TMA45 Audio Panel

Installation Manual

01852-00-AB
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1. Preface

1.1 Purpose

This manual describes the physical and electrical characteristics and the installation requirements for a TMA45 Audio Panel.

1.2 Scope

This manual applies to the installation of the TMA45 Audio Panel.

1.3 Changes from Previous Issue

Changes from Issue AA to Issue AB are:

Throughout	Front Panel images changed to show realistic lighting patterns.

1.4 Document Cross-References

01851-00	TMA45 Audio Panel Operating Manual	
TSO C35d	Airborne Radio Marker Receiving Equipment	FAA
ETSO 2C35d	Radio Marker Receiving Equipment	EASA
TSO C50c	Audio Selector Panels and Amplifiers	FAA
ETSO C50c	Audio Selector Panels and Amplifiers	EASA

2. Introduction

2.1 Equipment Description

The TMA45 is a state of the art audio isolation amplifier and audio selector that contains an automatic voice activated (VOX) intercom system and integral marker beacon receiver. It can switch two transceivers (Com 1, Com 2) and six receivers (Nav 1, Nav 2, ADF, DME, MKR and AUX).

A full duplex Telephone mode allows the TMA45 to act as an audio interface between aircraft headphone and microphones and specific aircraft approved (FAA/FCC) cellular telephone equipment, through the front mounted jack or a Bluetooth® wireless connection.

> *Warning: Use of non-aviation approved cellular telephone equipment may be prohibited by FCC regulation. Trig Avionics is not responsible for unauthorized airborne use of cellular telephones. For airborne use, the TMA45 must be interfaced with an approved system.*

There are five unswitched inputs, available for traffic or EGPWS, autopilot disconnect, and/or radar altimeter warning, with the fifth unswitched input through the front-mounted utility jack.

Push buttons select the receiver audio source provided to the headphones. A speaker button allows the user to listen to the receiver(s) selected on the cabin speaker. Except for the unswitched inputs, all speaker audio is muted during transmit. Unswitched inputs 1,3, and 4 are always presented to the aircraft speaker. Unswitched input 2 will be presented to the speaker when the front panel speaker push button has been selected.

Push button switches select one of the communication transceivers for the pilot and co-pilot position in transmit. In "Split Mode" the TMA45 allows the pilot to transmit on Com 1 while the co-pilot transmits independently on Com 2.

A fail-safe mode connects the pilot headphone and microphone to Com 1 and unswitched input 1 if power is removed for any reason, or if the audio panel is turned off by pushing the volume control.

A six-station voice activated (VOX) intercom is included in the TMA45. This system has the Trig Digital Noise Reduction circuitry that eliminates manual adjustments. The intercom system incorporates pilot isolate, all and crew

modes, two independent stereo music inputs with Trig Active Mute. Intercom volume control is through two concentric front panel knobs and a pushbutton intercom mode switch. The small volume knob controls the intercom level for the pilot and co-pilot, while the large knob controls the passenger intercom volume. Intercom squelch is automatic.

A 3-light Marker Beacon receiver is integral to the TMA45. This provides the Marker Beacon light and audio indications necessary for an Instrument Landing System (ILS) approach.

2.2 TSO Holder

The TSO holder and manufacturer of the TMA45 is PS Engineering, Lenoir City, TN, USA.

US patents no. 4,941,187; 5,903,227; 6,160,496 and 6,493,450 apply.

3. Technical Specifications

Specification	Characteristics
Compliance	Marker Beacon: TSO C35d, Class A, ETSO 2C35d Audio Selector/Intercom: TSO C50d, Class 1a ETSO C50c
Applicable documents	RTCA DO-214, RTCA DO-143, RTCA DO-160D, RTCA DO-178B and RTCA DO-254
Power Requirements	Voltage: 11 to 33 VDC Maximum current 2.5 amp (externally protected by a 5 amp pull-type circuit breaker).
Altitude	Up to 50,000 feet in a non-pressurised area of the cockpit
Operating Temperature	-15°C to +55°C
Input impedance	510 Ω
Input Isolation	-60 dB (min.)
Speaker Muting	-60 dB (min.)
Speaker Output (into 4 Ω) with no clipping	14 VDC: 3 watts (min.) 28 VDC: 10 watts (min)
Switched Receiver Inputs	9 (Com 1, Com 2, TEL, Nav 1, Nav 2, ADF, DME, MKR, AUX)
Unswitched Inputs	5 (including front jack)
Transmitter Selections	4 (Com 1, Com 2, TEL, Com 1/2)
Speaker Impedance	4 Ω
Headphone Impedance	150 - 1000 Ω
Headphone Output	38 mW each headset with no clipping, <1% THD typical
Microphone Impedance	150 - 600 Ω

Bluetooth Radio	Class 3, FCC ID QOQWT32AE
Intercom Positions	6 places (with individual automatic VOX circuits)
Music Inputs	2, (Independent, Stereo)
Music Muting	>30 dB muting when radio or intercom active
Distortion	<1% THD@ 38 mW into 150 Ω
Mic Freq. Response, ±3 dB	300 Hz - 6000 Hz
Music Freq. Response, ±3 dB	10 Hz - 26 kHz
Marker Beacon Receiver Frequency	75 MHz Crystal Controlled
Marker Beacon Receiver Sensitivity	Low: 1000 µV (Hard) (360 to 570 µV soft) High: 200 µV (Hard) (130 to 200 µV soft)
Marker Beacon Receiver Selectivity	-6 dB at ±10 kHz, -40 dB at ±120 kHz
External Lamp Output	7.5 (±4 VDC unloaded, at maximum brightness) VDC positive when active, max. current 125 mA
MM Sense	Active high (4.5 VDC ± 1.0VDC)

3.1 Physical Specifications

Specification	Characteristics
Height	33 mm (1.30”)
Width	159 mm (6.25”)
Depth	173 mm (6.8”)
Weight	0.61 kg (1.34bs)

3.2 Approval basis

The TMA45 is FAA authorised under TSO C50c (Audio Amplifiers) and TSO C35d (Marker Beacon Receivers).

The TMA45 is EASA authorised under ETSO C50c and ETSO 2C35d, ref EASA.IM.21O.10028565

All systems comply with EUROCAE 1/WG7/70, RTCA DO-143, DO-160D, DO-178B Level D, DO-214 and DO-254.

TSO Holder and Manufacturer PS Engineering, Lenoir City TN USA

Operation is subject to the following conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation

3.3 License Requirements

TMA45 Bluetooth® Radio approval:

- FCC ID: QOQWT32AE
- Industry Canada ID: 5123A-BGTWT32AE
- CE EMC Directive 89/336/EEC as amended by Directives92/31/EEC and 93/68/EEC

4. Unit and Accessories supplied

4.1 Equipment Supplied

Unit Description	Qty	Part Number
TMA45 Audio Panel	1	01862-00-01
TMA45 Installation kit	1	250-890-0000
TMA45 Mounting Tray	1	430-890-0040
TMA45 Pilots Operating Handbook	1	01851-00
TMA45 Installation Manual	1	01852-00

4.2 Installation Kit

The TMA45 installation kit includes the following items:

Unit Description	Qty	Part Number
Cable Clamp	1	625-001-0002
6-32 Clip Nut	6	475-630-0002
6-32 x ½" Phillips flat head screw	6	475-632-0012
4-40 x 7/16" Phillips pan head screw, nylon patch	4	475-440-0007
4-40 x 3/8" Phillips truss head screw, nylon patch	4	475-440-1038
4-40 x ¼" Phillips pan head screw, lock washer	2	475-440-0001
Solder lug terminal	2	475-009-0001
TMA45 backplate	1	430-890-0050
DB44 metal backshell	2	625-025-2465
Cast DB44 retaining block	2	431-881-0100
44-pin connector kit	2	120-891-2045

4.3 Required Items

Additional items you will require, but which are not in the TMA45 package, include:

- Speaker, 4 Ω
- Headphones, 150 Ω (stereo), up to 6 as required
- Microphones, up to 6 as required
- Marker Antenna (75 MHz, VSWR <1:1.5, as appropriate for the airspeed)
- Interconnect Wiring
- Headphone Jacks (stereo, as required)
- Microphone Jacks (as required)
- Circuit Breaker, 5 amp (pull type required)

5. Installation

This section provides detailed installation and interconnect instructions for the TMA45 Audio Panel.

