TERRA
BY TRIMBLE

TMA330D/340D/350D

AUDIO PANEL/MARKER BEACON RECEIVER

OPERATION/INSTALLATION MANUAL

Trimble
2105 Donley
Austin, Texas 78758
(512) 432-0400

PRINTED IN U.S.A.

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TMA 350D/TMA340D/TMA 330D AUDIO PANEL,
MARKER BEACON, INTERCOM
OPERATION/INSTALLATION MANUAL
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SECTION I

1. INTRODUCTION

1.1 SCOPE

This manual provides installation and operation instructions for the Terra by Trimble TMA 330D Audio Panel, TMA 340D Audio Panel/Marker Beacon Receiver and TMA 350D Audio Panel/Marker Beacon Receiver/VOX Operated Intercom Unit manufactured by Trimble of Austin, Texas.

1.2 DESCRIPTION

The TMA 330D/TMA 340D and TMA 350D Audio Panels are small, lightweight, solid state audio selector panels All three units provide the following features: A speaker amplifier with two speaker impedance options and in isolation amplifier. Capability of five (5) switchable audio inputs and three (3) unswitched inputs. Microphone switching for up to three transceivers featuring pilot controllable automatic selection of received audio. Additionally, the TMA 340D and TMA 350D Audio Panels provide a three (3) lamp marker beacon receiver with Terra by Trimble's auto muting function. The TMA 350D Audo Panel also provides four (4) place VOX operated intercom with automatic cutoff during transceiver communication. These features provide a wide range audio control for any installation.

Front panel controls consist of a set of toggle switches for selection of desired audio inputs for either speaker or headphone operation. A mic selector knob for choosing which of three (3) transceivers or which of two (2) speakers for the pilot or copilot microphones are to be connected. The TMA 340D and TMA 350D Audio Panels contain a marker beacon control toggle switch for marker beacon settings of automatic muting, constant sensitivity or lamp test. Finally, the TMA 350D audio panel has volume and squelch knobs for control of the intercom system.

All three panels have switched 510 ohm audio input lines for three (3) transceivers and up to five (5) receivers. Also there are three (3) unswitched audio input lines. The "AUTO" function automatically selects the audio output of the transceiver being used (selected by the mic selector knob) and pipes the transceiver audio to either the speaker or the headphones. Pilot or Copilot keying will remove any speaker selected audio to prevent audio feedback but selected headphone audio is not affected

Two (2) speaker selections are provided by all three audio panels on the mic selector knob. A "EXT" position to select mic audio to an external speaker for ramp hailing and a "PA" position for cabin speaker communications.

Finally, all three panels provide an emergency function is provided in case of power supply failure. When "EMG" is selected on the mic selector knob and power is removed to the unit, the pilot mic and key lines are directly connected to the COM1 transceiver.

1.2 DESCRIPTION (CONTINUED)

The TMA 340D/TMA 350D Marker Beacon is a crystal controlled, super heterodyne receiver. It features three (3) annunciator lamps with three (3) individual external annunciator lamp drivers. The marker beacon receiver feature an auto muting function which automatically switches the marker receiver from a initial high sensitivity to a low sensitivity and mutes the audio as the marker beacon is flown over. This function is selected by positioning the marker beacon toggle switch to the "AUTO" position.

When this switch is in the "HI" position, the receiver is in high sensitivity and the auto muting is disabled. The "Test" position tests the receiver's annunciator lamps and external annunciator lamps if connected. A middle marker sense output is provided for some flight control systems.

All power, audio, microphone, audio returns and accessory lines are made to the audio panels via the back panel, 44 pin cardedge connector. Audio shielding is connected to the tray grounding bar.

The Audio Panels are designed to operate from either a 13.75 volt DC or 27.5 volt DC aircraft power system with a battery floating on the supply at all times.

1.3 SPECIFICATIONS

The TMA 330D/TMA340D/TMA 350D Audio Panel is approved by the Federal Aviation Administration under the Technical Standard Order (TSO) C50b of par 37 of its ruels and regulations.

The TMA 340D/TMA 350D Marker Beacon Receiver is approved by the Federal Aviation Administration under the Technical Standard Order (TSO) C35d of part 37 of its rules and regulations.

The TMA 350D Intercom is approved by the Federal Aviation Administration under the Technical Standard Order (TSO) C50b of part 37 of its rules and regulations.

The TMA 330D Audio Panel, TMA 340D Audio Panel Marker Beacon Receiver and TMA 350D Audio Panel/Marker Beacon Receiver/VOX Intercom units may therefore, be installed and operated in civil aircraft of the United States registry and aircraft of other countires that accept FAA TSO approval.

1.3.1 MECHANICAL

Mounting:	Panel mounted using the supplied slide-in mounting tray.
Overall Dimensions:	6.25" (15.9 cm) wide .20" (3.0 cm) high 5.9" (15.0 cm) deep.
Mounting Dimensions:	6.31" (16.03 cm) wide 1.48" (3.76 cm) high, 5.5" (14.0 cm) behind front of instrument panel.
Panel Cut-out:	6.12" (15.5 cm) wide 1.13" (2.87 cm) high.
Weight (without tray)	1.3 lbs. (.6Kg)
Weight (with tray):	1.7 lbs. (0.8Kg)
Connectors (marker)	chassis mount, BNC
Connectors (all):	44 pin Cardedge type

1.3.2 POWER REQUIREMENTS

Idle Current:	13.75VDC -200mA typ. 27.50 VDC-200mA typ.
Maximum Current:	13.75VDC -1.25 Amps 27.50 VDC-1.5 Amps.
Instrument Lamp:	13.75VDC -100mA typ. 27.50 VDC-100mA typ.

1.3.3 ENVIRONMENTAL SPECIFICATIONS

1.3.3.1 ENVIRONMENTAL QUALIFICATION FORM

Type: Audio Selector Panel/ Marker Beacon Receiver/ Intercom
Model: TMA 350D Part Number: 1900-0592-00
TSO Numbers: C50b, C35d

Type: Audio Selector Panel/Marker Beacon Receiver
Model: TMA 340D Part Number: 1900-0595-00
TSO Numbers: C50b, C35d

Type: Audio Selector Panel
Model: TMA 330D Part Number: 1900-0593-00
TSO Number: C50b

Manufacturer: Trimble
Address: 2105 Donley Dr.
Austin, Texas 78758

Environmental Condition	Section	Description of Tests
Temperature and Altitude	4.0	Equipment Tested to Category C l
Low Temperature	4.5.1	
High Temperature	4.5.2 & 4.5.3	
In-Flight Loss of Cooling	4.5.4	Not Required
Altitude	4.6.1	
Decompression	4.6.2	
Over pressure	4.6.3	
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
Operational Crash Safety	7.2	
	7.3	Impulse Shock only
Vibration	8.0	Equipment tested without shock mounts to categories PKS
Explosion	9.0	Category X, no test required
Waterproofness	10.0	Category X, no test required

Fluids Susceptibility	11.0	Category X, no test required
Sand and Dust	12.0	Category X, no test required
Fungus	13.0	Category X, no test required
Salt Spray	14.0	Category X, no test required
Magnetic Effect	15.0	Equipment tested to category A
Power Input	16.0	Equipment tested to category B
Voltage Spike	17.0	Equipment tested to category B
Audio Frequency Susceptibility	18.0	Equipment tested to category B
Induced Signal Susceptibility	19.0	Equipment tested to category B
Radio Frequency Susceptibility	20.0	Equipment tested to category B
Radio Frequency Emission	21.0	Equipment tested to category B
Lightning Induced Transient Susceptibility	22.0	Category X, no tests required

1.3.4 TSO COMPLIANCE

Audio Selector Panel and Intercom	TSO C50b	TMA 330D/340D/350D
Marker Beacon Receiver	TSO C35d	TMA 340D/TMA 350D
Intercom	TSO C50b	TMA 350D

1.3.5 ELECTRICAL SPECIFICATIONS

TMA 340D/TMA 350D Marker Beacon Receiver

Frequency Control: Crystal

Sensitivity: Low - 1000uV (hard)with 95% modulation. High - 200uV(hard) with 95% modulation. Auto switches from high to low sensitivity and mutes audio automatically.

Selectivity: >-40dB at +200KHz.
AGC Control:From RX threshold to 50,000µV.
Lamps:Auto dimming with remote three (3) lamp capability. 12VDC @ 80mA max per lamp.

1.3.5 ELECTRICAL SPECIFICATIONS (CONTINUED)

INPUTS & SELECTORS:

Inputs:	Three transceivers, four additional switchable audio inputs. Three unswitchable audio inputs.
Input Selector:	Each switched audio input uses one switch to select one of the following options: SPEAKER, OFF, PHONES.
Mic Selector:	Selects pilot or copilot mic to either COM 1, COM2, AUX, EXT (speaker), or PA (speaker).
Emergency Mic Position:	When Mic selector is in EMG. And power to units is removed, the pilot mic and key lines are directly connected to COM1
Input Impedance:	510 ohms
Input Muting:	50dB when the mic is keyed.

SPEAKER AMPLIFIER

Speaker Output:	9 watts maximum (27.5VDC) or 5 watts maximum (13.75VDC) into 8 or 4 ohms. Speaker impedance matching via jumper.
Input to Output Isolation:	> 50dB from input to speaker with selector in OFF position.
Distortion:	<10% at rated output.

HEADPHONE AMPLIFIER

Input Selector:	Same as speaker.
Input Impedance:	600 ohms
Headphone Amplifier: Power Output	200mW into four headphone load, before clipping
Headphone Noise loads:	Under 5mVrms, Into Four headphone
Input Isolation: (Crosstalk)	>40dB minimum between inputs.
Frequency Response:	Under 3dB from 350 to 6000 Hz

1.3.5 ELECTRICAL SPECIFICATIONS (Continued)

TMA 350D INTERCOM

Inputs:	Four mic inputs. Pilot, Copilot, Passenger 1, Passenger 2
Number of Inputs:	1 to 4
Intercom Power Output:	200mW into four (4) headphone load (before clipping)
Intercom Inhibit:	Intercom disables when pilot or copilot transmits
Mic Bias:	Greater than 5 volts into 500Ω
Mic Input Impedance:	600 ohms
ICS Phone Volume:	Manually selectable from front panel ON/OFF VOLUME knob.
Intercom Activation:	Intercom is activated by an internal VOX (Voice Activated transmission) circuit.
Sensitivity Adjust:	Manually selectable from front panel SQUELCH knob.

