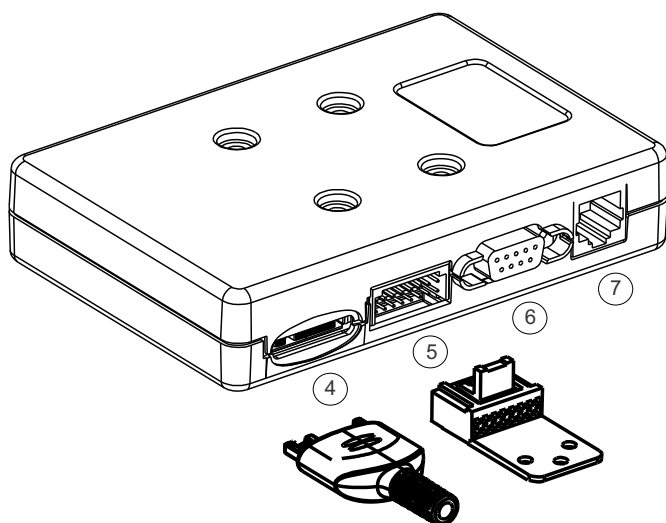
4 = Connector for programming cable FLN 9636
This is a legacy connector which currently is not supported. For programming the transciever, use PMKN4105A programming cable that is connected directly to the transciever.
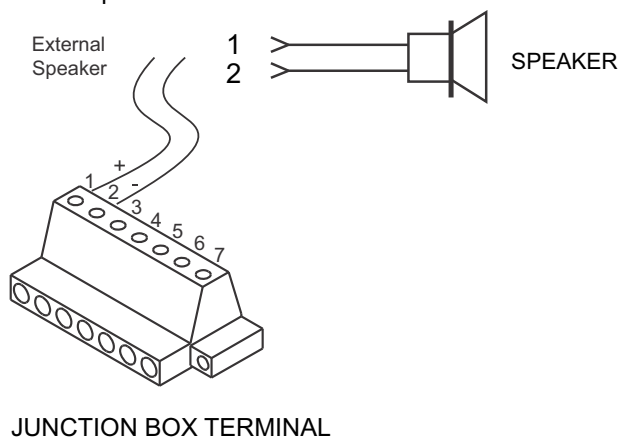
5 = Connector for accessory connector kit PMKN4026

6 = Connector for adapting a laptop via RS232 cable

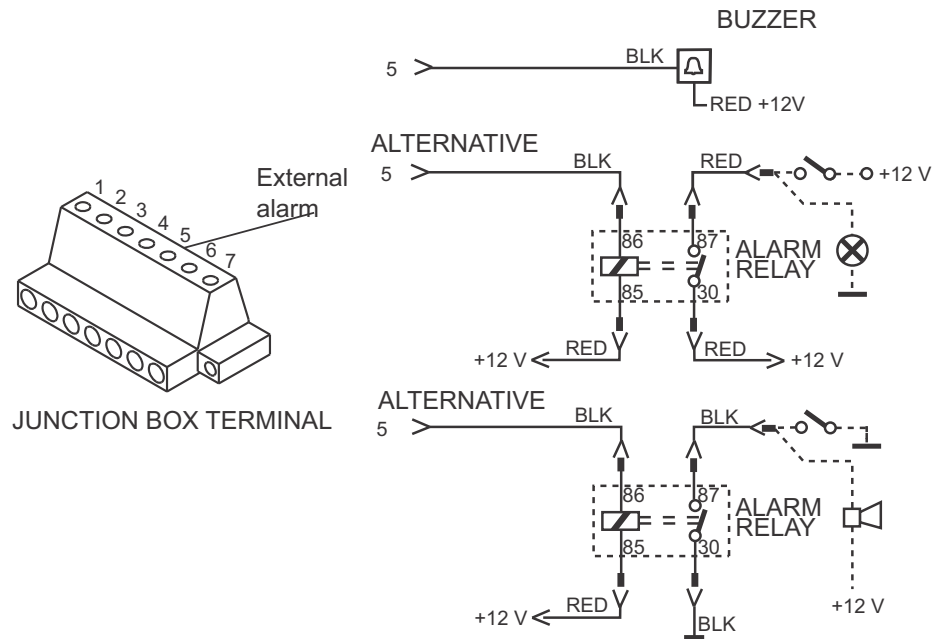7 = TELCO-connector for fist microphone (GMMN4063)

