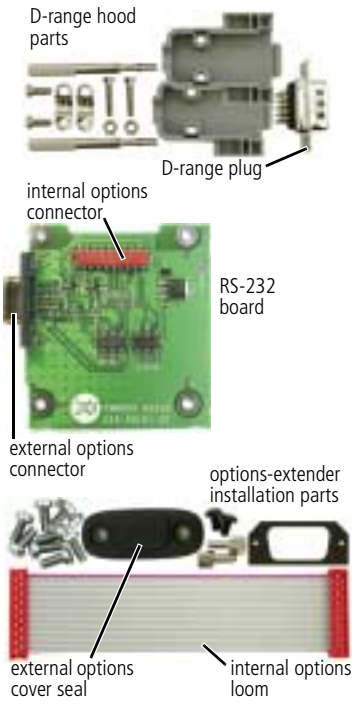
3 TMAA01-02 RS-232 Board



The TMAA01-02 RS-232 board fits inside the radio in the options cavity and is connected to the main PCB by the internal options connector and loom.

The RS-232 signals are then made available on the 9-way D-range connector mounted on the RS-232 board. This connector fits through the external options connector hole provided in the radio chassis.

Important The radio does not meet the IP54 protection standard once an RS-232 board has been installed unless the external options cover seal is installed.

Important To comply with EN 301 489-5, all cables connected to the external options connector must be less than three metres (10 feet) in length.

3.1 Operation

The TMAA01-02 RS-232 board provides a suitable interface to external devices requiring full RS-232 level compatibility. As well as supporting transmit and receive data lines, the board also supports RTS and CTS hardware flow control lines.

3.1.1 Hardware Flow Control

Although the serial transmit and receive lines are dedicated connections on the internal options connector, the RTS and CTS lines have to be assigned. For hardware flow control, these lines are set up in the programming application. RTS should be assigned to IOP_GPIO1 and CTS should be assigned to IOP_GPIO3.

Refer to the online help of the programming application for more information.

3.2 Installing the RS-232 Board

3.2.1 Parts Required

The following table describes the parts required to install an RS-232 board in a radio. The parts marked with an asterisk (★) are not shown in Figure 3.1 and are used to connect to the radio's external options connector.

Table 3.1 RS-232 installation parts required

Quantity	Internal Part Number	Description	Figure 3.1 Reference
1	362-01110-XX[a]	foam seal	③
1	362-01108-XX[a]	cover seal	⑪
2	347-00011-00	4-40x3/16 screws	⑫
2	354-01043-00	screw-lock fasteners	⑦
4	349-02062-00	M3x8 screws	⑨
★1	240-00034-00	D-range plug	—
★1	240-06010-29	D-range hood	—

a. Contact Technical Support for the exact IPN.

3.2.2 Installation Procedure

1. Disassemble the radio in order to gain access to the options cavity.

   For detailed disassembly instructions, refer to the disassembly procedure in the TM8000 Service Manual.

Refer to the diagram on the following page and the instructions below.

2. Remove the top cover and lid ① from the radio to access the options cavity.
3. Remove the external options connector bung ②, if it is fitted.
4. On the inside of the radio lid place the foam seal ③ over the external options connector cavity ④.
5. Plug one end of the internal options connector loom into the internal options connector on the RS-232 board.
6. With the top side of the RS-232 board ⑤ facing the radio lid, guide the external options connector ⑥ (the D-range connector on the RS-232 board) into the external options connector cavity.

Important The external options connector screw-lock fasteners must be tightened correctly before screwing the RS-232 board onto the mounting posts ⑧.

7. Screw the external options connector to the radio lid using the two screw-lock fasteners ⑦.

   Tighten the fasteners to a torque of 0.9N·m (8lbf·in).