Please read this manual carefully before beginning any installation to prevent damage and post installation problems. Installation of this equipment requires special tools, test equipment and knowledge as required by 14 CFR 65.81 (b).

5.1.1 Certification Requirements

The installation of FAA-authorized equipment such as a TMA45 in place of a similar audio panel is typically a minor alteration. Refer to FAA Advisory Circular AC20-41A

> *Note: The TMA45 requires specialized knowledge and tools for an effective installation. An appropriately rated Certified Aircraft Repair Station must install this equipment in accordance with applicable regulations. Trig's warranty is not valid unless the equipment is installed by an authorized Trig dealer. Failure to follow any of the installation instructions, or installation by a non-certified individual or agency will void the warranty, and may result in an unairworthy installation.*

5.2 Unpacking and Preliminary Inspection

Use care when unpacking the equipment. Inspect the units and parts supplied for visible signs of shipping damage. Examine the unit for loose or broken buttons, bent knobs, etc. Verify the correct quantity of components supplied with the list in Section 4. If any claim is to be made, save the shipping material and contact the freight carrier. Do NOT return units damaged in shipping to Trig. If the unit or accessories shows any sign of external shipping damage, contact Trig to arrange for a replacement. Under no circumstances attempt to install a damaged unit in an aircraft. Equipment returned to Trig for any other reason should be shipped in the original Trig packaging, or other UPS approved packaging.

5.3 Equipment Installation Procedures

5.3.1 Cooling Requirements

Forced-air cooling of the TMA45 is not required. However, the unit should be kept away from heat producing sources such as defrost or heater ducts, dropping resistors or heat producing avionics without adequate cooling air provided.

5.3.2 Mounting Requirements

The TMA45 must be rigidly mounted to the instrument panel of the aircraft structure and within view and reach of the pilot position(s). Installation must comply with FAA Advisory Circular AC 43.13-2B or other FAA-approved aircraft technical data. The unit may be mounted in any area where adequate clearance for the unit and associated wiring bundle exist.

To prevent noise, avoid installing the unit close to high current devices or systems with high-voltage pulse type outputs, such as DME or transponders. Avoid running the interconnecting bundles near any high current wires.

5.3.3 Mounting Rack Installation

Remove the unit from the mounting tray unscrewing the 3/32-inch hex-head screw that is in the centre of the unit. The hex-head screw is the lower opening. Carefully slide the unit free of the tray. Set the unit aside in a safe location until needed. Install the tray using six flat head Phillips 6-32 x ½-inch screws, P/N 475-632-0012 and six 6-32 clip nut, P/N 475-630-0002. The audio selector panel must be supported at front and rear of the mounting tray.

5.3.4 Audio Panel Tray and Connector Assembly

The rack connectors mate with two 44-pin connectors in the TMA45. The connector is a sub-miniature crimp-type, and require the use a hand crimp tool, from table below (or equivalent). The connectors are mounted to the tray back plate with 4-40 screws (475-440-1038), from the inside of the tray and the mounting block (431-891-0100). Ensure that proper strain relief and chafing precautions are made during wiring and installation, using the cable clamp (625-001-0002).

Two grounding lugs are provided, which may be attached to the rear mounting plate with 2 4-40 x ¼" screws with captive lock washers. These provide a convenient location to connect the shield ground terminations.

Manufacturer	Crimping Tool	Positioner	Extraction Tool
AMP	601966-1	601966-6	91067-1
Daniels	AFM8	K42	M24308-1
ITT-Cannon	995-0001-584	995-0001-739	91067-1

Table 5-1 Connector Pin crimping tools

5.4 Cable Harness Wiring

Refer to Appendix C for assembling the wiring harness as required for the installation. All wires must be MIL-SPEC in accordance with current regulations. Two- and three-conductor with shield wire must be used where indicated and be MIL-C-27500 or equivalent specification. Proper stripping, shielding and soldering technique must be used at all times. It is imperative that correct wire be used.

Refer to FAA Advisory Circular 43.13-2B for more information. Failure to use correct techniques may result in improper operation, electrical noise or unit failure. Damage caused by improper installation will void the Trig warranty.

5.4.1 Noise

Due to the variety and the high power of radio equipment often found in today's general aviation aircraft, there is a potential for both radiated and conducted noise interference.

The TMA45 power supply is specifically designed to reduce conducted electrical noise on the aircraft power bus by at least 50dB. Although this is a large amount of attenuation, it may not eliminate all noise, particularly if the amplitude of noise is very high. There must be at least 13.8 VDC present at the connector, J2 pins 8 and 9, of the TMA45 for the power supply to work in its designed regulation. Otherwise, it cannot adequately attenuate power line noise. Shielding can reduce or prevent radiated noise such as beacons, electric

gyros, or switching power supplies, but installation combinations can occur where interference is possible. The TMA45 is designed in a RFI hardened chassis and has internal Electromagnetic Interference (EMI) filters on all inputs and outputs.

Ground loop noise occurs when there are two or more ground paths for the same signal, such as the airframe and a ground return wire. Large cyclic loads such as strobes or inverters can inject noise signals onto the airframe that are detected by the audio system. Follow the wiring diagram very carefully to help ensure a minimum of ground loop potential. Use only MIL-SPEC shielded wires (MIL-C-275000, or better). Under no circumstances combine a microphone and headphone wiring into the same shielded bundle. Always use a 2 or 3 conductor shielded wire as shown on the installation wiring diagram.

The shields can be daisy-chained together, and then connected to the ground lugs mounted on the back plate shown in Appendix B.

Radiated signals can be a factor when low-level microphone signals are bundled with current carrying power wires. Keep these cables physically separated. It is very important that you use insulated washers to isolate the ground return path from the airframe to all headphone and microphone jacks.

5.4.1.1 Music Inputs and Noise

The TMA45 uses a differential input to help prevent noise from entering the music system. This feature is usually transparent to the installer; however, it is important that the appropriate music signal and ground connections are made directly to the dedicated music signal and ground inputs on the TMA45. The power for IFE and audio panel should be a common bus.

If a music jack instead of a music source is installed for Music 1 or 2, we recommend grounding the jack to airframe ground.

> *Note: Adding a high-performance audio control system, particularly in conjunction with active noise cancelling headsets, cannot improve on older avionics that were designed for cabin-speaker use. Trig makes no claim that the audio panel will provide a noise-free audio quality under all installation conditions, particularly with older avionics.*

5.4.2 Existing GMA340 Installation

If the installation replaces a GMA340, no changes are necessary as long as the existing installation meets the requirements. All existing functions of the GMA340 as well as the new capabilities afforded by the TMA45 will become instantly available. Be advised, the TMA45 does not support 3 VHF Coms, however the TMA45 handles two Com transceivers and a full-duplex cellular/satellite telephone.

Added capabilities include, Trig Noise Reduction, duplex telephone, improved music fidelity and Trig Active Mute, improved music distribution and additional unswitched audio inputs.

Installations where the external marker outputs are connected to a Sandel 3308 Navigation Display will require additional loading resistors. Refer to the Sandel installation data for more information.

5.4.3 Power

The TMA45 is compatible with both 14 and 28 volt DC systems. A 5 amp circuit breaker is required for all installations. Power wires should be 22 AWG connected to J2 Pins 8 and 9. Connect airframe ground to J2 Pin 10 and 11 only using 22 AWG wires. No dropping resistors are required.

5.4.4 External Push-to-Talk

An important part of the installation is the PTT (Push-To-Talk) switches that allow the use of your aircraft communications radio for transmissions. There are three typical configurations that can be used. Select the case that best fits the installation. Only the person who presses their PTT switch will be heard over the radio. If the pilot and co-pilot both use the PTT, only the pilot position has access to the radio. The pilot position will have PTT control regardless of the co-pilot when the TMA45 is in the FAIL-SAFE mode.

