

CHAPTER 14

ELECTRICAL AND AVIONICS SYSTEMS

<u>Section</u>	<u>Title</u>	<u>Page</u>
14.000	Electrical and Avionics Systems	14.1
14.300	Police and Electronic News Gathering (E.N.G.) Version Equipment	14.3
14.310	(Nucomm) HD Microwave System	14.3A
14.311	(Nucomm) HD Microwave System — Controller	14.3A
14.312	(Nucomm) HD Microwave System — Transmitter	14.3A
14.313	(Nucomm) HD Microwave System — Pod Antenna	14.3B
14.314	(Nucomm) HD Microwave System — Power Amp	14.3B
14.320	(Vislink) HD Microwave System	14.3C
14.321	(Vislink) HD Microwave System — Control Panel	14.3C
14.322	(Vislink) HD Microwave System — L1600 Encoder Transmitter	14.3C
14.323	(Vislink) HD Microwave System — Pod Antenna	14.3D
14.324	(Vislink) HD Microwave System — Power Amp	14.3D
14.330	Geneva Audio System	14.3E
14.331	Geneva Audio System — Pilot Audio Panel	14.3E
14.332	Geneva Audio System — Co-pilot Audio Panel	14.3E
14.333	Geneva Audio System — Aft Audio Panels	14.3F
14.334	Geneva Audio System — Router	14.3G
14.335	Geneva Audio System — Transmit Switch	14.3I
14.600	Electrical System Schematics	14.17
14.700	Electric Trim System	14.21
14.710	Trim Controller Adjustment	14.21
14.720	Trim System Electrical Trouble-Shooting	14.22C
14.800	Antenna Locations	14.25
14.900	Avionics Schematics	14.27

Intentionally Blank

CHAPTER 14**ELECTRICAL AND AVIONICS SYSTEMS**14.000 Electrical and Avionics Systems

Electrical System information has been moved to Chapter 37.

Avionics information has been moved to Chapter 38.

[Pages 14.3J thru 14.16 have been deleted, are no longer effective, and should be discarded.]

Intentionally Blank

Intentionally Blank

14.300 Police and Electronic News Gathering (E.N.G.) Version Equipment**14.310 (Nucomm) HD Microwave System**

Refer to R44 Illustrated Parts Catalog (IPC) Figures 90-21 and 90-27. Refer to MM Figures 14-3H, 14-3I, 14-3J, and 14-3K for microwave system installation wiring schematic.

14.311 (Nucomm) HD Microwave System - Controller**A. Removal**

1. Turn battery switch off & pull-out associated circuit breaker.
2. Remove screws and washers securing ARC-CM-TX-RX-CR-01 controller to aft console. Carefully lift controller from console.
3. Loosen screws securing D-sub connector to controller receptacle and disconnect connector from controller. Remove controller.

B. Installation

1. Turn battery switch off & pull-out associated circuit breaker.
2. Position ARC-CM-TX-RX-CR-01 controller above aft console support and connect D-sub connector to controller receptacle. Tighten connector screws and verify security.
3. Position controller in support and install mounting washers and screws. Verify security.
4. Push-in associated circuit breaker & turn battery switch on. Perform appropriate post-installation function checks. Turn battery switch off.

14.312 (Nucomm) HD Microwave System - Transmitter**A. Removal**

1. Turn battery switch off & pull-out associated circuit breaker.
2. Disconnect cable plugs from CMTX7-LITE transmitter.
3. Remove screws securing D429-12 angles and cable clamps to seat support and transmitter. Remove transmitter.

B. Installation

1. Turn battery switch off & pull-out associated circuit breaker.
2. Install screws securing D429-12 angles and cable clamps to seat support and CMTX7-LITE transmitter. Verify transmitter security.
3. Connect cable plugs to transmitter.
4. Push-in associated circuit breaker & turn battery switch on. Perform appropriate post-installation function checks. Turn battery switch off.

14.313 (Nucomm) HD Microwave System - Pod Antenna

A. Removal

1. Turn battery switch off & pull-out associated circuit breaker.
2. Disconnect cable plugs from PA8- or PA16- pod antenna and D618-1 amp assembly.
3. Have a second person support pod antenna. Remove screws and washers securing pod antenna to D586 brackets, and remove pod antenna.
4. Remove power amp per Section 14.314.

B. Installation

1. Turn battery switch off & pull-out associated circuit breaker.
2. Have a second person support PA8- or PA16- pod antenna. Install screws and washers securing pod antenna to D586 brackets. Verify pod antenna security.
3. Connect cable plugs to pod antenna.
4. Push-in associated circuit breaker & turn battery switch on. Perform appropriate post-installation function checks. Turn battery switch off.

14.314 (Nucomm) HD Microwave System - Power Amp

A. Removal

1. Turn battery switch off & pull-out associated circuit breaker.
2. Remove pod antenna per Section 14.313, as required, or disconnect cable plugs from amp assembly.
3. Remove screws securing amp assembly to PA8- or PA16- pod antenna, and remove amp and thermal pads.

B. Installation

1. Turn battery switch off & pull-out associated circuit breaker.
2. Align thermal pads, amp assembly, and PA8- or PA16- pod antenna fastener holes and install screws. Verify amp security.
3. Install pod antenna per Section 14.313, as required, or connect cable plugs to amp assembly.
4. Push-in associated circuit breaker & turn battery switch on. Perform appropriate post-installation function checks. Turn battery switch off.

14.320 (Vislink) HD Microwave System

Refer to R44 Illustrated Parts Catalog (IPC) Figures 90-23 and 90-27. Refer to MM Figures 14-3H, 14-3I, 14-3J, and 14-3K for microwave system installation wiring schematic.

14.321 (Vislink) HD Microwave System - Control Panel

A. Removal

1. Turn battery switch off & pull-out associated circuit breaker.
2. Remove screws and washers securing L1260 control panel to aft console. Carefully lift control panel from console.
3. Loosen screws securing D-sub connector to control panel receptacle and disconnect connector from control panel. Remove controller.

B. Installation

1. Turn battery switch off & pull-out associated circuit breaker.
2. Position L1260 control panel above aft console support and connect D-sub connector to control panel receptacle. Tighten connector screws and verify security.
3. Position control panel in support and install mounting washers and screws. Verify security.
4. Push-in associated circuit breaker & turn battery switch on. Perform appropriate post-installation function checks. Turn battery switch off.

14.322 (Vislink) HD Microwave System - L1600 Encoder Transmitter

A. Removal

1. Turn battery switch off & pull-out associated circuit breaker.
2. Disconnect cable plugs from L1600 encoder transmitter.
3. Remove screws securing transmitter to seat support, and remove transmitter.

B. Installation

1. Turn battery switch off & pull-out associated circuit breaker.
2. Install screws securing L1600 encoder transmitter to seat support. Verify transmitter security.
3. Connect cable plugs to transmitter.
4. Push-in associated circuit breaker & turn battery switch on. Perform appropriate post-installation function checks. Turn battery switch off.

14.322 (Vislink) HD Microwave System - HDT-1000 Encoder Transmitter**A. Removal**

1. Turn battery switch off & pull-out associated circuit breaker.
2. Disconnect cable plugs from HDT-1000 encoder transmitter.
3. Remove hardware securing transmitter to D429-13 plate, and remove transmitter.

B. Installation

1. Turn battery switch off & pull-out associated circuit breaker.
2. Install hardware securing HDT-1000 transmitter to D429-13 plate. Verify transmitter security.
3. Connect cable plugs to transmitter.
4. Push-in associated circuit breaker & turn battery switch on. Perform appropriate post-installation function checks. Turn battery switch off.

14.323 (Vislink) HD Microwave System - Pod Antenna

Perform pod antenna removal and installation per Section 14.313.

14.324 (Vislink) HD Microwave System - Power Amp

Perform power amp removal and installation per Section 14.314.

14.330 Geneva Audio System

Refer to MM Figures 14-3L and 13-3M for geneva audio system installation wiring schematic.

14.331 Geneva Audio - Pilot Audio Panel

Refer to R44 Illustrated Parts Catalog (IPC) Figure 92-21.

A. Removal

1. Turn battery switch off & pull-out associated circuit breaker.
2. Remove screws securing D579-8 audio panel to radio tray, and remove audio panel.

B. Installation

1. Turn battery switch off & pull-out associated circuit breaker.
2. Position D579-8 audio panel in appropriate radio tray support and install two mounting screws. Verify security.
3. Push-in associated circuit breaker & turn battery switch on. Perform appropriate post-installation function checks. Turn battery switch off.

14.332 Geneva Audio System - Co-pilot Audio Panel

Refer to R44 Illustrated Parts Catalog (IPC) Figure 92-23.

A. Removal

1. Turn battery switch off & pull-out associated circuit breaker.
2. Remove screws securing D557-2 cover to D592-1 mount and D579-7 audio panel. Remove cover.
3. Remove screws securing mount to FM transceiver and cabin structure.
4. Loosen screws securing D-sub connector to audio panel receptacle and disconnect connector from audio panel.
5. Remove audio panel. Remove screws securing mount to audio panel and remove mount.

14.332 Geneva Audio System - Co-pilot Audio Panel (continued)**B. Installation**

1. Turn battery switch off & pull-out associated circuit breaker.
2. Position D592-1 mount on D579-7 audio panel and install screws. Verify mount security.
3. Position audio panel in helicopter and connect D-sub connector to audio panel receptacle. Tighten connector screws and verify security.
4. Install screws securing mount to FM transceiver and cabin structure. Verify audio panel security.
5. Install screws securing D557-2 cover on audio panel. Verify cover security.
6. Push-in associated circuit breaker & turn battery switch on. Perform appropriate post-installation function checks. Turn battery switch off.

14.333 Geneva Audio System - Aft Audio Panels

Refer to R44 Illustrated Parts Catalog (IPC) Figure 92-25.

A. Removal

1. Turn battery switch off & pull-out associated circuit breaker.
2. Remove screws securing D579-7 or D579-9 audio panel to aft console. Carefully lift audio panel from console.
3. Loosen screws securing D-sub connector to audio panel receptacle and disconnect connector from audio panel. Remove audio panel.
4. Remove screws securing molding to audio panel and remove molding.

B. Installation

1. Turn battery switch off & pull-out associated circuit breaker.
2. Position molding on D579-7 or D579-9 audio panel and install screws. Verify molding security.
3. Position audio panel above appropriate aft console support and connect D-sub connector to audio panel receptacle. Tighten connector screws and verify security.
4. Position audio panel in support and install two mounting screws. Verify security.
5. Push-in associated circuit breaker & turn battery switch on. Perform appropriate post-installation function checks. Turn battery switch off.

14.334 Geneva Audio System - Router

Refer to R44 Illustrated Parts Catalog (IPC) Figure 92-27 and 92-31.

A. G13000 Digital Router Removal

1. Turn battery switch off & pull-out associated circuit breaker.
2. Hinge forward left seat forward.
3. Loosen screws securing D-sub connectors and ground wires to G13000 digital router receptacles and disconnect connectors from router. Remove audio panel.
4. Remove screws, washers, and spacers securing router to cabin floor. Remove router.

B. G13000 Digital Router Removal Installation

1. Turn battery switch off & pull-out associated circuit breaker.
2. Hinge forward left seat forward.
3. Position G13000 digital router on cabin floor and install spacers, washers, and screws. Verify router security.
4. Connect appropriate D-sub connectors and ground wires to router receptacles. Tighten connector screws and verify security.
5. Position audio panel in support and install two mounting screws. Verify security.
6. Hinge forward left seat aft. Push-in associated circuit breaker & turn battery switch on. Perform appropriate post-installation function checks. Turn battery switch off.

C. D579-2 Backplane Router Removal

1. Turn battery switch off & pull-out associated circuit breaker.
2. Hinge forward left seat forward. Cut and discard ty-raps as required to disconnect C060-5 transmit switch wiring from harness at connectors.
3. Loosen screws securing exterior D-sub connectors and ground wires to D579-2 backplane router and disconnect connectors from router.
4. Remove screw securing #1140 wire to router case. Remove screws securing three covers to router case, to access interior wire connectors.
5. Loosen screws securing interior D-sub connectors to router and disconnect connectors from router. Move harness to the side.
6. From helicopter belly, remove screws and washers securing router to floor. Lift router up and out of seat compartment.

14.334 Geneva Audio System - Router (continued)**D. D579-2 Backplane Router Installation**

1. Turn battery switch off & pull-out associated circuit breaker.
2. Hinge forward left seat forward.
3. Position D579-2 backplane router in seat compartment. From helicopter belly, install screws and washers securing router to floor. Verify security.
4. If not previously accomplished, remove screws securing three covers to router case, to access interior wire connectors.
5. Connect appropriate D-sub connectors to router interior receptacles. Tighten connector screws and verify security.
6. Install screws securing three covers to router case. Install screw securing #1140 wire to router case.
7. Connect appropriate D-sub connectors to router exterior receptacles. Tighten connector screws and verify security.
8. Connect C060-5 transmit switch wiring to harness at connectors and install ty-raps as required. Cinch ty-raps until snug without over-tightening, and trim tips flush with heads.
9. Hinge forward left seat forward. Push-in associated circuit breaker & turn battery switch on. Perform appropriate post-installation function checks. Turn battery switch off.

14.335 Geneva Audio - Transmit Switch

Refer to R44 Illustrated Parts Catalog (IPC) Figure 92-29.

A. Removal

1. Turn battery switch off & pull-out associated circuit breaker.
2. Unplug B121-1 transmit switch assembly from seat support. Hinge forward left seat forward.
3. Cut and discard ty-raps as required to disconnect transmit switch wiring from harness at connectors.
4. Remove hardware securing C060-5 transmit switch assembly to seat support, and remove switch assembly.

B. Installation

1. Turn battery switch off & pull-out associated circuit breaker.
2. Hinge forward left seat forward.
3. Position C060-5 transmit switch assembly against seat support and install hardware. Verify switch security.
4. Connect switch assembly wiring to harness at connectors and install ty-raps as required. Cinch ty-raps until snug without over-tightening, and trim tips flush with heads.
5. Hinge forward left seat forward. Plug B121-1 transmit switch assembly in seat support receptacle.
6. Push-in associated circuit breaker & turn battery switch on. Perform appropriate post-installation function checks. Turn battery switch off.

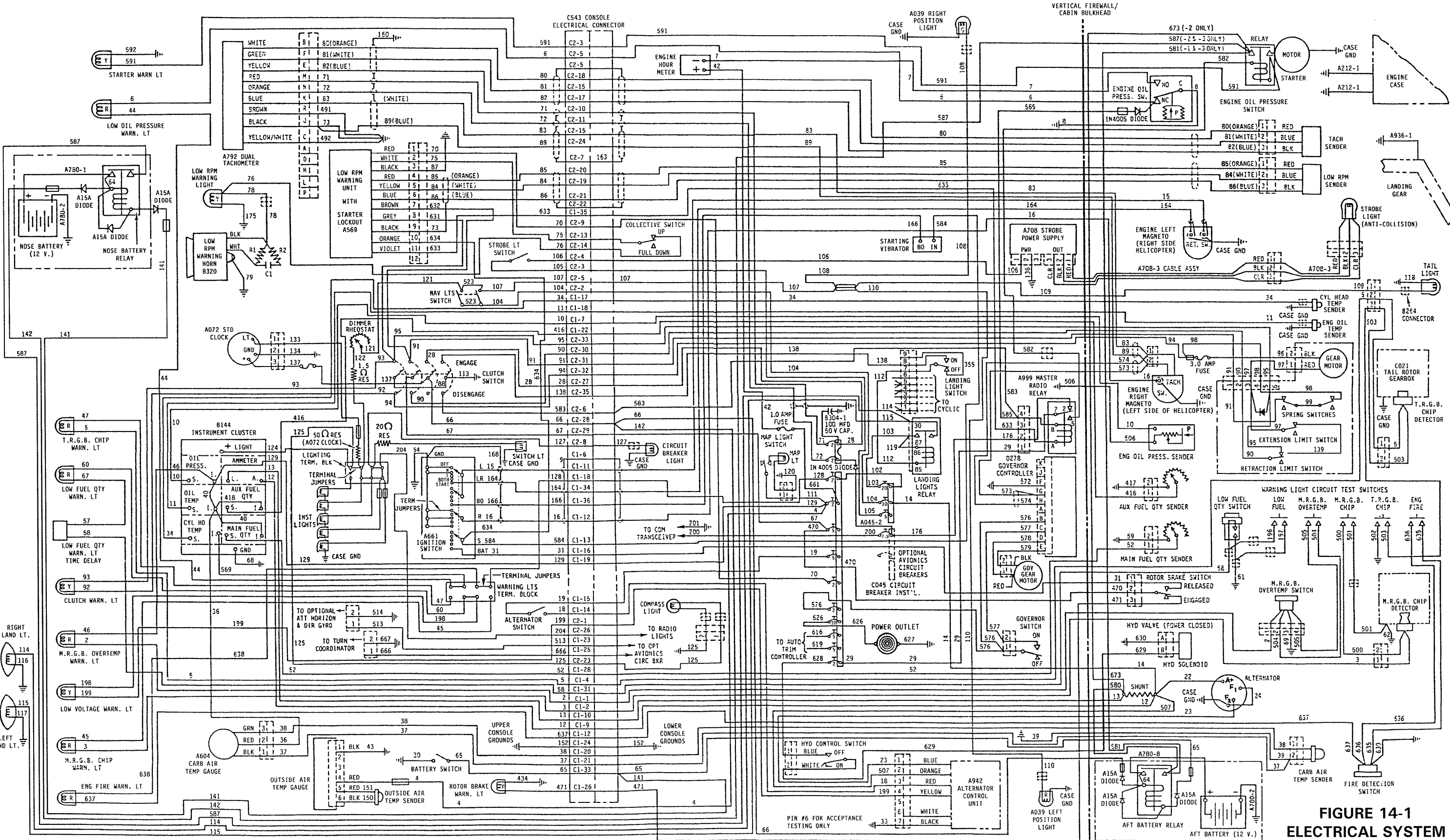
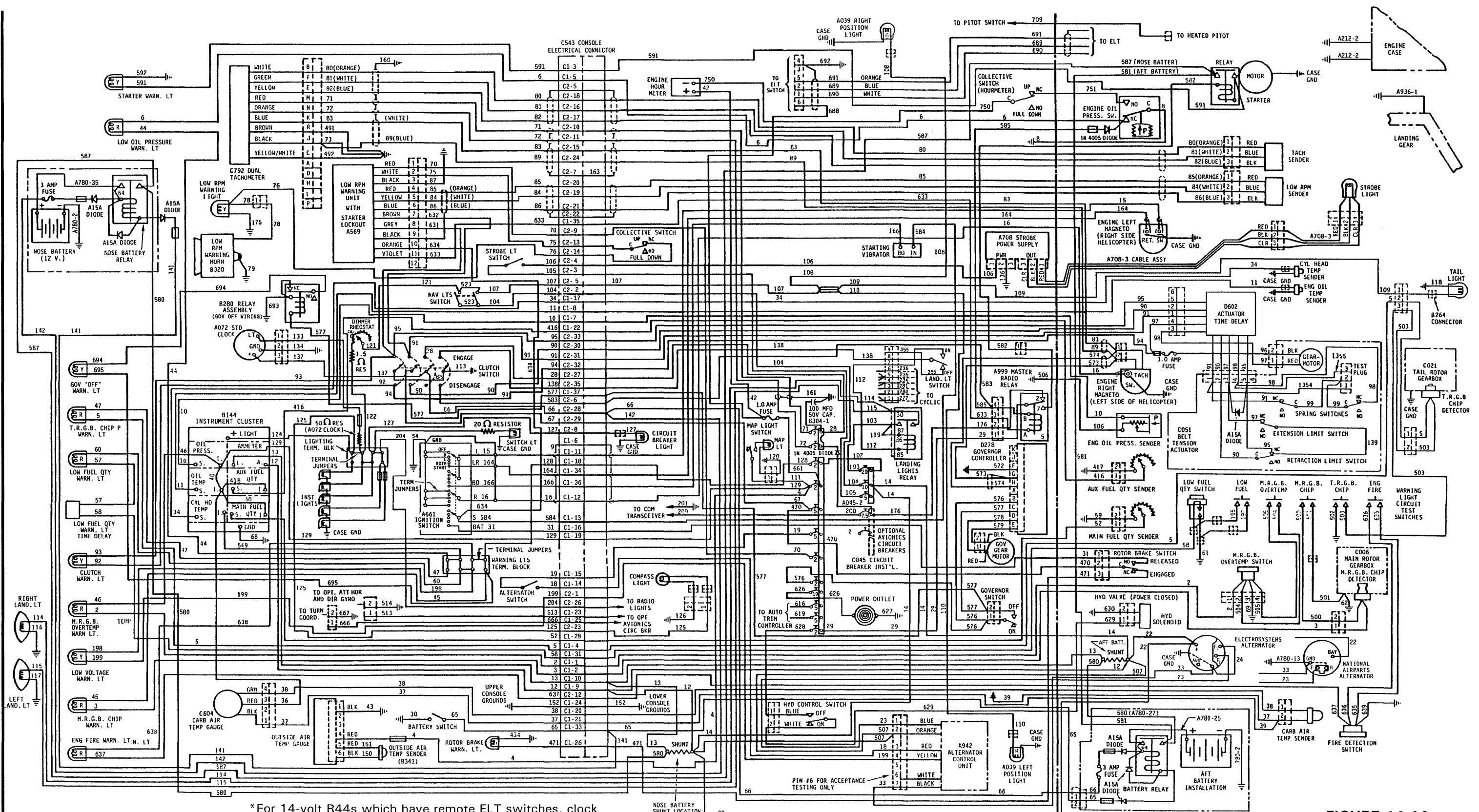


FIGURE 14-1
ELECTRICAL SYSTEM
SCHEMATIC (14-VOLT)



*For 14-volt R44s which have remote ELT switches, clock fuse on firewall, Governor-off warning light, clutch actuator test plug (if equipped), and National Airparts alternator (if equipped).