Figure 24 Connectors on the Junction Box - Rear Panel
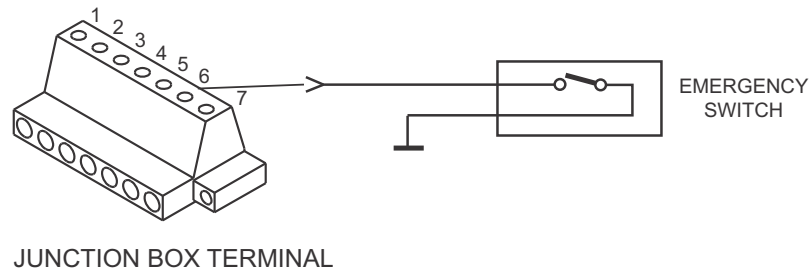
Connection Plan for the Junction Box Accessory Terminal

Connection Plan for the Speaker

SPEAKER

JUNCTION BOX TERMINAL

Connection Plan for the Alarm Relay

BUZZER

5 ⟩ ——— BLK ——— ⌂
                    └ RED +12V

ALTERNATIVE

External alarm 5 ⟩ ——— BLK ——— RED ⟵ o⟍o--o +12 V

86 87 ALARM
         RELAY ⊗
85 30

+12 V ⟵ RED   RED ⟶ +12 V

JUNCTION BOX TERMINAL

ALTERNATIVE

5 ⟩ ——— BLK ——— BLK ⟵ o⟍o

86 87 ALARM
         RELAY
85 30

+12 V ⟵ RED   +12 V

BLK

Connection Plan for the Emergency Switch

EMERGENCY SWITCH

JUNCTION BOX TERMINAL

To install the cable, carry out the following steps.

1. Connect the stripped lead of the fuse holder cable only to an ignition switched terminal of the fuse block. Use the supplied terminal or any other suitable terminal.

2. Mount the fuse holder using the mounting hole, and dress wires as required.

3. Cut the thin cable to the required length, crimp the supplied red lead to the stripped lead of the thin cable, and connect it to the blue terminal of the fuse holder cable.

4. Connect the other end of the ignition sense thin cable to pin 4 of the junction box terminal.

5. Insert the provided fuse into the fuse holder and close the cover.

| CAUTION | PIN 4: If the ignition line is not used, it needs to be grounded. Interference can cause radio to hang. |

EUROWORKER

Connection Plan for External PTT

7 ――――
3 ――――
version a)

3 ――――
version b)

JUNCTION BOX TERMINAL
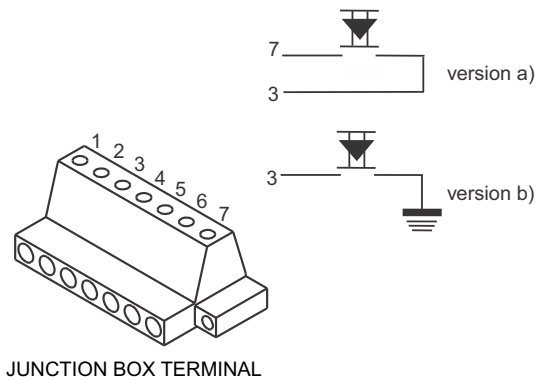
Connection Plan for Accessory Connector Kit (HLN9457)

Part Number/Description	Cable Connectivity
RSN4002A Speaker 13W GMSN4078 Speaker 5W	SPKR- 9 SPKR+ 10
RLN4857 Push button PTT RLN4858 Gooseneck PTT These accessories can be used for PTT or Emergency function.	EXT_PTT 17 GND 8
RLN4836 Tri-State Emergency Footswitch and Cable	12k Emergency 23 GND 8
GMKN4084 Speaker Extension Cable	5m 9 10
GKN6272 External Alarm Relay and Cable	+12V EXT_ALARM 26 +12V SWB+ 7 +12V (alternative) EXT_ALARM 26 12V
GLN7282 Buzzer	EXT_ALARM 26 SWB+ 7

Radios with Data Expansion Head Enhanced

To use a junction box with one of the MTM5400 mobile terminals fitted with a Data Expansion Head Enhanced, always use the 9-pin RS232 port on the Data Expansion Head Enhanced for PEI instead of the 9-pin RS232 port on the junction box (connector 6). Ensure to fit a jumper between pins 6 and 15 of the Junction Box (connector 5) for the PEI to operate correctly in this configuration.