CASE 1: PTT is built into both pilot and co-pilot yokes.

CASE 2: PTT is in pilot yoke only. This configuration requires a modified external PTT switch plugged into the co-pilot's microphone jack. (See Appendix A). When the co-pilot's PTT is pressed, the intercom switches the mic audio from pilot to co-pilot mic.

CASE 3: No built in PTT. This requires two built in PTTs to be installed or

modified external PTT switches to be used. Modify external PTT as required (See Appendix A).

5.4.5 Audio Panel interface

The TMA45 is designed to interface with standard aircraft avionics and presents a 510 Ω receiver impedance. For best results, a twisted-shielded cable is recommended from the avionics audio source to the audio panel, with the shield grounded at the audio panel end.

Some avionics do not provide a separate audio low and may introduce additional electrical noise into the system. For best results, connect the audio low from the audio panel to the radio ground, using one conductor of the twisted-shielded cable.

5.4.5.1 Speaker Load

The TMA45 contains one speaker amplifier. Some units with internal speaker amplifiers, such as the King Radio KX170-series, require a resistive load to prevent damage if their speaker amplifier is not used. Connect the speaker output from the unit to the Com 2 Speaker load input on the TMA45 (J1 27 with respect to 28). The speaker load is 16 Ω, 3W.

5.4.6 Transmit Interlock

Some communications transceivers use a transmit interlock system which changes the behaviour of one radio when the other one is transmitting. In order to use the Split Mode feature, this function will need to be correctly configured.

If you are using Trig radios, the transmit interlock pin on each radio should be connected to the PTT of the other radio. For other brands, consult the manufacturer installation manual.

5.4.7 Backlighting

The brightness of the green audio selection indicators and the marker lamps is automatically controlled by a photocell located in the centre of the unit.

The brightness of the buttons is set by the aircraft dimmer bus. For 14-volt electrical systems, connect J2 pins 6 and 7 to the aircraft dimmer bus, and pin 5 to ground. For 28-volt systems, connect pin 7 to the aircraft dimmer bus, and

pins 5 and 6 to ground.

If an external dimmer control is not used, a constant low-level illumination of the buttons can be established for night-time viewing. Connect J2 pins 6 and 7 (depending on system voltage, as described above) to the power on J2 pins 8 or 9.

If no connection the dimmer is made, or the dimmer voltage is < 0.5 VDC, the button lighting will be at a minimum level.

5.4.8 Unswitched inputs

J1, pins 31, 29 and J2 pin 15 are unswitched, unmuted (by transmitter keying), inputs 1, 3 and 4, respectively. These inputs are presented to the pilot and co-pilot regardless of the audio configuration and will always mute the music inputs. These 510Ω inputs can be used for altimeter DH audio, GPS waypoint audio, autopilot disconnect tones, or any other critical audio signal.

Unswitched input 1 is always presented to the speaker, plus to the crew headphones, and is available to the pilot in fail-safe (off) mode. Unswitched inputs 3 and 4 are always presented to the crew headphones and over the aircraft speaker.

Unswitched input 2, located on J1 pin 44, is always connected to the pilot's headphone. However, this unswitched audio is only presented to the aircraft speaker when the Speaker push button has been selected.

Unswitched input	Hear in Fail Safe	Hear in Crew Headset	Speaker button select	Gain
1	Yes	Yes	No	1:1 (fixed)
2	No	Yes	Yes	1:1 (fixed)
3	No	Yes	No	Adjustable
4	No	Yes	No	1:1 (fixed)
5	No	Yes	No	1:1 (fixed)

Table 5-2 Unswitched input table

The audio low for unswitched 4 (J2, pin 15) should be connected to a convenient audio low. However, this should NOT be connected to Music Low.

Unswitched 1 is presented to the pilot headphone in fail-safe (off) mode.

> *Note: Unswitched inputs 1, 2 and 4 have a fixed gain (1:1), and any audio level adjustments must be made at the input source. Unswitched input 3 has a variable adjustment control located on the bottom side of the unit. Refer to Adjustments section for more information.*

The front panel jack will behave as a fifth unswitched input if music is playing through the Music 1 input; the audio input to this jack will be presented to the pilot and co-pilot headsets, and it is not muted.

> *Note: The front-mounted utility jack is intended for portable equipment that is advisory in nature. It is not intended for use as a primary warning channel. Audio of importance must always be hard-wired into the unswitched inputs of the audio panel.*

5.4.9 Swap Mode

The optional Swap button, usually mounted on the control yoke, switches between the Com transmitters without having to reach for the audio panel. Pressing the Swap button has exactly the same effect as switching between XMT1 and XMT2 on the audio panel. The Swap button is connected between J2, pin 20 and aircraft ground.

5.4.10 Telephone (Duplex) Function for Mobile Phones

Audio streams selected via the intercom mode are provided to the TEL output, and audio from TEL is presented to the headset. This allows a telephone-like audio interface.

The Telephone mode in the TMA45 is compatible with many mobile telephones with hands-free headset interfaces. The front panel 3/32” utility jack can be used as the interface to the mobile phone, or a jack can be installed on the aircraft panel. The wired interface jack is connected with the TMA45 as shown.

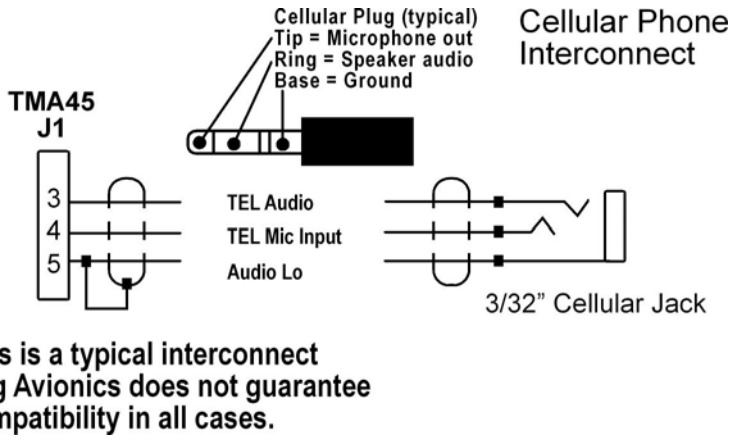


Figure 5-1 Mobile telephone interface for rear connector, if an additional jack is desired

The TMA45 is compatible with most Bluetooth® enabled devices for making and receiving telephone calls through the aircraft audio system.

The TMA45 provides by default a telephone sidetone to compensate for its absence in some mobile phones. The sidetone can be turned on and off by pressing the Telephone button for more than one second. The sidetone is not available when the Intercom Mode is set to Pilot.

> *NOTE: Unauthorized use of unapproved cellular telephone devices in aircraft is subject to FCC enforcement action, which may include a $10,000 fine per incident.*
>
> *FCC Regulation 47 CFR § 22.925 Prohibition on airborne operation of cellular telephones.*
>
> *Cellular telephones installed in or carried aboard airplanes, balloons or any other type of aircraft must not be operated while such aircraft are airborne (not touching the ground). When any aircraft leaves the ground, all cellular telephones on board that aircraft must be turned off.*

Trig does not endorse using unapproved cellular telephone equipment in flight and takes no responsibility for the user's action. Trig does not guarantee compatibility with personal cellular telephones.

5.5 Intercom wiring

See Appendix C and D for intercom connection configurations. It is critical to the proper operation of this system to have this connector wiring made in accordance with these diagrams. Use two- and three-conductor, MIL-SPEC cable as shown. Connect the shields at the audio panel end only, and tie to the audio low inputs as shown.

5.5.1 Music Inputs

The TMA45 has two independent music inputs, plus a front mounted jack that is connected to Music 1. Music input number 1 is J2 pins 23 (left channel) and 24 (right channel), with respect to pin 25, and Music number 2 is connected to 26 (left channel), 27 (right channel), with respect to 28.

The TMA45 has wireless connectivity to stream music from a paired Bluetooth device. This stream is distributed as Music 1. Refer to Section 8.15 for more information.

