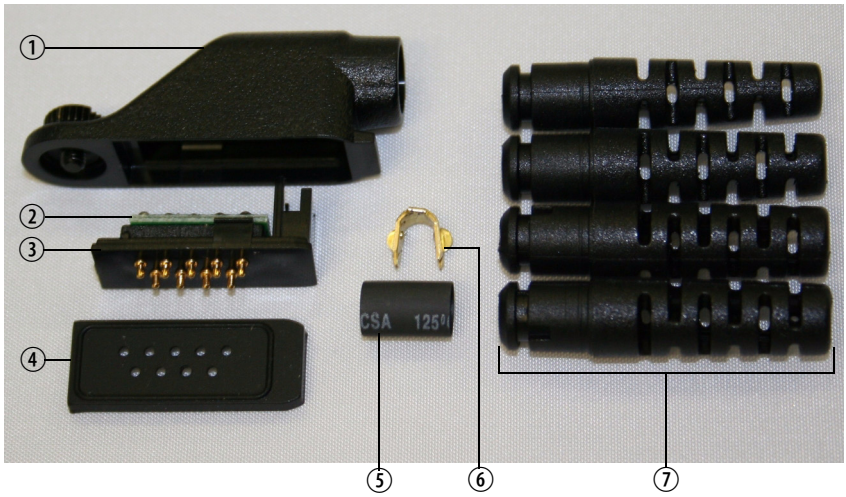
TPB-AA-005
TP7100/TP8100 Accessory Connector Kit
Installation Instructions

Use the accessory connector kit (TPB-AA-005) to connect a third-party external accessory, such as a speaker-microphone or headset, to a TP8100 or TP7100 radio.

Caution The radio produces a specific audio level at the maximum rated power. It is the sole responsibility of the end user to establish the applicability of, and to ensure compliance with, all relevant legal regulations defining the noise level an individual can be subjected to.

Figure 1 Accessory connector kit components



1. main body
2. PCB assembly (attached to baseplate)
3. baseplate
4. seal
5. heatshrink
6. strain relief crimp
7. strain relief (selection) suitable for 2.6mm, 3.2mm, 4.5mm, or 5.0mm diameter cable

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Step 1: Check Accessory Compatibility

Make sure that the accessory to be used is compatible with the accessory connector on the radio. Table 1 on page 3 describes the accessory connector pins and signals.

In particular, the accessory must meet the following specifications:

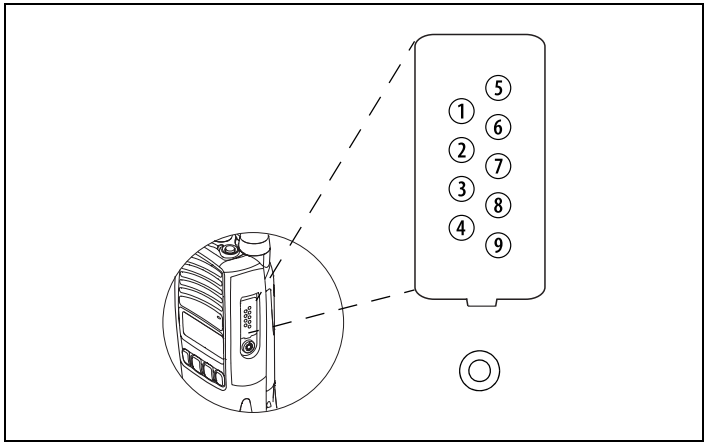
- speaker power: 0.5 W into 16 Ω via the external speaker port
- speaker impedance: 16 Ω nominal
- microphone: Electret type, approximately 1 kΩ

Do not use an accessory that has a PTT switch in series with a microphone. The PTT signal cannot be multiplexed on any other signal. It must be a separate signal, made available separately at the accessory connector.

Accessory connector pins and signals

The accessory connector on the radio provides nine contacts. See Figure 2.

Figure 2 Accessory connector contacts on TP8100 radio

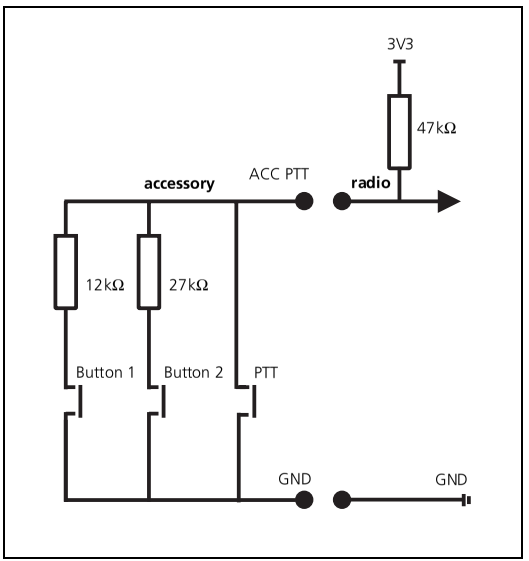


For a description of each contact, see Table 1.