FIGURE 14-1A
ELECTRICAL SYSTEM
SCHEMATIC 14-VOLT

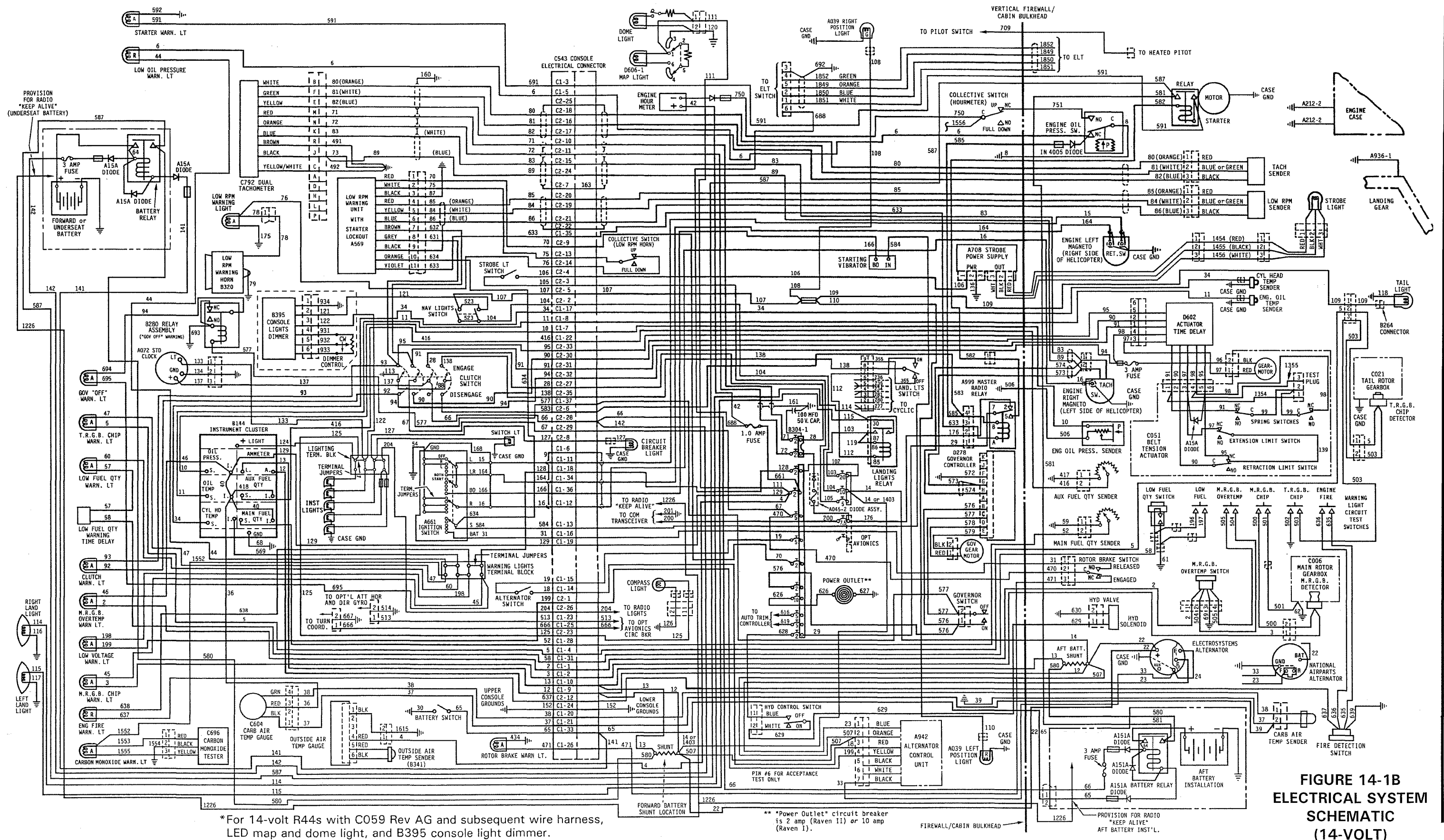
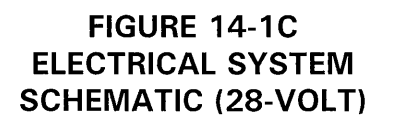


FIGURE 14-1B
ELECTRICAL SYSTEM
SCHEMATIC
(14-VOLT)



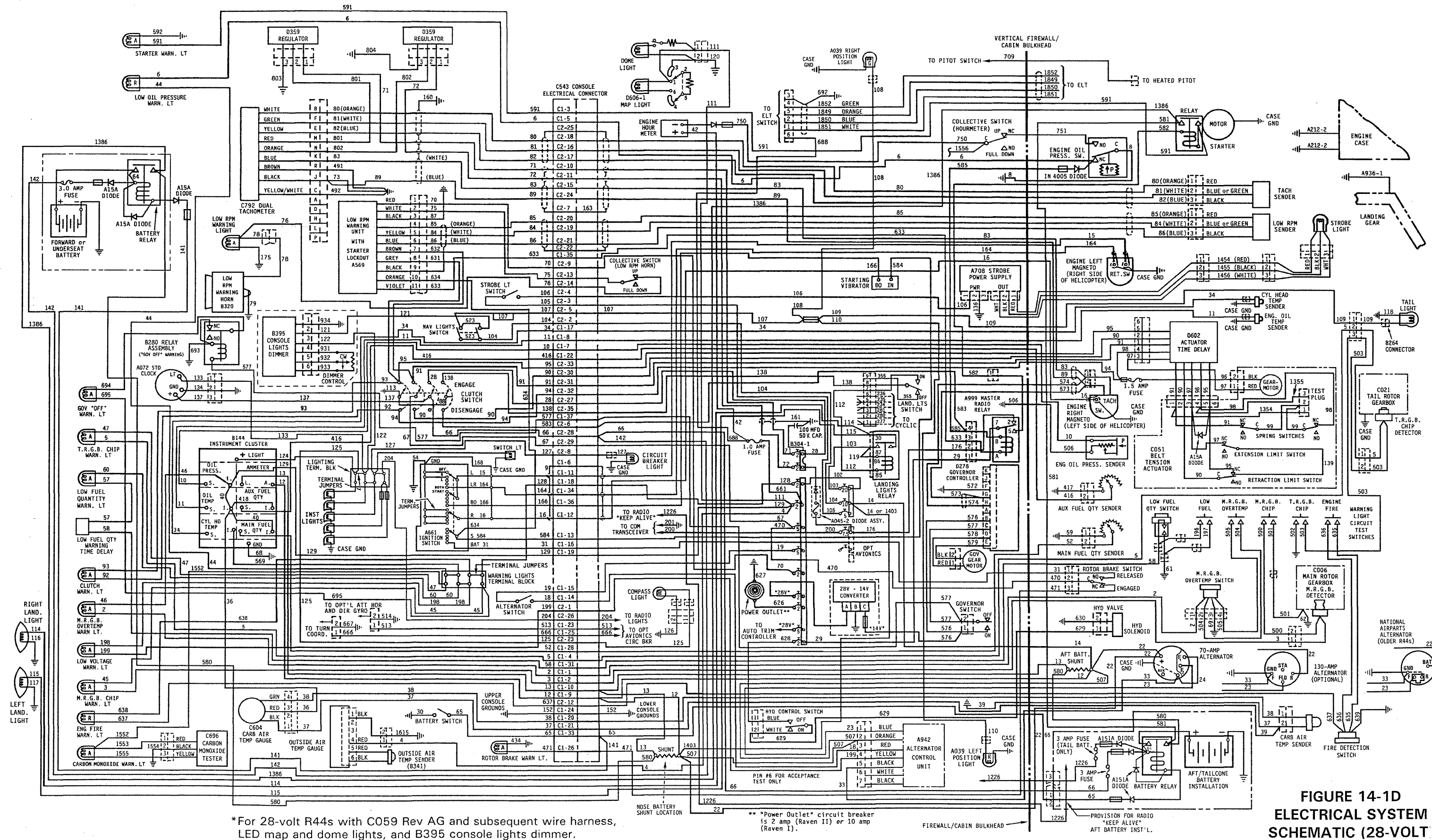


FIGURE 14-1D
ELECTRICAL SYSTEM
SCHEMATIC (28-VOLT)

*For 28-volt R44s with C059 Rev AG and subsequent wire harness, LED map and dome lights, and B395 console lights dimmer.

** "Power Outlet" circuit breaker is 2 amp (Raven II) or 10 amp (Raven I).

|

Intentionally blank

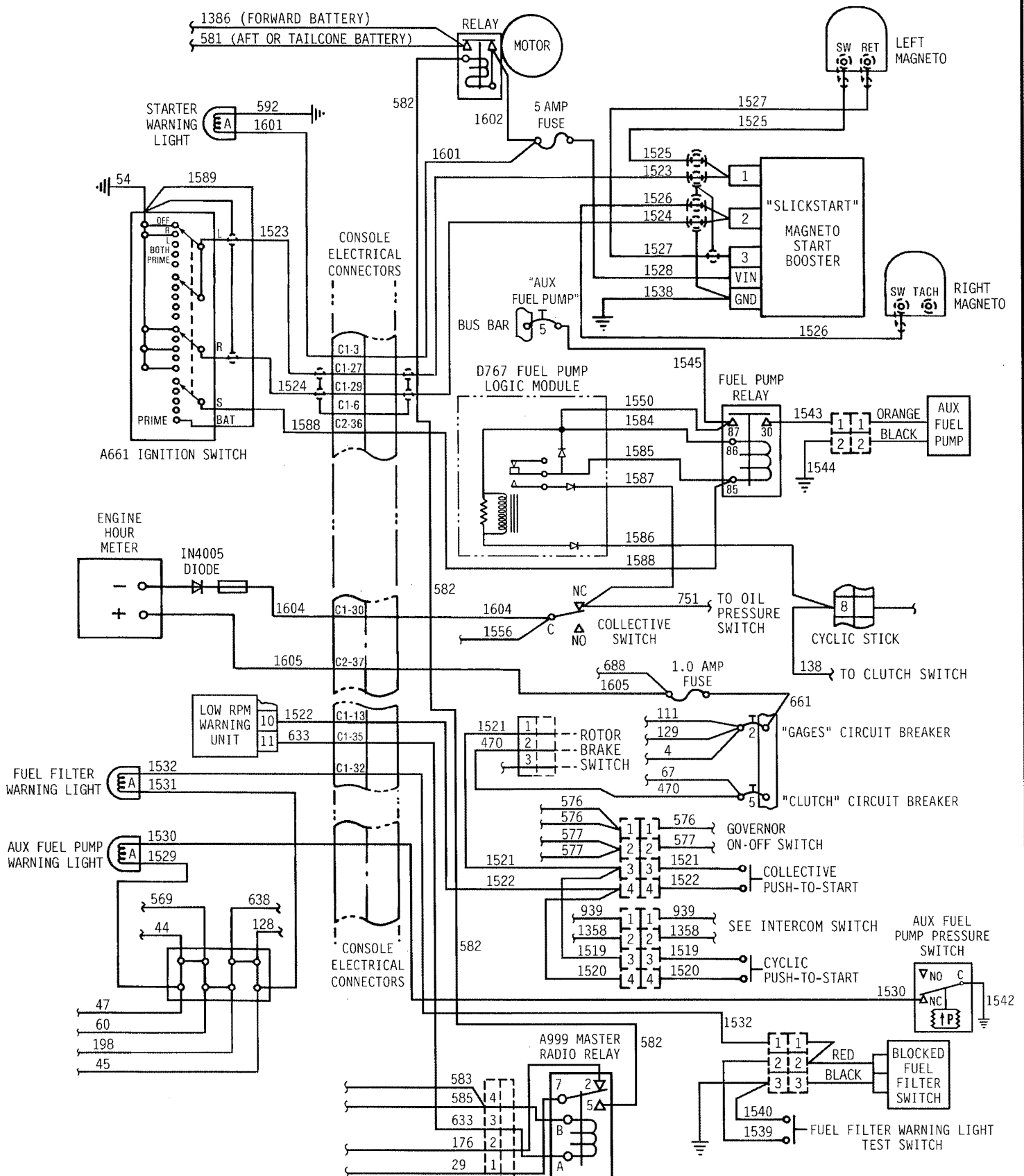


FIGURE 14-1E R44 II (IO-540) STARTING AND FUEL PUMP SCHEMATIC

14.600 ELECTRICAL SYSTEMS SCHEMATICS (Cont'd)

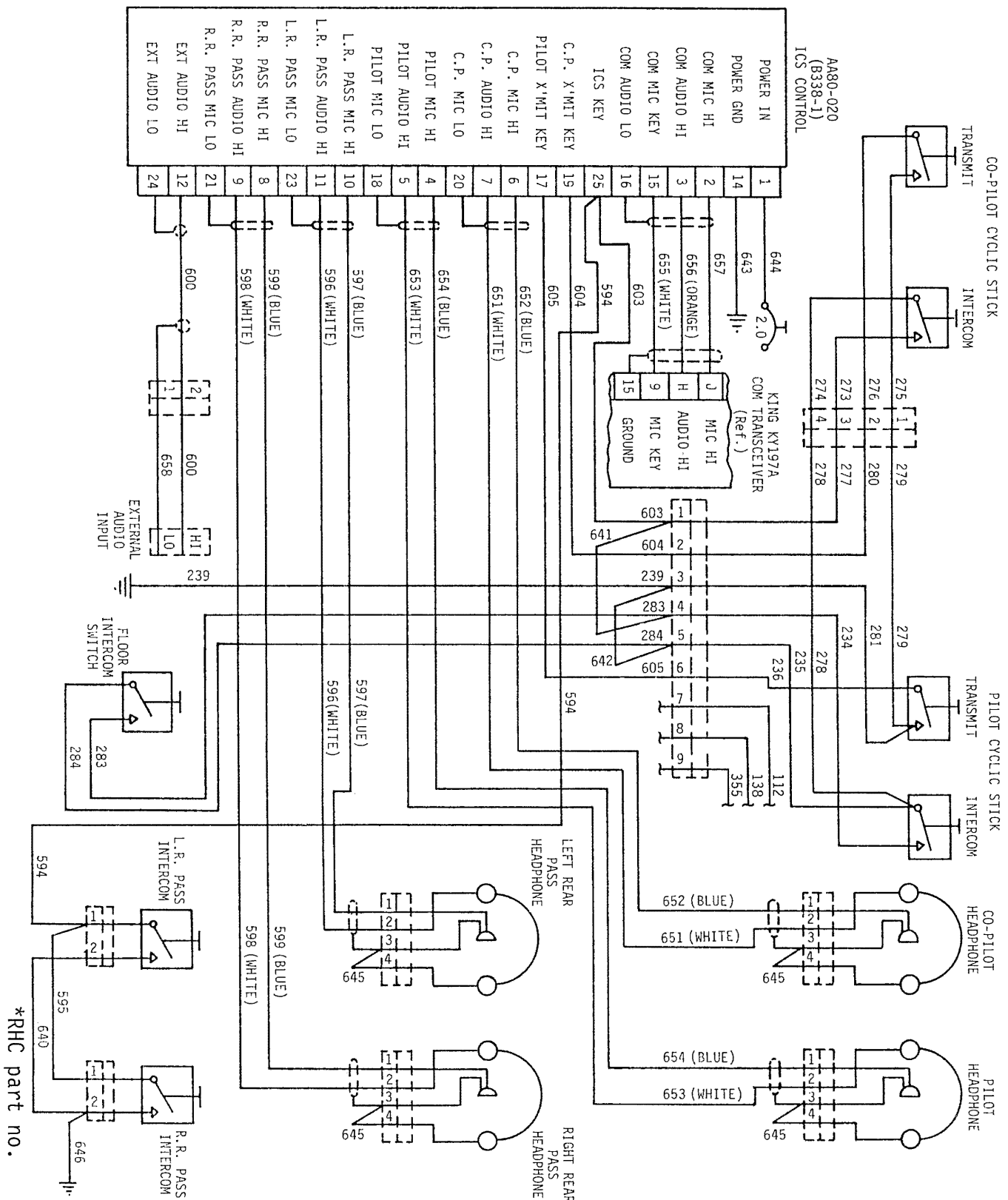


FIGURE 14-2 INTERCOM SCHEMATIC WITH NAT AA80-020 (B338-1*) ICS CONTROL
(SHIP S/N 10410 and PRIOR, SHIP S/N 1417 thru PRIOR)