> *NOTE: Use the low-level output of any music device to connect to the audio panel. Maximum signal level is 3 VAC p-p. DO NOT use a speaker-level output, this will cause internal damage in the audio panel.*

5.5.2 Music muting

The TMA45 incorporates a three-mode muting system. This will mute the music devices during intercom and/or radio conversation. Refer to Section 8.12 for more information.

Press the Mute button to turn Mute off; turning down the music volume allows the pilot to place the music into the background while having the radios in the foreground and eliminates the constant interruption of the music while keeping the radios a priority.

All additional music devices must be switched off for both take-off and landing.

> *CAUTION: Local oscillators and internal signals from music equipment can cause undesired interference with other aircraft systems. Before take-off, operate the music devices to determine if there is any adverse effect within the aircraft systems. If any unusual operation is noted in flight, immediately switch off the music devices.*

5.5.2.1 Music 2 Muting

Music 2 is by default muted by radio and/or intercom activity.

Connecting J2 pin 13 to pin 14 (or ground) through a SPST switch allows control of music 2 muting; when the switch is closed, incoming music and intercom conversation will not mute the music for the passengers' intercom net. This allows uninterrupted music during casual conversation and at times when radio communications are of lesser importance.

5.6 Marker Beacon Installation

5.6.1 Marker Antenna Installation

A marker beacon antenna, appropriate to the type and speed of the aircraft, is required (not included). Refer to aircraft and antenna manufacturer's installation instructions, as well as AC43.13-2B (or later revision), Chapter 3, for information on proper antenna installation techniques. The marker beacon antenna must be mounted on the bottom of the aircraft.

5.6.2 External Marker Lamps

For installations that require external marker beacon lights, there are three outputs that can drive 12-volt lamps only. The external output lamps are driven high (typically +7.5 VDC ±4.0 VDC unloaded, at max brightness) when active. Maximum source current per lamp is 125 mA. Voltage varies with photocell dimming.

5.6.3 Middle Marker Sense

A Middle Marker Sense output signal is available from the TMA45 to certain flight control systems. This function does operate in test mode. This output, located on J1, pin 39, will go to +4.5 VDC (± 1.0 VDC) when a valid Middle Marker signal is received.

5.7 Adjustments

The TMA45 is factory adjusted to accommodate the typical requirements for most aircraft configurations.

There are four adjustments however that will allow the installer to tailor the specific functions; to make the necessary adjustments, use a small jeweller's slotted screwdriver.

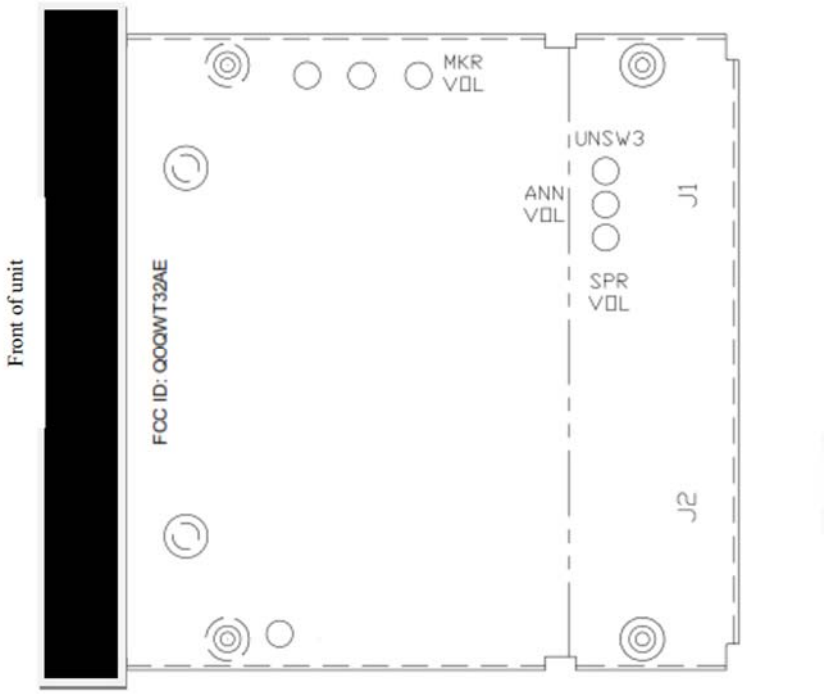


Figure 5-2 Adjustments

- Speaker Volume [SPR VOL] – Turn adjustment clockwise to increase cabin speaker output.
- Marker Beacon Volume [MKR VOL] – Turn adjustment clockwise to increase marker beacon audio level.
- Annunciation Volume [ANN VOL] – Controls the level of the voice

annunciations (top cover must be removed)

- Unswitched Input 3 Volume [UNSW 3] – Adjust from 50% to 200% of input value

5.8 Communications Antenna Installation Notes

For best results while in Split Mode, it is suggested that the one VHF communications antenna be located on top of the aircraft while the other communications antenna be on the bottom. Any antenna relocation must be accomplished in accordance with AC 43.13-2B, aircraft manufacturers' recommendations and FAA-approved technical data.

> *Warning: It is probable that radio interference will occur in Split Mode when the frequencies of the two aircraft radios are adjacent, and/or the antennas are physically close together. Trig makes no expressed or implied warranties regarding the suitability of the TMA45 in Split Mode.*

5.9 Wiring Checkout

After wiring is complete, verify power is ONLY on pins J2, 8 and 9 and airframe ground on pins J2, 10 and 11. Failure to do so will cause serious internal damage and void Trig's warranty

5.10 Unit Installation

To install the TMA45, gently slide the unit into the mounting rack until the hold-down screw is engaged. While applying gentle pressure to the face of the unit, tighten the 3/32" hex-head screw next to the co-pilot control shaft until the unit is secure.

> ***Warning: Do not over-tighten the lock down screw while installing the unit in tray. Internal damage will result.***

5.11 TMA45 Pin assignments

J1	Function	J2	Function
1	Marker Antenna	1	Pilot Headphones Low
2	Marker Antenna Low	2	Co-pilot Headphones Low
3	Telephone Audio in	3	Co-pilot Headphones Left
4	Telephone Low	4	Co-pilot Headphones Right
5	Telephone Mic Audio	5	Dimmer Bus Low
6	Telephone Mic Key	6	14/28V Dimmer Bus
7	ADF Audio In	7	14/28V Dimmer Bus
8	ADF Audio Low	8	Aircraft Power
9	Com 1 Audio	9	Aircraft Power
10	Com 1 Audio Low	10	Aircraft Ground
11	Com 1 Mic	11	Aircraft Ground
12	Com 1 Mic Key	12	No Connect
13	Com 2 Audio	13	Mute Inhibit
14	Com 2 Audio Low	14	Mute Inhibit Low
15	Com 2 Mic	15	Unswitched Audio 4
16	No Connect	16	Pilot Headphones Left
17	Nav 1 Audio	17	No Connect
18	Nav 1 Audio Low	18	No Connect
19	Nav 2 Audio	19	No Connect
20	Nav 2 Audio Low	20	Swap
21	DME Audio	21	Swap Low
22	DME Audio Low	22	No Connect
23	Auxiliary Audio Input	23	Music 1 Left
24	CNX80 Inhibit	24	Music 1 Right
25	No Connect	25	Music 1 Low

J1	Function	J2	Function
26	No Connect	26	Music 2 Left
27	Com 2 Speaker Load	27	Music 2 Right
28	Com 2 Speaker Load	28	Music 2 Low
29	Unswitched Audio 3	29	No Connect
30	Com 2 Mic Key	30	No Connect
31	Unswitched Audio 1	31	Pilot Headphones Right
32	Unswitched Audio 1 Low	32	Co-pilot Mic Audio
33	Unswitched Audio 1	33	Co-pilot Mic PTT
34	Pilot Mic PTT	34	Co-pilot Mic Low
35	Pilot Mic Low	35	Passenger 1 Mic Audio
36	Ext IM Marker Lamp	36	Passenger 1 Mic Audio Low
37	Ext OM Marker Lamp	37	Passenger 2 Mic Audio
38	Ext MM Marker Lamp	38	Passenger 2 Mic Audio Low
39	MM Marker Sense	39	Passenger 3 Mic Audio
40	Passenger Headphone Left	40	Passenger 3 Mic Audio Low
41	Passenger Headphone Right	41	Passenger 4 Mic Audio
42	Passenger Headphone Low	42	Passenger 4 Mic Audio Low
43	Unswitched Audio 2 Low	43	Speaker Low
44	Unswitched Audio 2	44	Speaker Output

6. Operational Checkout

6.1 Required Test Equipment

In order to return an aircraft to service after installation of the TMA45, the installer must have access to a Marker Beacon signal generator such as one of the following:

IFR NAV401L, NAV402AP, IFR4000, TIC T-30D, T-36C

Equivalent test equipment is acceptable as long as the testing requirements can be met.