1.4 EQUIPMENT SUPPLIED

	TMA 330D	TMA 340D	TMA 350D
Part Number	1900-0593-00	1900-0595-00	1900-0592-00
Mounting Tray	1900-0592-10	1900-0592-00	1900-0592-00
Installation Kit	1901-5335-00	1900-5336-00	1901-5334-00
Manual	82476	82476	82476

1.5 ADDITIONAL EQUIPMENT NEEDED

A. Sufficient RG-58A/U 50 ohm coaxial cable to reach, after routing, from the TMA 340D/TMA 350D back connector to the marker beacon antenna.

B. Various lengths and gauges of MIL 22759 and shielded wires to harness the unit according to Figure 3-3 or Figure 3-4 and aircraft interfacing requirements.

1.5 ADDITIONAL EQUIPMENT NEEDED

C. BNC coaxial fittings as required for the particular installation.
D. Microphone and headphone jacks and insulating grommets as required.
E. Circuit Breaker or fuse rated at 3 amps.
F. Circuit breaker or fuse rated at 1 amp.
G. Speakers as required. (4Ω or 8Ω preferred)
H. Marker Beacon antenna as required for a particular installation.

1.6 LICENSE REQUIREMENTS

No license is required to operate this equipment.

SECTION II

2. INSTALLATION

2.1 GENERAL

This section contains all necessary installation instructions and checkout procedures for the Terra by Trimble model TMA 330D/TMA 340D/TMA 350D Audio Panel/Marker Beacon Receiver/Intercom.

Refer to either Figure 3-3 or Figure 3-4 in section III for assistance in wiring the harness. Figure 3-4 is for a 27.5 volt installation while Figure 3-3 is for a 13.75 volt installation.

2.2 PREPARATION FOR USE

Every precaution has been taken to protect your Audio Panel during shipment. However, upon receipt of the equipment, perform the following inspection to ensure that no damage has occurred during shipment or anything has inadvertently been lost.

1. Remove the unit from the shipping container and visually inspect for damage.
2. Check controls and switches to determine if they may have been damaged.
3. Make sure that all hardware and connectors listed in section 1.4, under "Equipment Supplied", are present.

If the unit is damaged, a claim must be filed with the carrier. The carrier assumes title of the unit when it accepts it for shipment. Do not return it to Trimble or its representatives.

It is suggested that the package be retained for inspection by the carrier in case of damage or for future use should it be necessary to ship the unit for service or to transfer it to another location. If the packaging is to be disposed of, please recycle as much material as possible to help preserve our environment.

2.3 INSTALLATION

Installation of any equipment in an aircraft requires that the work be performed by a Certificated Radio Repair Station with appropriate ratings. The installing agency must complete an FAA Form 337 and compute a new weight and balance for the aircraft for insertion in the Aircraft Flight Manual. Unless the mechanic is the designated inspector for a Certificated Radio Repair Station or holds an Inspection Authorization, the work is subject to inspection and approval of an FAA inspector or the holder of an Inspection Authorization.

2.3 INSTALLATION (CONTINUED)

Following is the installation procedure for the Audio Panel main unit. It gives details of what to watch for when mounting hardware and wiring the wire harness.

When choosing the location for mounting the Audio Panel avoid locations where heat sources are adjacent to it. If this is unavoidable, additional cooling will be required. Also ensure that adequate room has been allowed behind the front panel for wires, connectors, and additional cooling. A minimum of 8.00 inches (20.3cm) is recommended.

1. Refer to Audio Panel Figure 3-1 in section III for the panel cut-out details and mounting dimensions as well as pertinent notes.

2. Install the mounting tray assembly in the instrument panel. Ensure compliance with standards set forth in the FAA Aircraft Inspection and Repair Document AC 43.13-2A.

3. The 44 pin connector assembly supplied with the Audio Panel must be wired correctly to connect the aircraft avionics systems or severe damage may result to the Audio Panel or other systems. Using either interconnecting wiring diagram, Figure 3-5 or Figure 3-6 in Section III for the 44 pin connector, connect the Audio Panel to the other equipment. Comply with standards set forth in FAA Aircraft Inspection and Repair Document AC 43.13- 1 A Section 7 and other pertinent FAR's as required. Ensure that MIL-SPEC (or equiv.) wire is utilized for all interconnections. ENSURE THE 44 PIN CONNECTOR IS MOUNTED PROPERLY BY MAKING SURE THAT THE "#1" AND "A" PINS ARE ON THE LEFT SIDE OF THE TRAY AS VIEWED FROM THE FRONT.

Pin 1 Ground. This pin is to be connected to the Ground Buss located on the back of the install tray.
Pin 2 Marker Audio input, TMA 330D only. Wired to external marker receiver headphones audio output, it is pilot selectable using a toggle switch located on the TMA 330D. No connection on the TMA 340D and TMA 350D.
Pin 3 Ground. This pin is to be connected to the Ground Buss located on the back of the install tray.
Pin 4 External Inner Marker Lamp, TMA 340D and TMA 350D only. This is a output line designed to drive an external lamp. It has a maximum drive capability of 80 mA. This lamp will be illuminated when ever the inner marker lamp on the front panel is illuminated.
Pin 5 External Outer Marker Lamp, TMA 340D and TMA 350D only. This output line is the same type of output line as pin 4 above. It illuminates the external outer marker lamp whenever the outer marker lamp on the front panel is illuminated.
Pin 6 External Middle Marker Lamp TMA 340D and TMA 350D only. This output line is the same type of output line as pin 4 above. It illuminates the external middle marker lamp when ever the middle marker lamp on the front panel is illuminated.

2.3 INSTALLATION (CONTINUED)

Pin 7 Middle Marker Sense, TMA 340D and TMA 350D only. This is an output line designed to drive some autopilots that require a middle marker sense input line. This is an active high line that is used in some flight control systems.

Pin 8 COM 2 Receiver Audio. Wired to COM 2 headphones audio output, it is pilot selecteable using a toggle switch located on the Audio Panel.

NOTE: Since the Audio Panel accepts only earphone audio inputs, speaker outputs provided by other equipment are unused. However, many radios require the speaker output to be loaded. When connecting the Terra by Trimble TX 760D, the 15 ohm 3 watt resistor supplied in installation kit 1901-5334-00 should be connected between the TX 760D's speaker output and ground. Refer to specific installation manual for other types of equipment.

Pin 9 PA Speaker. This speaker output line will drive 4 or 8 ohm speakers (internally selected with a jumper). Used for public address in passenger area of larger aircraft.

Pin 10 No Connect. This pin has no internal connection.

Pin 11 AUX 4 Audio. This is a unswitchable audio input line. It comes from the headphone output line of the AUX 4 unit. This could be a telephone ringer, a DH alert from a radar altimeter, or any other audio source needed in the speaker or headphones that does not need to be switched off at the front panel of the Audio Panel. This line has an input impedance of 510 ohms.

Pin 12 DME Audio. This is a switchable audio input line. It comes from the headphone output line of the DME. This line has an input impedance of 510 ohms.

Pin 13 ADF Audio. This is a switchable audio input line. It comes from the headphone output line of the ADF. This line has an input impedance of 510 ohms.

Pin 14 AUX 1 Audio. This is a switchable audio input line. It comes from the headphone output line of the AUX 1 unit. This unit could be a HF transceiver, a third VHF communication unit, or any other audio source needed in the speaker or headphones. This line has an input impedance of 510 ohms.

Pin 15 Pilot Mic Key. This input line connects to the Pilot's Microphone Jack, key (tip) connection. Grounding this line keys the transmitter that is selected with Mic selector switch.

Pin 16 COM 2 Mic Audio. This audio output line connects to the microphone input line of the COM 2 transceiver.

Pin 17 COM 1 Mic Key. This output line connects to the microphone key line of the COM 1 transceiver. This line is grounded if C1 is selected on the Mic selector switch while either Pilot Mic or Co-pilot Mic is keyed.

Pin 18 AUX 2 Audio. This is an unswitchable audio input line. It comes from the headphone output line of the AUX 2 unit. This could be a telephone ringer, a DH alert from a radar altimeter, or any other audio source needed in the speaker or headphones that does not need to be switched off at the front panel of the Audio Panel. This line has an input impedance of 510 ohms.

2.3 INSTALLATION (CONTINUED)

Pin 19 External Speaker. This speaker output line will drive 4 or 8 ohm speakers (internally selected with a jumper). Used for public address to ground crews outside the aircraft.

Pin 20 AUX 3 Audio. This is an unswitchable audio input line. It comes from the headphone output line of the AUX 3 unit. This could be a telephone ringer, a DH alert from a radar altimeter, or any other audio source needed in the speaker or headphones that does not need to be switched off at the front panel of the Audio Panel. This line has an input impedance of 510 ohms.

Pin 21 No Connection. This pin has no internal connection.

Pin 22 Ground. This pin is to be connected to the Ground Buss located on the back of the install tray.

Pin A Ground. This pin is to be connected to the Ground Buss located on the back of the install tray.

Pin B Ground. This pin is to be connected to the Ground Buss located on the back of the install tray.

Pin C Earphone Amplifier Power. Connects to aircraft 13.75 volt DC or 27.5 volt DC power source through a 1 amp circuit breader or fuse.

Pin D Speaker Amplifier Power. Connects to aircraft power in 27.5 volt DC aircraft through a 3 amp circuit breaker or fuse. Not used in 13.75 volt installations.

Pin E Headphone output. This 600 ohm output connects to the Earphone Jacks.

Pin F Speaker Amplifier Power. Connects to aircraft power in 13.75 volt DC aircraft through a 3 amp circuit breaker or fuse. Not used in 27.5 volt installations.

Pin H COM 1 Receiver Audio. Wired to COM 1 headphones audio output, it is pilot selectable using a toggle switch located on the Audio Panel.

NOTE: Since the Audio Panel accepts only earphone audio inputs, speaker outputs provided by other equipment are unused. However, many radios require the speaker output to be loaded. When connecting the Terra by Trimble TX 760D, the 15 ohm 3 watt resistor supplied in installation kit 1901-5334-00 should be connected between the TX 760D's speaker output and ground. Refer to specific installation manual for other types of equipment.

Pin J Co-Pilot Mic Audio. This audio input line connects to the Co-Pilot's Microphone Jack, audio (ring) connection.

Pin K NAV 2 Audio. This is a switchable audio input line. It comes from the headphone output line of the NAV 2 receiver. It has an input impedance of 510 ohms.

Pin L NAV 1 Receiver Audio. Wired to NAV 1 headphones audio output, it is pilot selecteable using a toggle switch located on the Audio Panel.

Pin M This input line connects to the Co-Pilot's Microphone Jack, key (tip) connection. Grounding this line keys the transmitter that is selected with Mic selector switch.