14.600 ELECTRICAL SYSTEMS SCHEMATICS (Cont'd)

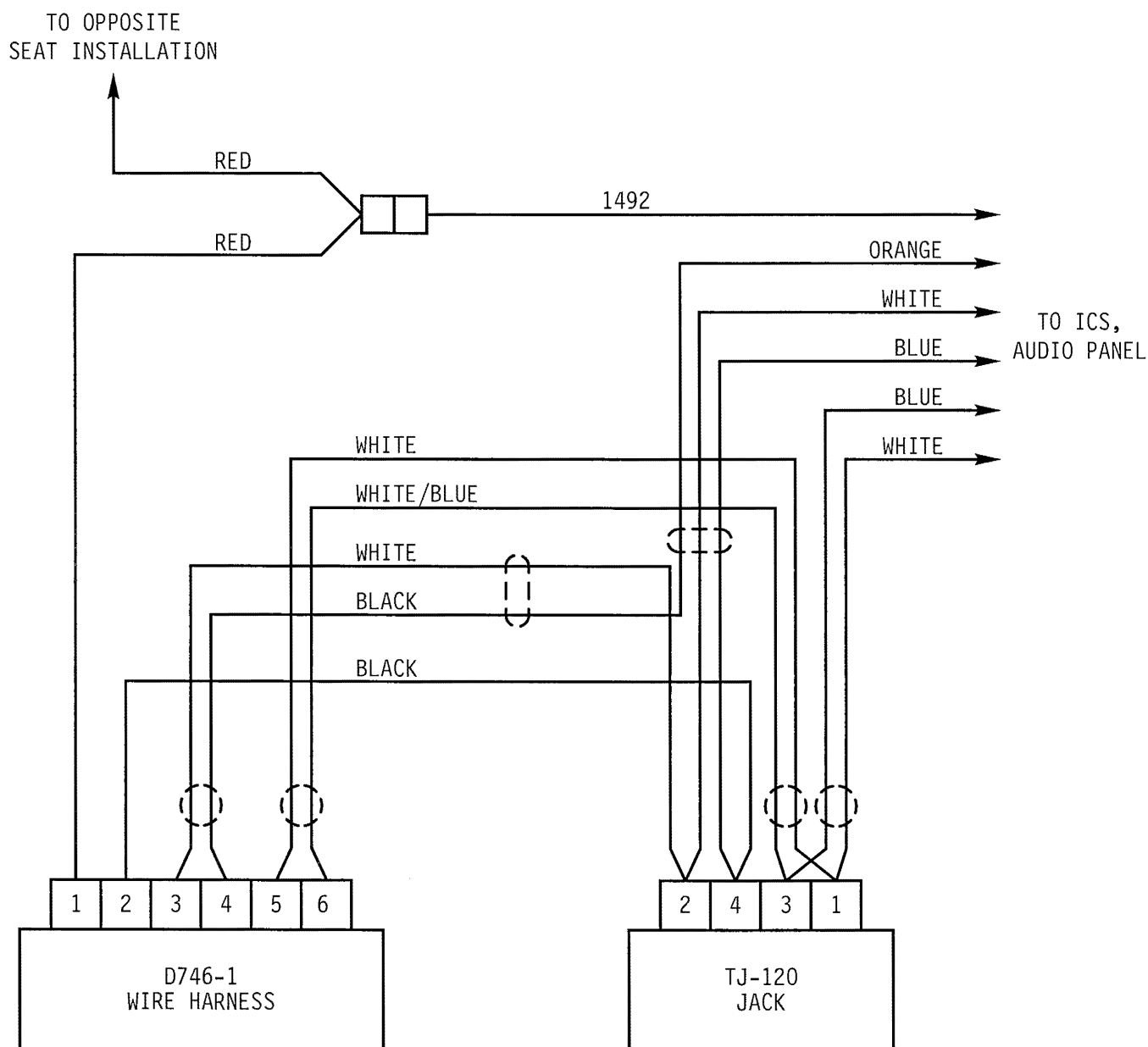


FIGURE 14-2B WIRING SCHEMATIC - BOSE HEADSET

14.600 ELECTRICAL SYSTEM SCHEMATICS (Cont'd)

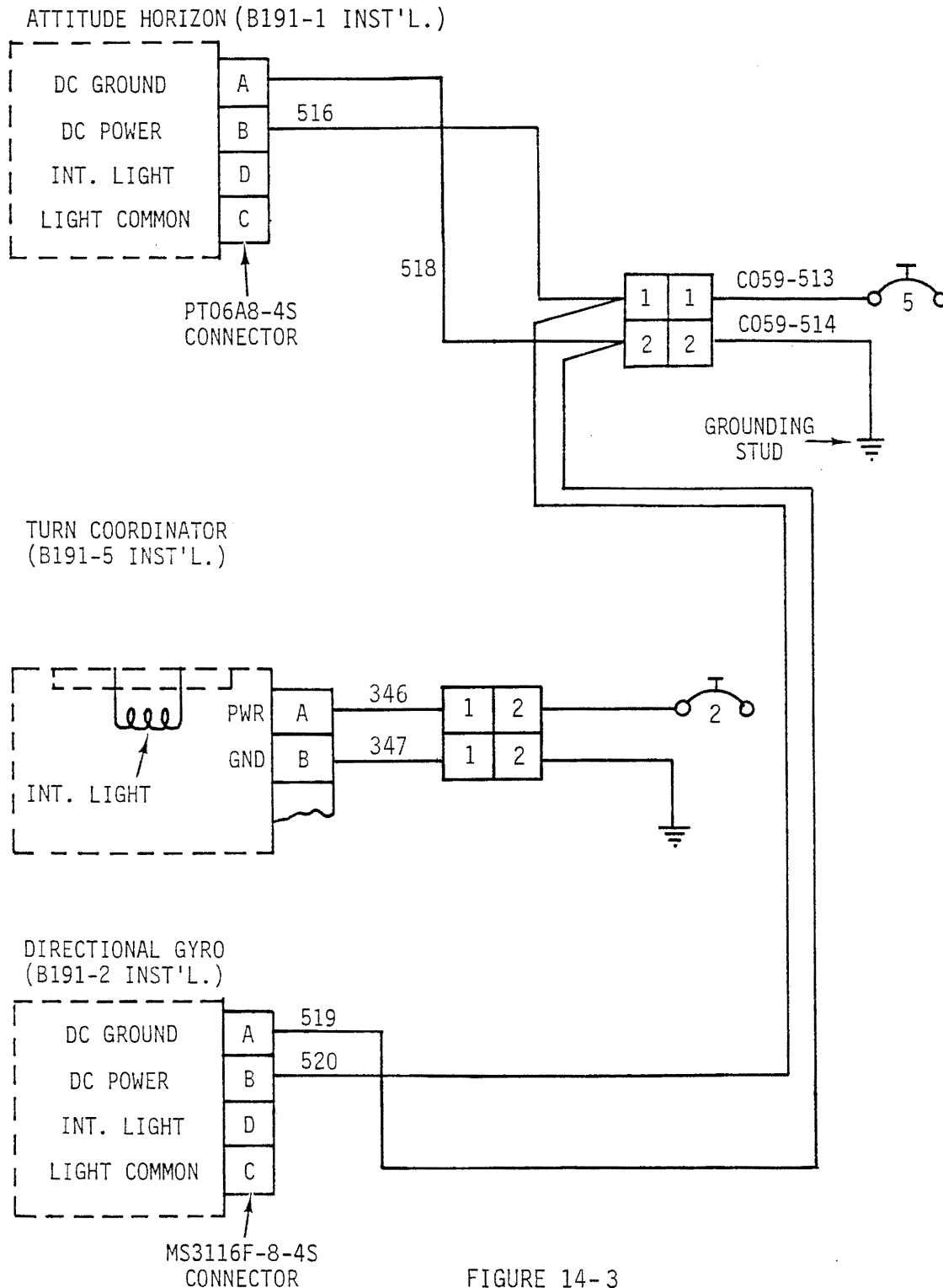
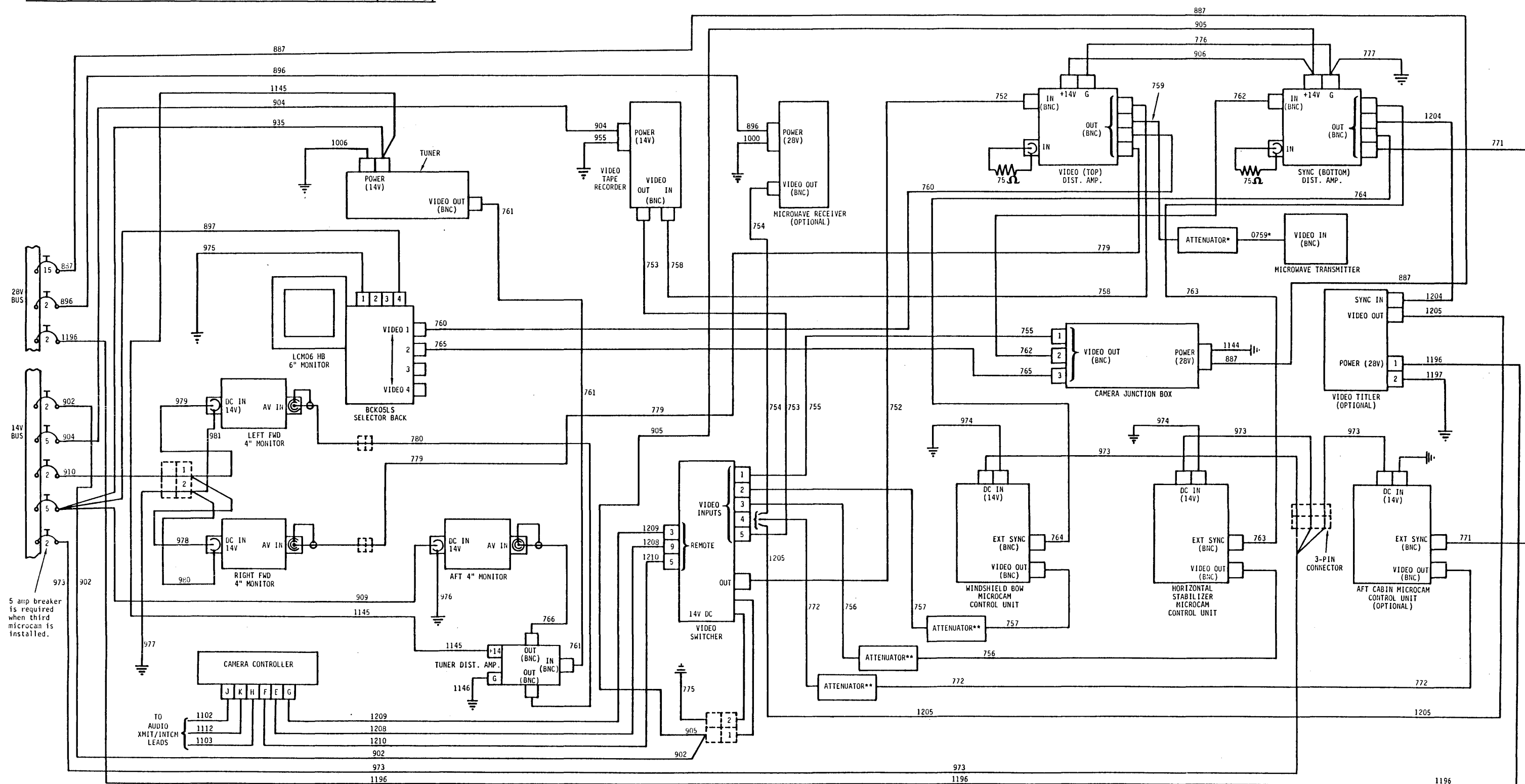


FIGURE 14-3

B191-3 ATTITUDE HORIZON (J.E.T. ELECTRONICS)
B191-4 DIRECTIONAL GYRO (J.E.T. ELECTRONICS)
B329-1 TURN COORDINATOR (ELEC. GYRO CORP.)

14.600 ELECTRICAL SYSTEM SCHEMATICS (Cont'd)



*Installed only if reduced bandwidth is required.

**31-70019 Coupler may be installed at this location instead.

FIGURE 14-3A
VIDEO SIGNAL
WIRING SCHEMATIC
(ENG helicopters only)

14.600 ELECTRICAL SYSTEM SCHEMATICS (Cont'd)

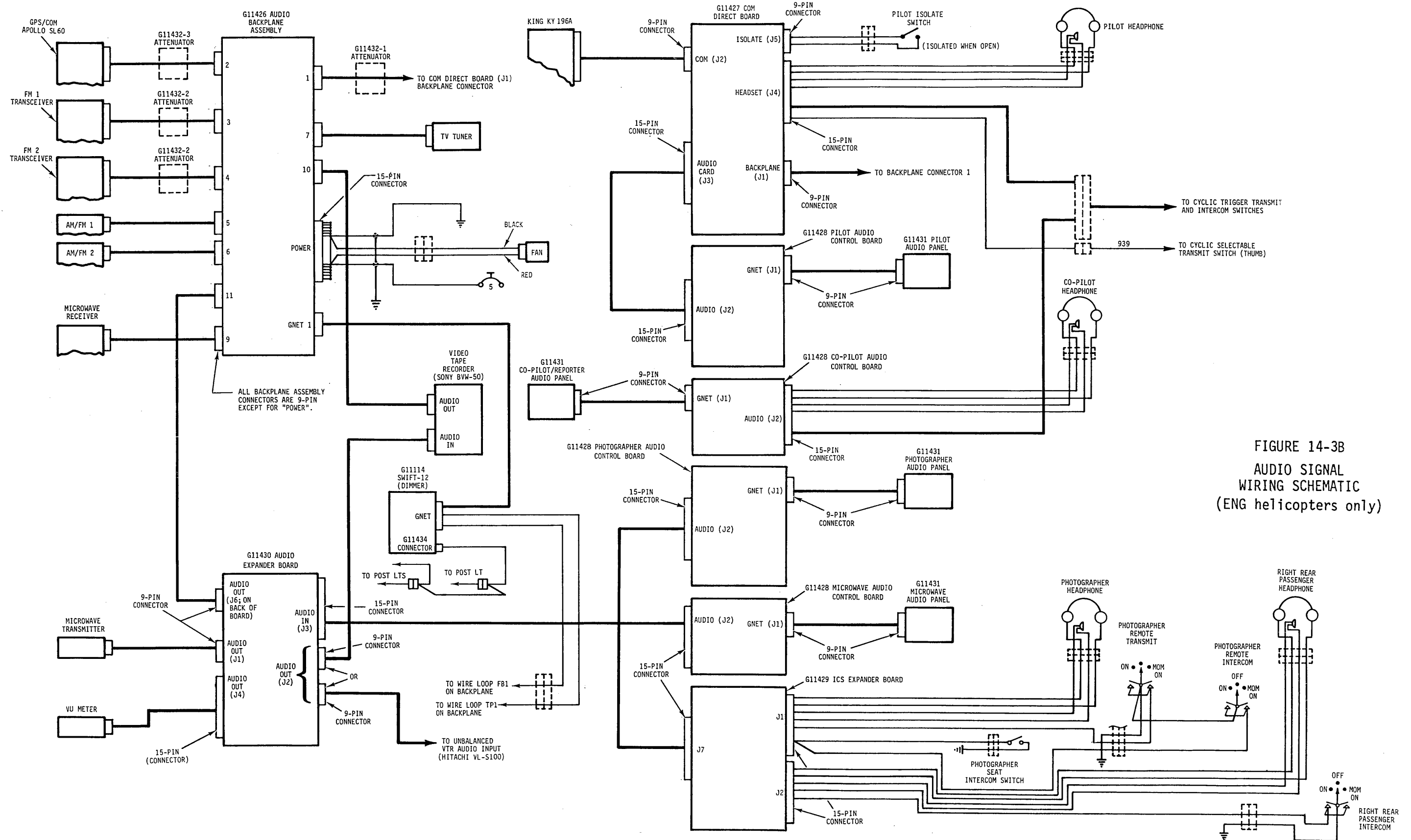


FIGURE 14-3B
AUDIO SIGNAL
WIRING SCHEMATIC
(ENG helicopters only)

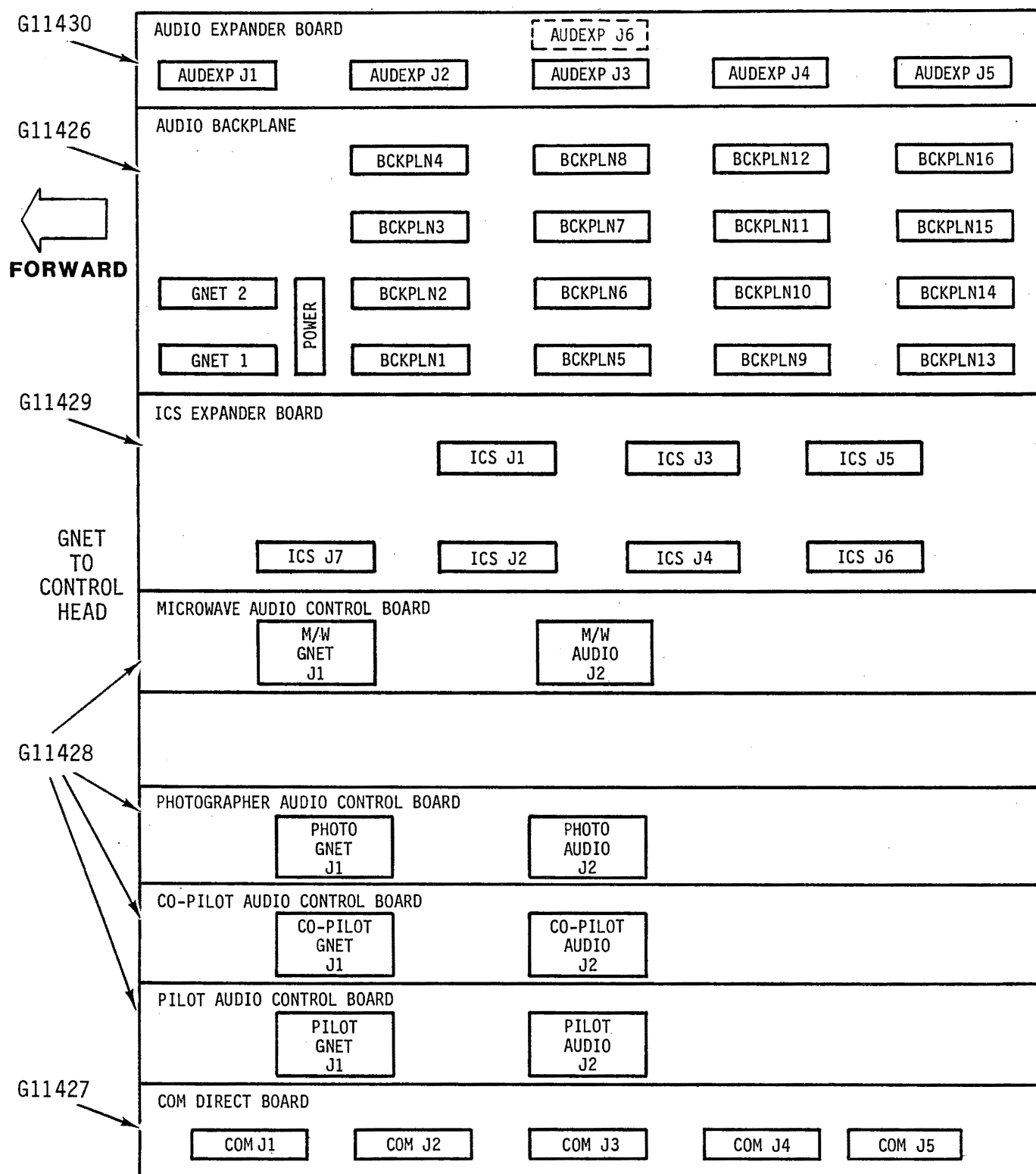


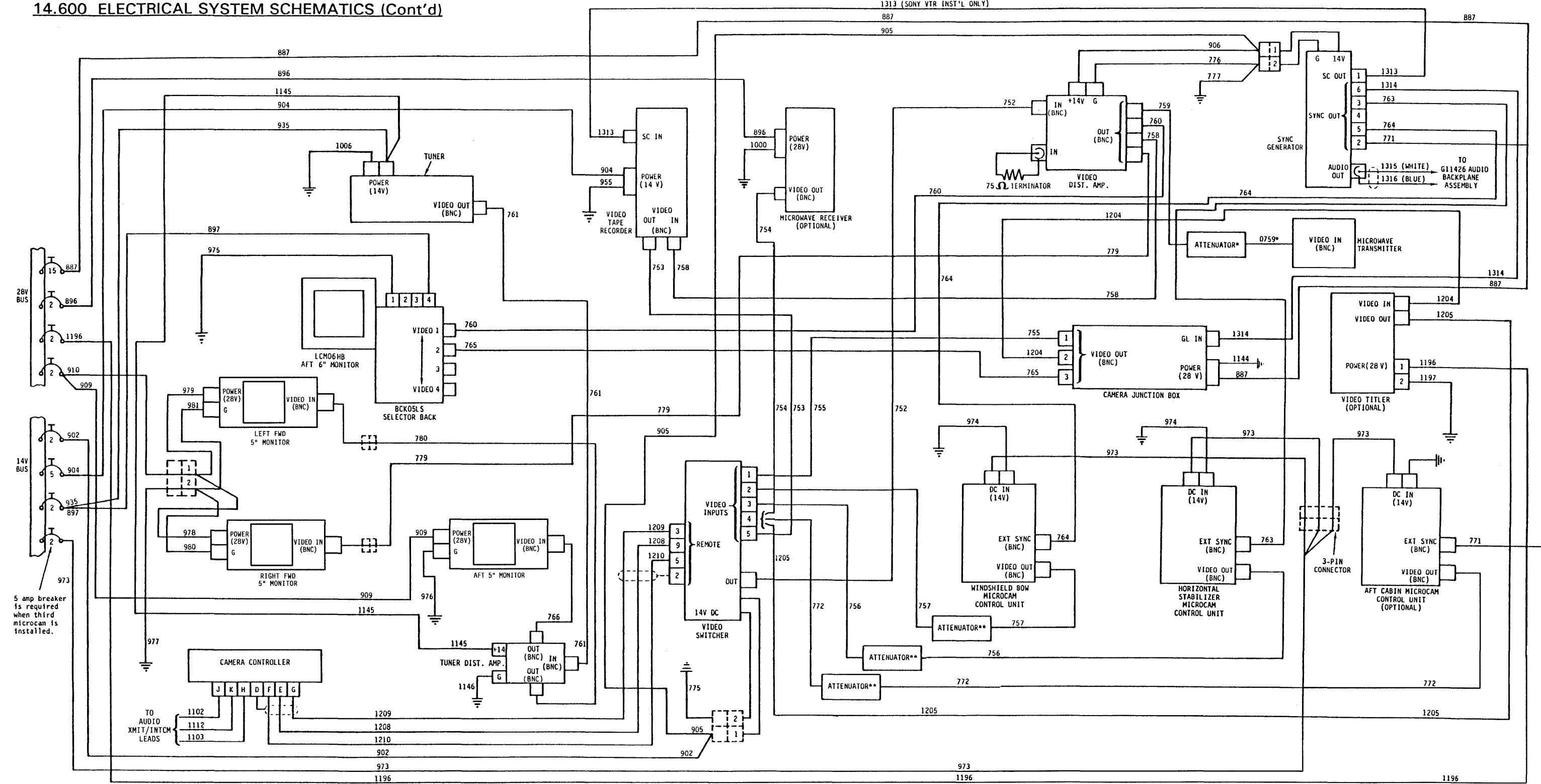
FIGURE 14-3C

GENEVA BOX AUDIO SIGNAL WIRING
CONNECTOR DIAGRAM

(Located beneath forward LH seat, view looking down)

This page intentionally left blank.