6.2 Audio Panel Test

1. Apply power to the aircraft and avionics.
2. Plug headsets into the pilot, co-pilot, and occupied passenger positions.
3. Verify fail-safe operation by receiving and transmitting on Com 1 from the pilot position, with the audio panel power off.
4. Switch on the unit by pressing the volume knob.
5. Check intercom operation.
6. Push the XMT1 button.
7. Verify that both the LEDs (Light Emitting Diode) near the **COM1 and XMT1** buttons light. Verify that transmit button LED near the mic selector is not blinking. If the LED is blinking, stop testing and troubleshoot the microphone PTT installation.
8. Verify proper transmit and receive operation from the co-pilot position, noting that the co-pilot PTT switch allows proper transmission on the selected transceiver. Verify that the LED near the XMT1 button blinks when transmitting.
9. Verify that pushing the **COM2** button causes the LED near the button to illuminate, and the Com 2 receiver to be heard. Verify operation on Com 1 from the pilot position.
10. Repeat for Com 2
11. Press and hold the XMT1 button. While holding the XMT1 button, press the XMT2 button. This places the unit in Split Mode; verify that the pilot

can transmit and receive on COM1, while the co-pilot transmits and receives on COM2.

12. Verify proper operation of all receiver sources by selecting them using the appropriate button. The LED near the button illuminates to show which source is in use.
13. Push the Speaker button. Verify that all selected audio is heard in the cockpit speaker. Verify that the audio mutes when the mic is keyed.
14. Verify that the appropriate LED in the lower button row blinks when either push to talk is keyed.
15. Verify proper Intercom system operation in the **ALL, ISO** and **CREW** modes (see Section 8.11).
16. Verify that the audio selector panel system does not adversely affect any other aircraft system by systematically switching the unit on and off, while monitoring the other avionics and electrical equipment on the aircraft.

6.3 Marker Checkout

1. Connect a ramp generator at the antenna end of the marker coax. With the unit under test in HI sensitivity, verify that a 160 μV, modulated 95% with 1300 Hz, signal will illuminate the amber (M) marker light, and that marker audio is present in the headphones when the Marker Audio (MKR) push-button has been depressed. Select the button with the speaker symbol to verify marker audio availability on the cabin speaker. Verify that the white (I) and blue (O) lights will illuminate within ± 3dB of the amber lamp, with 3000 HZ and 400 Hz applied, respectively.
2. Repeat with the unit in LOW sensitivity, with 430 μV applied.
3. Connect the marker antenna and verify proper operation.

6.4 Telephone Checkout

Press the TEL button. Verify that the pilot headset is connected to the cellular telephone system (if installed). Verify that by using the pilot side PTT, the pilot can transmit on the other selected radio (Com 1 or Com 2). The telephone function will allow any person heard by the pilot on the intercom, to be also heard on the telephone.

6.4.1 Bluetooth Checkout

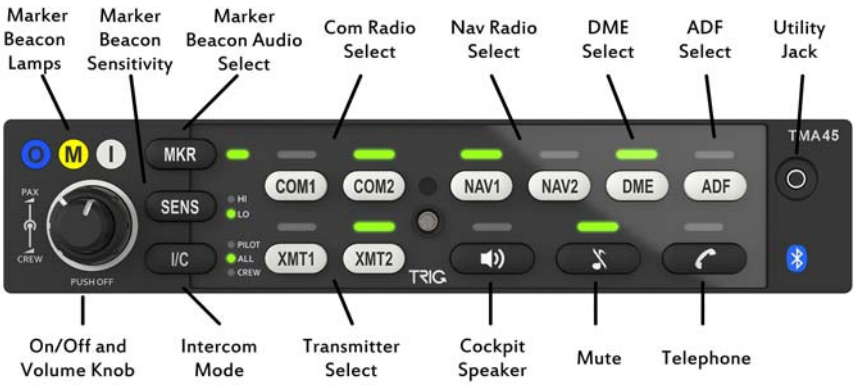
Verify that the TMA45 will pair with a Bluetooth device, and interface with cellular phone and Music source. See Section 8.12 for more information.

7. Final Inspection

Verify that the wiring is bundled away from all controls and no part of the installation interferes with aircraft control operation. Move all controls through their full range while examining the installation to see that no mechanical interference exists. Verify that the cables are secured to the aircraft structure in accordance with good practices, with adequate strain relief. Ensure that there are no kinks or sharp bends in the cables and coaxial cables. Verify that the cables are not exposed to any sharp edges or rough surfaces, and that all contact points are protected from abrasion. Complete logbook entry, FAA Form 337, weight and balance computation and other documentation as required.

8. Normal Operation

8.1 Front Panel



8.2 Power On and Fail-Safe Operation

The audio panel is turned on and off by pressing the volume control knob (smaller, inner knob on left side of unit).

When the system is turned off or if power is removed the audio panel will be placed in the fail-safe mode. In the off or fail-safe mode, the pilot is connected directly to Com 1 and to unswitched input 1, allowing transmit, receive and alert capability regardless of audio panel condition.

The fail-safe audio will only be heard in the left ear of a stereo headset.

8.3 Transmitter Selection

To select a radio for transmission, press either the XMT1 or the XMT2 button; the green indicator lamp above the button will light up, indicating which radio you will transmit on. The corresponding COM1 or COM2 indicator will also light up; you always hear the audio from the transceiver that is selected for transmit.

Both pilots can transmit on the selected radio, but only the person who presses their Push-To-Talk switch will be heard over the aircraft radio.

8.4 Receiver Selection

To listen to both radios, press the COM1 or COM2 button as required to enable the second radio. Both radios will remain selected until one is manually deselected.

8.5 Navigation Audio Selection

The MKR, NAV1, NAV2, DME and ADF buttons select the switched navigation receivers. Press once to turn on the corresponding source, press again to turn it off; a green lamp above the button will light indicating which audio source is selected.

The DME input, if present, is shared with AUX.

8.6 Cockpit Speaker

This button will place all selected audio on the cockpit speaker when active.

> Note: In Split mode (see below), only unswitched inputs will play through the speaker.

To help reduce power consumption and internal heat build-up in the avionics stack, switch off the speaker when not in use.

8.7 Swap Mode

The optional Swap button, usually mounted on the control yoke, switches between the Com transmitters without having to reach for the audio panel. Pressing the Swap button has exactly the same effect as switching between XMT1 and XMT2 on the audio panel.

8.8 Split Mode

Pressing both XMT1 and XMT2 buttons at the same time puts the TMA45 into Split mode; all four COM and XMT indicators will light up. This connects the pilot to Com 1 and the co-pilot to Com 2, and they can use their respective

radios independently. The passengers will not hear the radios or crew intercom in Split mode.

Press either XMT button to exit Split mode.

It is not possible to place the pilot on Com 2 and the co-pilot on Com 1.

In Split mode, only the pilot will hear the selected navigation audio.

An example of this feature is when the pilot may want to talk to Air Traffic Control, while the co-pilot may be speaking to ground handling agents.

> **Note: Due to the nature of VHF communications signals, and the size constraints in general aviation aircraft, it is probable that there will be some transmission bleedover in Split Mode, particularly on adjacent frequencies. Split Mode may not be suitable in all aircraft conditions.**

8.9 Intercom Volume

Turning the smaller volume control knob on the left side of the audio panel adjusts the loudness of the intercom for the pilot and co-pilot. It has no effect on selected radio levels, music input levels or passengers' volume level.

