## 2.4    Internal Options Connector

When installing an internal options board, the internal options connector is the electrical interface to the main board of the radio body.
The internal options connector provides similar I/O to the auxiliary connector. The digital signals and the serial port are independent of the auxiliary connector signals, but the AUD_TAP_IN, AUD_TAP_OUT, AUX_MIC_AUD, RSSI signals are shared with the auxiliary connector. The internal options connector is an 18-pin 0.1 in pitch Micro-MaTch connector.

Examples of internal options boards:

■  TMAA30-02 3DK Application Board.
Refer to the TM8000 3DK Application Board Service Manual.

■  TMAA01-01 Line-Interface Board.
Refer to the TM8100 Mobile Radio Accessories Manual.

■  TMAA01-05 Options Extender Board.
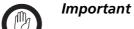Refer to the TM8100 Mobile Radio Accessories Manual.

For information on how to create your own internal options board, refer to "Internal Options Board" on page 85.

**Table 2.14   Internal options connector - pins and signals**

| Pinout | Pin | Signal | Description | Signal type |
|---|---|---|---|---|
|  top view | 1 | 13V8_SW[a] | Switched 13V8 supply. Supply is switched off when the Radio Body is switched off. | Power |
| | 2 | AUD_TAP_OUT | Programmable tap point out of the Rx or Tx audio chain. DC-coupled. | Analogue |
| | 3 | AGND | Analogue ground. | Ground |
| | 4 | AUX_MIC_AUD | Auxiliary microphone input. Electret microphone biasing provided. Dynamic microphones are not supported. | Analogue |
| | 5 | RX_BEEP_IN | Receive sidetone input. AC-coupled. | Analogue |
| | 6 | AUD_TAP_IN | Programmable tap point into the Rx or Tx audio chain. DC-coupled. | Analogue |
| | 7 | RX_AUD | Receive audio output. Post volume control. AC-coupled. | Analogue |
| | 8 | RSSI | Analogue RSSI output. | Analogue |
| | 9…15 | IOP_GPIO1…7 | Programmable function and direction. With LK4 fitted, GPIO7 is a power sense input[b]. | Digital. 3V3 CMOS |
| | 16 | DGND | Digital ground. | Ground |
| | 17 | IOP_RXD | Asynchronous serial port - Receive data. | Digital. 3V3 CMOS |
| | 18 | IOP_TXD | Asynchronous serial port - Transmit data. | Digital. 3V3 CMOS |

a. Can be switched or unswitched. For more information refer to "Connector Power Supply Options" on page 131.

b. For more information on hardware links refer to "Power Sense Options" on page 121.

**Important** The digital I/O signals are intended to interface directly with compatible logic signals only. Do not connect these signals to external devices without appropriate signal conditioning and ESD protection.

**Table 2.15  Internal options connector - DC characteristics**

| Parameter | Standard | | | | Test method and conditions | Comments |
|---|---|---|---|---|---|---|
| | min. | typ. | max. | units | | |
| **Digital signals** | | | | | | |
| Input low level:<br>All inputs | | | 0.7 | V | No hardware links fitted[a]. | Also applies to IOP_GPIO7 with LK4 fitted. |
| Input high level:<br>All inputs<br>IOP_GPIO7 | 1.7<br>2.8 | | | V<br>V | No hardware links fitted.<br>LK4 fitted[a]. | Configured as power sense input. |
| Input low current:<br>All inputs | | −100 | −120 | µA | No hardware links fitted[a]. | Also applies to IOP_GPIO7 with LK4 fitted. |
| Input high current:<br>All inputs<br><br>IOP_GPIO7 | | | 10<br>1500<br>250 | µA<br>µA<br>µA | 3.3V input.<br>5V input.<br>3.3V input. LK4 fitted[a]. | Configured as power sense input. |
| Output low level:<br>All outputs | | | 120 | mV | 100µA sink current. | 1kΩ series R on all outputs. |
| Output high level:<br>All outputs | 3.1 | | | V | 100µA source current. | 1kΩ series R on all outputs. |
| Safe DC input limits:<br>All inputs/outputs | −0.5 | | +5.5 | V | | Input current must not exceed ±10mA. |
| **Analogue signals (for signals not listed here refer to the auxiliary connector specification)** | | | | | | |
| Safe DC input limits:<br>RX_AUD<br>RX_BEEP_IN | −17<br>−17 | | +7<br>+17 | V<br>V | | |

a. For more information on hardware links refer to "Power Sense Options" on page 121.

**Table 2.16  Internal options connector - AC characteristics**

| Parameter | Standard | | | | Test method and conditions | Comments |
|---|---|---|---|---|---|---|
| | min. | typ. | max. | units | | |
| **RX_BEEP_IN** | | | | | | |
| Nominal input level | | 0.76 | | $V_{p-p}$ | For 6.2$V_{p-p}$ at speaker @1kHz. | Level for 10dB below rated power. |
| Full scale input level | | | 2.5 | $V_{p-p}$ | For onset of clipping at 13.8V. | |
| Frequency response | 0.3 to 3kHz | | | | −3dB with respect to level at 1kHz. | |
| Input impedance | 10 | | | kΩ | DC–10kHz | |
| **RX_AUD** | | | | | | |
| Nominal output level | | 1.0 | | $V_{p-p}$ | At 1kHz, 60% dev. Full volume | |
| Full scale output level: | | 2.0 | | $V_{p-p}$ | At 1kHz, 120% dev. Full volume | |
| Output impedance: | | 100 | | Ω | At 1kHz. | |
| Frequency response: | Refer to plot in Table 2.18. | | | | | |

**Table 2.17   Internal options connector - data characteristics**

| Parameter | Standard | | | | Test method and conditions | Comments |
|---|---|---|---|---|---|---|
| | min. | typ. | max. | units | | |
| **Serial port** | | | | | | |
| Baud rate: | 1200, 2400, 4800, 9600, 14400, 19200 | | | bit/s | | All UART parameters are fixed and common to all UARTs except for the baud rate which is configurable and different for different modes/applications |
| Data bits: | 8 | | | | | |
| Start bit: | 1 | | | | | |
| Stop bit: | 1 | | | | | |
| Parity: | None | | | | | |
| Protocol: | CCDI2 | | | | | |
| Flow control: Software | XON/XOFF | | | | | |
| **GPIO** | | | | | | |
| Delays: I/O mirror to AUX UI key delay | | | 500 50 | μs ms | | |

**Table 2.18   RX_AUD frequency response plot**