14.600 ELECTRICAL SYSTEM SCHEMATICS (Cont'd)



*Installed only if reduced bandwidth is required.

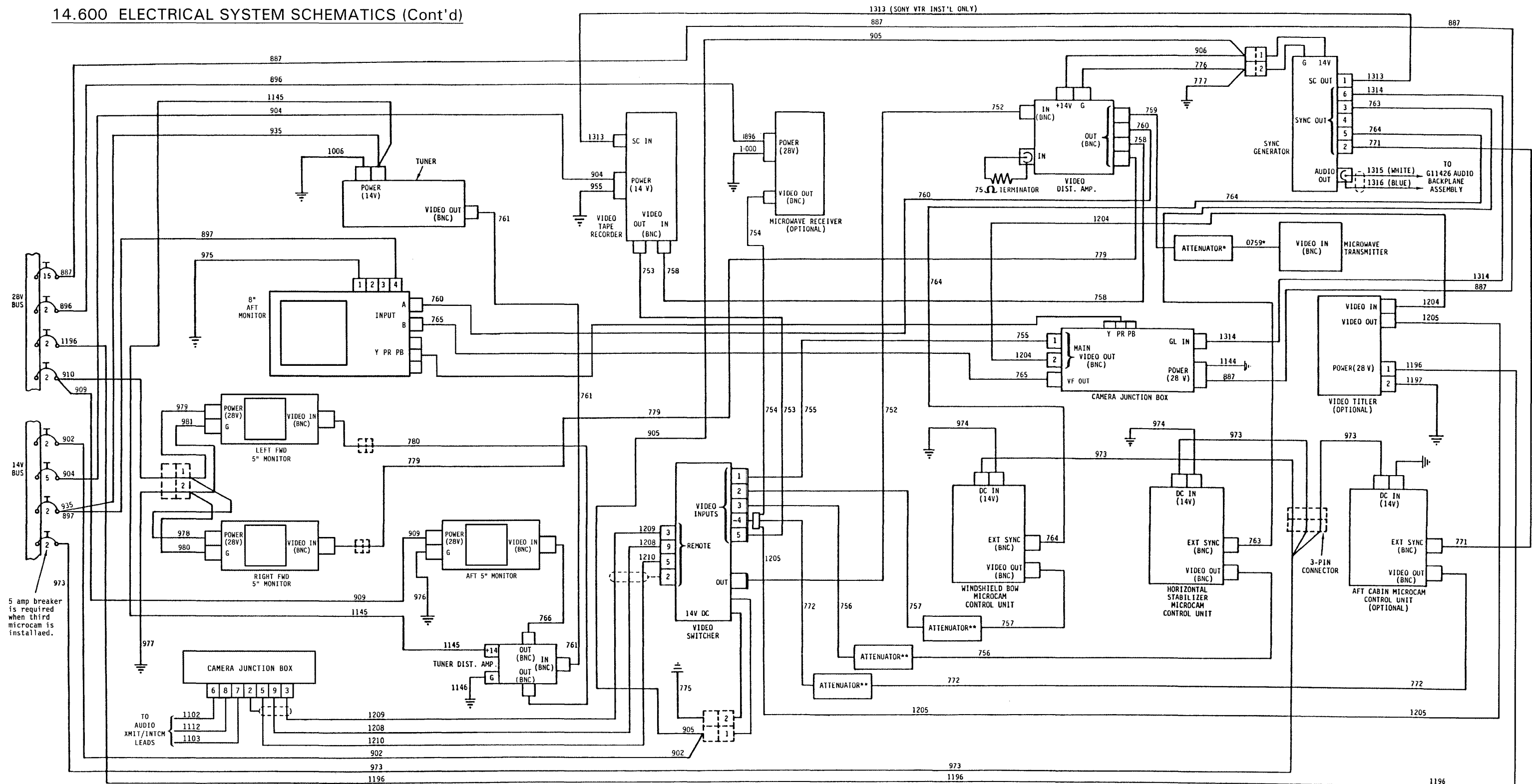
**31-70019 Coupler may be installed at this location instead.

FIGURE 14-3D VIDEO SIGNAL WIRING SCHEMATIC
(ENG helicopters only, ship S/N 469 and on with five-inch monitors. S/N 475 and on have Sync Generator instead of two Video Distribution Amps.)

FIGURE 14-3E AUDIO SIGNAL WIRING SCHEMATIC
(ENG helicopters only, ship S/N 475 and on
with Input-to-Tone Port on Audio Backplane
Assembly.)

FIGURE 14-3E AUDIO SIGNAL WIRING SCHEMATIC
(ENG helicopters only, ship S/N 475 and on
with Input-to-Tone Port on Audio Backplane
Assembly.)

14.600 ELECTRICAL SYSTEM SCHEMATICS (Cont'd)



*Installed only if reduced bandwidth is required.

**31-70019 Coupler may be installed at this location instead.

FIGURE 14-3D VIDEO SIGNAL WIRING SCHEMATIC
(ENG helicopters only, ship S/N 10016 and on)

[illegible]

FIGURE 14-3E AUDIO SIGNAL WIRING SCHEMATIC
(ENG helicopters only, ship S/N 10016 and on)