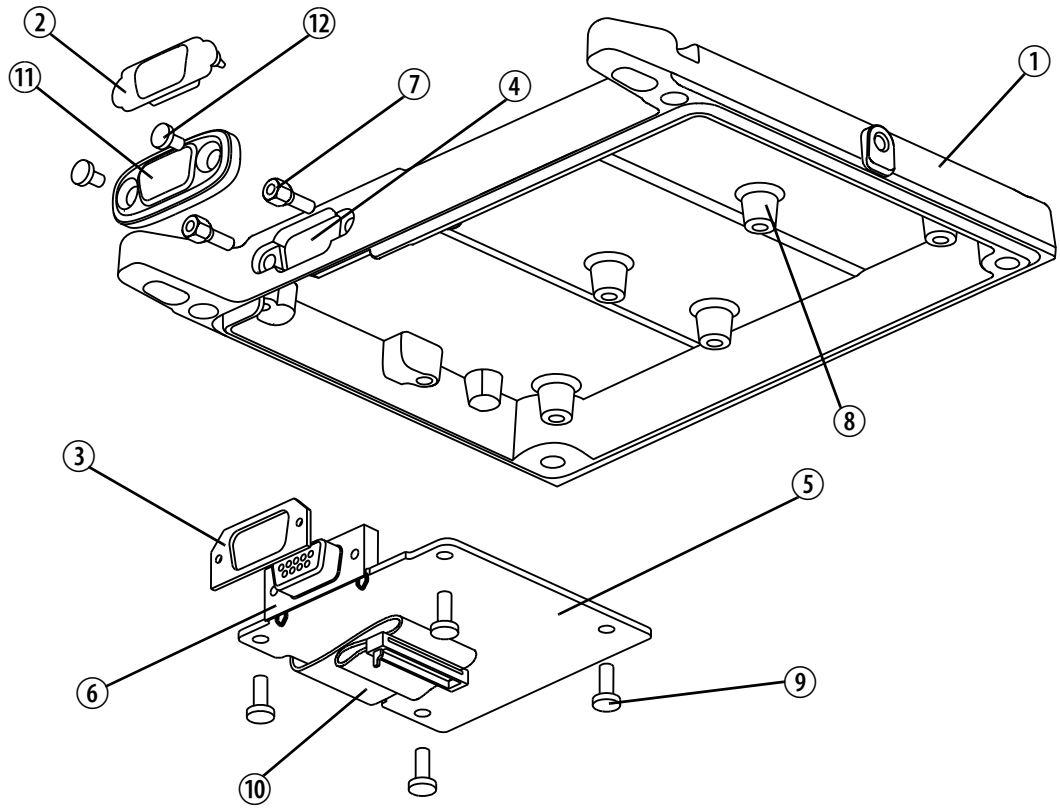
8. Screw the RS-232 board to the mounting posts on the radio lid using four M3x8 self-tapping screws ⑨.

   Tighten the M3x8 screws to a torque of 1.9 N·m (17 lbf·in)

9. Plug the unattached end of internal options connector loom ⑩ into the internal options connector on the radio main PCB.

10. Refit the radio lid and top cover to the radio and screw the external options cover seal ⑪ over the external options connector, using the two 4-40x3/16 screws ⑫.

Figure 3.1 RS-232 board installation



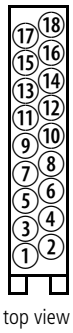
① radio lid
② external options connector bung
③ foam seal
④ external options connector cavity
⑤ RS-232 board
⑥ external options connector
⑦ screw-lock fasteners
⑧ mounting posts
⑨ M3x8 self-tapping screws
⑩ internal options loom
⑪ external options cover seal
⑫ 4-40x3/16 screws

3.3 Interface Specification

The following tables summarize the signals used for the RS-232 board on the internal options connector (SK1 on the RS-232 board) and the external options connector (SK2 on the RS-232 board).

Note The TM8000 3DK Hardware Developer's Kit Application Manual (product code MMAA30-01-00-807) contains a detailed electrical specification for the signals available on the radio's internal options connector. This manual is part of the 3DK Resource CD, which can be purchased using product code TMAA30-01.