Standard Radios without Data Expansion Head Enhanced

For standard MTM5400 mobile terminals without a Data Expansion Head Enhanced, the jumper between pins 6 and 15 of the junction box (connector 5) should be removed.

Table 8 Jumper on Accessory Connector

MTM5400 Mobile Terminal	Fit Jumper Pins 6-15?	Use Junction Box RS232 PEI?
With Data Expansion Head Enhanced	Yes	No Use the Data Expansion Head Enhanced 9-pin PEI instead.
Without Data Expansion Head Enhanced	No	Yes

Connectors and Pin Assignment of the Radio

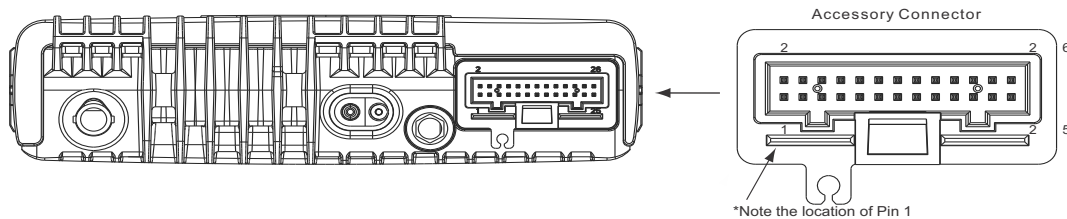## Transceiver Rear Side - Pin Function

Figure 25 Location of Accessory Connector - Rear Side

This section gives a description of the Accessory Connector pin functions.

CAUTION	The accessory connections shown are not compatible to some other models of Motorola radios. Check the appropriate accessory or technical manual for further information.

Table 9 26-Pin Accessory Connector

Pin	Function	Description
1	UART1_TXD / USBx_D+	USB 1.1 – Default Host RS232 or UART2 – Alternative Setting
2	UART1_RXD / USBx_D-	
3	UART1_RTS / USBx_VBUS	
4	GND_USBx	
5	1-WIRE	1-Wire standard port (pulled via 2K2 to 5V inside U600)
6	KEYFAIL / FLASH	Key load (pulled via 10K to 5V) Flash input (>10V will trigger Flash mode)
7	SWB +	A+ voltage (limited to 14V) with 1A current limitation
8	GND_MAIN	Main and power ground
9	SPEAKER-	Loudspeaker (PA) output – (NOT TO BE GROUNDED!)
10	SPEAKER+	Loudspeaker (PA) output +
11	TX_AUDIO	TX audio output
12	GND_ANA	Main audio ground
13	MIC1 / EXT_MIC	Ext mic input / MIC1 for noise cancelling dual mic input

Table 9 26-Pin Accessory Connector

| Pin	Function	Description
14	RX_AUDIO	RX audio output
15	MIC2	MIC2 for noise cancelling dual mic input
16	GND_MIC	Ground (for MIC)
17	EXTERNAL_PTT	PTT input (pulled via 4K7 to 5V)
18	UART2_DTR / USBy_ID	RS232 or UART1 / UART2 DTR / 2nd USB2.0 (OTG) ID
19	HOOK_PA_EN	HOOK_PA_EN input (or programmable 5V GPIO)
20	UART2_TXD / USBy_TX	RS232 or UART2 TXD / 2nd USB2.0 (OTG) D+
21	UART2_RTS / USBy_VBUS	RS232 or UART2 RTS / 2nd USB2.0 (OTG) VBUS – 100mA
22	UART2_RXD / USBy_RX	RS232 or UART2 RXD / 2nd USB2.0 (OTG) D-
23	EMERGENCY	Emergency Input (Pulled via 24K9 to A+) – Pull low to power on
24	UART_CTS	RS232 or UART1 / UART2 CTS input
25	IGNITION	Ignition input (through series 15K) – Pull > 5V to power on
26	EXTERNAL ALARM	External Alarm input (Pulled via 4K7 to A+)

CAUTION   PIN 25: If the ignition line is not used, it needs to be grounded for example connected to pin 8. Interference can cause radio to hang.