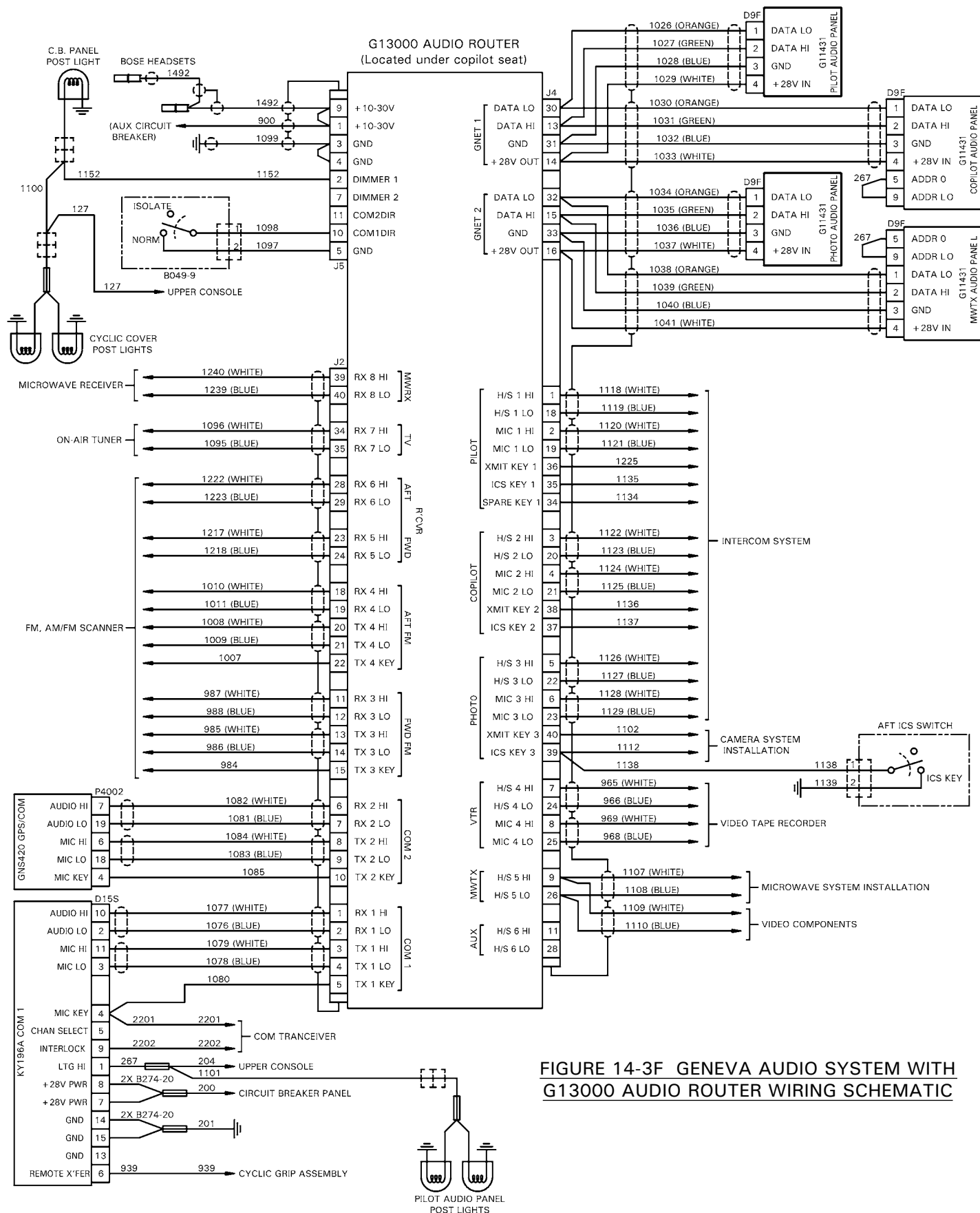


FIGURE 14-3F GENEVA AUDIO SYSTEM WITH G13000 AUDIO ROUTER WIRING SCHEMATIC

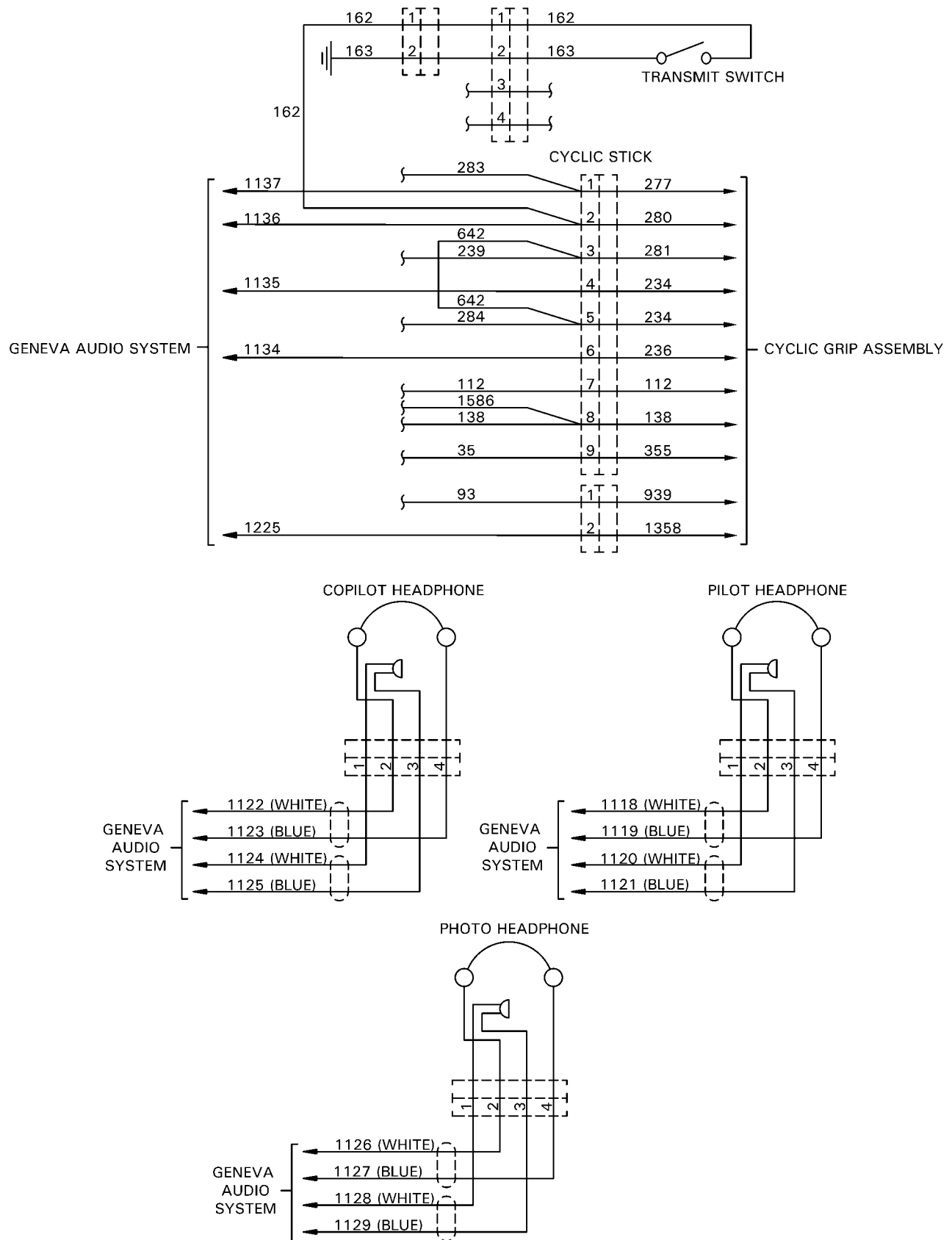


FIGURE 14-3G INTERCOM SYSTEM WIRING SCHEMATIC FOR E.N.G. HELICOPTERS WITH G13000 AUDIO ROUTER GENEVA AUDIO SYSTEM

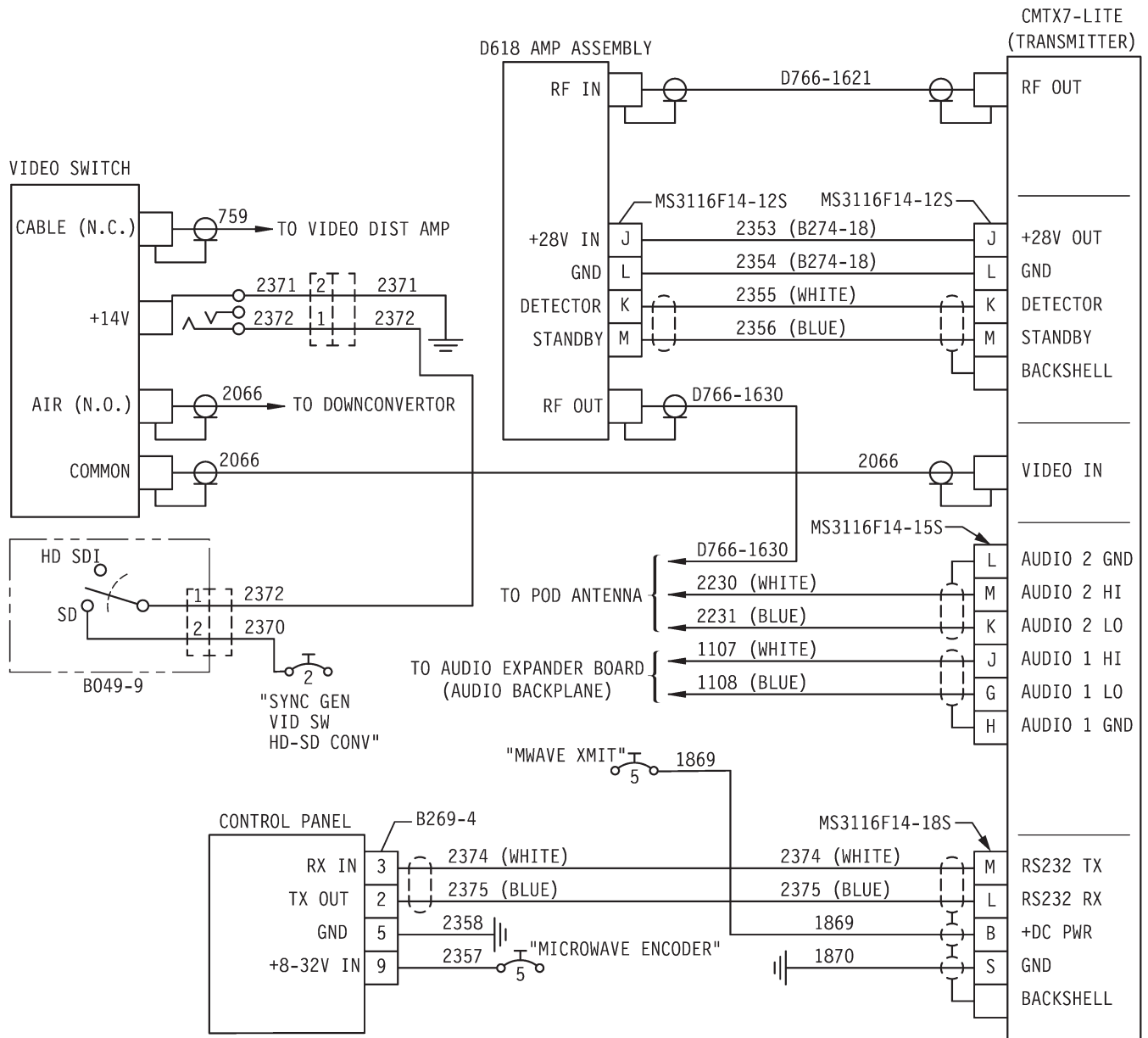


FIGURE 14-3H D056-1 MICROWAVE SYSTEM INSTALLATION

Intentionally Blank

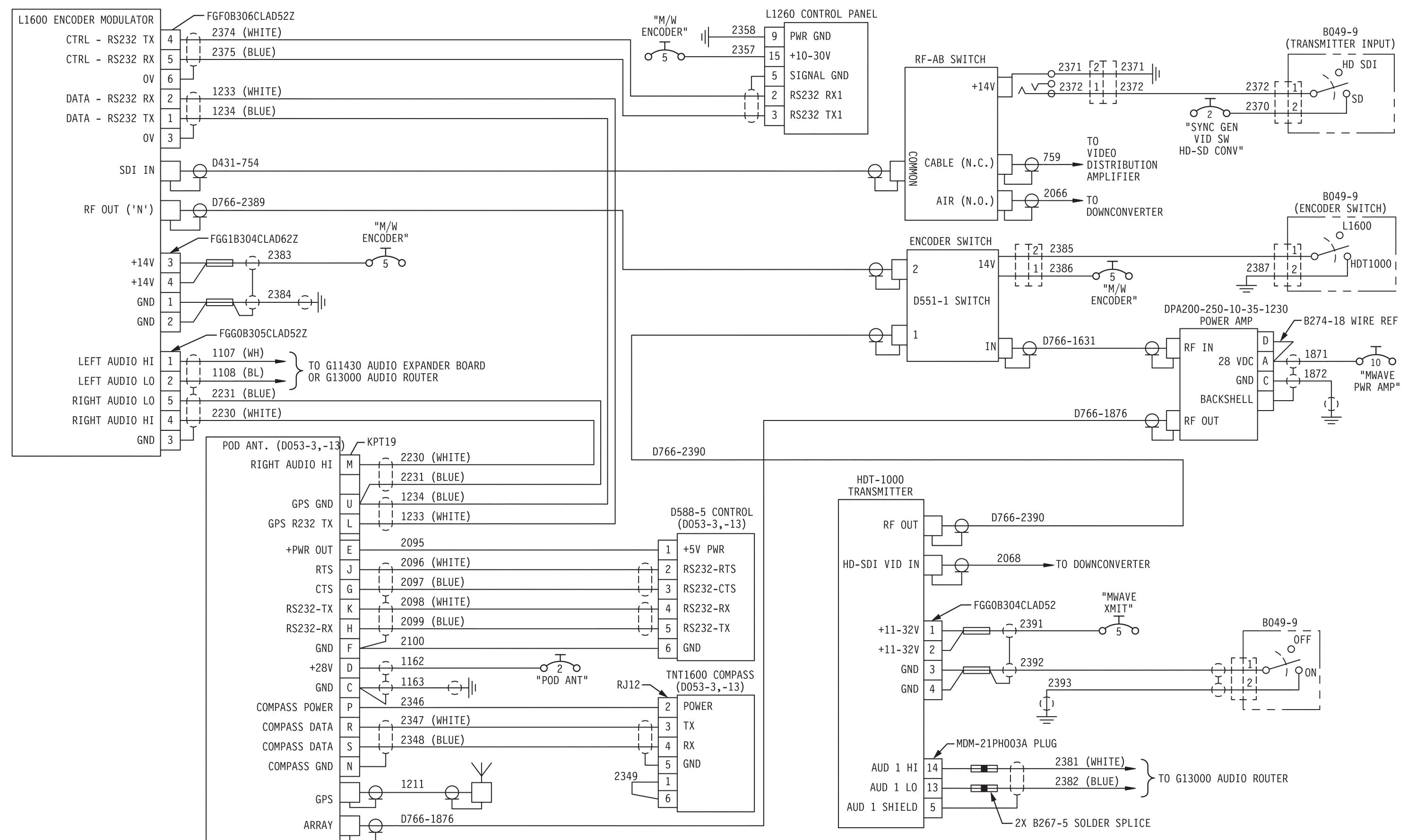


FIGURE 14-3I D056-2 MICROWAVE SYSTEM INSTALLATION

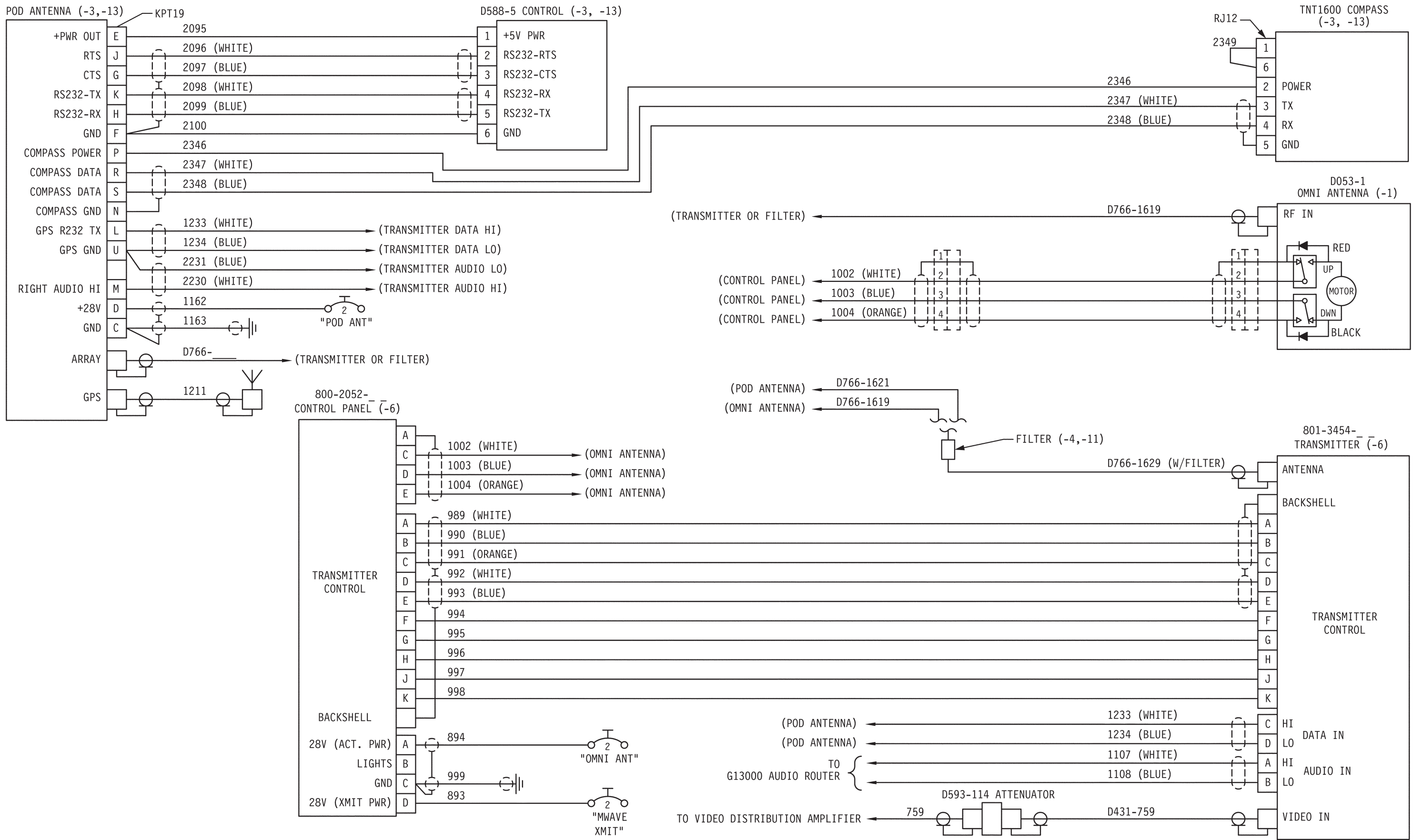


FIGURE 14-3J D053-1, -3, -4, -5, -6, & -11 MICROWAVE SYSTEM INSTALLATION

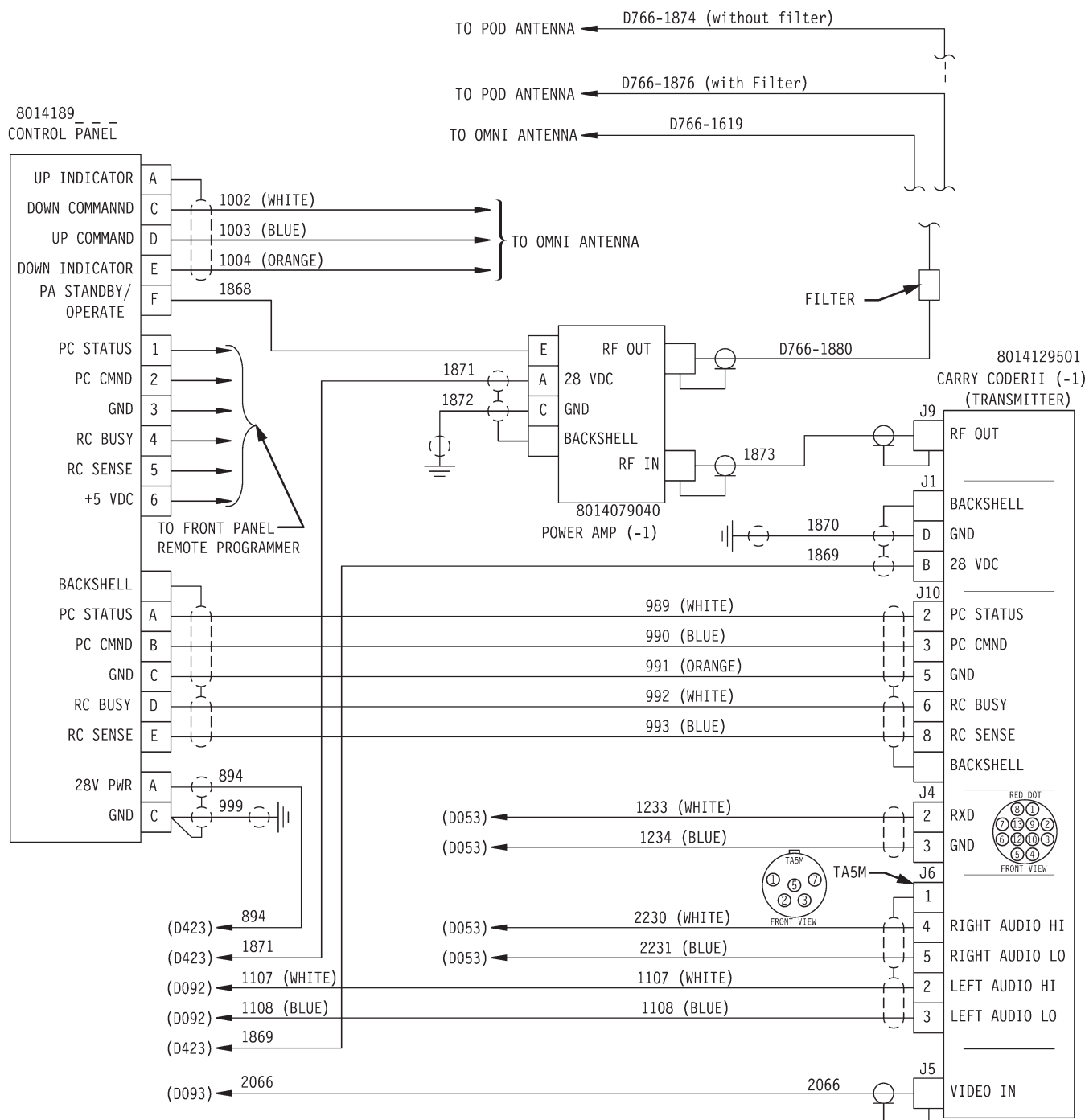


FIGURE 14-3K D055 DIGITAL MICROWAVE SYSTEM INSTALLATION

Intentionally Blank



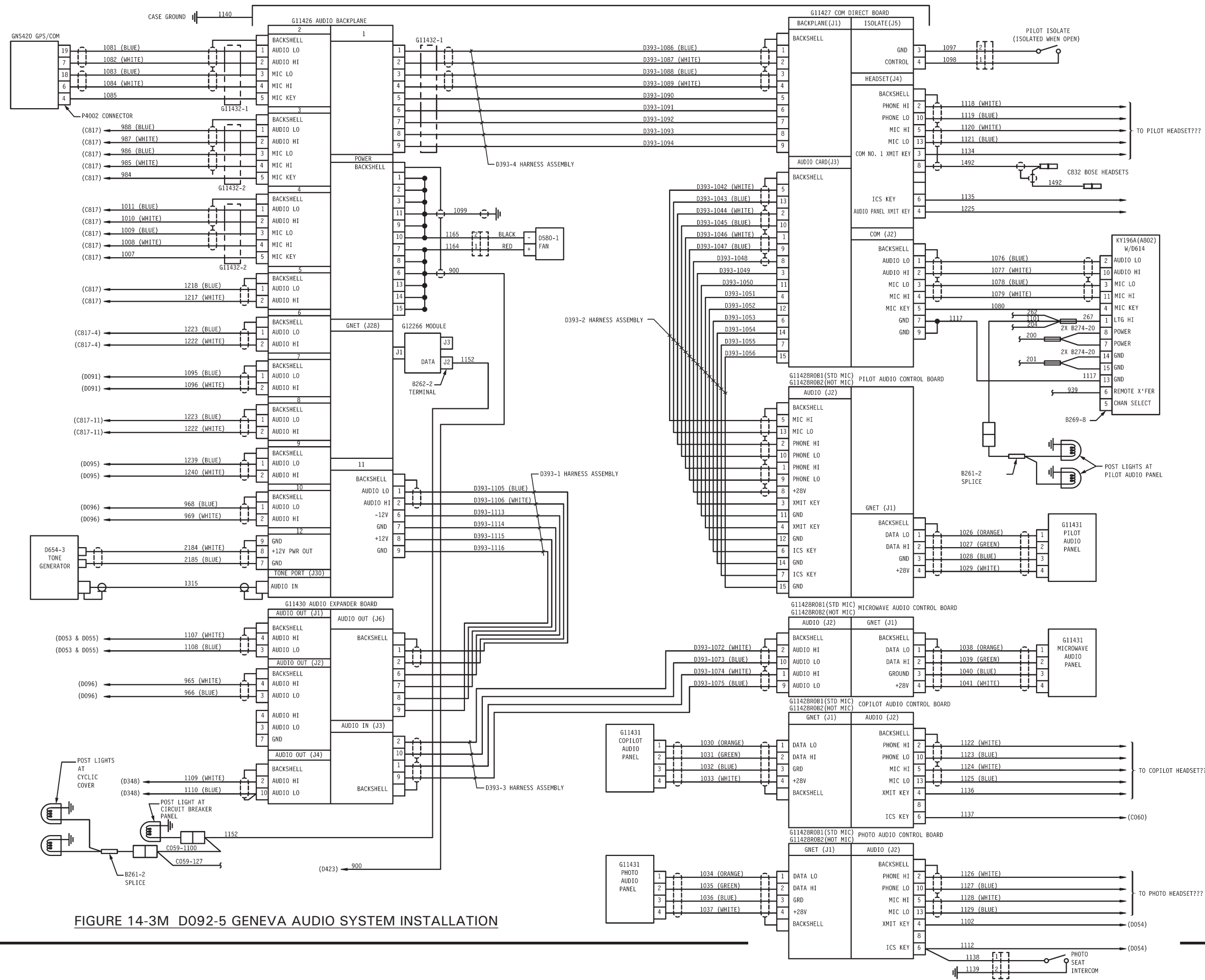


FIGURE 14-3M D092-5 GENEVA AUDIO SYSTEM INSTALLATION

14.700 ELECTRIC TRIM SYSTEM

The R44 is equipped with an automatic electric trim system. The system includes cyclic stick-mounted strain gages, a trim controller in the left front baggage compartment and lateral and longitudinal electric trim actuators at the base of the cyclic stick. The strain gages sense cyclic stick forces applied by the pilot. The trim controller processes the strain gage signals and sends compensating trim force commands to the trim actuators. A thumb-activated trim control switch on the right hand cyclic grip allows fine adjustment of the trim controller.

The automatic trim controller consists of two independent motor controllers housed in the same box. Each section has inputs for power, strain gage signal, and offset control as well as outputs for motor and regulated strain gages power. A single on-off switch on the cyclic center stick deactivates the trim actuator outputs while signal processing circuits remain on and stabilized.

If a problem is evident, then check and adjust trim controller per Section 14.710. Refer to Section 14.720 if problems are encountered when adjusting trim controller. Contact RHC Technical Support if trim controller adjustment and trouble shooting do not correct or identify problem.

14.710 Trim Controller Adjustment

CAUTION

There are two trim controller part numbers: D140-1 and D140-2. D140-1 trim controller must be used ONLY with the C055-2, -6 and -8 cyclic trim assemblies. D140-2 trim controller must be used ONLY with the C055-9, -10 and -11 cyclic trim assemblies. Incompatible controller and trim assembly(s) will result in trim system failure.

- 1) Prepare helicopter:
 - a) Ship on level ground.
 - b) Cyclic stick must have C683-4 damper firmly attached.
 - c) Removable co-pilot grip or C683-6 damper installed.
 - d) Cyclic boot installed and secured.
 - e) Cyclic stick vertical.
 - f) Cyclic friction fully on.
 - g) Trim switch "OFF".
 - h) Trim box connected to airframe harness (but not mounted).
 - i) Attach test cord from MT547-1 set-up box to trim controller. Remove cover nuts from longitudinal and lateral balance potentiometers.

14.710 Trim Controller Adjustment (cont'd)

- j. Pull all circuit breakers except warning lights, trim (28V aircraft only) longitudinal trim (14V aircraft only), and lateral trim (14V aircraft only).
- k. Turn on master battery switch.

Note: System must be on (circuit breakers in) for 10 minutes to stabilize before final adjustments are made (coarse adjustments and checkout can be done during warm up).

2. Connect MT547-1 set-up box test leads to the VDC jacks (red to (+), black to (-)) of a sensitive scale high impedance digital multimeter (such as Fluke 75, Fluke 8010A, Fluke 8050A, etc).
 3. Switch on set-up box to LONG TP1 and adjust longitudinal balance potentiometer for a reading of $0.0 \text{ mV} \pm 5.0 \text{ mV}$. Use small blade screwdriver to adjust potentiometer; do not loosen jam nut.
 4. Switch set-up box to LONG TP2. Reading should be $0.0 \text{ mV} \pm 0.2 \text{ mV}$.
Record reading: _____ mV
 5. Press and hold trim control thumb switch in forward direction. Meter reading should go in positive direction to a maximum of approximately either +325 mV (for D140-1 trim controller) or +92 mV (for D140-2 trim controller).
Record reading: _____ mV
 6. Press and hold trim control thumb switch in aft direction. Meter reading should go in negative direction to a maximum of approximately -72 mV (D140-1) or -92 mV (D140-2). Record reading: _____ mV
 7. The time required to travel from full (+) to full (-) (or vice versa) is approximately either 6 seconds (D140-1) or 4 seconds (D140-2).
- Note: Some meters may take up to 1 second to stabilize at the new reading, therefore a 1 second longer reading could be acceptable.
8. For 14V aircraft, momentarily turn master "OFF" then back "ON". For 28V aircraft, momentarily disconnect then reconnect 10-pin power connector (containing wires 616 and 619) at trim controller. Meter reading should return to $0.0 \text{ mV} \pm 0.2 \text{ mV}$.
Record reading: _____ mV
 9. Switch set-up box to LONG TP3. After 10 minutes warm up, adjust longitudinal balance for a reading of $0.0 \text{ mV} \pm 5.0 \text{ mV}$. Tap box with knuckles to relieve O-ring (which seals the potentiometer shaft) tension. Readjust as required until reading stays within limits. Then reinstall longitudinal balance potentiometer cover nut. Record reading: _____ mV
 10. An approximately 2 1/2 lb forward force applied to middle of stick should result in a reading of -100 mV to -150 mV. An approximately 2 1/2 lb aft force applied to middle of stick should result in a similar but positive reading of +100 mV to +150 mV.

Note: Do not actually move stick.

14.710 Trim Controller Adjustment (cont'd)

11. No force on stick should result in same reading as in step 9, ± 2.5 mV.
Record reading: _____ mV
12. Switch set-up box to LAT TP1 and adjust lateral balance for a reading of 0.0 mV ± 5.0 mv.
13. Switch set-up box to LAT TP2. Reading should be either 0.0 mV ± 0.2 mV (D140-1) or $+20.0$ mV ± 0.2 mV (D140-2).
Record reading: _____ mV
14. Press and hold trim control thumb switch in left direction. Meter reading should go in positive direction to a maximum of approximately $+92$ mV (D140-1) or $+75$ mV (D140-2). Record reading: _____ mV
15. Press and hold trim control thumb switch in right direction. Meter reading should go in the negative direction to maximum of approximately -92 mV (D140-1) or -35 mV (D140-2). Record reading: _____ mV
16. The time required to travel from full (+) to (-) (or vice versa) is approximately 7 seconds (D140-1) or 6 seconds (D140-2).

Note: Some meters may take up to 1 second to stabilize at the new reading, therefore a 1 second longer reading could be acceptable.

17. For 14V aircraft, momentarily turn master "OFF" then back "ON". For 28V aircraft, momentarily disconnect then reconnect 10-pin power connector (containing wires 616 and 619) at trim controller. Meter reading should return to 0.0 mV ± 0.2 mV (D140-1) or 20.0 mV ± 0.2 mV (D140-2).
Record reading: _____ mV

- a. For systems with D140-2 trim controller ONLY: Momentarily press trim control switch until a stable reading of 0.0 mV ± 0.2 mV is obtained.

Note: Voltage at LAT TP2 must remain at 0.0 mV ± 0.2 mV thru step 20. The voltage will be correct provided trim controller power is not interrupted and the trim control switch is not moved.

18. Switch set-up box to LAT TP3. After 10 minute warm up adjust lateral balance for a reading of 0.0 mV ± 5.0 mV. Tap box with knuckles to relieve O-ring tension, readjust as required until reading stays within limits. Reinstall lateral balance potentiometer cover nut.
Record reading: _____ mV
19. An approximately 2 1/2 lb left force applied to middle of stick should result in a reading of -100 mV to -150 mV. An approximately 2 1/2 lb right force applied to middle of stick should result in a similar but positive reading of $+100$ mV to $+150$ mV. **Note:** Do not actually move stick.
20. No force on the stick should result in the same readings in step 18, ± 2.5 mV.
Record reading: _____ mV

14.710 Trim Controller Adjustment (cont'd)

21. With thumb switch, adjust LAT TP3 to +100mV. Turn trim switch ON and observe trim actuator response; it should run smoothly to the stop. Turn trim switch OFF. With thumb switch, adjust LAT TP3 to -100mV. Turn trim switch ON and observe trim actuator response; it should run smoothly to the stop. Turn trim switch OFF. With thumb switch, again adjust LAT TP3 to +100 mV. Turn trim switch ON and observe trim actuator response; it should run smoothly to the stop. Replace actuator if it does not run smoothly. Turn trim switch and master switch OFF.
22. Turn master switch ON. Switch set-up box to LONG TP3. With thumb switch, adjust LONG TP3 to -100mV. Turn trim switch ON and observe trim actuator response; it should run smoothly to stop. Turn trim switch OFF. With thumb switch, adjust LONG TP3 to +100 mV. Turn trim switch ON and observe trim actuator response; it should run smoothly to the stop. Replace actuator if it does not run smoothly. Turn trim switch OFF.
23. Switch set-up box to LONG TP2 and adjust thumb switch for $0.0 \text{ mV} \pm 0.2 \text{ mV}$. Switch set-up box to LAT TP2 and adjust thumb switch for $0.0 \text{ mV} \pm 0.2 \text{ mV}$.
24. Disconnect meter and test cable and install receptacle cap (make sure it locks in position). Turn trim system switch "ON". Motors should not be running.
25. A light finger push to stick in forward or aft direction should cause longitudinal motor to run down or up, respectively. Motor should stop when push stops. Motor should run smoothly from stop to stop.
Note: Motor runs faster with stronger push.
26. A light finger push to stick in the left or right direction should cause lateral motor to run left or right. Motor should stop when push stops. Motor should run smoothly from stop to stop.
Note: Motor runs faster with stronger push.
27. Lateral push should not cause longitudinal motor to run and vice versa.
28. Pull LONG TRIM circuit breaker and verify only lateral trim actuator functions when lateral and longitudinal forces are applied to cyclic stick. Reset LONG TRIM circuit breaker. (Not applicable to 28 volt aircraft.)
29. Pull LAT TRIM circuit breaker and verify only longitudinal trim actuator functions when lateral and longitudinal forces are applied to cyclic stick. Reset LAT TRIM circuit breaker. (Not applicable to 28 volt aircraft.)
30. Partially release cyclic friction. Hold cyclic grip and move it in all directions. Motors should move with motion. If motor pushes back and resists motion (or moves sideways to force), there is a wiring error.