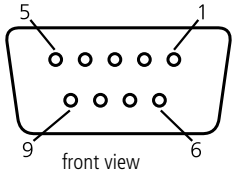
Table 3.2 Internal options connector - pins and signals



top view

Pin	Connector Signal	Description
1	13V8_SW	switched 13V8 supply from the radio
2	AUD_TAP_OUT	Programmable tap point out of the receive or transmit audio chain. DC-coupled
3	AGND	analogue ground
4	AUX_MIC_AUD	Auxiliary microphone input, with electret microphone biasing provided. Dynamic microphones are not supported.
5	RX_BEEP_IN	receive sidetone input, AC-coupled
6	AUD_TAP_IN	Programmable tap point into the receive or transmit audio chain. DC-coupled
7	RX_AUD	not connected
8	RSSI	analogue RSSI output
9-15	IOP_GPIO1 to IOP_GPIO7	programmable function and direction
16	DGND	digital ground
17	IOP_RXD	an RS-232 compliant asynchronous serial port - receive data
18	IOP_TXD	an RS-232 compliant asynchronous serial port - transmit data

Table 3.3 External options connector - pins and signals



Pin	Signal	Direction	Description
2	serial transmit data	output from the radio	RS-232 levels
3	serial receive data	input to the radio	RS-232 levels capable
5	data ground	-	-
8	RTS using IOP_GPIO1	output from the radio	RS-232 levels
7	CTS using IOP_GPIO3	input to the radio	RS-232 capable