2.3 INSTALLATION (CONTINUED)

Pin N COM 1 Mic Audio. This audio output line connects to the microphone input line of the COM 1 transceiver.

Pin P Instrument Lamp 27.5 volt. This pin is one of three pins used to power the Audio Panel back light lamps. For 27.5 volt installations this pin will be connected to the instrument panel dimmer control. For 13.75 volt installations this pin is to be left unconnected.

Pin R Instrument Lamp Ground. This pin is the second of three pins used to power the Audio Panel back light lamps. This pin connects to ground.

Pin S AUX 1 Mic Audio. This audio output line connects to the microphone input line of the AUX 1 transceiver.

Pin T Pilot Mic Audio. This audio input line connects to the Pilot's Microphone Jack, audio (ring) connection.

Pin U COM 2 Mic Key. This output line connects to the microphone key line of the COM 2 transceiver. This line is grounded if C2 is selected on the Mic selector switch while either Pilot Mic or Co-pilot Mic is keyed.

Pin V AUX 1 Mic Key. This output line connects to the microphone key line of the AUX 1 transceiver. This line is grounded if AUX is selected on the Mic selector switch while either Pilot Mic or Co-pilot Mic is keyed.

Pin W Instrument Lamp 13.75 Volt. This is the third of three pins used to power the Audio Panel back light lamps. For 13.75 volt installations this pin connects to the instrument panel dimmer control. For 27.5 volt installations this pin is to be left unconnected.

Pin X Cabin Speaker. This is an audio output line intended for use in the cockpit area of the aircraft. It will drive either 4 or 8 ohm speakers (internally selected with a jumper).

Pin Y Passenger 1 Mic Audio. This audio input line connects to the Passenger 1 Microphone Jack, audio (ring) connection.

Pin Z Passenger 2 Mic Audio. This audio input line connects to the Passenger 2 Microphone Jack, audio (ring) connection.

4. On the TMA 340D and TMA 350D attach the antenna coax to the BNC slip connector which is mounted on the back of the tray. This should be done in accordance with Figure 3-2.

5. Ground Buss, this bus is located on the back of the installation tray. All shield grounds must be connected to this buss. A 20AWG wire must be connected from this buss to Aircraft ground buss.

6. Carefully remove the bottom cover of the Audio Panel, saving the screws and cover. Referring to section III, Figure 3-7 locate the jumper plug and select the jumper position that best matches the impedance of the speakers being used. Re-install the cover of the Audio Panel.

2.3 INSTALLATION (CONTINUED)

7. Using a multi-meter, check for proper voltages on the 44 pin connector. Check also for shorts between individual pins and between the ground and power bus pins. DO THIS BEFORE INSTALLING THE AUDIO PANEL IN THE MOUNTING TRAY.

8. Slide the Audio Panel into the mounting tray. Secure it in place by using a 7/64" Allen (hex) wrench to tighten the locking shaft accessible through the front panel. Rotate the wrench clockwise while applying gentle pressure to the front panel until the unit engages the rear connector at the rear of the mounting tray. Use caution to prevent stripping the threads. When properly installed, the front panel of the unit will be very close to the instrument panel. To remove the Audio Panel, perform this step in reverse order.

2.4 ANTENNA INSTALLATION

A dedicated Marker Beacon Antenna is recommended. **Ensure that the maximum speed of the antenna being used matches the maximum speed of the aircraft the Audio Panel is being installed on.**

Using the location information provided by the manufacturer of the marker beacon antenna, choose a location to mount the antenna. Using the mounting template supplied by the antenna manufacturer, mark, drill (punch), and mount the antenna to the aircraft.

2.5 OPERATIONAL CHECKOUT

Following is a checkout procedure to ensure that the Audio Panel is performing as it should after installation. If a failure occurs in any of the following steps, stop the check out, correct the problem, recheck that procedure and then continue.

l. Turn on the avionics master switch.
2. For TMA 340D and TMA 350D hold the marker beacon in the TEST or down position. All three marker beacon lamps on the Audio Panel (and any remote marker beacon lamps) should be illuminated. Place a finger over the auto dimming photocell just below and to the left of the function switch. Check to be sure that the lamps dim (they don’t need to be fully extinguished). Let up on the TEST switch.

3. Verify proper performance of all inputs by setting the COM l rocker switch to the speaker position with all other input switches centered. Tune the COM l receiver to an active frequency and verify COM l receiver audio is heard on the speaker. Move the COM l switch to the center or “OFF” position and verify that COM l receiver audio is muted to the speaker and headphones. Move the COM l switch to the phone position and verify COM l receiver audio is heard in the headphones.

2.5 OPERATIONAL CHECKOUT (CONTINUED)

4. Progressively select the other input line switches (COM 2, NAV l, NAV 2, MKR, ADF, DME, and AUX) and perform step 3 for each of these input lines.

5. Move the COM l switch to the speaker position and center all other toggle switches. Rotate the microphone switch to C l and verify COM l transmit and mic audio. Move the microphone switch to EMG and also verify COM l transmit and mic audio. Move the microphone switch back to C1. Move the COM 1 switch to the center position and move the AUTO switch to the speaker position. Verify that COM 1 receiver audio is heard on the speaker. Move the AUTO switch to the phone position. Verify that COM 1 receiver audio is heard in the headphones.

6. Rotate the microphone switch to C2. Verify COM 2 transmits and mic audio is present. Check for receive audio in the speaker and headphones. Perform the same test for the AUX position (if wired).

7. Rotate the microphone switch to EXT. Ensure that pilot and copilot microphone audio is present on the external speaker. Rotate the microphone switch to PA. Ensure that pilot and copilot microphone audio is present on the PA speaker.

8. Rotate the aircraft dimmer control from bright to dim and back to bright. Ensure that the Audio Panel back lights dim and return to bright.

9. Connect a Marker Beacon signal generator to the antenna connector of the TMA 340D or TMA 350D only, at the antenna end of the coaxial cable. Inject a 300µV signal and check all three marker beacon tones on the Audio Panel. With the marker control switch AUTO, check for audio on both the speaker and the headphone by toggling the MKR switch to the speaker and phone positions. Check for both indicator and external lamp drivers on all three tones. Increase injected signal to 1500µV and determine that the auto muting feature is working correctly by checking for headphone and speaker audio.

l l. If middle marker sense is used for flight control systems, check for a high on pin 7, middle marker sense, when a middle maker signal is injected.

10. Secure all avionics master and power switches in/on the aircraft. Disconnect the marker beacon signal generator cable reconnecting the coaxial cable to the marker beacon antenna.

2.6 FINAL INSPECTION

l. Ensure that all wiring is properly routed and secure. Dress harnessing neatly and secure in place with cable ties. Check connector integrity and locking devices. Ensure locking devices are functioning properly and are secured. Verify that cabling is not “clotheslined” and provisions have been made for service loops. Pull yoke to its maximum travel. While slowly returning the yoke to its original position, rotate the yoke to full left and full right to ensure all cabling is routed and tied properly and does not interfere with the yoke assembly. Cycle rudder pedals and verify they are free and cables are unobstructed. Install gust locks, perform complete checkout of all avionics including dimmers.

2. Have the installation inspected by an authorized F.A.R. Part 65 inspector.

3. Add the Terra by Trimble Audio Panel to the aircraft equipment list, make sure to include the serial number. If required, complete F.A.A. form 337 and make required airframe logbook entries. A weight and balance change may be required depending on the type of aircraft the Audio Panel was installed in.

4. Complete the warranty card and return it to Trimble.

SECTION III

3. INSTALLATION DRAWINGS

3.1 SCOPE

Drawings in this section are intended to assist the installer in the installation of the TMA 330D/TMA 340D or TMA 350D. In this section you will find Figure 3-3 which shows a typical installation of the Audio Panel in a 13.75 volt system aircraft. Also in this section you will find Figure 3-4 which shows a typical installation of the Audio Panel in a 27.5 volt system aircraft. Figure 3-1 depicts physical dimensions of the TMA 330D/TMA 340D/TMA 350D, the mounting tray, and the instrument panel cutout. Figure 3-1 depicts the location of the speaker impedance jumper. They also show the positions for the 4 ohm and 8 ohm jumper settings.

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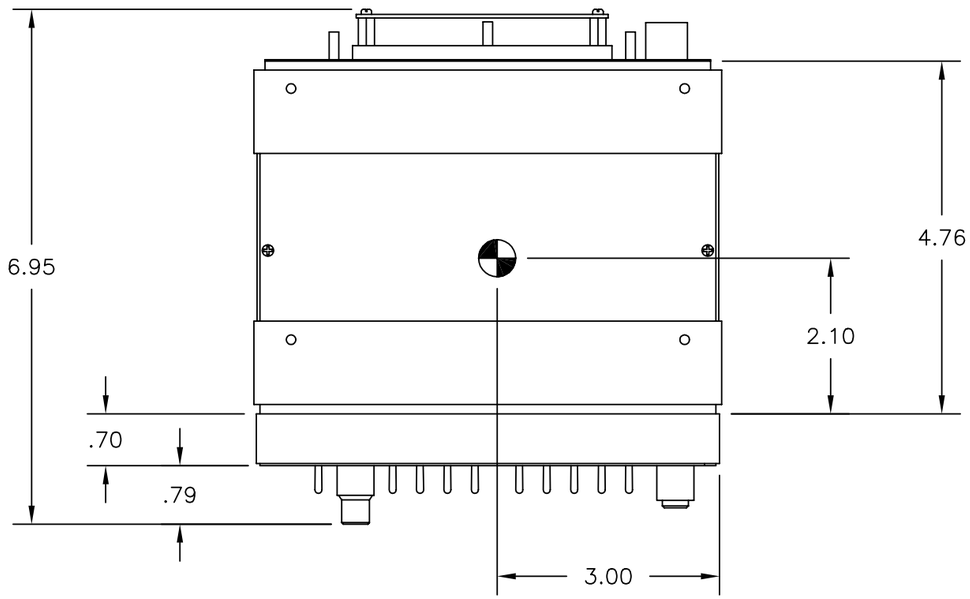