Table 1 Accessory connector on radio: pins and signals

Pin	Signal name	Description	Signal type	Signal specification		
1	ACC TXD[1]	Asynchronous serial port. Data direction is from the radio to the PC.	Digital. 3V3 CMOS.	Application specific. RS-232 compatible, with data polarity inverted relative to conventional UART behavior.		
2	ACC SPKR–	External speaker negative output. Balanced load configuration. (Differential drive with ACC SPKR+.)	Analog audio.	Rated audio power is 0.5W into 16Ω via the external speaker port only. The internal speaker is disconnected. **Note**: This value is the 'rated audio power' referred to by external standards.	Maximum power is >1W into a 16Ω load. Rated duty cycle is 100% at 'rated audio power' into 16Ω via the internal speaker port only. Rated duty cycle is 33% into both the internal and external speakers at nominal load.	Minimum load is 16Ω. If speakers are connected in parallel, the total load across all speakers must be at least16Ω. Nominal load on the internal speaker port is 16Ω ±20%. Nominal load on the external speaker port, via the accessory connector, is 16Ω ±10%.
3	ACC GPI01[1]	General purpose input/output. Function and direction depends on the radio model.	Digital. 3V3 CMOS input. Open collector output with pullup.	**Note**: Short circuit this line to GND to indicate to the radio that an external accessory is connected (and that the internal speaker must thus be muted).		
4	ACC PWR	Power output. Switched and current-limited supply from the radio to the accessory. Supply is switched off when the radio is powered off.	Power.	Range is typically 6.0 V to 8.4 V. Provides the battery voltage, nominally 7.5V. The battery voltage determines the supply voltage. If the battery is newly charged, the voltage provided may increase by 2.5V. If the battery is flat, the voltage provided may decrease by 1.5V.		50mA maximum current (current-limited).

[1] Safe DC limit: –12 V (minimum), +12 V (maximum).

Pin	Signal name	Description	Signal type	Signal specification
5	GND	Analog ground	Ground	
6	ACC PTT[1]	External PTT or button input. Analog signal allows multiplexed buttons in external devices such as speaker-microphones. Two levels are defined for button presses, which creates three inputs to the system on the single wire.	Analog	The impedance used to pull the signal to ground determines the detection thresholds: 12kΩ ±1% activates the accessory button 1 27kΩ ±1% activates the accessory button 2 PTT is direct to GND  The voltage is internal to the radio.

[1] Safe DC limit: –12 V (minimum), +12 V (maximum).

Pin	Signal name	Description	Signal type	Signal specification		
7	ACC SPRK+	External speaker positive output. Balanced load configuration. (Differential drive with ACC SPKR–.)	Analog audio.	Rated audio power is 0.5W into 16Ω via the external speaker port only. The internal speaker is disconnected. **Note**: This value is the 'rated audio power' referred to by external standards.	Maximum power is >1W into a 16Ω load. Rated duty cycle is 100% at 'rated audio power' into 16Ω via the internal speaker port only. Rated duty cycle is 33% into both the internal and external speakers at nominal load.	Minimum load is 16Ω. If speakers are connected in parallel, the total load across all speakers must be at least16Ω. Nominal load on the internal speaker port is 16Ω ±20%. Nominal load on the external speaker port, via the accessory connector, is 16Ω ±10%.
8	ACC MIC[1]	Accessory (auxiliary) microphone input. Electret microphone biasing is provided inside the radio. Dynamic microphones are not supported.	Analog.	Sensitivity is 7.5mV$_{RMS}$ ±1.5mV$_{RMS}$ (satisfies EIA-603C)	DC bias is 3.0V ±0.2V via 2.2kΩ (the bias for an Electret microphone)	Input impedance is 2.2kΩ ±0.1kΩ
9	ACC RXD[1]	Asynchronous serial port. Data direction is from the PC to the radio.	Digital, 3V3 CMOS.	Application specific. RS-232 compatible, with data polarity inverted relative to conventional UART behavior.		

[1] Safe DC limit: –12 V (minimum), +12 V (maximum).

Step 2: Attach the Accessory to the Accessory Connector Kit

Notice The accessory connector kit is not sealed against water and dust ingress. If waterproofing or dustproofing is essential, apply a suitable glue or sealant while attaching the accessory to the accessory connector kit. For more information, please contact Tait Technical Support at http://support.taitradio.com.

To attach the accessory to the accessory connector kit:

1. Strip 18 mm from the end of the accessory cable. See Figure 3.
2. Select the strain relief that best fits the diameter of the accessory cable. **The strain relief must fit tightly around the accessory cable**.
3. Insert the stripped end of the accessory cable into the 'blunt' end of the strain relief (the blunt end of the strain relief points to the right in Figure 1). Pull the accessory cable through the strain relief.
4. Solder the accessory lines to the PCB assembly attached to the baseplate. For suggested connections, see page 8.

Notice Do not short ACC SPKR+ or ACC SPKR– and do not connect either of these lines to GND. Voltage is present on both lines: together they provide the differential voltage that drives the speaker.

5. Position and then shrink the heatshrink into place over the cut end of the accessory cable.
6. Fit the strain relief crimp to the accessory cable, immediately behind the heatshrink. Use a crimp tool or a small pair of pliers to tighten the crimp. (The crimp provides strain relief for the solder joints.)