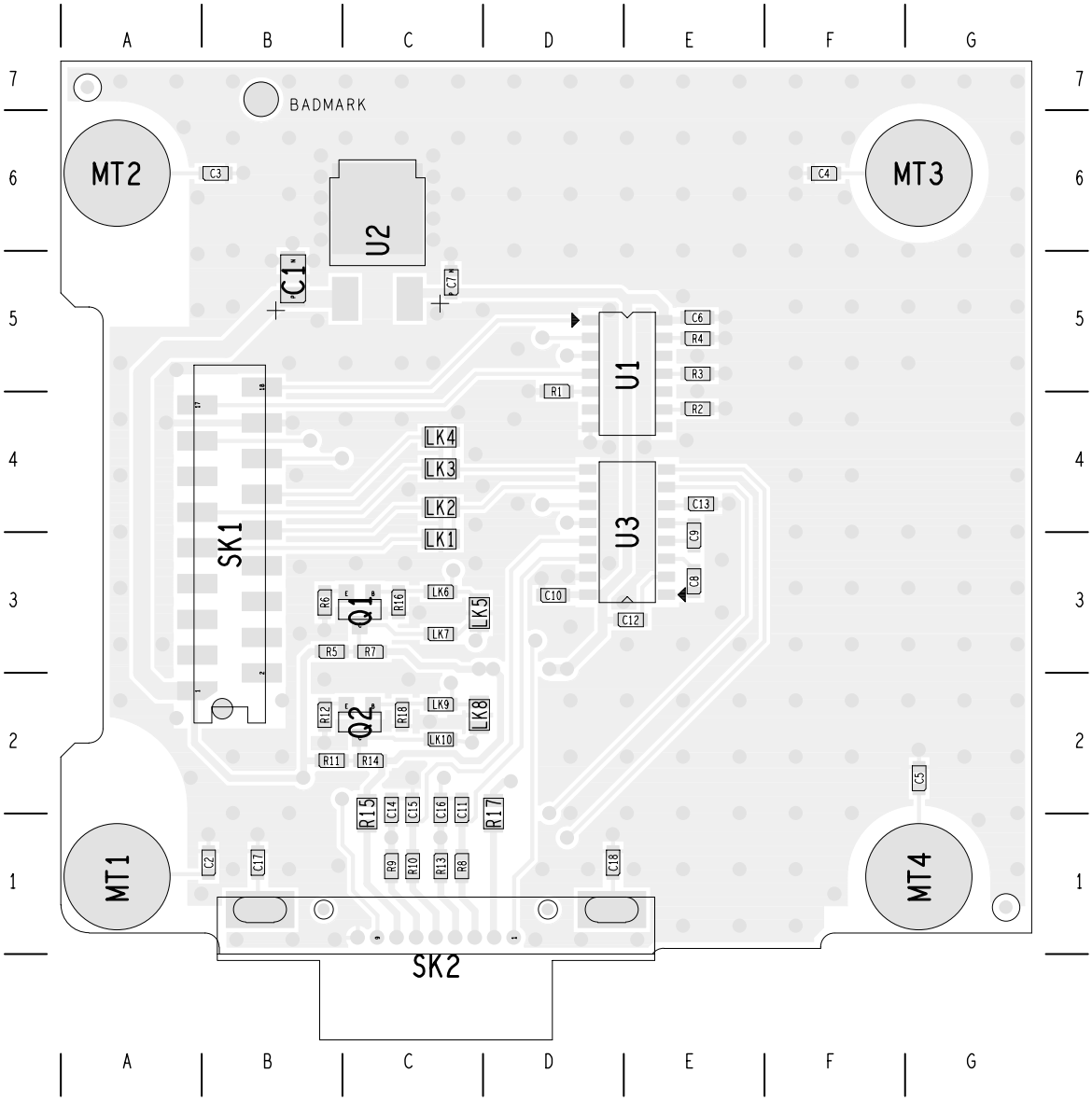
3.4 PCB Information

3.4.1 TMAA01-02 Parts List (PCB IPN 220-01740-01)

Ref.	IPN	Description
C1	010-07100-02	Cap Tant SMD 1u0 16v 20% A
C2	018-14100-00	Cap 0603 1n 50v X7r ±10%
C3	018-14100-00	Cap 0603 1n 50v X7r ±10%
C4	018-14100-00	Cap 0603 1n 50v X7r ±10%
C5	018-14100-00	Cap 0603 1n 50v X7r ±10%
C6	018-16100-00	Cap 0603 100n 16v x7r + - 10%
C7	014-07470-10	Cap Tant SMD 4u7 10V 20% 0603
C8	018-16100-00	Cap 0603 100n 16v x7r + - 10%
C9	018-16100-00	Cap 0603 100n 16v x7r + - 10%
C10	018-16100-00	Cap 0603 100n 16v x7r + - 10%
C11	018-14100-00	Cap 0603 1n 50v X7r ±10%
C12	018-16100-00	Cap 0603 100n 16v x7r + - 10%
C13	018-16100-00	Cap 0603 100n 16v x7r + - 10%
C14	018-14100-00	Cap 0603 1n 50v X7r ±10%
C15	018-14100-00	Cap 0603 1n 50v X7r ±10%
C16	018-14100-00	Cap 0603 1n 50v X7r ±10%
C17	018-14100-00	Cap 0603 1n 50v X7r ±10%
C18	018-14100-00	Cap 0603 1n 50v X7r ±10%
LK1	036-14100-10	Res M/F SMD 0805 1k 1%
LK3	036-14100-10	Res M/F SMD 0805 1k 1%
R1	038-15100-00	Res 0603 10k 1/10w 5%
R2	038-15100-00	Res 0603 10k 1/10w 5%
R3	038-15100-00	Res 0603 10k 1/10w 5%
R4	038-15100-00	Res 0603 10k 1/10w 5%
R8	038-13100-00	Res 0603 100R 1/10w 5%
R9	038-13100-00	Res 0603 100R 1/10w 5%
R10	038-13100-00	Res 0603 100R 1/10w 5%
R13	038-13100-00	Res 0603 100R 1/10w 5%
SK1	240-10000-11	Conn SMD 18w Skt
SK2	240-06009-20	Conn DIP D-Sub 9W
U1	002-10740-40	IC 74AHCT04 SOIC14 Hex Inv
U2	002-10078-00	IC SMD MC78M05CDT5v Reg0.5a