Turning the larger, outer volume control knob on the left side of the audio panel adjusts the intercom volume for the passengers. It has no effect on radio or music levels.

8.10 Trig Digital Noise Reduction

The TMA45 provides an automatic VOX squelch control (TDNR). Each microphone input is monitored through a digital processor and opens instantly when human speech is detected. This results in seamless conversations aboard the airplane for crew and passengers, without syllable clipping or fatigue-inducing noise.

No manual control or field adjustment is required.

The system is designed to block continuous tones, therefore people humming or whistling in monotone may be blocked after a few moments.

For consistent performance, any headset microphone must be placed within ¼-inch of the lips, preferably against them. It is important to have the microphone

element parallel to the mouth, and not twisted inside the cover.

You should also keep the microphone out of a direct wind; moving your head through an air stream may cause the TDNR to open momentarily.

The TDNR is designed to work with normal aircraft cabin noise levels (70 dB and above), therefore it may not always recognize speech and clip syllables in a quiet area, such as in the hangar, or when the engine is not running.

8.11 Intercom Modes

The Intercom (I/C) button is a 3-function mode selector that allows the pilot to tailor the intercom function to best meet the situation; it cycles through the following modes, from top to bottom:

- PILOT: The pilot is isolated from the intercom and is connected only to the aircraft radios. Co-pilot and passengers will hear the intercom and Music 1, but not the aircraft radio receptions or pilot transmissions.
- ALL: All parties will hear the aircraft radios, intercom, and Music 1.
- CREW: Pilot and co-pilot are connected on one intercom channel and have exclusive access to the aircraft radios. They may also listen to Music 1. Passengers can continue to communicate amongst themselves without interrupting the crew and may listen to Music 2.

When in Split mode, the ALL intercom mode is not available and pressing the Intercom button will cycle between PILOT and CREW modes.

Intercom Mode Table

Mode	Pilot Hears	Co-pilot Hears	Passengers Hear	Comments
Pilot	Radios Sidetone	Passengers Music 1	Co-pilot Passengers Music 1	This mode allows the pilot to communicate with air traffic control without the co-pilot or passengers hearing the conversation. Co-pilot and passengers can continue to talk and listen to music.
All	Radios Sidetone Co-pilot Passengers Music 1	Radios Sidetone Pilot Passengers Music 1	Radios Sidetone Pilot Co-pilot Passengers Music 1	This mode allows all on board to hear radio reception as well as communicate on the intercom.
Crew	Radios Sidetone Co-pilot Music 1	Radios Sidetone Pilot Music 1	Passengers Music 2	A second music source is automatically enabled for the passengers.

8.12 Trig Active Mute

Trig Active Mute, when enabled, will automatically decrease the music volume during any voice communication and gradually restore it to its original level after communications are complete.

Music source 1 (Music 1 input, front panel jack or Bluetooth streaming) has three muting modes, which are cycled through by pressing the Mute button and announced in the headset as they are activated.

- Radio Mute: aircraft radio activity mutes the music
- Mute on: radio and intercom mute the music
- Mute off: nothing interrupts the music

Music 2 has muting on or off, and can be externally controlled only if your

installation includes an external switch.

8.13 Monitor Mode

Press and hold COM2 for more than two seconds to activate and deactivate Monitor mode; an audio annunciation will report changes to the Monitor mode status.

In Monitor mode, the audio from the radio selected for transmit will mute the other Com radio.

For example, if Com 1 is selected to transmit to Air Traffic Control and Com 2 is receiving weather information, the audio from the weather will be muted while Air Traffic Control is transmitting.

When Monitor mode is on, the indicator lamp of the radio selected for receive only will blink every three seconds.

Monitor mode is not available in Split mode and is defaulted to off when the audio panel is turned on.

8.14 Telephone Mode

The Telephone mode serves as a full duplex interface and distribution for telephone systems such as mobile phones with earpiece jacks or Bluetooth connectivity.

Pressing the Telephone button connects the telephone to the users as follows:

- In PILOT intercom mode, only the pilot will hear the telephone, and only he will be heard. No telephone sidetone can be created in PILOT Mode; selecting PILOT mode during a call will cause the sidetone, if present, to disappear.
- In ALL intercom mode, all crew and passengers will be heard on the phone when they speak.
- In CREW intercom mode, only the pilot and co-pilot are connected to the telephone, passengers will not hear or be heard on the call.

Com and other selected radio audio is also heard in the headsets as specified by the Intercom mode. The radio PTT will switch the microphone output to the selected radio, and allow continued aircraft communication. The telephone party will not hear Com radio communications, and vice versa.

A phone call can only be initiated from the phone itself.

In cases where the mobile phone doesn't provide sidetone, the audio panel can be configured, by holding the TEL button for more than one second, to create sidetone for you.

Trig recommends the use of mobile devices in a way that maintains safe flight operations and good airmanship at all times.

8.15 Bluetooth®

A Bluetooth-enabled mobile phone must first be paired with the TMA45 before it can be used wirelessly for making calls or streaming music.

Activate the "seek device" function on the mobile phone, and then enter the access code "0000" (if required) when the phone detects the TMA45 on the list of available devices. This process must be repeated for any phone to be used, and only one mobile phone can be paired with the TMA45 at any one time.

A second Bluetooth-enabled device can be used to stream music but it must be paired and connected after the mobile phone.

If a paired device fails to reconnect, the Bluetooth interface can be reset by holding both the DME and ADF buttons while the TMA45 is powered on; a "Bluetooth reset" annunciation will be heard in the headphones. The device must then be paired again.

8.16 Utility Jack

The 2.5 millimetre (3/32") jack on the front of the TMA45 has three distinct functions: mobile phone input, priority advisory audio input and music input.

- A mobile phone can be connected to the TMA45 via the front panel jack using a phone-specific adapter cord; the mobile phone is added to the intercom loop by pressing the Telephone button. Regardless of the Telephone mode setting, the telephone ringer audio will be heard in the intercom if it is present on the telephone's output (ringer may be muted by radio and intercom).
- The utility jack can be used as stereo music input by using an appropriate adaptor cord and will be treated as Music 1. Please note

that the adapter cord needed for music input is different from the one for mobile phone input.

- When an audio signal is actively playing on Music 1 through the rear connector or via Bluetooth, the front jack automatically becomes a priority advisory input that is not muted by radio or intercom. It will be heard by all parties regardless of the Intercom mode and may be used for auxiliary systems such as a GPS terrain advisory or portable traffic watch system.

8.17 Marker Beacon Receiver

The marker beacon receiver uses visual and audio indicators to alert you when the aircraft passes over a 75 MHz beacon transmitter.

The marker beacon audio can be enabled and disabled by pressing the MKR button. A green lamp to the right of the button will light when the audio is enabled.

- The blue outer marker lamp has an associated 400 hertz 'dash' tone. The lamp and tone are keyed at a rate of two per second when the aircraft is in the range of the outer marker.
- The amber middle marker lamp is coupled with a 1300 hertz tone, keyed alternately with short 'dot' and long 'dash' bursts at 95 combinations per minute.
- The white inner marker lamp has a 3000 hertz 'dot' tone. The lamp and tone are keyed at a rate of six times per second.

The sensitivity (SENS) button can be used to change the marker beacon receiver sensitivity to high or low. Use HI sensitivity only when navigating using fan markers on airways. For normal ILS marker beacons the sensitivity should always be set to LO.

Holding the SENS button for one second illuminates all three lamps simultaneously to assure the lamps (internal and external) are in working order. It will also cause the marker audio to mute for that beacon; the next beacon received will reactivate the audio. Releasing the SENS button restores the last sensitivity.

9. Continued Airworthiness

Other than for periodic functional checks required by the regulations, the TMA45 audio panel has been designed and manufactured to allow "on condition maintenance". This means that there are no periodic service requirements necessary to maintain continued airworthiness, and no maintenance is required until the equipment does not properly perform its intended function. When service is required, a complete performance test should be accomplished following any repair action. Repairs should only be carried out in accordance with Trig Avionics Limited service procedures.