Figure 3 Accessory lines attached to the baseplate

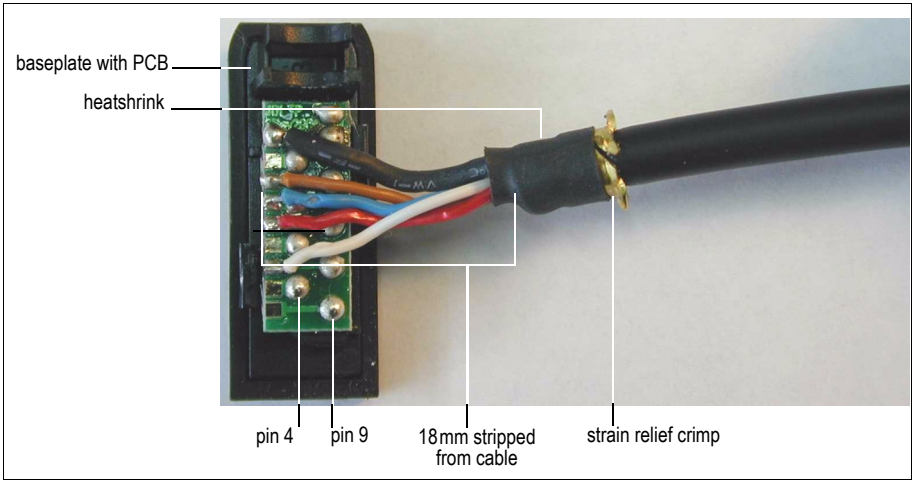
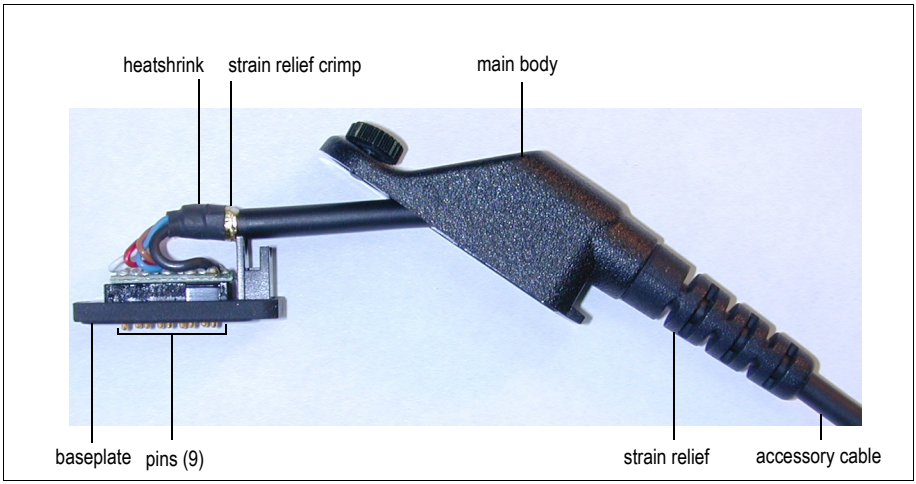


Figure 4 Fitting the accessory to the accessory connector kit



7. Without twisting or straining the accessory cable, and without pinching or folding the rubber seal around the edge of the baseplate, fit the baseplate into the main body of the accessory connector kit. The baseplate must sit cleanly in the main body. The PCB assembly holds the strain relief in place.

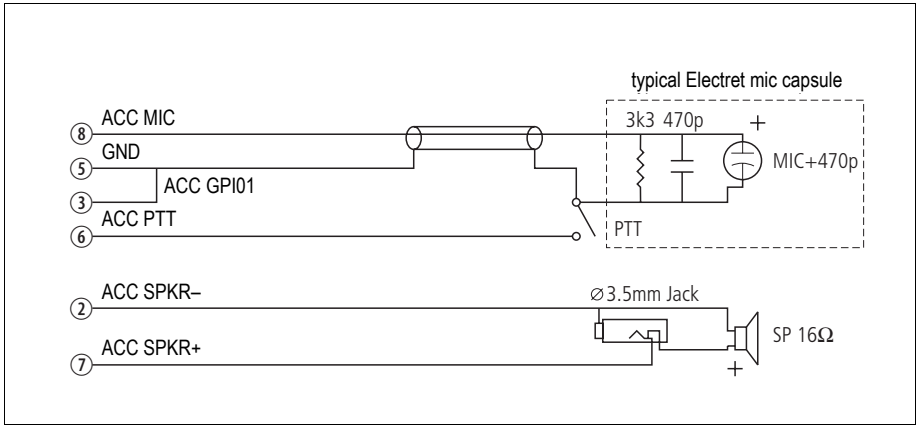
You can now attach the accessory to the accessory connector on the radio.

Suggested Connections

Figure 5 and Figure 6 show typical connections used when attaching an external accessory. Circled numbers refer to the signals described in Table 1 on page 3.

Pins ① and ⑨ are not connected.

Figure 5 Attaching an external speaker-microphone



In Figure 6, a 100R resistor has been added in order to limit the volume output to the earpiece. See the Caution on page 1.

Figure 6 Attaching a headset