EW
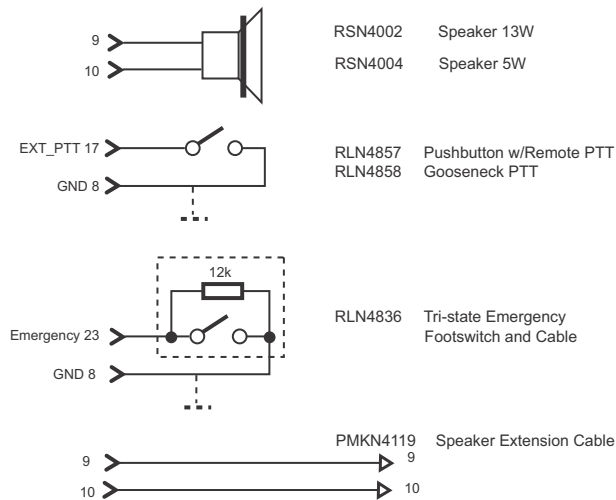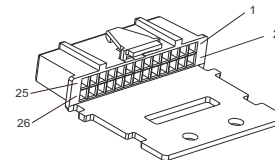EUROWORKER

Accessory Connection Plan

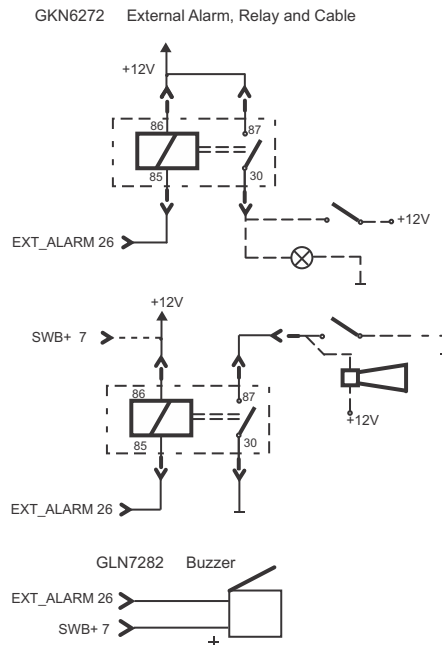| CAUTION	The accessory connections shown are not compatible to some other models of Motorola radios. Check the appropriate accessory or technical manual for further information. Ensure correct position of the accessory connector.

Accessory Connector
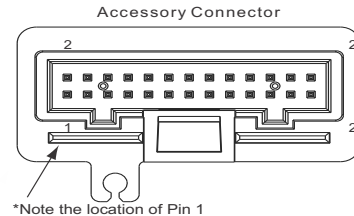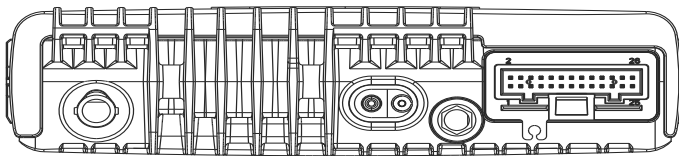
26-pin Accessory Connector

The 26-pin connector, Part Number: 1516174H01 (delivered with the accessory connector kit, Part Number: PMLN5072A) plugs into the 26-pin accessory connector on the terminal. The four outside pins are not connected, see grey square at figure above.

(Alternatively, a 26-pin connector can be used as well, Part Number: 1586184B01).

9, 10	RSN4002	Speaker 13W
	RSN4004	Speaker 5W
EXT_PTT 17, GND 8	RLN4857	Pushbutton w/Remote PTT
	RLN4858	Gooseneck PTT
Emergency 23, GND 8, 12k	RLN4836	Tri-state Emergency Footswitch and Cable
9, 10 → 9, 10	PMKN4119	Speaker Extension Cable

PMLN5072A   Accessory connector kit containing:
Seal, Part No 3202606Y02
Crimp Contact, Part No 2984249N01

GKN6272   External Alarm, Relay and Cable

+12V
86   87
85   30
EXT_ALARM 26
+12V

+12V
SWB+ 7
86   87
85   30
EXT_ALARM 26
+12V

GLN7282   Buzzer
EXT_ALARM 26
SWB+ 7

Re-crimp Procedure

In order to use accessories (RLN4858 and GKN6272) with the rear connector of the radio, please follow the re-crimp procedure using the crimp pins provided with PMLN5072 connector kit.

NOTE These accessories do not require to be re-crimped when used with the Junction Box GMLN5089.