Verify adequate clearance for all combinations of stick and motor arm positions. Verify adequate clearance for motor wires and cyclic stick wires.
31. Center motors and turn trim system and master switches "OFF". Reset all circuit breakers.
32. Install and secure trim controller, and route D161-1 trim controller harness out of baggage compartment and away from any sharp edges (sheet metal, screws, etc).

14.720 Trim System Electrical Troubleshooting

Perform Trim Controller Adjustment per section 14.710 whenever a problem is suspected in trim system.

If LONG or LAT TP1 is in excess of ± 2.00 volts and will not adjust, there may be a broken strain gage signal wire. Refer to Figure 14-4 Automatic Trim Control Schematic. Lateral circuit signal is pin S & pin R. Longitudinal circuit signal is pin T & pin U.

If LONG TP1 & TP3 (or LAT TP1 & TP3) adjust satisfactorily (balance) but it is not possible to obtain ± 100 - 150 mV reading when pushing cyclic stick (ref Section 14.710 steps 10 & 19), there may be a broken strain gage power wire. Lateral circuit power is pin A & pin P. Longitudinal circuit power is pin V & pin N.

Check following if strain gage wiring faults are suspected.

1. **Strain Gage Bridge Resistance Readings:** Disconnect 19-pin signal connector at trim controller and measure resistance between following harness connector pins. If infinite resistance is found between any 3 combinations in one circuit then an open circuit exists. A damaged strain gage is indicated if resistance readings do not follow chart.

Lateral Circuit

<u>Pin</u>	<u>to Pin</u>	<u>= Resistance</u>
A	P	350 ± 3 ohms
S	R	350 ± 3 ohms
A	S	262 ± 3 ohms
A	R	262 ± 3 ohms
P	S	262 ± 3 ohms
P	R	262 ± 3 ohms

Longitudinal Circuit

<u>Pin</u>	<u>to Pin</u>	<u>= Resistance</u>
V	N	350 ± 3 ohms
T	U	350 ± 3 ohms
V	T	262 ± 3 ohms
V	U	262 ± 3 ohms
N	T	262 ± 3 ohms
N	U	262 ± 3 ohms

2. **Strain Gage Bridge Insulation Resistance:** Disconnect 19-pin signal connector at trim controller and measure at harness connector; resistance must be in excess of 20 megohms for each of the following:

Lateral Gages
Pin A to
ship ground

Longitudinal Gages
Pin V to
ship ground

**Lateral Gages-to-
Longitudinal Gages**
Pin A to Pin V

**Lateral Gages-
to-Shield**
Pin A to Pin G

**Longitudinal Gages-
to-Shield**
Pin V to Pin G

Shield
Pin G to
Ship Ground

This page intentionally left blank.

14.700 ELECTRIC TRIM SYSTEM (CONT'D)

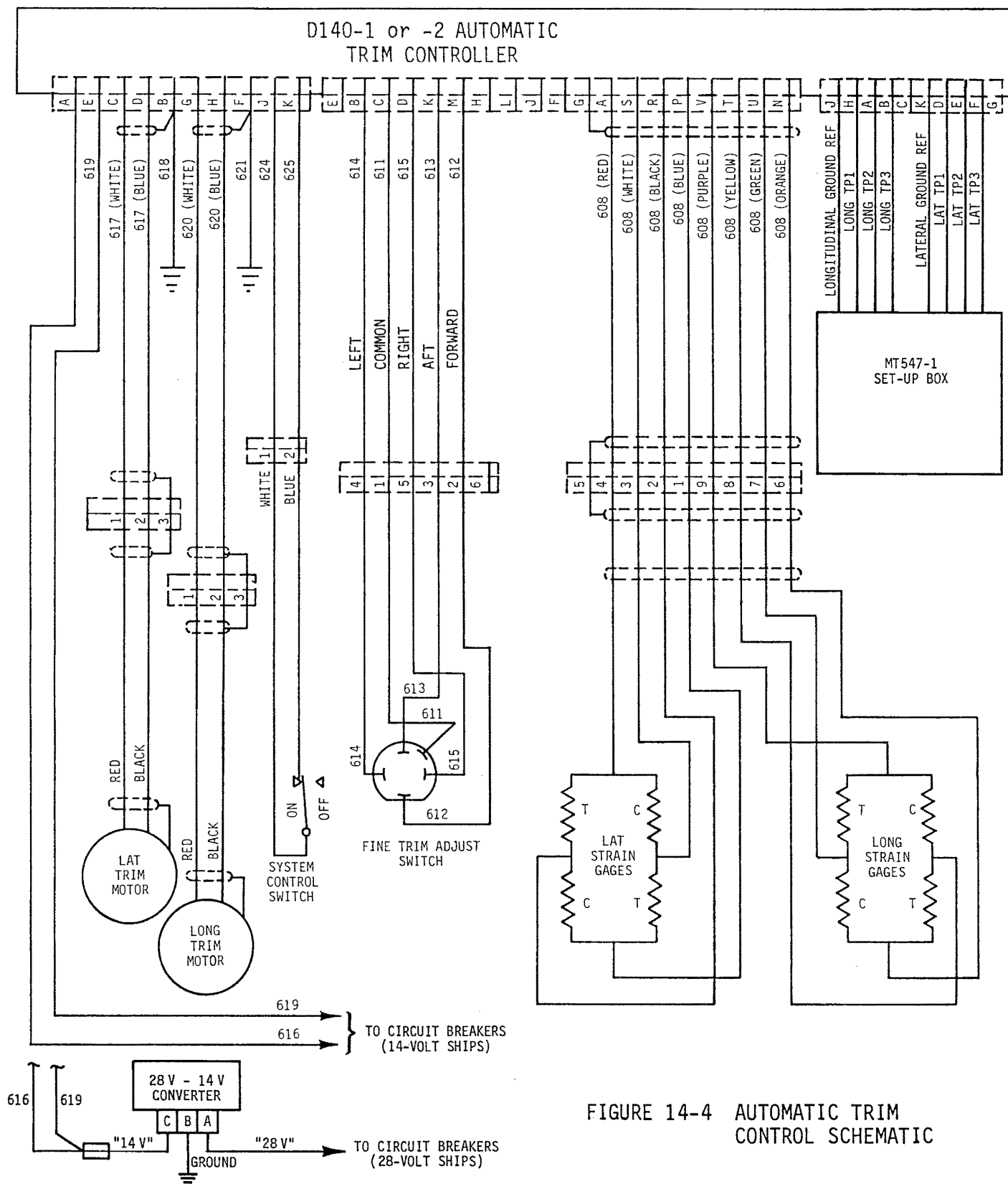


FIGURE 14-4 AUTOMATIC TRIM CONTROL SCHEMATIC

14.700 ELECTRIC TRIM SYSTEM (CONT'D)

This page intentionally left blank.

14.800 Antenna Locations

Antenna Locations information has been moved to § 16-70.

Intentionally Blank

14.900 AVIONICS SCHEMATICS

The basic communications wiring common to all the Com. radio configurations include a N.A.T. Intercom System that provides a voice-activated intercom and Pilot and Co-Pilot cyclic stick switches. In addition, an intercom switch at each of the 2 rear seats can also activate the intercom.

The pilot's and co-pilots individual headphone jacks are mounted to the ceiling and a little behind their respective heads. The rear passenger headphone jacks are contained in a com box centered at the rear most portion of the cabin ceiling. The pilot can use the Pilot "Isolate" switch which will remove him from the Intercom bus; he can then communicate over the com radio without disturbances.

14.900 AVIONICS SCHEMATICS (Cont'd)

This page intentionally left blank.

14.900 AVIONICS SCHEMATICS (Cont'd)

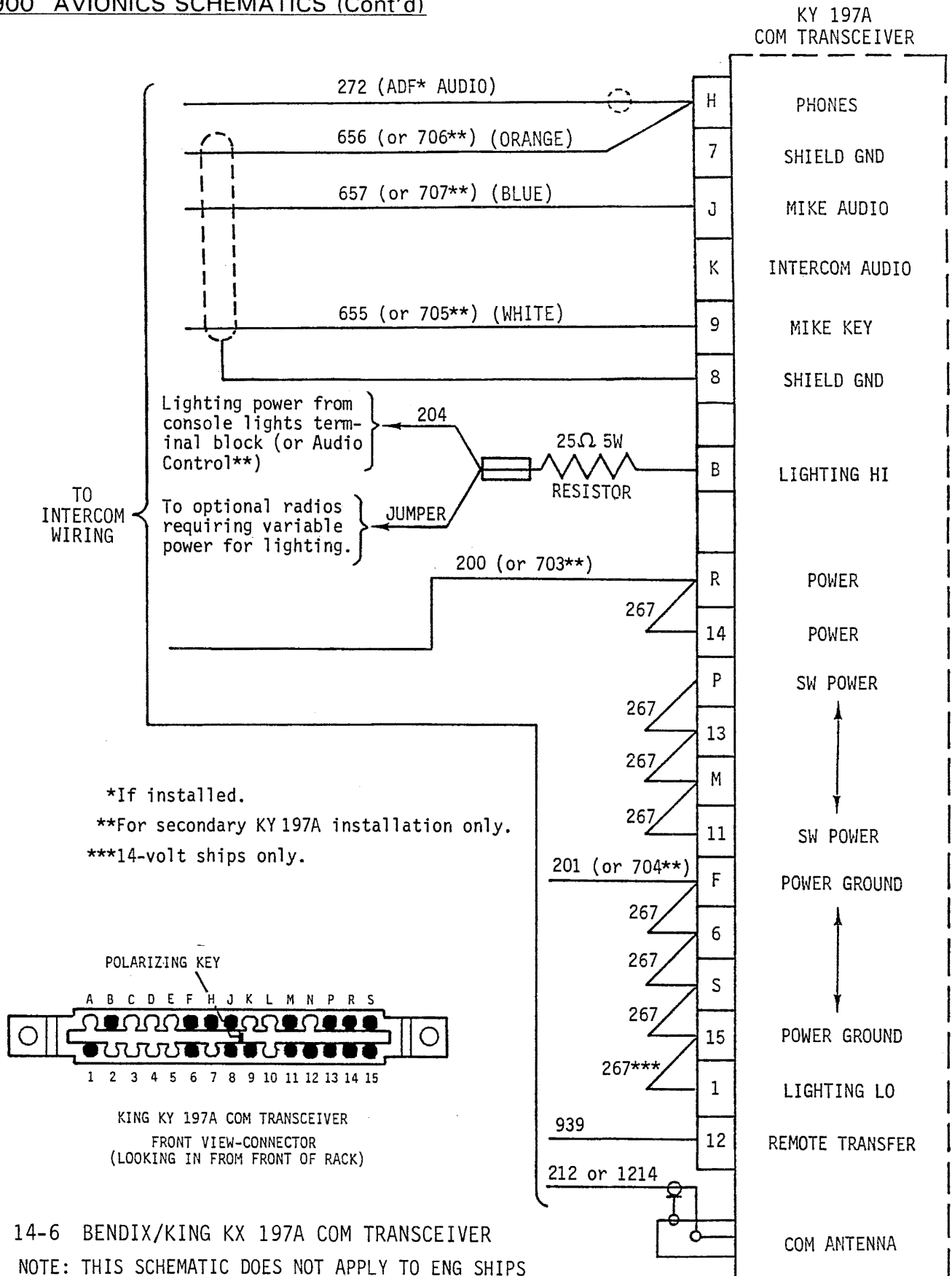


FIGURE 14-6 BENDIX/KING KX 197A COM TRANSCEIVER

NOTE: THIS SCHEMATIC DOES NOT APPLY TO ENG SHIPS WITH GENEVA AUDIO SYSTEM.