9.1 Cleaning the Front Panel

The plastic body and switches should be cleaned with a soft cotton cloth moistened with clean water.

10. Limited Warranty

Trig Avionics Limited warrants our products to be free from defects in materials and workmanship for a period of two (2) years from the date of installation by an authorised dealer.

This warranty covers repair and/or replacement at our option, of any parts found to be defective, provided such defects in our opinion are due to faulty material or workmanship and are not caused by tampering, abuse, or normal wear.

All warranties are FCA

Trig Avionics Limited
Heriot Watt Research Park
Riccarton, Edinburgh, EH14 4AP

Trig Avionics will not accept or pay for any charges for warranty work performed outside our factory without prior written consent.

This warranty applies only to products in normal use. It does not apply to units or circuit boards defective due to improper installation, physical damage, tampering, lightning or other electrical discharge, units with altered serial numbers, or units repaired by unauthorised persons or in violation of Trig Avionics Limited service procedures.

Trig Avionics Limited assumes no responsibility for any consequential losses of any nature with respect to any products or services sold, rendered, or delivered.

11. Environmental Qualification Form

Nomenclature:	TMA45 Audio Panel	
Part Number:	Trig Part Number 01861-00-01	
TSO	C50c, C35b Class A	
ETSO:	C50c, 2C35d EASA.IM.21O.10028565	
Manufacturer:	PS Engineering Incorporated, 9800 Martel Road, Lenoir City, TN	
Conditions	**DO-160B**	**Description of Conducted Tests**
Temperature and Altitude	4.0	Equipment tested to Category A1 & D1
Low temperature	4.5.1	-55°C Survival, -15°C Low Operating (A1)
High temperature	4.5.2	+85°C Survival, +70°C High Short Term Operating
In-Flight Loss of Cooling	4.5.4	Not Applicable, no cooling required
Altitude	4.6.1	50,000 feet unpressurised (D1)
Decompression	4.6.2	Not Applicable
Overpressure	4.6.3	Not Applicable
Temperature Variation	5.0	Equipment tested to Category C
Humidity	6.0	Equipment tested to Category A
Shock	7.0	Equipment tested to Operational test only
Vibration	8.0	Equipment tested to Category M & N
Explosion	9.0	Equipment identified as Category X – no test required
Waterproofness	10.0	Equipment identified as Category X – no test required
Fluids Susceptibility	11.0	Equipment identified as Category X – no test required
Sand and Dust	12.0	Equipment identified as Category X – no test required
Fungus	13.0	Equipment identified as Category X – no test required

Salt Spray	14.0	Equipment identified as Category X – no test required
Magnetic Effect	15.0	Equipment tested to Category Z
Power Input	16.0	Equipment tested to Category B
Voltage Spike	17.0	Equipment tested to Category A
Audio frequency conducted susceptibility	18.0	Equipment tested to Category B
Induced signal susceptibility	19.0	Equipment tested to Category A
Radio frequency susceptibility	20.0	Equipment tested to Category T
Radio frequency emission	21.0	Equipment tested to Category B
Lightning induced transient susceptibility	22.0	Equipment tested to Category XXE2
Lightning Direct Effects	23.0	Equipment identified as Category X – no test required
Icing	24.0	Equipment identified as Category X – no test required
ESD	25.0	Equipment identified as Category X – no test required

Appendix A External PTT Hook Up

Part of the installation includes the installation of PTT (Push-To-Talk) switches that allow the use of your aircraft radio for communications transmissions. There are three configurations that can be used, you must select the case that best fits your installation.

CASE 1 - The PTT is built into the pilot and co-pilot yokes

Simply install the plugs from the headset into the aircraft headphone jacks. Then use the yoke mounted PTT to transmit. No other action is required.

CASE 2 - Built in PTT only on the pilot side only

This configuration requires a modified external PTT switch plugged into the co-pilot's mic jack – see modification details below. When the co-pilot's PTT is depressed, this activates an internal relay that switches the mic audio to the aircraft radio from the pilot to the co-pilot.

CASE 3 - No built in PTT switch at all

Two built-in PTT must be installed, or two external, modified PTT switches will be required for both the pilot and co-pilot – see modification details below.

Push To Talk Modifications

When received from the manufacturer, an after-market PTT switch opens the mic audio path to the "ring" connection of the PTT mic plug until the button is pressed. When the PTT is between the intercom and the headset, the intercom function will not work unless the PTT switch is depressed. A simple modification can be performed to allow proper intercom operation. NOTE: This mod does not alter normal operation.

Below are some examples of typical modifications. Contact Trig Support or the PTT manufacturer for more details if necessary.

Procedures for David Clark PTT

1. Unscrew the round black plastic cover from the jack.

2. Connect the joined black wires to the red wire.

3. Replace the round black plastic cover.

Procedures for Telex PT-200

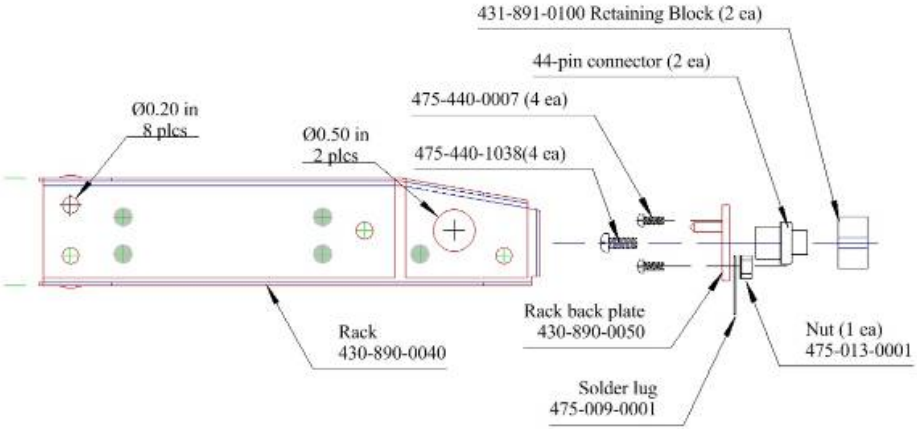
1. Unscrew the round black plastic cover from the jack.
2. Cut the red wire in the middle of the wire.
3. Strip both ends of the insulation.
4. Solder the two ends to the ground lug to the PTT jack.
5. Replace the round black plastic cover.

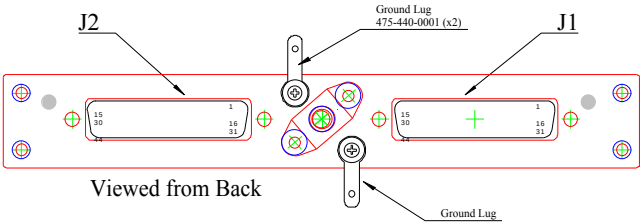
Procedures for Telex PT-300

1. Unscrew the round black plastic cover from the plug jack.
2. Remove the heat shrink material from the joined black wires.
3. Solder these two wires to the lug that has a white wire already soldered to it.
4. Replace the round black plastic cover