1. Cut and remove nickel plated pins from wire.
2. Strip the insulation from the end of the wires (2mm to 4mm).
3. Place the new gold plated crimp pin (from the PMLN5072 kit) on the gauge slot on the crimp tool.
4. Insert wire into wire slot of the crimp pin.
5. Apply pressure to the crimp tool handle, until wire is crimped by the pin.

Connectors and Pin Assignment of Data Expansion Head Enhanced and Remote Head Enhanced
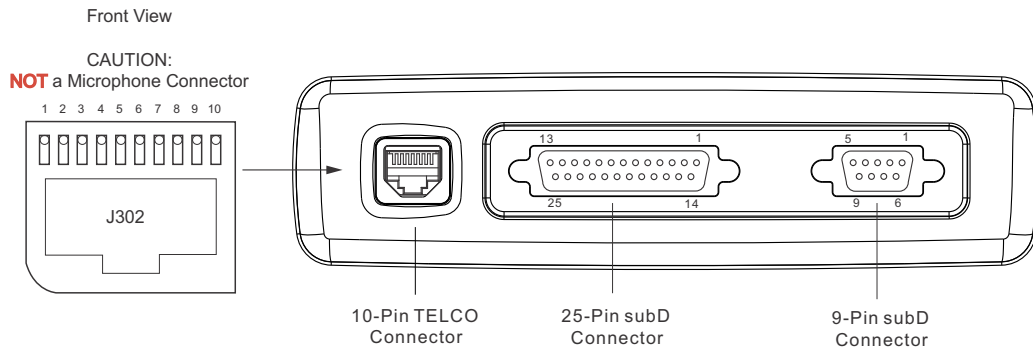

Figure 26 Data Expansion Head Enhanced - Front View and Connector Location
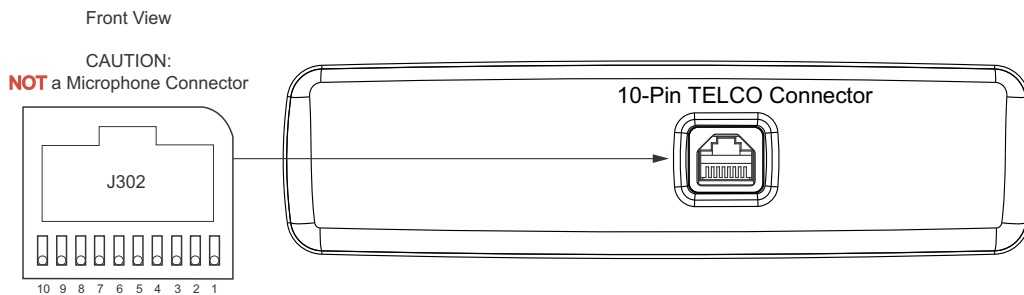
Figure 27 Remote Head Enhanced - Front View and Connector Location

10-Pin TELCO Connector

Data Expansion Head Enhanced:

a) The 10-pin TELCO connector can be used to connect a customized adapter, for example, for connecting the helmet including microphone/earpiece (non-Motorola accessory) or an external PTT. The customized adapter will be connected via the cable RKN4077.

b) The 10-pin TELCO connector can be used to connect a remote mount Enhanced Control Head.

DO NOT connect any other accessories (for example, microphone). This might result in malfunctioning hardware failure.

Remote Head Enhanced:

The 10-pin TELCO connector of the Remote Head Enhanced can be used in the same way as described on b).

Table 10 10-Pin TELCO Connector

Pin	Function	Description
1	Audio +	Balanced Audio + (Bidirectional)
2	Not Connected	
3	BUS+	This is used for communication between the radio and an Enhanced Control Head.
4	Audio-	Balanced Audio - (Bidirectional)
5	Not Connected	
6	Ground	Ground
7	Radio On/Off Control	This is the Enhanced Control Head service request input. A level of 5 volts indicates that the Enhanced Control Head needs to communicate with the radio. In addition it switches on the radio's voltage regulators. The idle state is a level below 0.6V.
8	SCI_TX	This if for communication between the radio and the Enhanced Control Head.
9	FLT_A+	This voltage is at battery voltage level and is available as long as the radio is connected to the supply voltage. The maximum current is 300mA. A fuse in the radio prevents further circuit damage in case of shorting this pin to ground.
10	Analog Ground	Analog Ground

25-Pin subD Connector

Data Expansion Head Enhanced:

