TRICOM
RESEARCH, INC.

OPERATOR'S MANUAL
TCR-SPK-DUALv2
AMPLIFIED DUAL-NET SPEAKER

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TCR-SPK-DUALv2 OPERATOR'S MANUAL

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1.0 INTRODUCTION

1.1 GENERAL INFORMATION

The TCR-SPK-DUALv2 is the next generation of Tricom's Amplified Dual-Net Tactical Speaker. As one of the smallest and most capable amplified speakers on the market, the TCR-SPK-DUALv2 easily integrates into vehicular, maritime, airborne, and fixed station applications. The speaker amplifies two tactical radio nets with intuitive operation, enables simultaneous transmit across both nets, and supports up to two handsets per net. Utilizing optional cable configurations, the TCR-SPK-DUALv2 can be tailored to nearly any integration.

- Integrated high-power audio amplifier
- Dual Digital Signal Processors (DSP) for superior audio performance
- Selectable EQ settings ensure quality sound in various environments
- Simplified front panel, compact and low-profile
- Individual net volume controls with rapid mute function
- Mute and "missed traffic" LED indicators for each net
- Dimmable, NVG compatible LEDs
- Compatible with existing communications equipment
- Local handset function regardless of speaker power
- Individual handset for each net, no single point of failure
- Supports multiple handsets for each net
- Field replaceable driver
- Optional cable configurations available, tailored to system integration
- USB charging port
- Auxiliary audio in, automatically mutes on any audio traffic (incoming or outgoing)

Figure 1-1. TCR-SPK-DUALv2 Amplified Dual-Net Speaker

1.2 ABBREVIATIONS AND GLOSSARY

AGC	Automatic Gain Control
CONN	Connector
dB	Decibel
GND	Ground
HDST	Handset
Hz	Hertz
I/O	Input/Output
kHz	Kilohertz
LED	Light Emitting Diode
PTT	Push to Talk
RX	Receive
VDC	Volts, Direct Current
W	Watt
TX	Transmit

1.3 SPEAKER

The TCR-SPK-DUALv2 Amplified Dual-Net Speaker has a sealed, rugged enclosure finished in black anodize and designed to withstand the elements and resist corrosion. The enclosure houses all electronic subassemblies.

1.4 CABLES

Five multi-conductor cables connect the speaker to the DC power, communications system(s), and handsets. Multiple installation scenarios are supported using optional cable configurations. Interconnect characteristics are shown in Table 1-2.

1.5 SPECIFICATIONS

Note: Information in Table 1-1 is included for reference only and does not constitute a warranty of performance.

Table 1-1. General Specifications

DC Input	12-32 VDC
Audio Input	Standard Tactical Radio Audio
Audio Frequency Response	Radio: 300-3,000 Hz
	Aux: 125-20,000 Hz
Distortion	< 2% at Full Power
Speaker TX Mute	Automatic with PTT
Volume Controls	Net A+, Net A-
	Net B+, Net B-
	*each with audio confirmation
	Mute (Cycles Mute A/B, A, B, OFF)
Indicators	Power
	Mute
	Missed Traffic
USB Charging Port	5 VDC 2.1A Charging Only
Auxiliary Audio In	3.5mm
Environmental	Designed to meet MIL-STD-810, IP67
Electrical	Designed to meet MIL-STD-1275
Dimensions	4.13” H x 3.87” W x 3.26” D (including mount)
Weight	2.2 lb