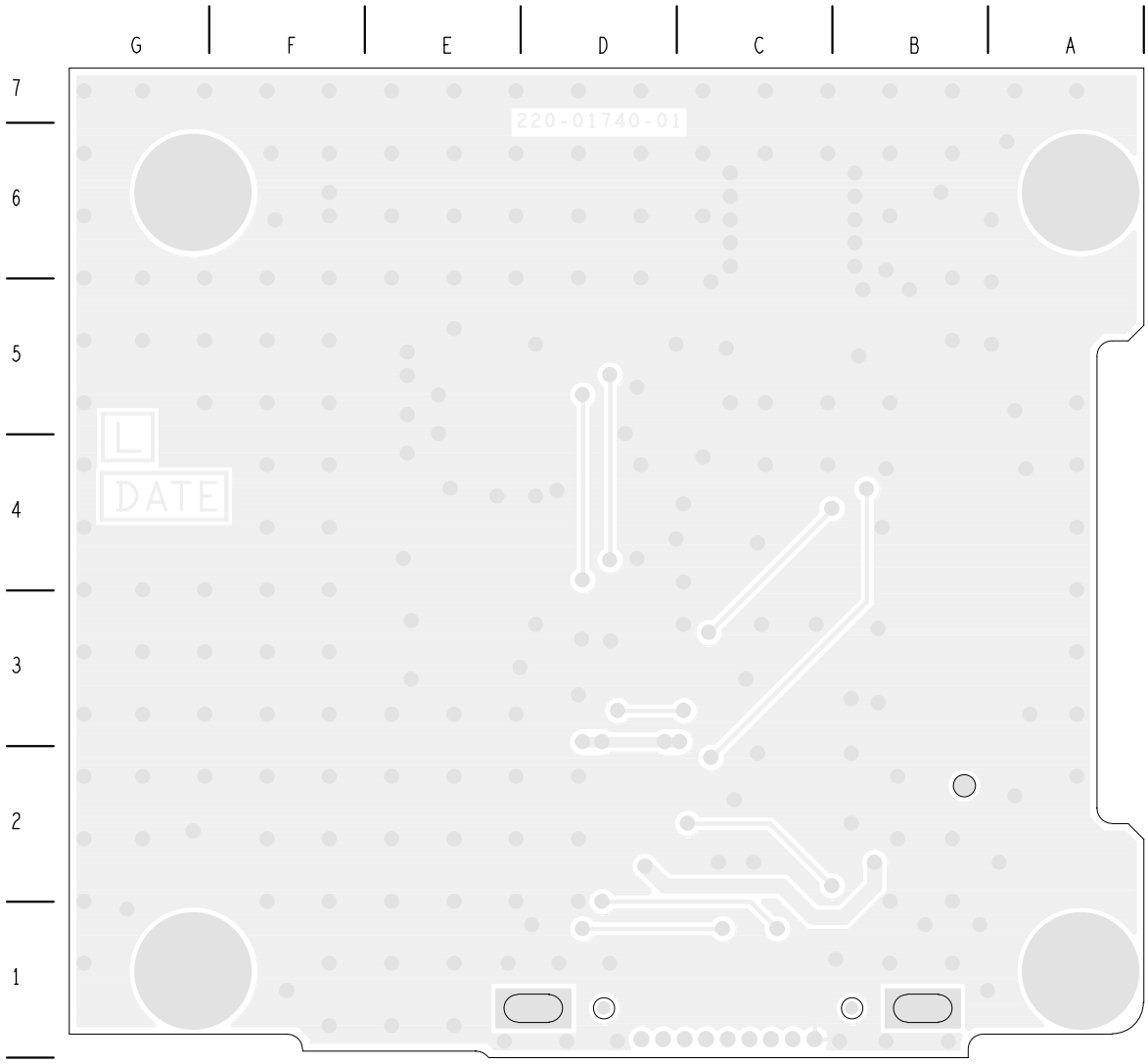
Ref.	IPN	Description
	220-01740-01	PCB TMA RS232 Options
	365-00011-38	Lbl Static Warning Yel
	365-00011-54	Lbl White R1556/2 90*24mm
	399-00010-87	Bag Static Shlding 102*152mm
	402-00019-00	F/Inst TMAA01-02 RS232 Brd
	410-01064-02	Pkg Hdr Card New Logo
600-00010-00 parts:		
	219-00329-00	Loom TMA Int Opt
	354-01043-00	Fsnr Scrw Lok 1pr 4-40
	362-01108-01	Seal Drng Cvr 9way TMA
	362-01111-00	Seal Drng 9way TMA
	347-00011-00	Scrw 4-40*3/16 Unc P/P Blk
	349-02062-00	Scrw M3*8 T/T P/T ContiR
600-00012-00 parts:		
	240-00034-00	Plg 9w Drng UL-CSA Pnl Mtg
	240-06010-29	Conn 9w Hood/Cvr Lets

3.4.2 RS-232 Board Layout (top side)



IPN 220-01740-01

3.4.3 RS-232 Board Layout (bottom side)



IPN 220-01740-01

3.4.4 RS-232 Board Circuit Diagram