Table 11 25-Pin subD Connector

Pin	Function	Description
1	GND	Ground
2	RS232_SCI_TX	Transceive data (RS232 line with RS232 level)
3	RS232_SCI_RX	Receive data (RS232 line with RS232 level)
4	RS232_RTS	Request to Send (RS232 line with RS232 level)
5	RS232_CTS	Clear to Send (RS232 line with RS232 level)
6	FLT_A+	Filtered unswitched U_B+ / 200mA
7	Signal_GND	Ground for RS232
9	NC	Not Connected
10	NC	Not Connected
11	NC	Not Connected
12	SW_B+	Switched U_B +/100mA
13		

Table 11 25-Pin subD Connector

Pin	Function	Description
14	ON_OFF_CONTROL / FLASH_MODE	Switch into flash mode (connect pin14 with 6) On/Off control for Std. Control Head
15		
16	INT_MIC	Microphone analogue input of $80mV_{RMS}$, 600ohm impedance, $9V_=$
17		
18	NC	Not Connected
19	GROUND	Ground
20	IGNITION	Connecting this pin to the ignition line of the vehicle that will automatically turn on the radio if ignition of the vehicle is turned on. High active
21	ON_OFF_GND	This is On/Off control for the old Control Head "J" (MTM300 Control Head)
22	EXPANSION_PTT	Expansion PTT, works together with INT_MIC
23		
24	HANDSET_AUDIO	Handset audio to earpiece Earpiece impedance has to be > 200 Ohm
25	NC	Not Connected

9-Pin subD Connector

The pin assignment of this 9-pin subD connector will follow the requirements of an RS232 standard interface with RS232 voltage level. The cable (see section "Connecting Cables" on page 68) which has to be used is a standardized serial interface cable which allows to connect a data device with an RS232 Interface such as for example PC, Laptop, Console.

Table 12 9-Pin subD Connector

Pin	Function	Description	PC Direction
1	DCD	Data Carrier Detect	Input
2	RXD	Received Data	Serial IN
3	TXD	Transmitted Data	Serial OUT
4	DTR	Data Terminal Ready	Output
5	GND	Ground	Output
6	DSR	Data Set Ready	Input
7	RTS	Request to Send	Output
8	CTS	Clear to Send	Input
9	RI	Ring Indicator	Input

Connector and Pin Assignment of the Enhanced Control Head

Front View of the Mobile
Microphone Port (MMP)
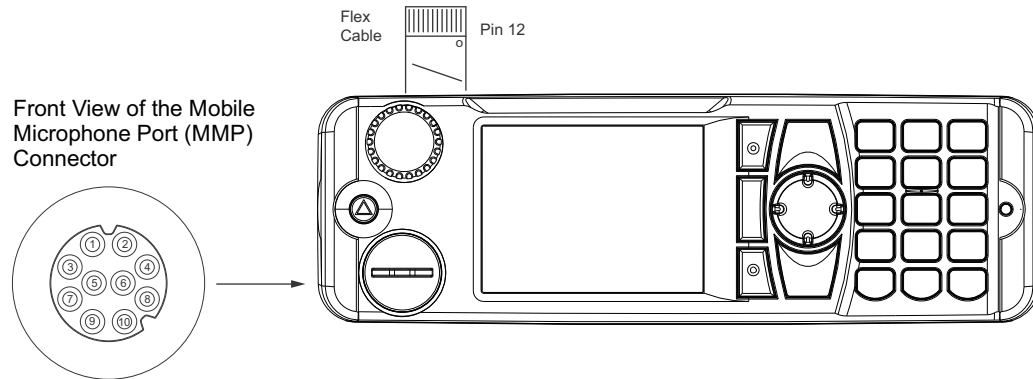Connector

Flex
Cable   Pin 12

Figure 28 View of the Enhanced Control Head's Mobile Microphone Port Connector and Flex Cable

NOTE The keypad labelling of the control head may vary according to the specific customer/country concerns.