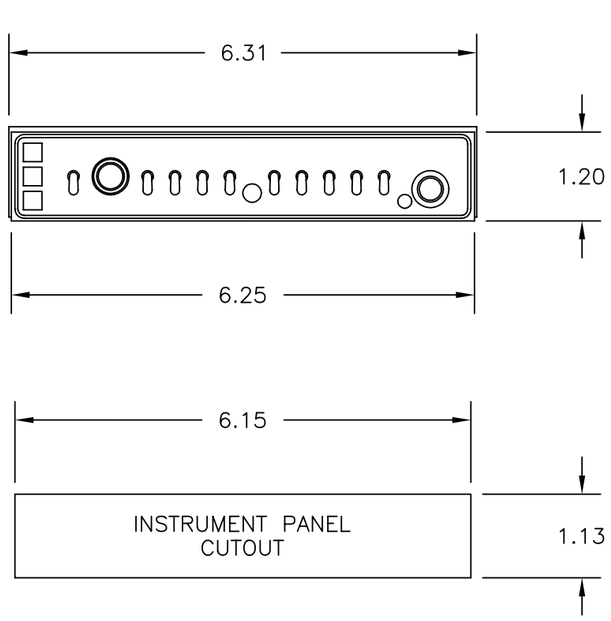

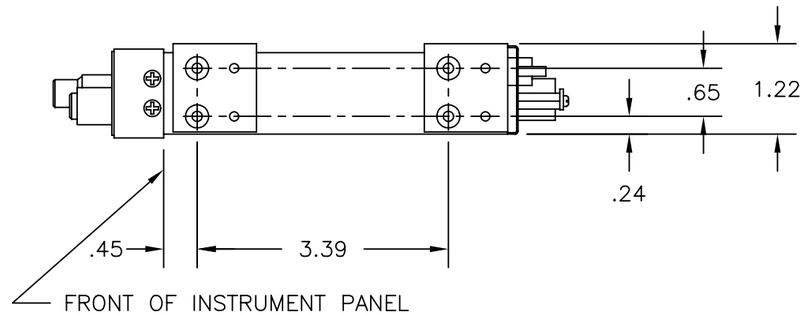

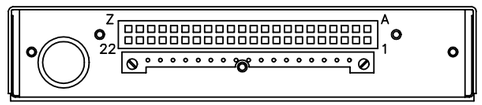

Figure 3-1
TMA 330D/TMA 340D/TMA 350D Outline Drawing

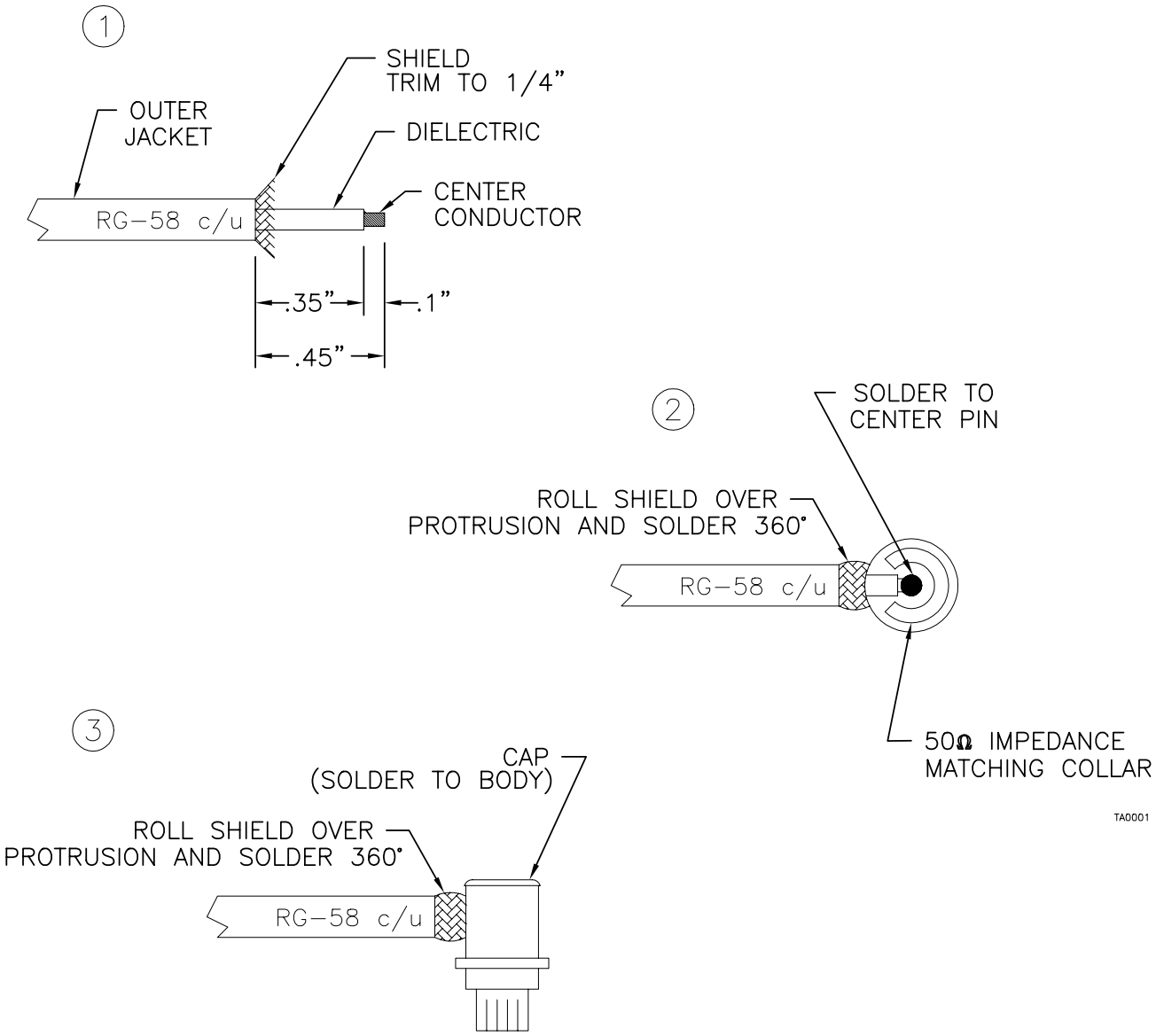

Figure 3-2
Coax Connector Instructions

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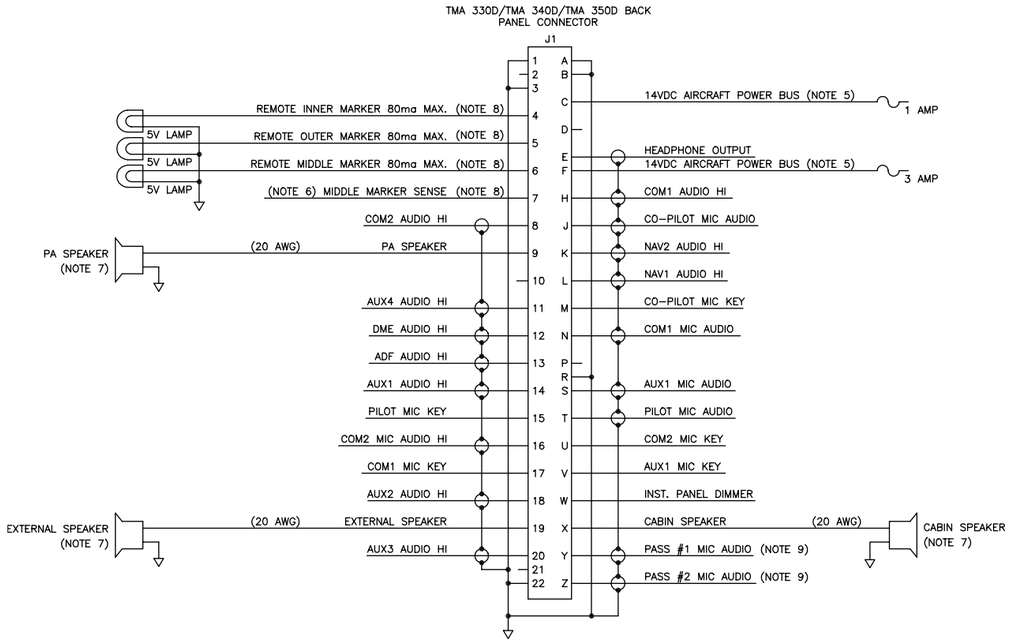
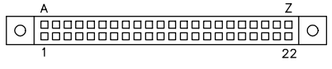
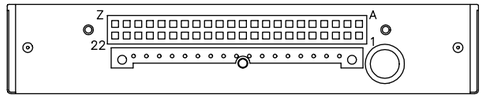
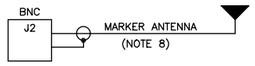




FRONT VIEW OF CONNECTOR



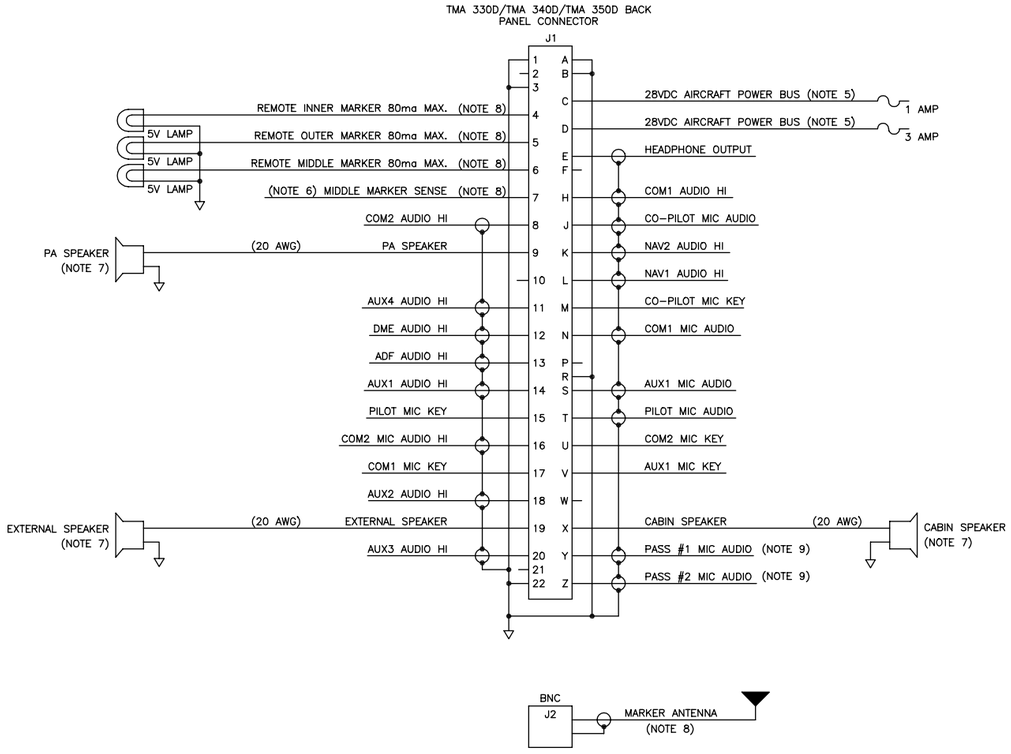
REAR VIEW OF TRAY

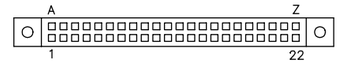


NOTES:

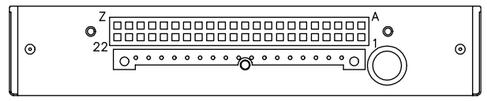
1. ALL SHIELDS ARE TO BE CONNECTED TOGETHER ON THE GROUND BUS ON THE BACK OF THE INSTALLATION TRAY.
2. COAX CABLE TO THE ANTENNA IS TO BE RG-58A/U OR EQUIVALENT.
3. ALL AUDIO LINES ARE TO USE #22 AWG SHIELDED CABLE WITH TEFLON INSULATION OR EQUIVALENT.
4. ALL POWER LINES ARE TO USE #20 AWG TEFLON INSULATED WIRE OR EQUIVALENT.
5. POWER INPUTS ARE TO BE SUPPLIED THROUGH INDIVIDUAL BREAKERS. DO NOT CONNECT TOGETHER.
6. THIS OUTPUT CONNECTS TO AUTO PILOTS UTILIZING MIDDLE MARKER SENSE FOR AUTO PILOT SENSITIVITY ADJUSTMENT (ACTIVE HI).
7. THE P.A. SPEAKER, EXT. SPEAKER, AND CABIN SPEAKER ARE OPTIONAL AND CAN BE OMITTED BY LOADING ALL UNUSED SPEAKER OUTPUT LINES TO A 15 OHM 3W RESISTOR. THE RESISTOR IS SUPPLIED IN THE TMA 350D INSTALL KIT.
8. AVAILABLE ON TMA 340D AND TMA 350D ONLY.
9. AVAILABLE ON TMA 350D ONLY.

Figure 3-3
TMA 330D/TMA 340D/TMA 350D TSO A/C Wiring Diagram - 14V





FRONT VIEW OF CONNECTOR



REAR VIEW OF TRAY

NOTES:

1. ALL SHIELDS ARE TO BE CONNECTED TOGETHER ON THE GROUND BUS ON THE BACK OF THE INSTALLATION TRAY.
2. COAX CABLE TO THE ANTENNA IS TO BE RG-58A/U OR EQUIVALENT.
3. ALL AUDIO LINES ARE TO USE #24 AWG SHIELDED CABLE WITH TEFLON INSULATION OR EQUIVALENT.
4. ALL POWER LINES ARE TO USE #20 AWG TEFLON INSULATED WIRE OR EQUIVALENT.
5. POWER INPUTS ARE TO BE SUPPLIED THROUGH INDIVIDUAL BREAKERS. DO NOT CONNECT TOGETHER.
6. THIS OUTPUT CONNECTS TO AUTO PILOTS UTILIZING MIDDLE MARKER SENSE FOR AUTO PILOT SENSITIVITY ADJUSTMENT (ACTIVE HI).
7. THE P.A. SPEAKER, EXT. SPEAKER, AND CABIN SPEAKER ARE OPTIONAL AND CAN BE OMITTED BY LOADING ALL UNUSED SPEAKER OUTPUT LINES TO A 15 OHM 3W RESISTOR. THE RESISTOR IS SUPPLIED IN THE TMA 350D INSTALL KIT.
8. AVAILABLE ON TMA 340D AND TMA 350D ONLY.
9. AVAILABLE ON TMA 350D ONLY.

Figure 3-4
TMA 330D/TMA 340D/TMA 350D TSO A/C Wiring Diagram - 28V

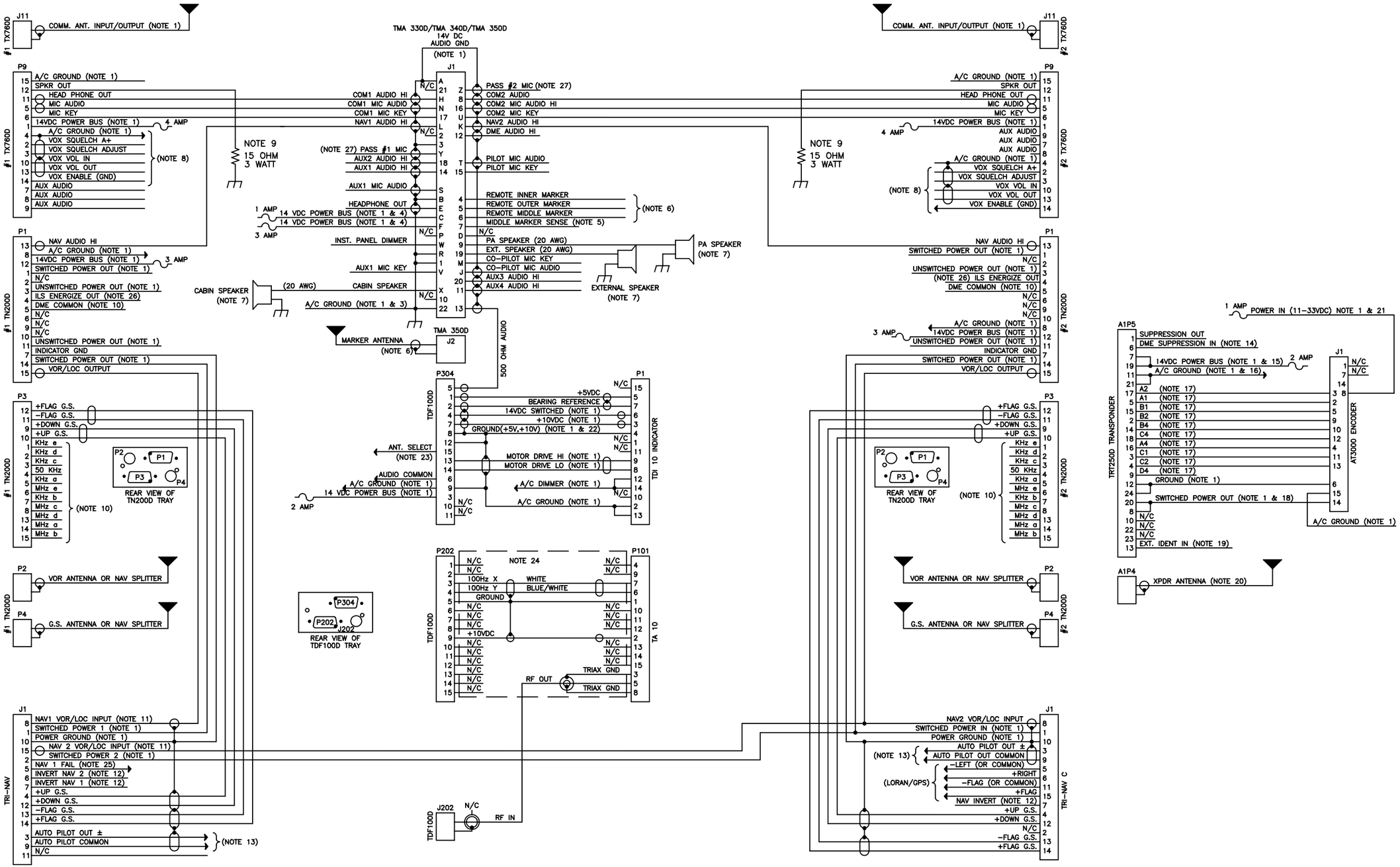


Figure 3-5 (Sheet 1 of 2)
TMA 330D/TMA 340D/TMA 350D Interconnect Diagram 14 VDC

NOTES:

1. WIRE SIZE: POWER INPUT AND POWER (CHASSIS) GROUND ARE AWG 20, AUDIO AND SHIELD GROUND IS AWG 24, ALL OTHERS ARE AWG 22. ALL WIRE IS MIL 22759/16.
ALL COAX IS RG-58 A/U OR EQUIVALENT, UNLESS OTHERWISE NOTED.

2. ALL SHIELDS ARE TO BE GROUNDED ON ONE END ONLY. THE END TO BE GROUNDED SHOULD BE THE LOAD END. KEEP THE UNSHIELDED PORTION AS SHORT AS POSSIBLE.

3. ALL SHIELDS FOR THE AUDIO PANEL ARE TO BE CONNECTED TO THE GROUND BUS ON THE BACK OF THE INSTALLATION TRAY.

4. POWER INPUTS TO THE AUDIO PANEL ARE TO BE SUPPLIED THROUGH INDIVIDUAL BREAKERS. DO NOT CONNECT TOGETHER.

5. THIS OUTPUT ONLY AVAILABLE FROM THE TMA 340D AND THE TMA 350D, CONNECTS TO AUTO PILOTS UTILIZING MIDDLE MARKER SENSE FOR AUTO PILOT SENSITIVITY ADJUSTMENT (ACTIVE HIGH).

6. THE REMOTE MARKER LAMP OUTPUTS, ONLY AVAILABLE FROM THE TMA 340D AND THE TMA 350D, SUPPLY 13VDC TO DRIVE REMOTE LAMPS, AND HAVE A MAXIMUM CURRENT OF 80 mA EACH.

7. THE P.A. SPEAKER, EXT. SPEAKER, AND CABIN SPEAKER ARE OPTIONAL AND CAN BE OMITTED BY LOADING ALL UNUSED SPEAKER OUTPUT LINES TO A 15 OHM 3W RESISTOR. THE RESISTOR IS SUPPLIED IN THE AUDIO PANEL INSTALL KIT.

8. IF THE INTERNAL VOX CIRCUITRY OF THE TX 760D IS NOT DESIRED, ALL OF THESE PINS ARE LEFT OPEN.

9. SPEAKER OUTPUT ON THE TX 760D RADIOS MUST BE LOADED WITH A 15 OHM 3 WATT RESISTOR TO PREVENT DAMAGE TO THE OUTPUT CIRCUITRY. TWO RESISTORS P/N 9-4720-230-00 ARE SUPPLIED IN THE AUDIO PANEL INSTALL KIT.

10. DME COMMON IS ON P1 AND DME CHANNELING IS ON P3. WHEN CONNECTING DUAL NAV/DME CHANNING THE DME COMMON IS TOGGLED BETWEEN NAV 1 AND NAV 2. ISOLATION DIODES MUST BE CONNECTED TO P3 PINS 1-8 AND 13-15 OF TN200D UNITS S/N 1099 & BELOW. WHEN USING TN200D UNITS S/N 1100 & ABOVE THE DIODES ARE FACTORY INSTALLED.