14.900 AVIONICS SCHEMATICS (Cont'd)

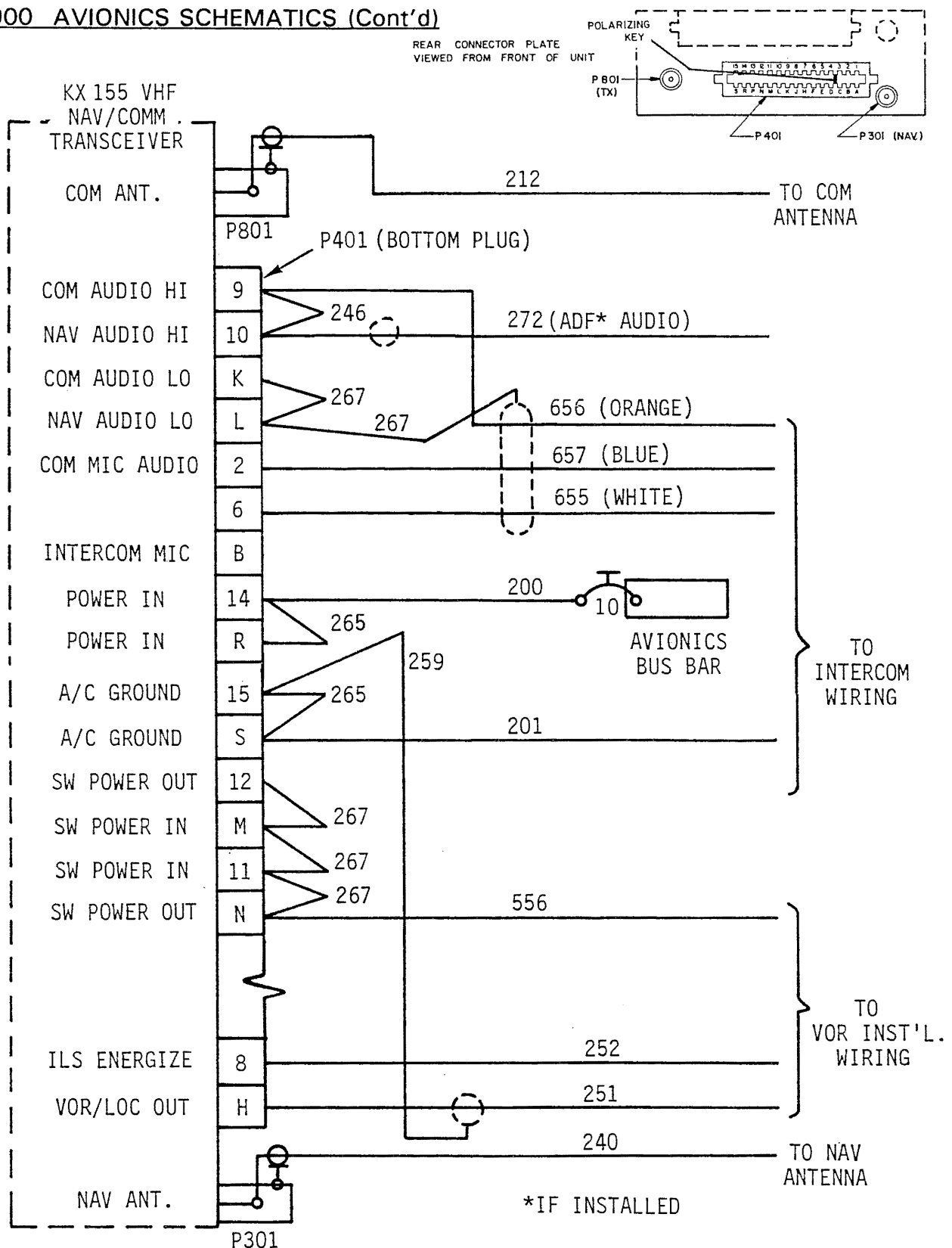


FIGURE 14-7 BENDIX/KING KX 155 VHF NAV/COMM TRANSCEIVER

14.900 AVIONICS SCHEMATICS (Cont'd)

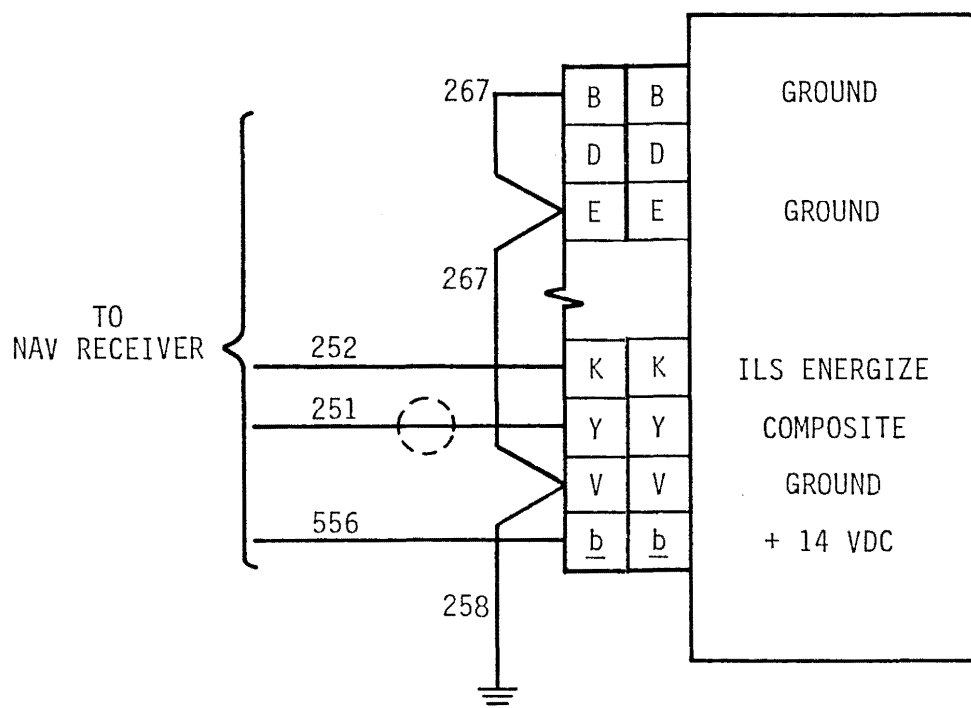


FIGURE 14-8 BENDIX/KING KI 203 VOR INDICATOR

14.900 AVIONICS SCHEMATICS (Cont'd)

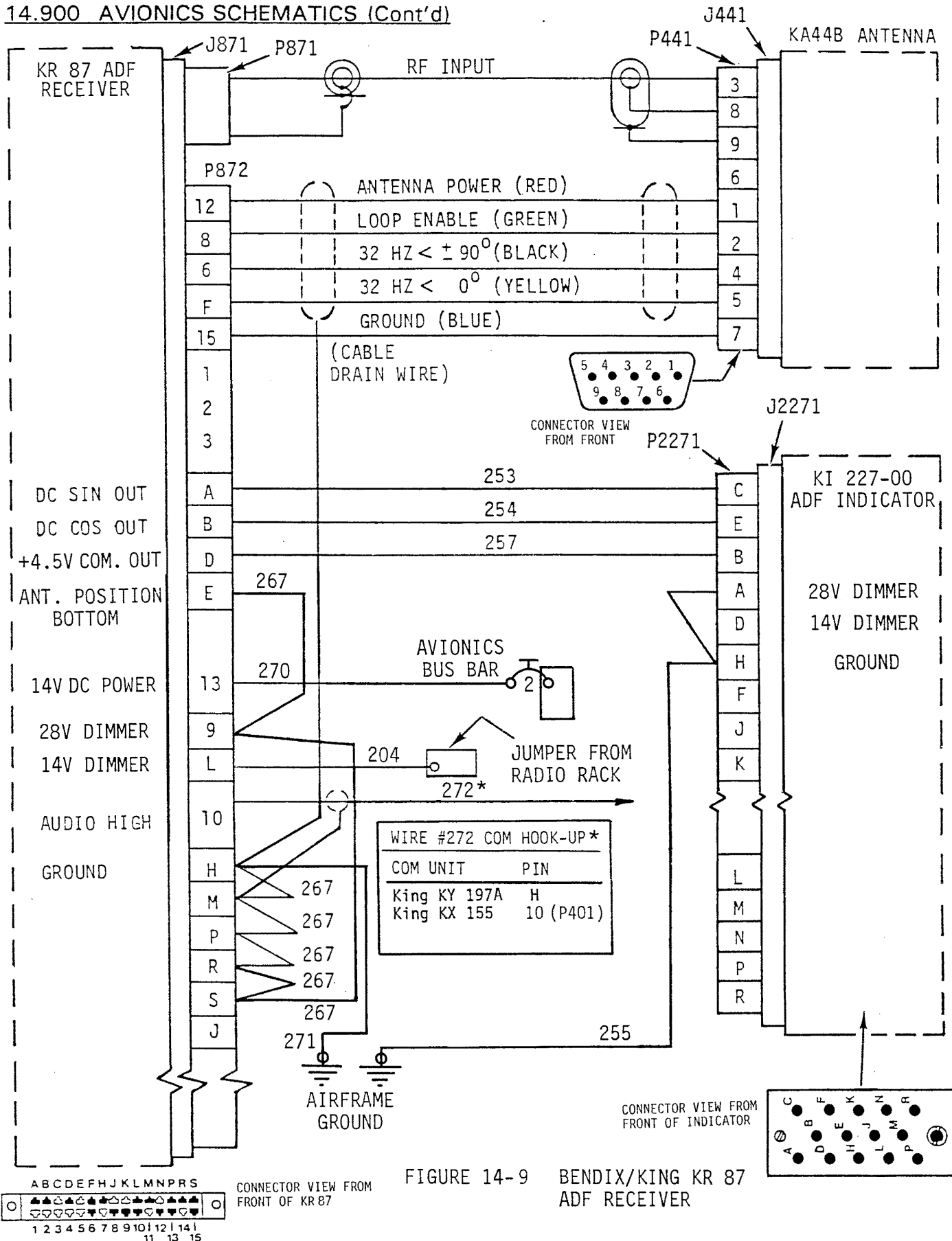
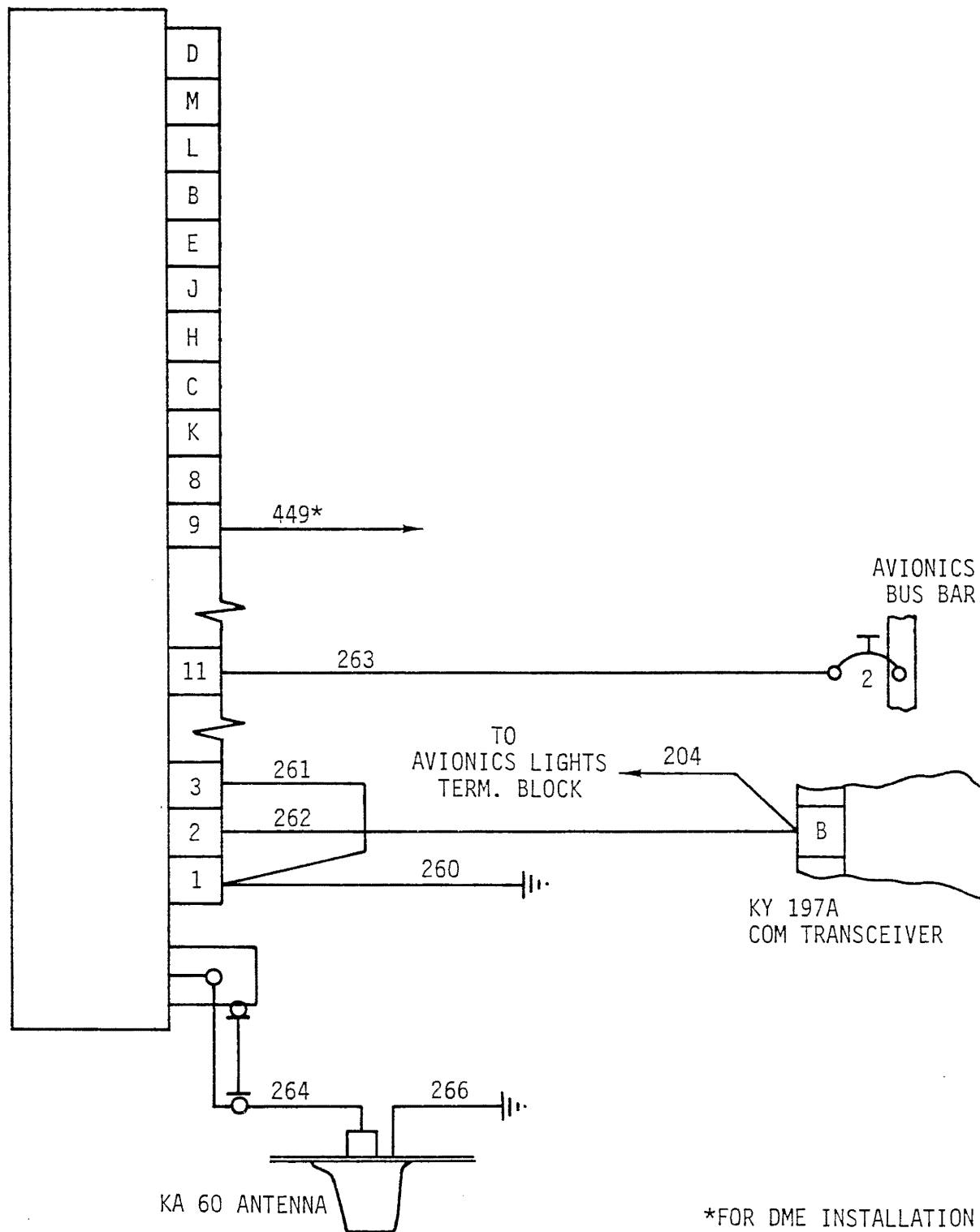


FIGURE 14-9

BENDIX/KING KR 87
ADF RECEIVER

14.900 AVIONICS SCHEMATICS (Cont'd)

KT 76A TRANSPONDER



*FOR DME INSTALLATION ONLY. CONNECT TO PIN "K" OF KN 63 DME.