Table 13 10-Pin Mobile Microphone Port (MMP) Connector

Mobile Microphone Port Pin	Default Functions	Alternative Functions	USB Functions	RS232 Functions
1	1-WIRE	1-WIRE	1-WIRE	1-WIRE	1-WIRE
2	GPIO_3	PTT	GP Input or Output	GP Input or Output	RS-232-RTS
3	SPEAKER	SPEAKER	SPEAKER	SPEAKER	SPEAKER
4	GPIO_2	GPIO_2 INPUT	GP Input or Output	DATA -	RS-232-RXD
5	GND	GND	GND	GND	GND
6	OPT 5V	HIGH Impedance	OPT 5V	VBUS	OPT 5V
7	MIC +	MIC +	MIC +	MIC +	MIC +
8	GPIO_1	GPIO_1 INPUT	GP Input or Output	DATA +	RS-232-TXD
9	GPIO_4	HOOK	GP Input or Output	GP Input or Output	RS-232-CTS
10	GPIO_0	GPIO_0 INPUT	GP Input or Output, PWR ON	GP Input or Output, PWR ON	GP Input or Output, PWR ON

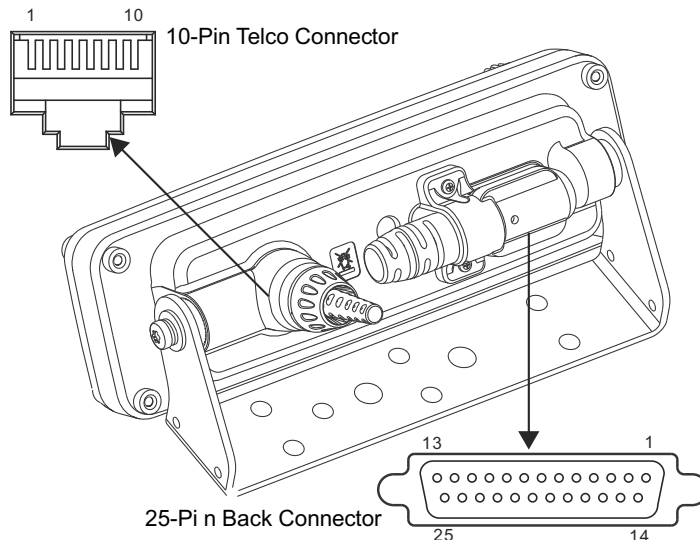

Figure 29 View of the Enhanced Control Head's rear connectors

Table 14 10-Pin Telco Connector

Telco Connector Pin	Function	Description
1	AUDIO +	Balanced Audio + (Bidirectional)
2	NC	Not Connected
3	BUS +	This is used for communication between the radio and an Enhanced Control Head.
4	AUDIO -	Balanced Audio - (Bidirectional)
5	NC	Not Connected
6	GND	Ground
7	Radio On/Off Control	This is the Enhanced Control Head service request input. A level of 5 volts indicates that the Enhanced Control Head needs to communicate with the radio. In addition it switches on the radio's voltage regulators. The idle state is a level below 0.6V.
8	SCI_TX	This if for communication between the radio and the Enhanced Control Head.
9	FLT_A +	This voltage is at battery voltage level and is available as long as the radio is connected to the supply voltage. The maximum current is 300mA. A fuse in the radio prevents further circuit damage in case of shorting this pin to ground.
10	Analog Ground	Analog Ground

Table 15 25-Pin Back Connector

Back Connector Pin	Function	Description	Default
1	GPIO_9	GPIO	Output: Active for duration of call (car radio mute)
2	GPIO_6	GPIO	PTT Input, TX audio from MIC_REAR_2
3	GPIO_8	GPIO	Disabled
4	GPIO_3	GCAI PIN 2	PTT Input, TX audio from MIC_REAR_1
5	VBUS_1B	GCAI PIN 6: 5V Supply	Disabled
6	REAR_D -	GCAI PIN 4: USB D -, GPIO_2 (Shared with the front MMP)	Disabled
7	REAR_D +	GCAI PIN 8: USB D +, GPIO_1 (Shared with the front MMP)	Disabled
8	GPIO_0	GCAI PIN 10: GPIO	Input: GCAI detection / Select Line
9	VBUS_2	Second USB 5 V Supply	Disabled
10	TX	4-wire RS232 TX	
11	RX	4-wire RS232 RX	
12	MIC_REAR_2	Second Rear Microphone	Disabled
13	GND	Ground	
14	GPIO_5	GPIO	Disabled
15	GPI_7	4-Level Analogue Input	Enabled
16	1_WIRE	GCAI PIN 1: Bi-directional Serial Bus	Disabled
17	HANDSET	GCAI PIN 3: Handset Audio Output	Parallel to front GCAI
18	GND	GCAI PIN 5: Ground	
19	MIC_REAR_1	GCAI PIN 7: Microphone Input	Disabled
20	GPIO_4	GCAI PIN 9: GPIO	Hook Input
21	USB_D +	Second USB D +	
22	USB_D -	Second USB D -	
23	RTS	4-wire RS232 RTS	
24	CTS	4-wire RS232 CTS	
25	PWR_ON	Enhanced Control Head Power On Input	