Table 1-2. Interconnect Characteristics

CONN	SIGNAL/PIN	DETAIL
POWER	Power/Auxiliary	Tajimi R05-RB5M
	Pin A	VDC+
	Pin B	Electrical Ground (GND)
	Pin C	Optional Slave Speaker +
	Pin D	Optional Slave Speaker -
	Pin E	Spare
HDST A (MAIN A/B)	Handset(s)	Tajimi R05-RB8F
	Pin A	GND
	Pin B	RX Audio A (Audio from Radio A)
	Pin C	PTT A
	Pin D	TX Audio A (Handset Mic to Radio A)
	Pin E	5 VDC Microphone Bias
	Pin F	RX Audio B (Audio from Radio B)
	Pin G	PTT B
	Pin H	TX Audio B (Handset Mic to Radio B)
	Shell	Shield
RADIO A	Radio A	Tajimi R05-RB5F
	Pin A	GND
	Pin B	RX Audio A
	Pin C	PTT A
	Pin D	TX Audio A
	Pin E	Microphone Bias from Radio A
	Shell	Shield
HDST B (AUX A/B)	Handset(s)	Tajimi R05-RB8F
	Pin A	GND
	Pin B	RX Audio A (Audio from Radio A)
	Pin C	PTT A
	Pin D	TX Audio A (Handset Mic to Radio A)
	Pin E	5 VDC Microphone Bias
	Pin F	RX Audio B (Audio from Radio B)
	Pin G	PTT B
	Pin H	TX Audio B (Handset Mic to Radio B)
	Shell	Shield
RADIO B	Radio B	Tajimi R05-RB5F
	Pin A	GND
	Pin B	RX Audio B
	Pin C	PTT B
	Pin D	TX Audio B
	Pin E	Microphone Bias from Radio B
	Shell	Shield

2.0 OPERATION

2.1 GENERAL INFORMATION

The TCR-SPK-DUALv2 can be used for operation once it has been installed, as described in Section 3.

2.2 CONTROLS

The TCR-SPK-DUALv2 has an intuitive front panel with seven buttons, as shown in Table 2-1:

Table 2-1. Front Panel Controls

CONTROLS	TYPE	FUNCTION
PWR	Pushbutton Switch	Power On, Power Off
EQ	Pushbutton Switch	Cycles Equalizer Settings
MUTE	Pushbutton Switch	Cycles Mute Conditions
A+	Pushbutton Switch	Increases Net A Volume
A-	Pushbutton Switch	Decreases Net A Volume
B+	Pushbutton Switch	Increases Net B Volume
B-	Pushbutton Switch	Decreases Net B Volume

2.3 POWER ON, INITIALIZATION, AND SET UP

Pressing the front panel PWR pushbutton initiates a Power On Self-Test (POST) process, after which the speaker is ready for operation.

Net A and Net B volume is adjusted using the A+/A- and B+/B- pushbuttons. The radio volume control controls handset volume. Set Up is complete once the unit is powered on and proper volume levels set.

NOTE: A minimum radio volume level, equivalent to that which can be heard on the standard handset, is required for proper operation of the speaker's auto noise gating and AGC functions. Ensure receiving radio is set to the proper minimum volume.

Power down (off/bypass) is accomplished by pressing and holding the PWR pushbutton for greater than two seconds.

NOTE: Upon application of DC Power, the TCR-SPK-DUALv2 returns to its previous operating state, including all settings.

2.4 PUSHBUTTON FUNCTIONS

PWR Pushbutton – Power On/Off - To turn the speaker on, press the PWR button momentarily. The speaker will turn on, complete a post process, and is then ready for operation in the same state as it was last powered off. The PWR button is backlit green when

the speaker is on. Press and hold the PWR button for more than two seconds to power down the speaker. While off, handset and radio connections are straight pass-throughs enabling communication using the handsets.

PWR Pushbutton – Brightness - To change the brightness of button backlighting, press the PWR button momentarily. Each press will cycle through four levels of brightness: bright, medium, medium-low, low.

EQ Pushbutton – Equalizer – Pressing the EQ button cycles equalizer settings for radio and auxiliary audio, each with four factory settings: flat, low, mid, and high emphasis. Each momentary press of the button results in a single tone that corresponds to the setting; a dual tone indicates the factory setting. Settings for radio traffic are selected by pressing the EQ button while receiving radio traffic or when no audio is playing. Settings for auxiliary audio are selected by pressing the EQ button while playing auxiliary audio.

MUTE Pushbutton – Mute – Pressing the Mute button cycles mute conditions: Mute A/B, Mute A, Mute B, Mute OFF. A single short tone indicates Mute OFF has been selected. The Mute button is backlit green during any active mute condition.

NOTE: The mute button only mutes radio audio. Any audio played through the Aux port will not be muted.

A+ Pushbutton – Volume – Momentary presses of the A+ button increases volume in ten steps (audio logarithmic taper) with each increase indicated by a single short tone. A single long tone indicates maximum volume has been selected. Holding the A+ button increases volume through the steps continuously. The A+ button is backlit green anytime Net A is muted. The A+ button will flash when Net A is muted and radio traffic is detected, alerting the user to missed radio traffic.