11. FOR SINGLE SYSTEM INSTALLATION, NAV 2'S INPUT (PIN 15) CAN BE CONNECTED TO NAV 1'S INPUT (PIN 8) TO DISPLAY THE SELECTED OBS SETTING IN THE NAV 1 DISPLAY AND SIMULTANEOUSLY DISPLAY THE RECEIVED NAV 1 DIGITAL RADIAL IN THE NAV 2 DISPLAY.

12. TRI NAV OR TRI NAVC MOD 5 OR ABOVE, WHEN USING TERRA BY TRIMBLE'S TN 200, TN200D OR OTHER SIMILARLY PHASED COMPOSITE OUTPUTS, PIN 7 IS INTERNALLY GROUNDED (FACTORY INSTALLED) FOR PROPER PHASE PROGRAMMING. ON NAV RECEIVERS WITH COMPOSITE SIGNALS 180 DEGREES OUT, CUT THE JUMPER SHOWN IN INSTALLATION MANUAL 1910-0220-00 (TRINAV) OR 1900-0220-10 (TRI NAVC). TRI NAV OR TRI NAVC MOD 4 OR BELOW SEE INSTALLATION MANUALS LISTED ABOVE.

13. AUTO PILOT OUTPUT LEVEL IS 15 MILLIVOLTS PER DEGREE OF VOR COURSE ERROR, OR 90 MILLIVOLTS FOR A 0.093 DDM LOCALIZER SIGNAL. THE AUTO PILOT OUTPUT WILL DRIVE ANY COUPLER WITH AN INPUT IMPEDANCE GREATER THAN 100 OHMS. OUTPUT IS UNBALANCED TO GROUND.

14. MUST BE CONNECTED TO APPROPRIATE PIN ON DME IF USED, OTHERWISE NO CONNECTIONS ARE MADE.

15. PINS 7 AND 19 MUST BOTH BE CONNECTED TO A COMMON 2 AMP CIRCUIT BREAKER.

16. BOTH PINS 11 AND 21 MUST BE GROUNDED.

17. IF TWO OR MORE DEVICES ARE TIED TO THE ENCODER, DIODE ISOLATION FOR EACH UNIT MUST BE UTILIZED.

18. TOTAL CURRENT DRAW ON PINS 20 AND 8 SHOULD BE 0.5 AMPS OR LESS.

19. USE ONLY A MOMENTARY SWITCH TO GROUND FOR EXT. IDENT. FUNCTION.

20. SELECT 1 EACH TYPE CABLE AND CONNECTOR FROM THOSE LISTED:
CABLE LENGTHS; RG-58 A/U - 9 FEET MAXIMUM LENGTH
RG-8 A/U - 17 FEET MAXIMUM LENGTH
CONNECTORS; RG-58 A/U - UG-88C, UG-88D, UG-88E, AMPHENOL 31-320, 31-357 OR 36775
RG-8 A/U - UG-959, AMPHENOL 6775

21. IF THE AT3000 ENCODER & TRT250D TRANSPONDER ARE WIRED AS SHOWN, THE AT3000 ENCODER OVEN WARM UP TIME WILL BEGIN AS SOON AS THE MASTER POWER IS ON. THE AT3000 ENCODER DATA WILL BE AVAILABLE WHEN THE TRT250D TRANSPONDER IS SWITCHED ON. ELIMINATE PIN 8 CONNECTION FOR AT3000 UNITS MOD 4 OR BELOW.

22. RUN GROUND WIRES AS SHOWN BETWEEN UNITS TO AVOID INTERFERENCE CAUSED BY "GROUND LOOPING" TO THE AIRFRAME.

23. FOR TOP MOUNTED ANTENNA, NO CONNECTION IS MADE TO PIN 15 OF P304. FOR BOTTOM MOUNTED ANTENNA, GROUND PIN 15 OF P304.

24. ANTENNA CABLE ASSEMBLY IS PREWIRED, ON THE TA 10 END, AT THE FACTORY. ORDER P/N 1900-0372-00 FOR A 14 FOOT LENGTH OR P/N 1900-0372-10 FOR A 28 FOOT LENGTH. LENGTH IS NOT CRITICAL AND MAY BE SHORTENED IF DESIRED.

25. APPLYING A GROUND TO PIN 5 CAUSES NAV 2 INFORMATION TO BE CHANNELED TO THE NAV 1 DISPLAY. THIS PIN CAN BE WIRED TO AN EXTERNAL SWITCH FOR USE IN CASE OF A RECEIVER FAILURE OR TO TRANSFER NAV 2'S VOR/LOC INFORMATION INSTANTANEOUSLY TO DISPLAY FLIGHT INFORMATION.

26. NOT USED ON TRI NAV OR TRI NAVC INSTALLATIONS. ILS ENERGIZE PROVIDES GROUND FOR UNITS NEEDING POSITIVE ILS INDICATION.

27. ONLY AVAILABLE ON THE TMA 350D.

Figure 3-5 (Sheet 2 of 2)
TMA 350D Interconnect Diagram 14VDC

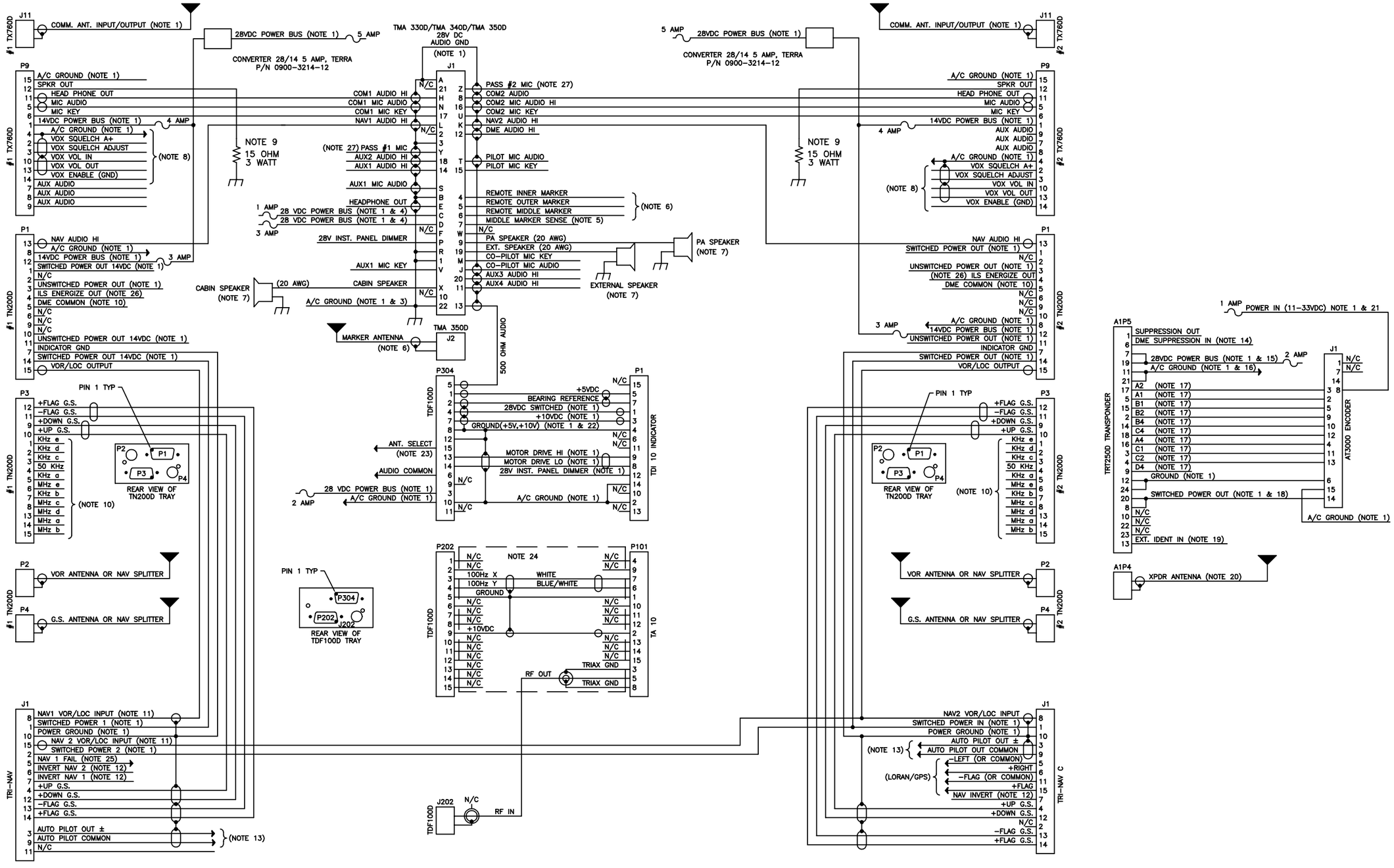


Figure 3-6 (Sheet 1 of 2)
TMA 330D/TMA 340D/TMA 350D Interconnect Diagram 28 VDC

NOTES:

1. WIRE SIZE: POWER INPUT AND POWER (CHASSIS) GROUND ARE AWG 20, AUDIO AND SHIELD GROUND IS AWG 24, ALL OTHERS ARE AWG 22. ALL WIRE IS MIL 22759/16. ALL COAX IS RG-58 A/U OR EQUIVALENT, UNLESS OTHERWISE NOTE.

2. ALL SHIELDS ARE TO BE GROUNDED ON ONE END ONLY. THE END TO BE GROUNDED SHOULD BE THE LOAD END. KEEP THE UNSHIELDED PORTION AS SHORT AS POSSIBLE.

3. ALL SHIELDS FOR THE AUDIO PANEL ARE TO BE CONNECTED TO THE GROUND BUS ON THE BACK OF THE INSTALLATION TRAY.

4. POWER INPUTS TO THE AUDIO PANEL ARE TO BE SUPPLIED THROUGH INDIVIDUAL BREAKERS. DO NOT CONNECT TOGETHER.

5. THIS OUTPUT, ONLY AVAILABLE FROM THE TMA 340D AND THE TMA 350D, CONNECTS TO AUTO PILOTS UTILIZING MIDDLE MARKER SENSE FOR AUTO PILOT SENSITIVITY ADJUSTMENT (ACTIVE HIGH).

6. THE REMOTE MARKER LAMP OUTPUTS, ONLY AVAILABLE FROM THE TMA 340D AND THE TMA 350D, SUPPLY 13VDC TO DRIVE REMOTE LAMPS, AND HAVE A MAXIMUM CURRENT OF 80 mA EACH.

7. THE P.A. SPEAKER, EXT. SPEAKER, AND CABIN SPEAKER ARE OPTIONAL AND CAN BE OMITTED BY LOADING ALL UNUSED SPEAKER OUTPUT LINES TO A 15 OHM 3W RESISTOR. THE RESISTOR IS SUPPLIED IN THE AUDIO PANEL INSTALL KIT.