Connecting Cables

Motorcycle Mount Enhanced Control Head-to-Remote Head Enhanced/Data Expansion Head Enhanced (Motorcycle Mount TELCO Cable)
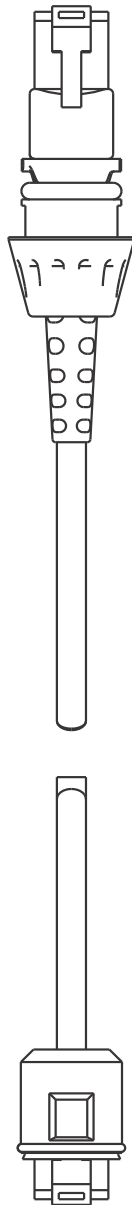
Part Number: PMKN4030
Length : 2.3 m (7.55 feet)

Figure 30 Connecting Cable - Motorcycle Mount TELCO Cable

Remote Mount Enhanced Control Head/Motorcycle Mount Enhanced Control Head-to-Accessories (Accessories Expansion Cable)
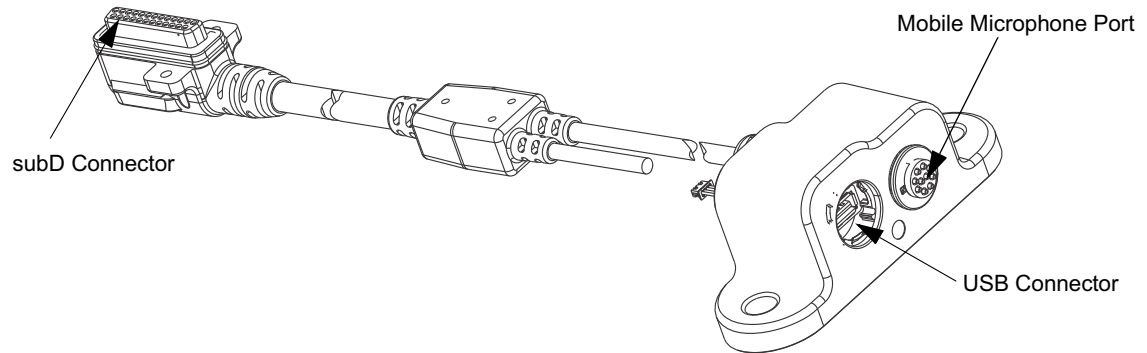
Part Number : PMKN4029

Figure 31 Connecting Cable - Accessories Expansion Cable

Table 16 Accessories Expansion Cable, Connector Pin Function

USB A JACK	Signal	subD 25 Pos
1	VBUS	9
2	D-	22
3	D+	21
4	Ground	18
Mobile Microphone Port (MMP)		
1	1_WIRE	16
2	GPIO_3 / OTG-ID / RTSc (PTT)	4
3	Speaker to Headset	17
4	GPIO_2 / D- / RxDc	6
5	GND (Ground)	-
6	Opt_5V / VBUS	5
7	Mic+	19
8	GPIO_1 / D+ / TxDc	7
9	GPIO_4 / CTSc / Keyfail (HOOK)	20
10	GPIO_0 / Pwr On	8
Customised Wire Color		
BROWN / BLACK	GPIO_9	1
ORANGE / BLACK	GPIO_6	2
YELLOW / BLACK	GPIO_8	3
LIGHT BLUE	GPIO_2	6
TURQUOISE	GPIO_1	7
GREEN / BLACK	TX	10
BLUE / BLACK	RX	11
GRAY / BLACK	MIC_2	12
BLUE	Ground	13
PINK / BLACK	GPIO_5	14
BLACK / WHITE	GPI_7	15

USB A JACK	Signal	subD 25 Pos
BROWN / WHITE	RTS	23
RED / WHITE	CTS	24
ORANGE / WHITE	Power On	25
RED / BLACK	Headset	17
YELLOW / WHITE	Ground	-