A- Pushbutton – Volume – Momentary presses of the A- button decreases volume in ten steps with each increase indicated by a single short tone. A single long tone indicates minimum volume has been selected. Holding the A- button decreases volume through the steps continuously.

B+ Pushbutton – Volume – Momentary presses of the B+ button increases volume in ten steps (audio logarithmic taper) with each increase indicated by a single short tone. A single long tone indicates maximum volume has been selected. Holding the B+ button increases volume through the steps continuously. The B+ button is backlit green anytime Net B is muted. The B+ button will flash when Net B is muted and radio traffic is detected, alerting the user to missed radio traffic.

B- Pushbutton – Volume – Momentary presses of the B- button decreases volume in ten steps with each increase indicated by a single short tone. A single long tone indicates minimum volume has been selected. Holding the B- button decreases volume through the steps continuously.

NOTE: The speaker volume buttons do not change auxiliary audio volume.

2.5 USB CHARGING PORT

The USB charging port is provided for charging USB devices only. The port provides 5 VDC and up to 2.1A for charging.

2.6 AUXILIARY AUDIO PORT

The TCR-SPK-DUALv2 has a standard 3.5mm auxiliary audio-in port for audio playback. Audio playback is automatically muted with incoming radio traffic or handset PTT. Auxiliary audio volume is set by the auxiliary source. The audio playback function has a five second delay after audio is started and after an automatic mute from incoming radio traffic or handset PTT. After the five second delay, audio playback ramps back up to the auxiliary source volume over a five second period.

2.7 HANDSET OPERATION

The handsets connected to the speaker control their respective radios. If single handset cables (HDST A and HDST B) are used: the handset connected to HDST A will only control Radio A, and; the handset connected to HDST B will only control Radio B. If dual handset cables (MAIN A/B and AUX A/B) are used: the MAIN A and AUX A handsets control Radio A, and; the MAIN B and AUX B handsets control Radio B.

3.0 INSTALLATION

3.1 PREPARATION FOR USE

After unpacking the system and inspecting for physical damage, select an appropriate location for the speaker. Although the TCR-SPK-DUALv2 is weather-resistant, placing it in a location where it is protected from rain, sunlight, and salt spray will increase its service life.

3.2 MOUNTING PROVISIONS

The TCR-SPK-DUALv2 can be mounted using the supplied mounting bracket with six #8 through holes, see Figure 3-1. Alternatively, the speaker can be flush mounted using four 8-32 x .25" deep tapped screw holes on the rear panel, see Figure 3-2. Ensure proper access to connectors and clearance for cables.