8. IF THE INTERNAL VOX CIRCUITRY OF THE TX 760D IS NOT DESIRED, ALL OF THESE PINS ARE LEFT OPEN.

9. SPEAKER OUTPUT ON THE TX 760D RADIOS MUST BE LOADED WITH A 15 OHM 3 WATT RESISTOR TO PREVENT DAMAGE TO THE OUTPUT CIRCUITRY. TWO RESISTORS P/N 9-4720-230-00 ARE SUPPLIED IN THE AUDIO PANEL INSTALL KIT.

10. DME COMMON IS ON P1 AND DME CHANNELING IS ON P3. WHEN CONNECTING DUAL NAV/DME CHANNELING THE DME COMMON IS TOGGLED BETWEEN NAV 1 AND NAV 2. ISOLATION DIODES MUST BE CONNECTED TO P3 PINS 1-8 AND 13-15 OF TN200D UNITS S/N 1099 & BELOW. WHEN USING TN200D UNITS S/N 1100 & ABOVE THE DIODES ARE FACTORY INSTALLED.

11. FOR SINGLE SYSTEM INSTALLATION, NAV 2'S INPUT (PIN 15) CAN BE CONNECTED TO NAV 1'S INPUT (PIN 8) TO DISPLAY THE SELECTED OBS SETTING IN THE NAV 1 DISPLAY AND SIMULTANEOUSLY DISPLAY THE RECEIVED NAV 1 DIGITAL RADIAL IN THE NAV 2 DISPLAY.

12. TRI NAV OR TRI NAVC MOD 5 OR ABOVE, WHEN USING TERRA BY TRIMBLE'S TN 200, TN200D OR OTHER SIMILARLY PHASED COMPOSITE OUTPUTS, PIN 7 IS INTERNALLY GROUNDED (FACTORY INSTALLED) FOR PROPER PHASE PROGRAMMING. ON NAV RECEIVERS WITH COMPOSITE SIGNALS 180 DEGREES OUT, CUT THE JUMPER SHOWN IN INSTALLATION MANUAL 1910-0220-00 (TRINAV) OR 1900-0220-10 (TRI NAVC). TRI NAV OR TRI NAVC MOD 4 OR BELOW SEE INSTALLATION MANUALS LISTED ABOVE.

13. AUTO PILOT OUTPUT LEVEL IS 15 MILLIVOLTS PER DEGREE OF VOR COURSE ERROR, OR 90 MILLIVOLTS FOR A 0.093 DDM LOCALIZER SIGNAL. THE AUTO PILOT OUTPUT WILL DRIVE ANY COUPLER WITH AN INPUT IMPEDANCE GREATER THAN 100 OHMS. OUTPUT IS UNBALANCED TO GROUND.

14. MUST BE CONNECTED TO APPROPRIATE PIN ON DME IF USED, OTHERWISE NO CONNECTIONS ARE MADE.

15. PINS 7 AND 19 MUST BOTH BE CONNECTED TO A COMMON 2 AMP CIRCUIT BREAKER.

16. BOTH PINS 11 AND 21 MUST BE GROUNDED.

17. IF TWO OR MORE DEVICES ARE TIED TO THE ENCODER, DIODE ISOLATION FOR EACH UNIT MUST BE UTILIZED.

18. TOTAL CURRENT DRAW ON PINS 20 AND 8 SHOULD BE 0.5 AMPS OR LESS.

19. USE ONLY A MOMENTARY SWITCH TO GROUND FOR EXT. IDENT. FUNCTION.

20. SELECT 1 EACH TYPE CABLE AND CONNECTOR FROM THOSE LISTED:
    CABLE LENGTHS; RG-58 A/U - 9 FEET MAXIMUM LENGTH
    RG-8 A/U - 17 FEET MAXIMUM LENGTH
    CONNECTORS; RG-58 A/U - UG-88C, UG-88D, UG-88E, AMPHENOL 31-320, 31-357 OR 36775
    RG-8 A/U - UG-959, AMPHENOL 6775

21. IF THE AT3000 ENCODER & TRT250D TRANSPONDER ARE WIRED AS SHOWN, THE AT3000 ENCODER OVEN WARM UP DME WILL BEGIN AS SOON AS THE MASTER POWER IS ON. THE AT3000 ENCODER DATA WILL BE AVAILABLE WHEN THE TRT250D TRANSPONDER IS SWITCHED ON. ELIMINATE PIN 8 CONNECTION FOR AT3000 UNITS MOD 4 OR BELOW.

22. RUN GROUND WIRES AS SHOWN BETWEEN UNITS TO AVOID INTERFERENCE CAUSED BY "GROUND LOOPING" TO THE AIRFRAME.

23. FOR TOP MOUNTED ANTENNA, NO CONNECTION IS MADE TO PIN 15 OF P304. FOR BOTTOM MOUNTED ANTENNA, GROUND PIN 15 OF P304.

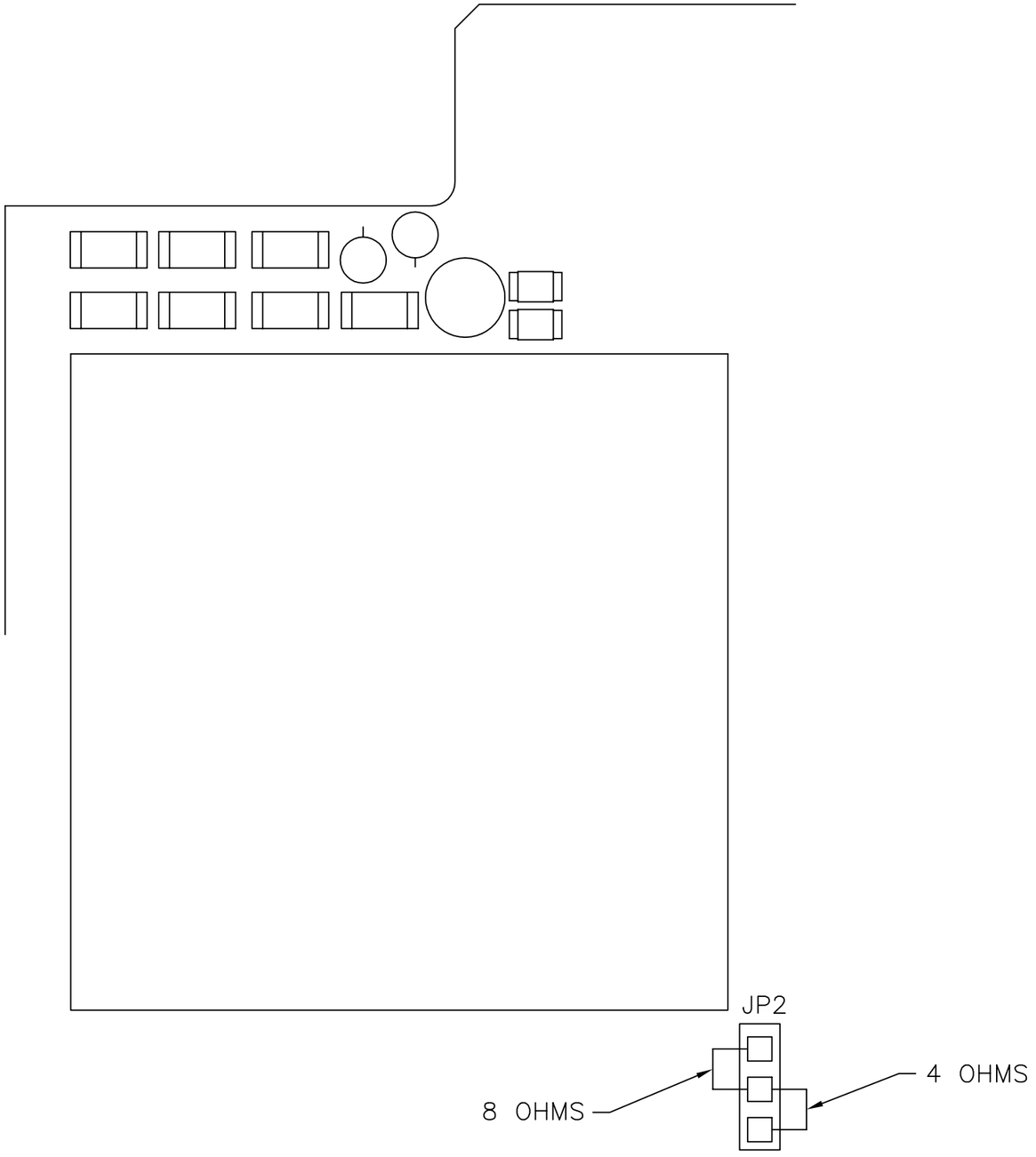
24. ANTENNA CABLE ASSEMBLY IS PREWIRED, ON THE TA 10 END, AT THE FACTORY. ORDER P/N 1900-0372-00 FOR A 14 FOOT LENGTH OR P/N 1900-0372-10 FOR A 28 FOOT LENGTH. LENGTH IS NOT CRITICAL AND MAY BE SHORTENED IF DESIRED.

25. APPLYING A GROUND TO PIN 5 CAUSES NAV2 INFORMATION TO BE CHANNELED TO THE NAV 1 DISPLAY. THIS PIN CAN BE WIRED TO AN EXTERNAL SWITCH FOR USE IN CASE OF A RECEIVER FAILURE OR TO TRANSFER NAV 2'S VOR/LOC INFORMATION INSTANTANEOUSLY TO DISPLAY FLIGHT INFORMATION.

26. NOT USED ON TRI NAV OR TRI NAVC INSTALLATIONS. ILS ENERGIZE PROVIDES GROUND FOR UNITS NEEDING POSITIVE ILS INDICATION.

27. ONLY AVAILABLE ON THE TMA 350D.

Figure 3-6 (Sheet 2 of 2)
TMA 350D Interconnect Diagram 24 VDC



NOTE:
1. THIS DWG. INDICATES JUMPER POSITION FOR TMA 330D/ 340D/350D REVISION 'D' AND LATER PC BOARDS. REFER TO DWG # 9-1160-0031-02 FOR EARLIER REVISION PC BOARDS.

Figure 3-7
Impedance Jumper Locater

SECTION IV

4. OPERATION

4.1 SCOPE

This section describes the proper operation of the Terra by Trimble model TMA 330D/TMA 340D/TMA 350D Audio Panel Marker Beacon Intercom unit. It will instruct the user on the correct usage of the switches and knobs located on the front panel of the unit.