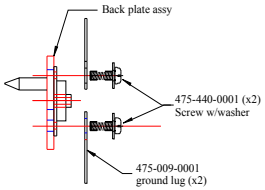
Appendix B Installation Drawings

Drawings are not to scale

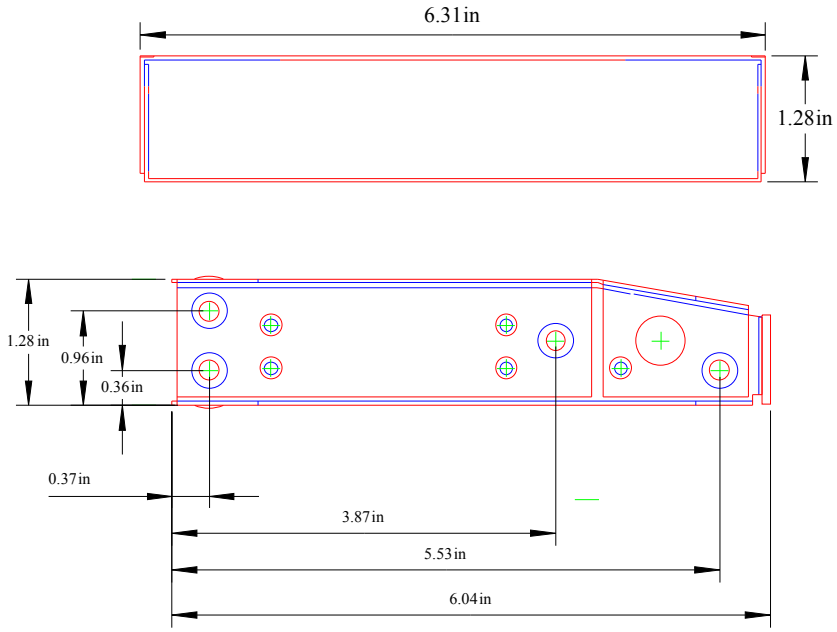




Viewed from Back

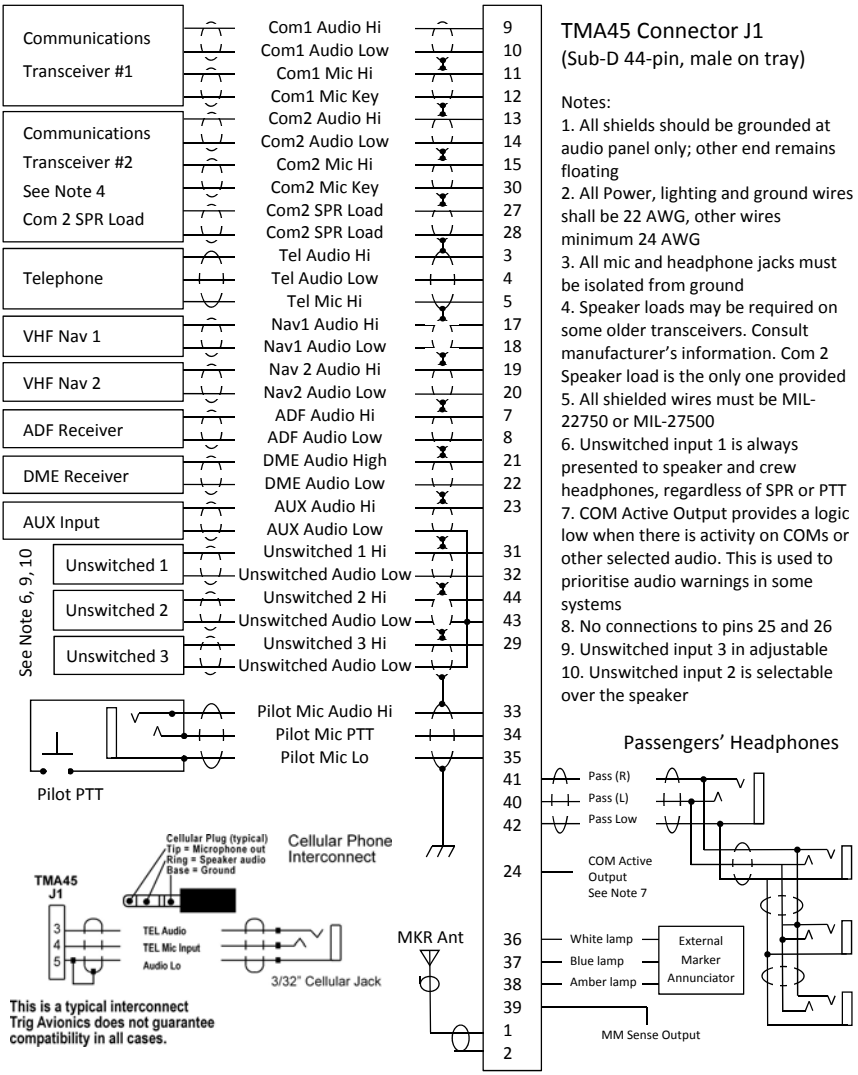


Ground lug detail



Caution: Apply steady pressure to the bezel while screwing the unit into the tray to ensure even seating of the unit and connectors.

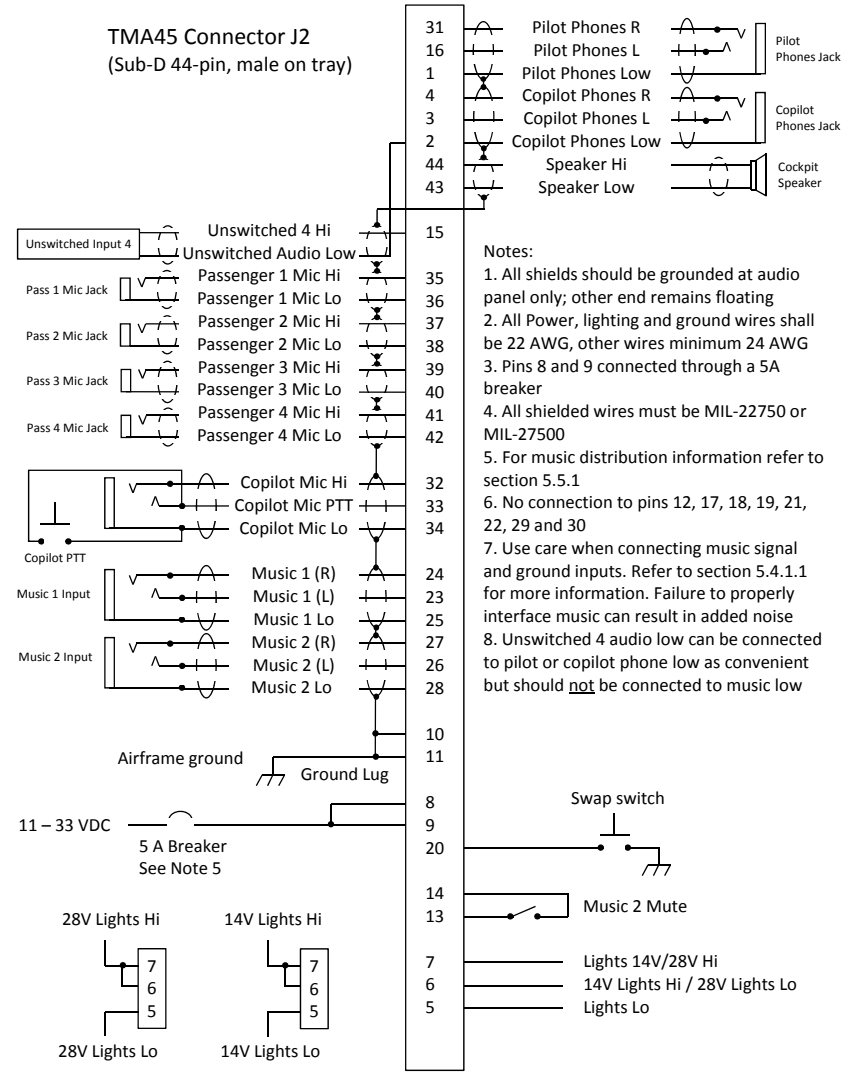
Appendix C J1 Connector Interconnect



TMA45 Connector J1
(Sub-D 44-pin, male on tray)

Notes:
1. All shields should be grounded at audio panel only; other end remains floating
2. All Power, lighting and ground wires shall be 22 AWG, other wires minimum 24 AWG
3. All mic and headphone jacks must be isolated from ground
4. Speaker loads may be required on some older transceivers. Consult manufacturer's information. Com 2 Speaker load is the only one provided
5. All shielded wires must be MIL-22750 or MIL-27500
6. Unswitched input 1 is always presented to speaker and crew headphones, regardless of SPR or PTT
7. COM Active Output provides a logic low when there is activity on COMs or other selected audio. This is used to prioritise audio warnings in some systems
8. No connections to pins 25 and 26
9. Unswitched input 3 in adjustable
10. Unswitched input 2 is selectable over the speaker

Appendix D J2 Connector Interconnect



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