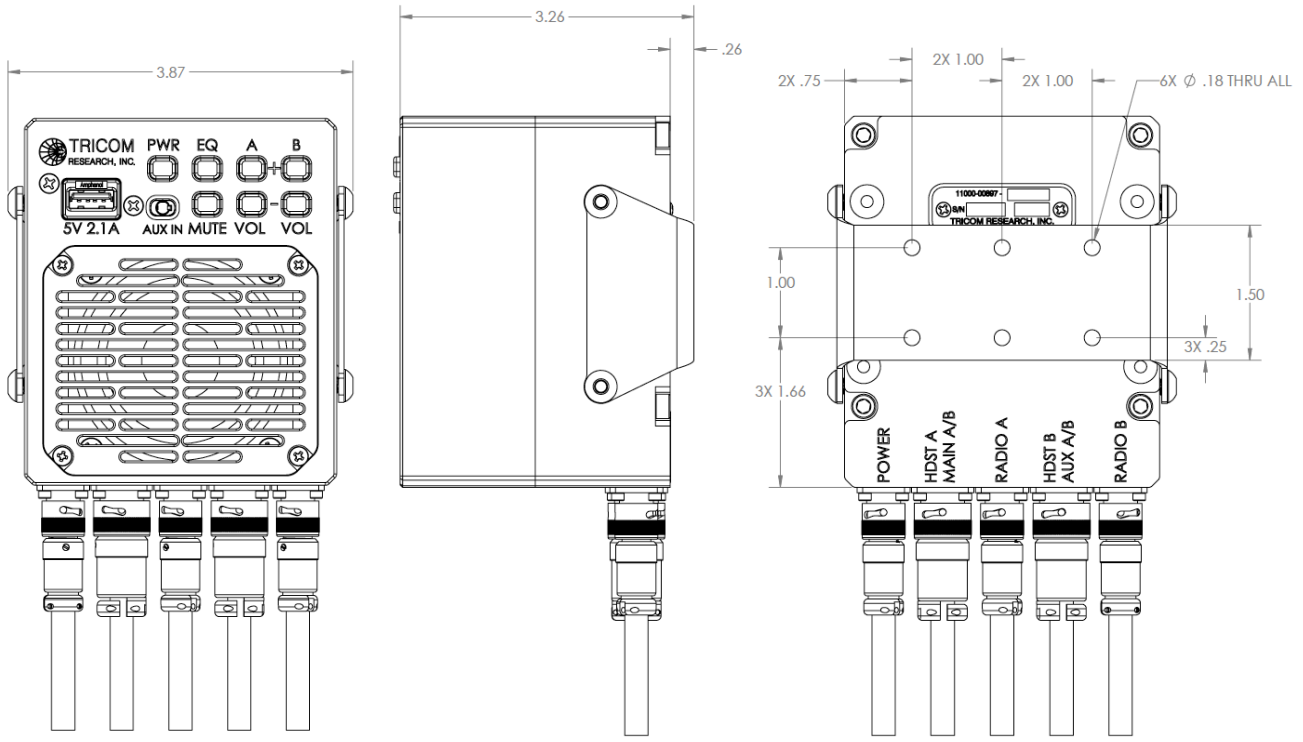

Figure 3-1. TCR-SPK-DUALv2 Outline Drawing (w/ Mount)

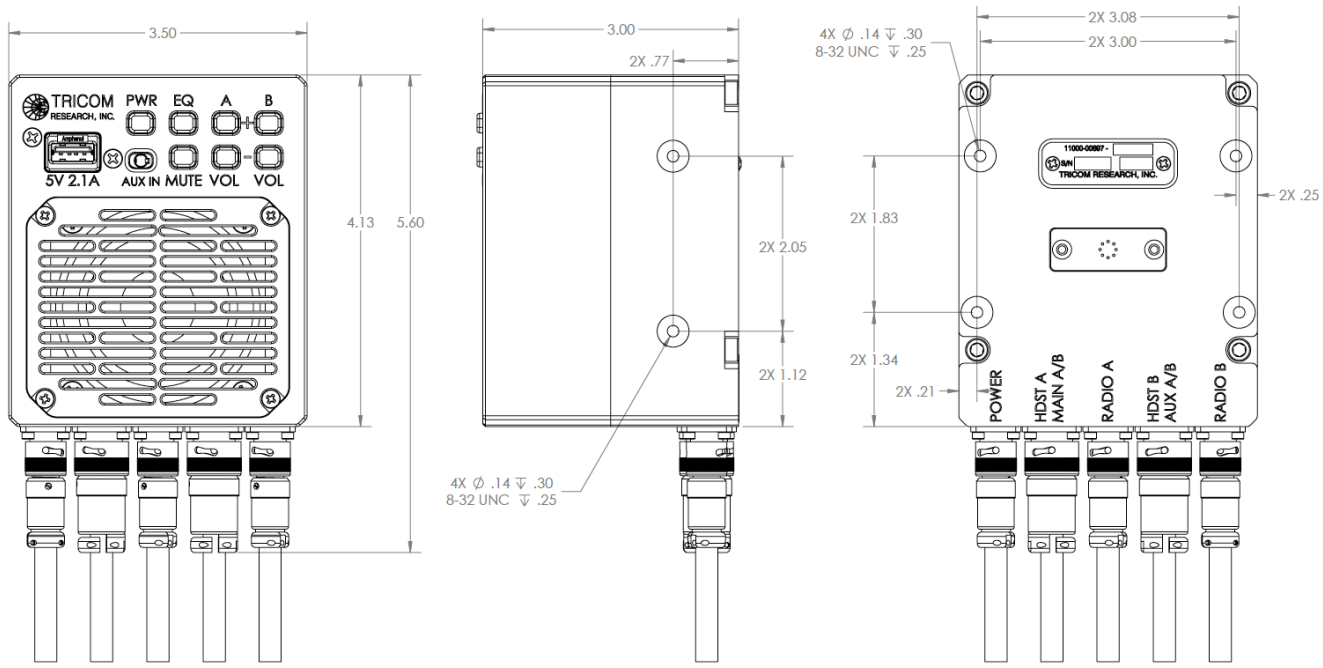

Figure 3-2. TCR-SPK-DUALv2 Outline Drawing (w/o Mount)