4.2 TOGGLE SWITCHES OPERATION

The front panel of the TMA 340D and TMA 350D have ten (10), three (3) position toggle switches. From left to right these switches are labeled as “HI/AUTO/TEST”, “COM 1”, “COM 2”, “NAV 1”, “NAV 2”, “MKR”, “ADF”, “DME”, “AUX”, and “AUTO”.

HI/AUTO/TEST Switch. The HI/AUTO/TEST toggle switch is located at the far left of the front panel of the TMA 340D/TMA 350D. Its function is to control the sensitivity of the marker beacon receiver and test the marker beacon annunciators located on the front panel. For most operations of the marker beacon receiver, the switch will be in the center (AUTO) position. This center position allows the receiver to operate in its full automatic mode. When no signal is being received, the receiver is in a high sensitivity mode. As the aircraft approaches a marker beacon transmitter the corresponding lamp annunciator lights and the correct tone is audible. As the signal gets stronger as the aircraft flies over the transmitter, the receiver automatically switches to a lower sensitivity and mutes the received audio tone to the audio panel. If it is wished, the receiver can be forced to stay in a higher sensitivity mode by pushing the AUTO switch to the up or HI position. This action will keep the received audio tones un-muted. When the AUTO switch is pushed to the momentary down (TEST) position, all three front panel annunciator lamps as well as all three external annunciator lamps (if installed) will be illuminated. Also the HI/LOW gain circuitry of the receiver will be reset to the HI gain mode. When flying over a middle marker beacon, the middle marker sense will go to a high. This is for some flight control systems which require middle marker information. The middle marker sense does not activate during lamp test.

COM 1 Switch. The COM 1 switch is used to select whether or not the received audio of the COM 1 transceiver is to be heard. If the received audio is to be heard, the pilot can choose to pipe the audio to either the headphones or the cabin speaker.

Centering the COM 1 toggle switch shuts off all audio from that transceiver. If the COM 1 audio is to be heard on the cabin speaker, move the COM 1 toggle switch to the up position. If the COM 1 audio is to be heard in the headphones, move the COM 1 toggle switch to the down position.

COM 2 Switch. Operation of the COM 2 toggle switch is exactly the same as that of the COM 1 switch. The only difference is that it controls the receive audio line of the COM 2 transceiver.

4.2 TOGGLE SWITCHES OPERATION (CONTINUED)

NAV 1 Switch. The NAV 1 switch controls the received audio of the NAV 1 receiver. When the NAV 1 switch is put in the up position it connects the NAV 1 receiver audio to the cabin speaker. When the NAV 1 switch is put in the down position, it connects the NAV 1 receiver audio to the headphones. And when the NAVI switch is in the center position, all audio from the NAV 1 receiver is shut off

NAV 2 Switch. Operation of the NAV 2 toggle switch is exactly the same as that of the NAV 1 switch. The only difference is that it controls the receive audio line of the NAV 2 receiver.

MKR Switch. The MKR switch controls the audio of the internal marker beacon receiver of the TMA 340D/TMA 350D or the external marker audio inpup for a TMA 330D. The up position connects the Marker Beacon receiver audio to the cabin speaker while the down position connects the Marker Beacon receiver audio to the headphones. When the switch is in the center position, all Marker Beacon receiver audio is shut off.

ADF Switch. The ADF switch controls the audio from the ADF receiver. The up position connects the ADF receiver audio to the cabin speaker while the down position connects the ADF receiver audio to the headphones. When the ADF switch is in the center position, all ADF receiver audio is shut off.

DME Switch. The DME switch controls the audio from the DME. The up position connects the DME audio to the cabin speaker while the down position connects the DME audio to the headphones. When the DME switch is in the center position, all DME audio is shut.

AUX Switch. The AUX switch controls the AUX receiver audio from the AUX receiver/ transceiver. The up position connects the AUX receiver audio to the cabin speaker while the down position connects the AUX receiver audio to the headphones. When the AUX switch is in the center position, all AUX receiver audio is shut.

AUTO Switch. The AUTO switch is used in conjunction with the microphone selector knob. It automatically connects the selected COM transceiver receiver audio to the speaker or headphones, which ever is desired.

4.3 MICROPHONE SELECTOR SWITCH OPERATION

The microphone select switch is used to connect the pilot and co-pilot microphones to any of three (3) transceivers or two (2) speakers when the microphones are keyed. This switch also has an emergency function. When the knob is in the EMG position and power is removed from the unit, the COM 1 transceiver audio is hardwired to the headphones along with the pilot microphone and mic key. This feature is included in the TMA 330D/TMA 340D/TMA 350D in the event of a supply failure.

4.3 MICROPHONE SELECTOR SWITCH OPERATION (Continued)

For normal operations the COM 1, COM 2, and AUX positions connect the pilot and co-pilot microphones and mic keys to the respective communication units. The EXT position connects the pilot and co-pilot microphones to the external (ramp) speaker. The PA position connects the pilot and co-pilot microphones to the PA speaker in the passenger area of the aircraft. In both the EXT and the PA positions, no receiver audio is selected by the AUTO switch.

4.4 INTERCOM CONTROL KNOBS (TMA 350D ONLY)

Two knobs on the front panel of the TMA 350D control the internal intercom. The two knobs are ON/OFF Volume and Squelch. The center (small) knob is the ON/OFF Volume knob and is used to turn on and off the intercom. It is also used to set the intercom's headphone volume level. The full Counter Clock Wise (CCW) detented position of this knob is the off position while the full Clock Wise (CW) position of this knob is the maximum volume position.

The outer (large) knob is the squelch control and is used to set the sensitivity of the intercom VOX circuit. The full CW position of this knob is the maximum sensitivity position (mic always on) while the full CCW position of this knob is the minimum sensitivity position (mic always off).

4.5 MARKER BEACON RECEIVER (TMA 340D/TMA 350D ONLY)

The marker beacon receiver is an integral part of the TMA 340D and TMA 350D only unit and is automatically powered up when the Audio Panel is given power. The operation of the marker beacon receive is controlled by the HI/AUTO/TEST switch and the MKR switch. This marker beacon receiver employs a function which is different than other receivers by other manufacturers. It uses a receiver muting circuit which automatically mutes the received audio after the signal strength reaches a preset level. Approximately every 15 seconds the circuitry reevaluates the received signal level and either mutes or unmutes as necessary. This will save the pilot from unnecessary noises and tone which may distract him/her during the approach.

The HI/AUTO/TEST switch is a three (3) position toggle switch. The center or HI/AUTO/ TEST position puts the marker beacon receiver in the automatic mode. What this means is that all gain sensitivity and muting is controlled automatically in this position. In the up or HI position, the marker beacon receiver is forced to stay in the high gain position. The marker beacon receiver audio will not be muted automatically as the signal level of the marker beacon transmitter increases while flying over it. Placing the switch in this position puts the receiver in the hi gain mode bypassing the audio mute function of the receiver. In the down or TEST position, the three (3) annunciator lamps on the front of the Audio Panel (and also the external annunciator lamps) will be illuminated, whether or not you are flying over a marker beacon transmitter. This allows the pilot to test the correct operation of the lamps. This position is a momentary position and when you let up on it will return to the center or AUTO position. Placing the switch in this position and returning it to the auto position will reset the internal circuitry that controls the hi/low receiver gain and audio muting.

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THREE YEAR UNLIMITED WARRANTY *TRIMBLE*

What does your warranty cover?

Any defect in materials or workmanship of Terra by Trimble equipment.
This warranty applies only to equipment sold after January 1, 1993.

How does your warranty become effective?

Your warranty does not become effective unless you mail your completed Warranty Registration card to us within 15 days after installation of your Terra by Trimble equipment.

For how long?

Three years from date of original installation of the equipment, but not more than four years from date of purchase.
If you receive repair or replacement of equipment under this warranty, the warranty remains in effect on the repaired or replaced equipment for the remainder of the original three-year term.

What will we do to correct problems?

Repair any equipment found to be defective in materials or workmanship.
If we choose, we may replace the equipment rather than repairing it.
We will be responsible for the cost of labor and materials for repair or replacement of any equipment found to be defective in materials or workmanship.

How do you make a warranty claim?

Contact your nearest Authorized Terra by Trimble dealer for repair or replacement of any equipment defective in materials or workmanship.
If directed by your Authorized Terra by Trimble dealer, or if you are unable to contact a Terra by Trimble dealer, send the equipment to our factory:
Properly pack your equipment; we recommend using the original container and packing materials.
Include in the package a copy of the sales receipt or other evidence of date of original purchase and installation. If the equipment was a gift, provide a statement specifying the date received and installed. Also note your name, address, daytime telephone number, and a description of the defect.
Ship the equipment UPS or equivalent. You must prepay the shipping charges. Ship to:

Trimble
2105 Donley Dr.
Austin, TX 78758
(512) 432-0400 Phone (512) 836-9413 FAX

We will pay surface shipping charges to return the equipment to you.

What does your warranty not cover

Terra by Trimble equipment purchased "As New" from other than an Authorized Terra by Trimble Dealer or Distributor.
Malfunctions or failures resulting from the way the equipment was installed or from installation not in accordance with factory instructions.
Certificated Aircraft: Installation by other than an FAA Repair Station (USA), approved installation facility (non-USA) and/or without

- — Appropriate air-worthiness approval(s) as required by governing aviation authority;
- — Form 337;
- — Logbook entry.

Experimental Category Aircraft: Installation without

- — Appropriate air-worthiness approval(s) as required by governing aviation authority;
- — Form, 8130-(x).
- — Logbook entry.

Fuses and batteries.
Use of equipment for purposes other than those for which is was designed.
Accidental or deliberate damage, alterations of any kind, inadequate storage or maintenance.
Warranty repair by anyone other than Trimble or Terra by Trimble Authorized Dealer with factory approval.

For conditions not covered by this warranty, you will receive an estimate of costs before the repair is initiated. Repairs will be billed to you at the normal repair rates of the facility that performs the repairs.

Are there any other limitations or exclusions?

Any implied warranties are in effect only as long as this warranty is in effect.
This warranty does not cover incidental or consequential damage such as damage to other equipment or to your aircraft that results from defects covered by this warranty.
Some states do not allow limitations on how long an implied warranty lasts, or allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

How does state law relate to this warranty?

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

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SECTION VI

6. INSTALLATION BULLETINSINOTES

6.1 INSTALLATION BULLETINS

Place any installation bulletins after this page and record below:

DATE	BULLETIN NUMBER	DESCRIPTION	ENTERED BY

6.2 INSTALLATION NOTES

Make any notes or drawings here for use by service personnel.