3.3 DC INPUT POWER

The DC input power connector, shown in Figure 3-3, is compatible with a specific power cable fitted with a matching Tajimi female connector. A typical power cable is shown in Figure 3-4. Note that the speaker has true reverse polarity protection, including protection from connecting the positive voltage input to Pin B (GND) with a grounded chassis.

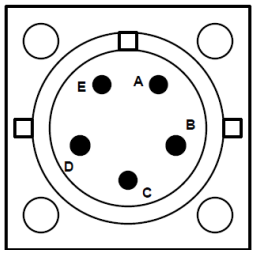

Figure 3-3. DC Input Power Connector (Tajimi R05-RB5M)

Table 3-1. DC Input Power Connector Pinout

Pin	I/O	Description
A	I	12-32 VDC
B	I	Electrical Ground (GND)
C	O	Optional Slave Speaker +
D	O	Optional Slave Speaker -
E	I/O	Spare

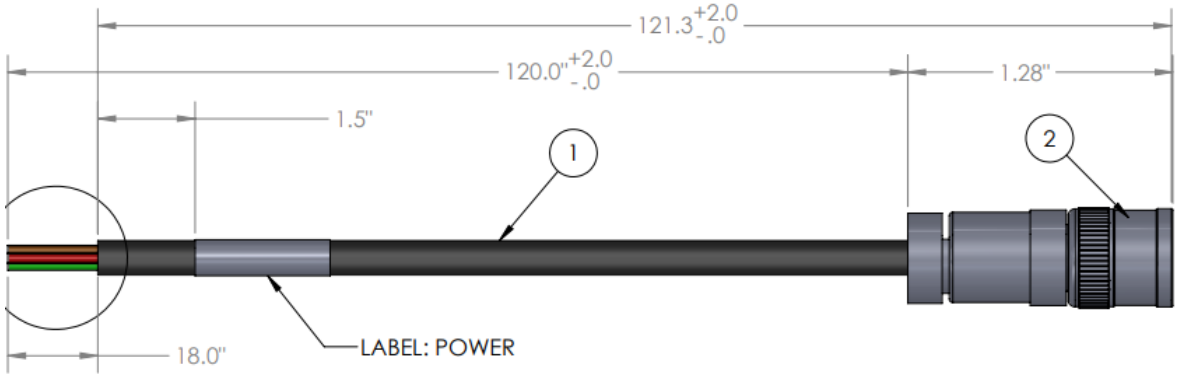

Figure 3-4. DC Power Cable 120" (Part Number 77500-00923)

3.4 RADIO INTERFACES

The speaker can connect to two radios, labeled RADIO A and RADIO B.

3.5 HANDSET INTERFACES

The speaker has two handset cable connectors labeled HDST A (MAIN A/B) and HDST B (AUX A/B). If the integration requires only 2 handsets, 1 for Radio A and 1 for Radio B, then the HDST A and HDST B cables will be used. If the user requires 4 handsets, 2 for Radio A and 2 for Radio B, then the MAIN A/B and AUX A/B cables will be used.

When the speaker is powered on, a 5 VDC, 220-Ohm current limited microphone bias exists on the HDST A (MAIN A/B) and HDST B (AUX A/B) connectors, as described in Table 1-2. This microphone bias is passed through the external MAIN A/B and AUX A/B cables to pin F on the 6-pin audio connector.

When the speaker is powered off, the microphone bias provided by the radio is passed through the TCR-SPK-DUALv2 to Pin F on the 6-pin audio connector.

3.6 FIRMWARE UPDATES

The TCR-SPK-DUALv2 firmware may be updated through the front USB connector when put into bootloader mode. Contact for details.

3.7 OPTIONAL SLAVE SPEAKER

The TCR-SPK-DUALv2 has the capability of connecting an additional slave speaker via its power cable. The same amplified mono audio signal is sent to the slave speaker. Contact for details.