FIGURE 14-10 BENDIX/KING KT 76A TRANSPONDER

14.900 AVIONICS SCHEMATICS (Cont'd)

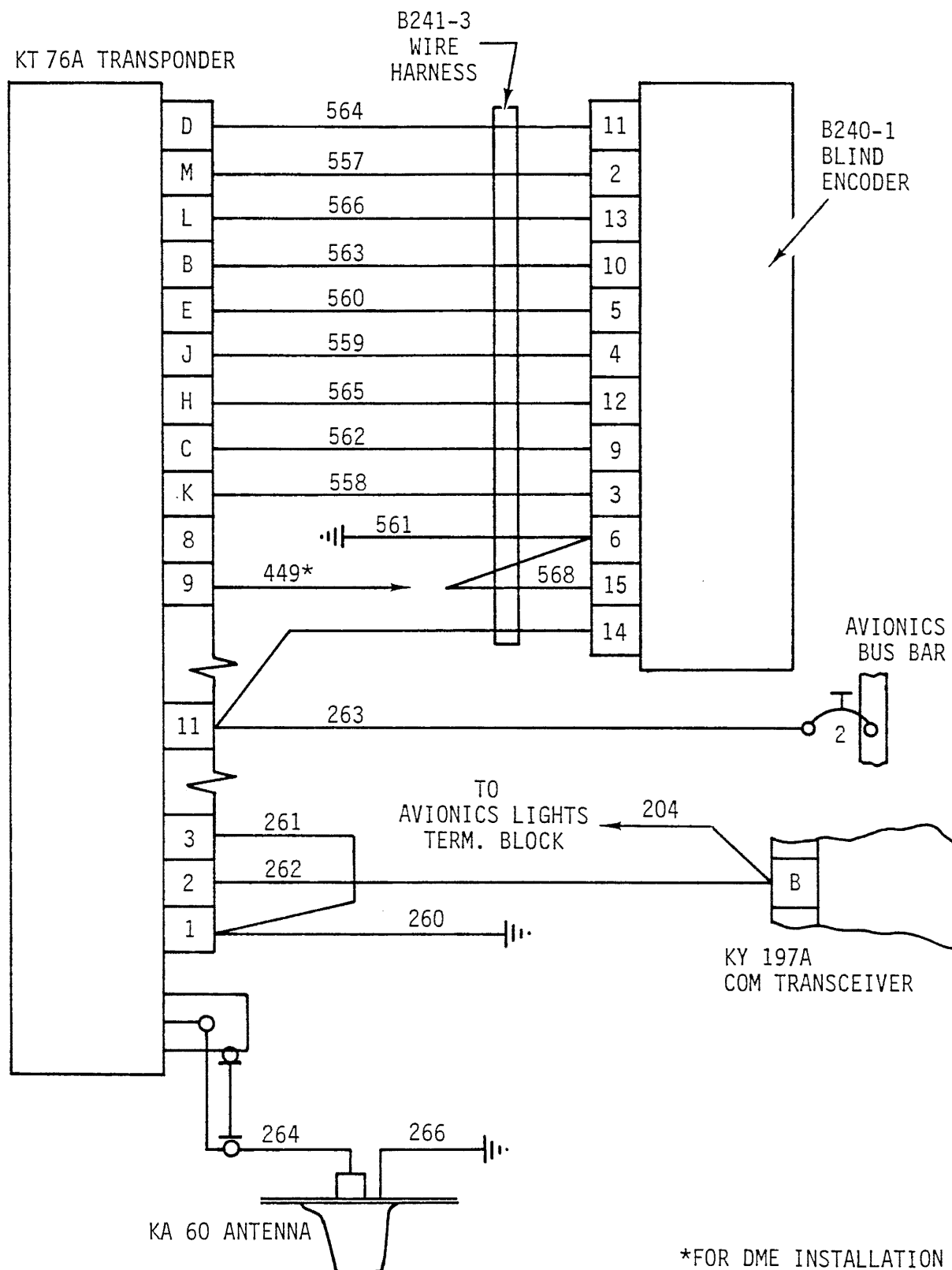


FIGURE 14-11 BENDIX/KING KT 76A TRANSPONDER WITH BLIND ENCODER

14.900 AVIONICS SCHEMATICS (Cont'd)

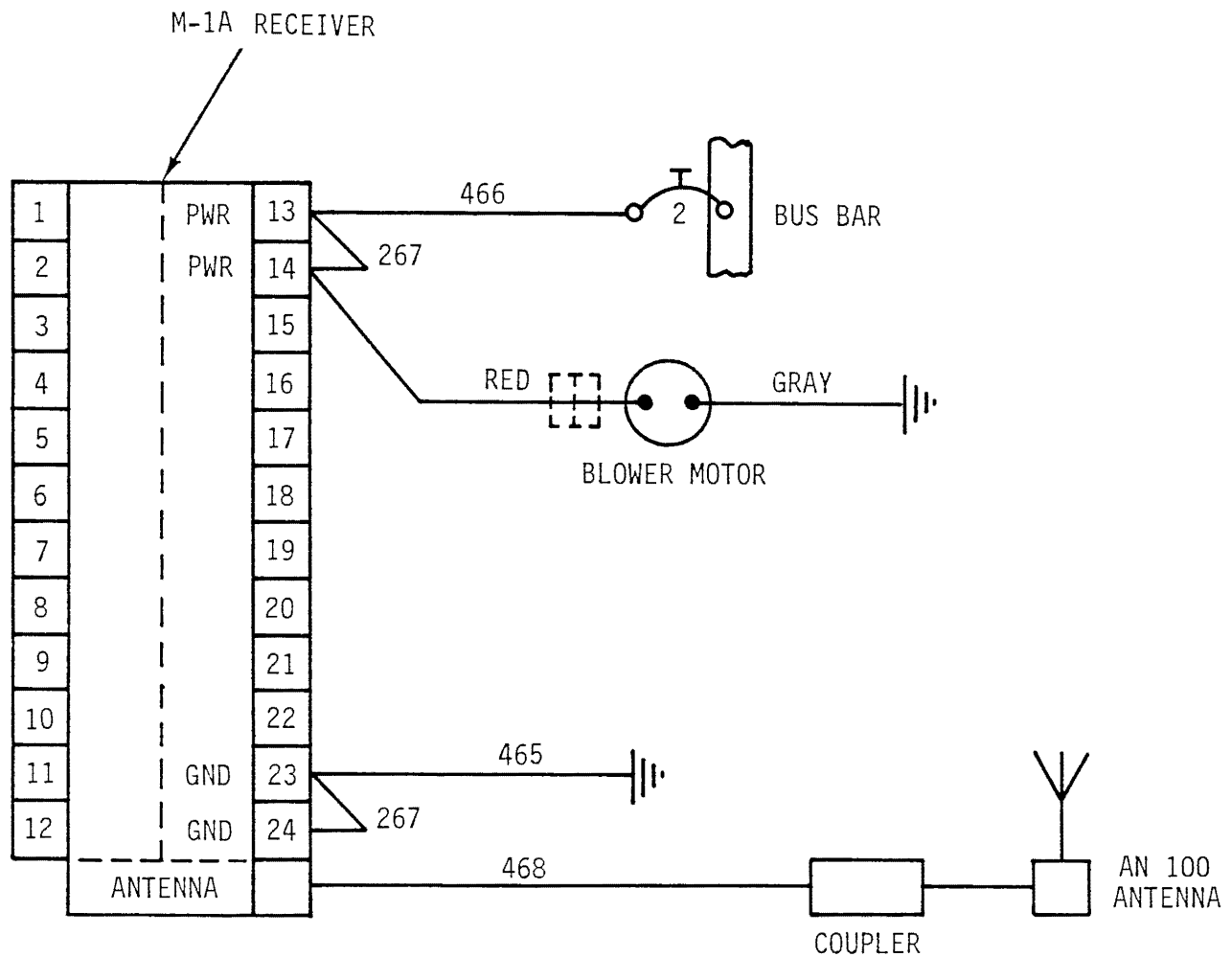


FIGURE 14-12 NORTHSTAR M-1A LORAN C RECEIVER

14.900 AVIONICS SCHEMATICS (Cont'd)

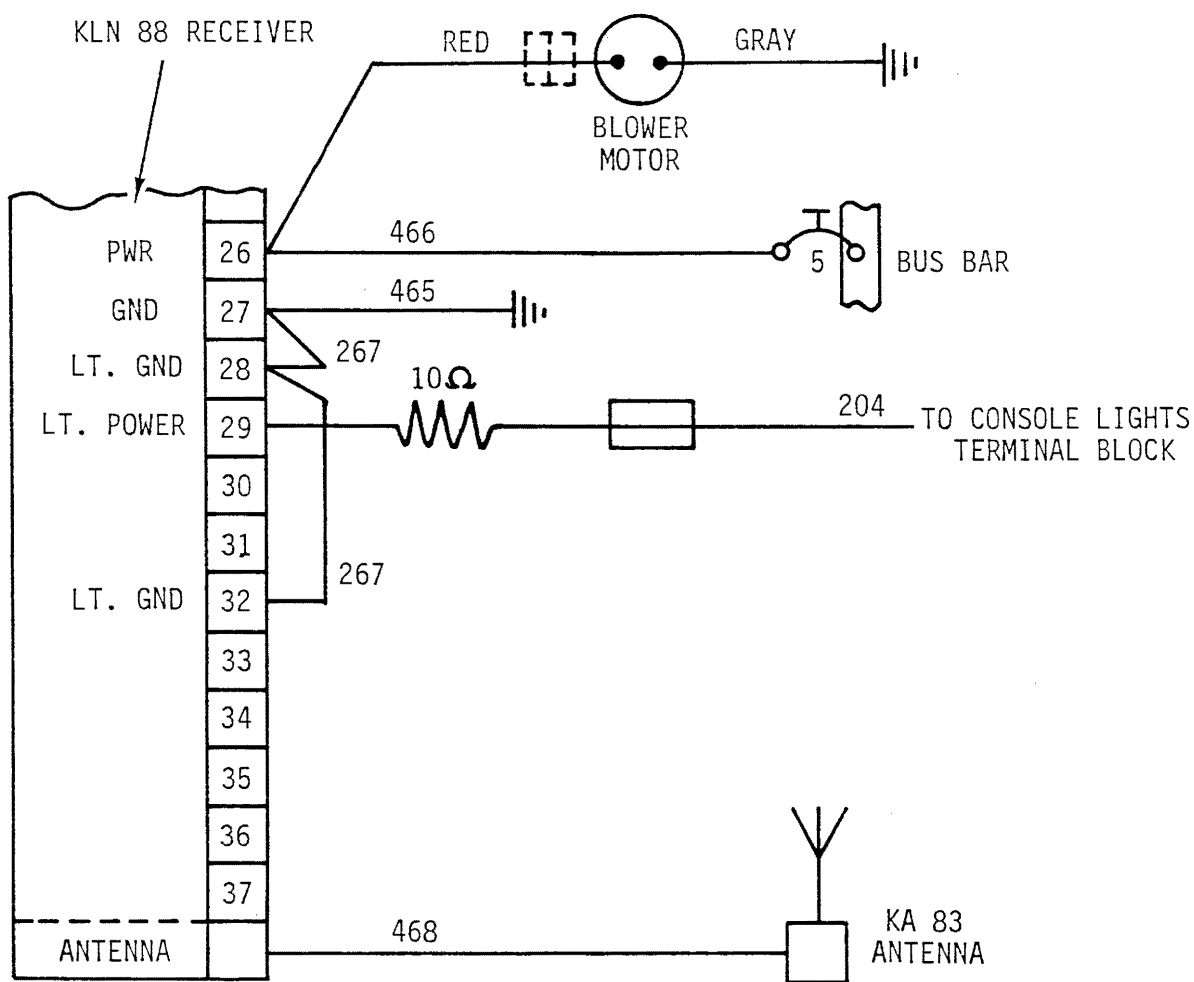


FIGURE 14-13 BENDIX/KING KLN 88 LORAN C RECEIVER

14.900 AVIONICS SCHEMATICS (Cont'd)

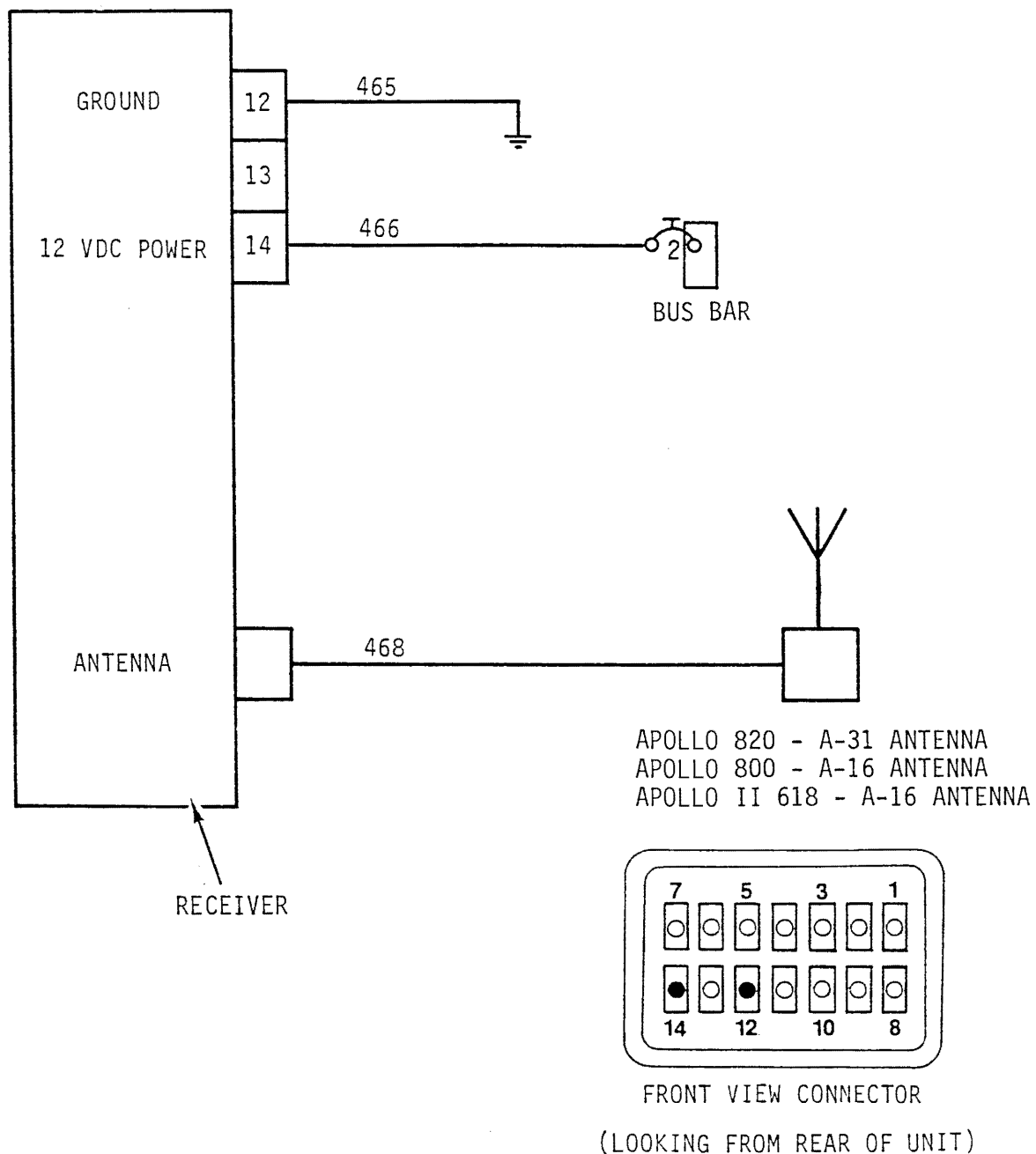


FIGURE 14- 14

APOLLO 820 FLYBUDDY GPS RECEIVER
 APOLLO 800 FLYBUDDY PLUS LORAN C RECEIVER
 APOLLO 618 TCA LORAN C RECEIVER

14.900 AVIONICS SCHEMATICS (Cont'd)

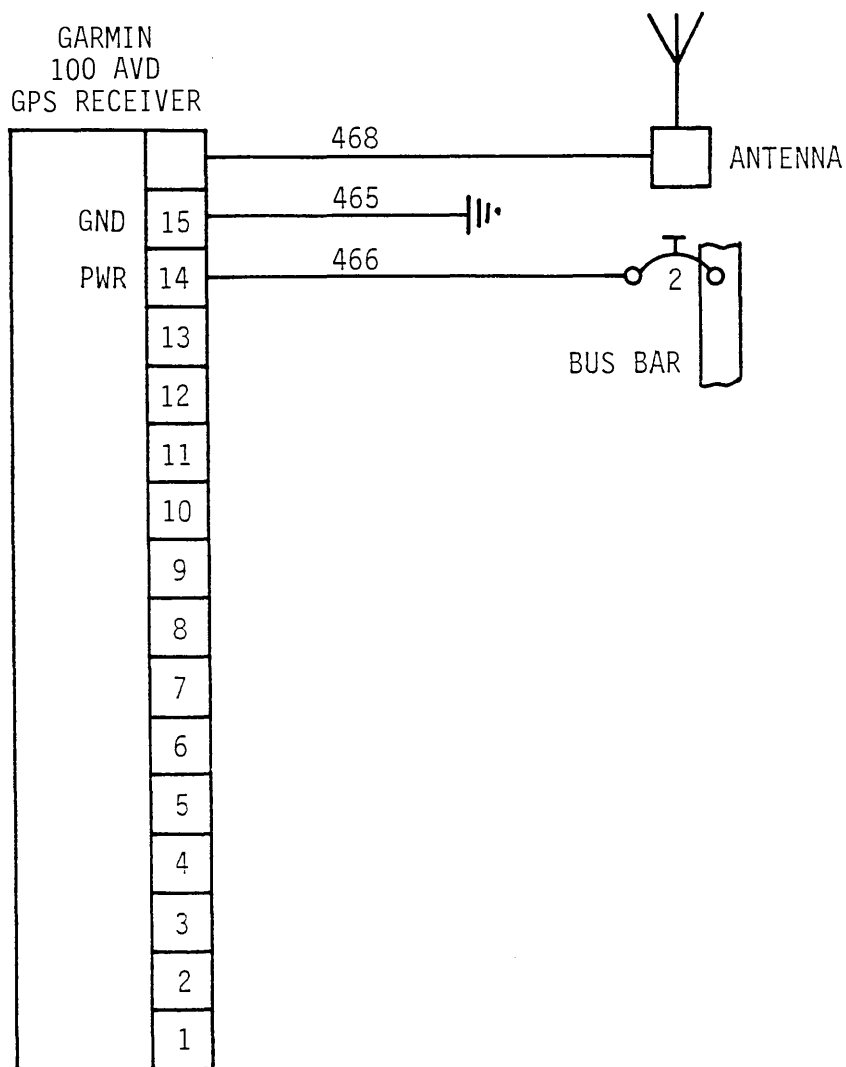


FIGURE 14-15 GARMIN 100 AVD GPS RECEIVER

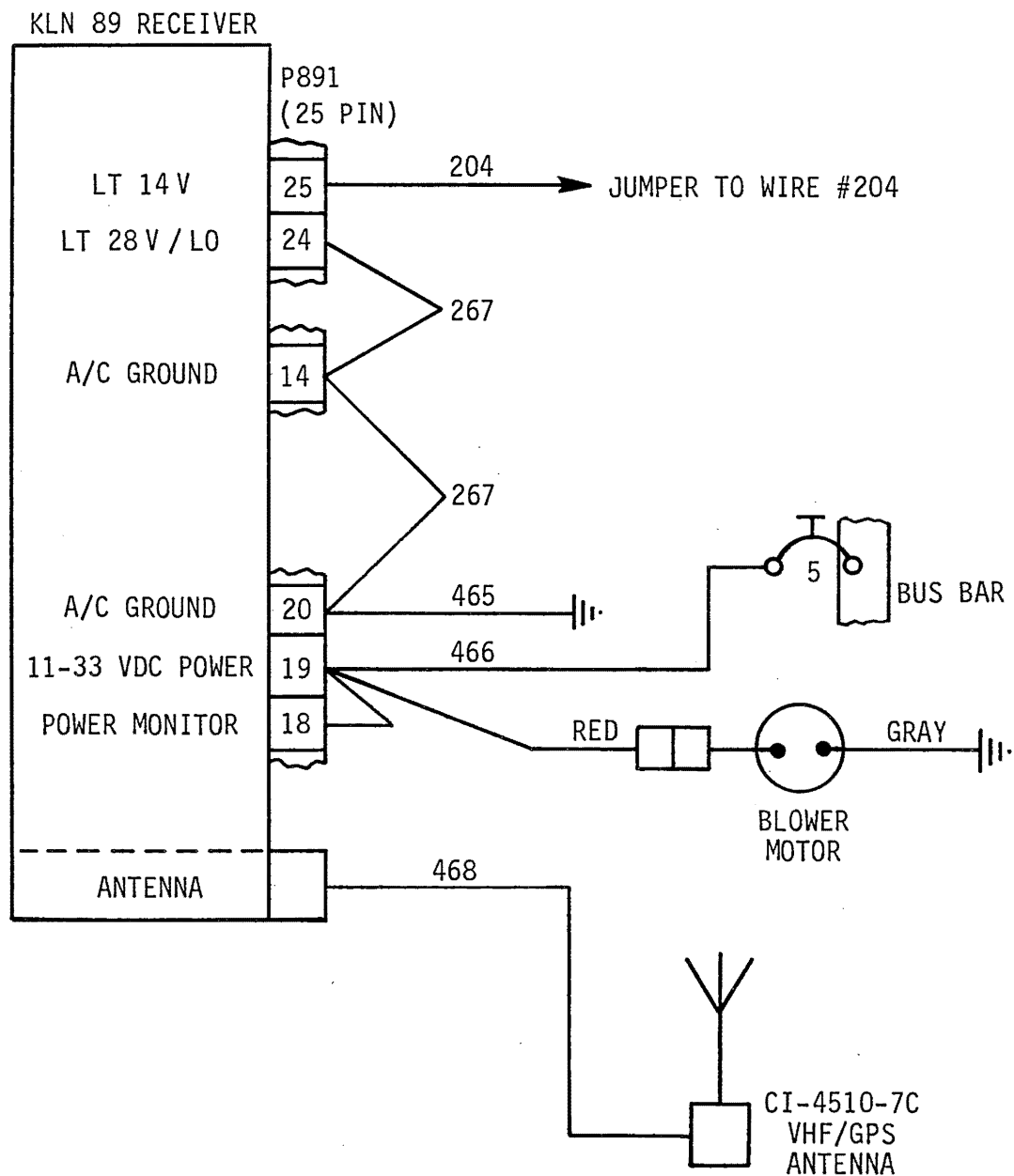


FIGURE 14-16 BENDIX/KING KLN 89 GPS RECEIVER

14.900 AVIONICS SCHEMATICS (Cont'd)

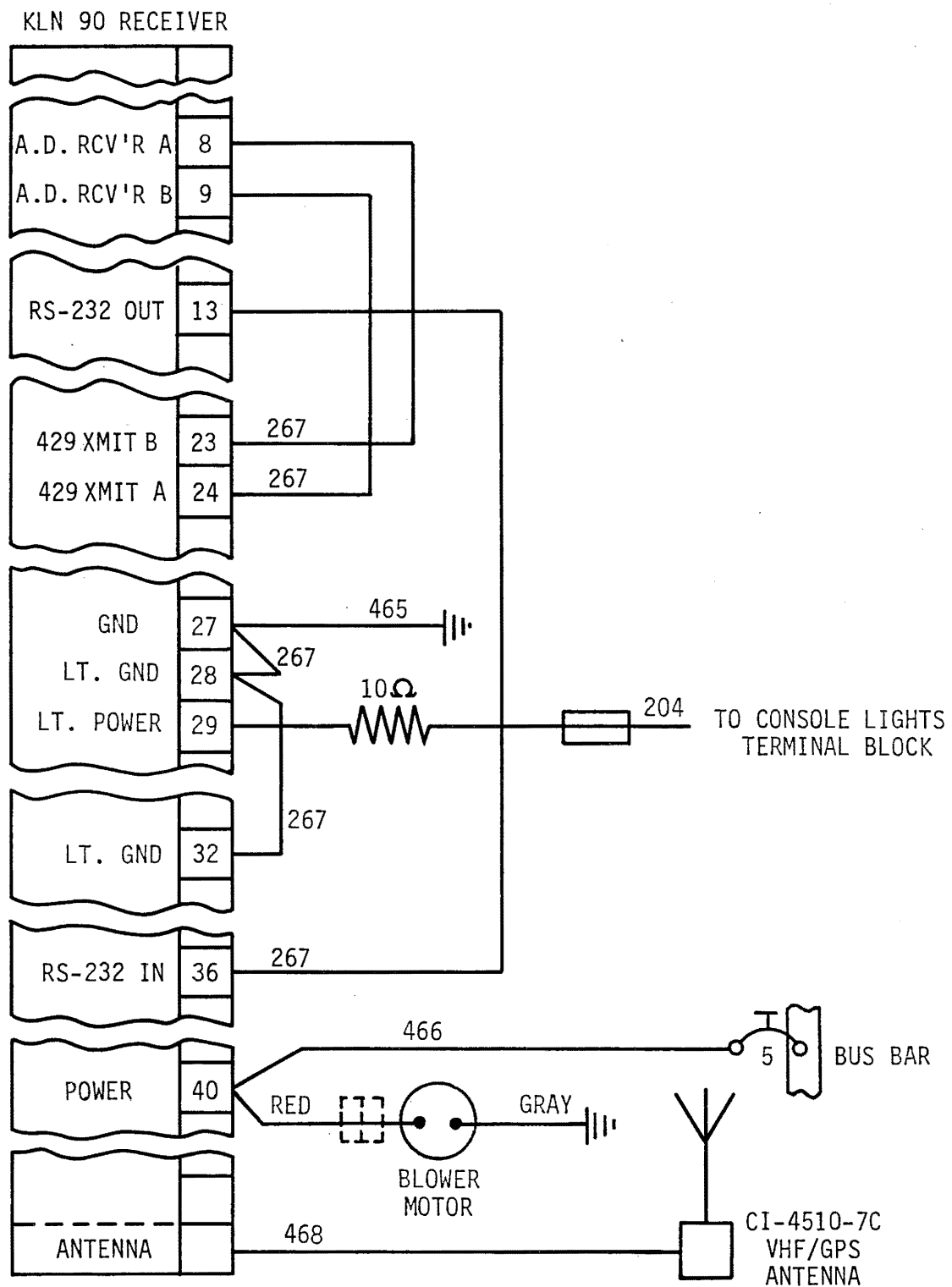
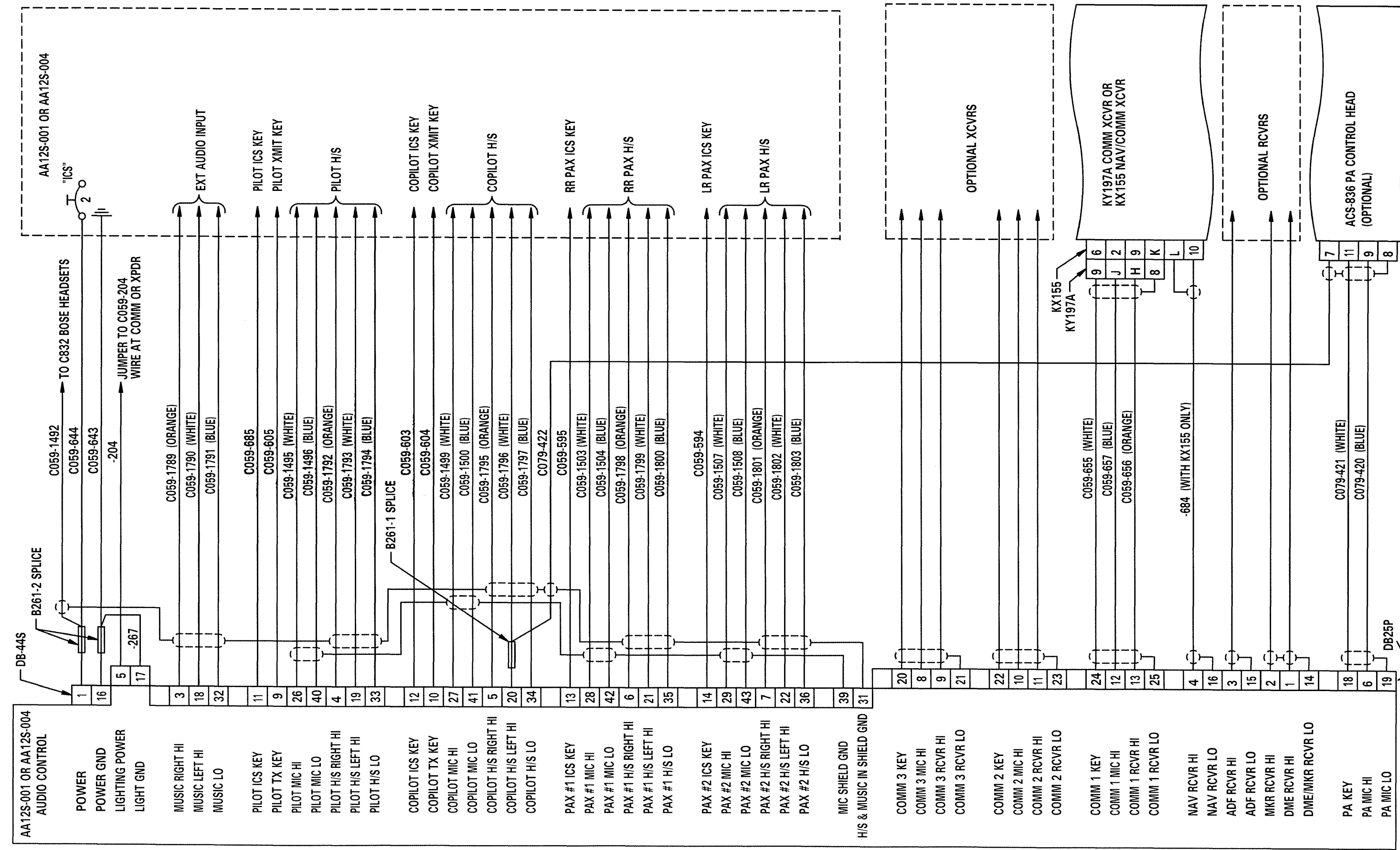
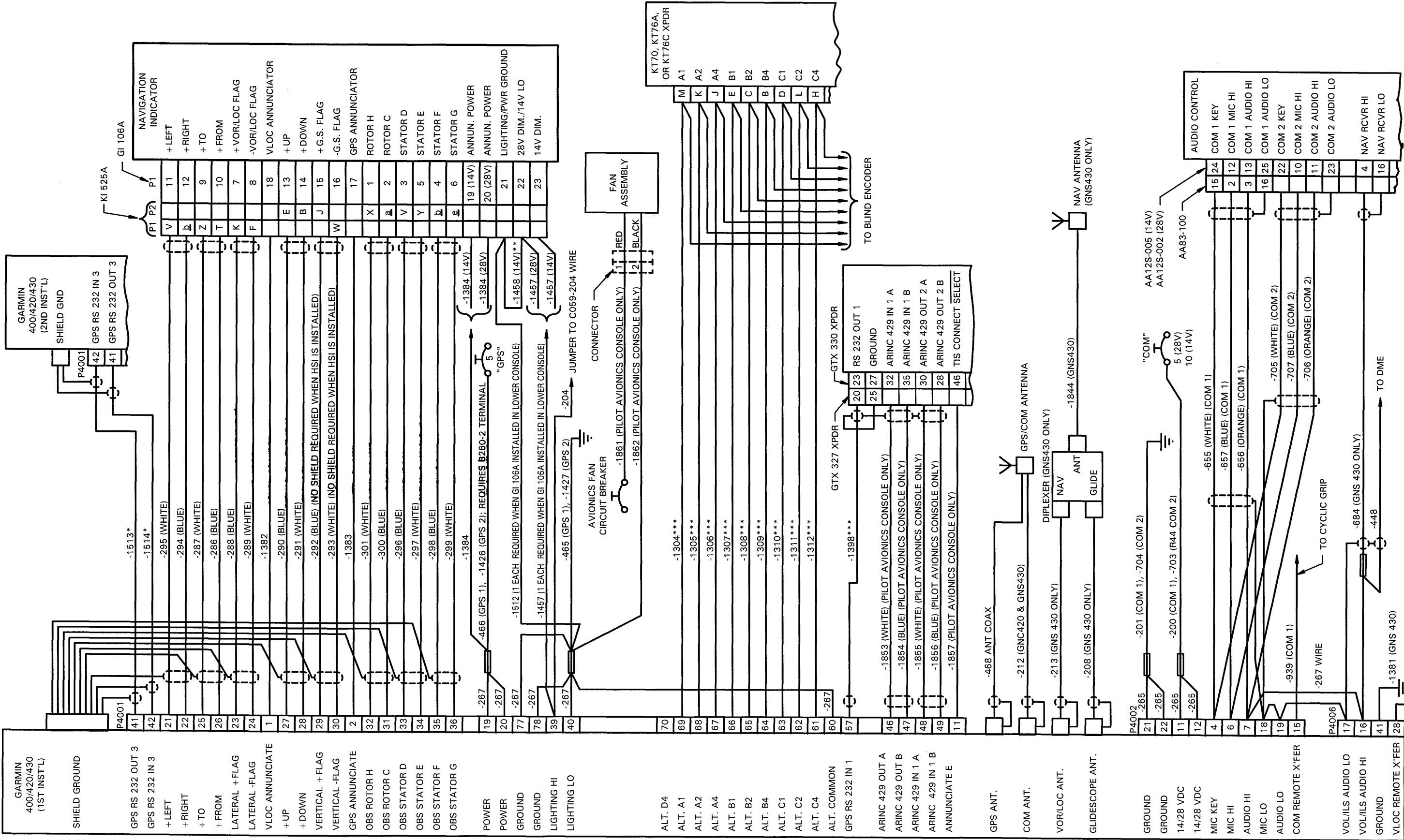


FIGURE 14-17 BENDIX/KING KLN 90 GPS RECEIVER





* 1 each required when two Garmin 400/420/430s are installed.
** Omit -1458 wire on 28-volt installations.
*** Omit if used for GPS 2 installation.

FIGURE 14-20 GARMIN 400/420/430 GPS



Intentionally Blank

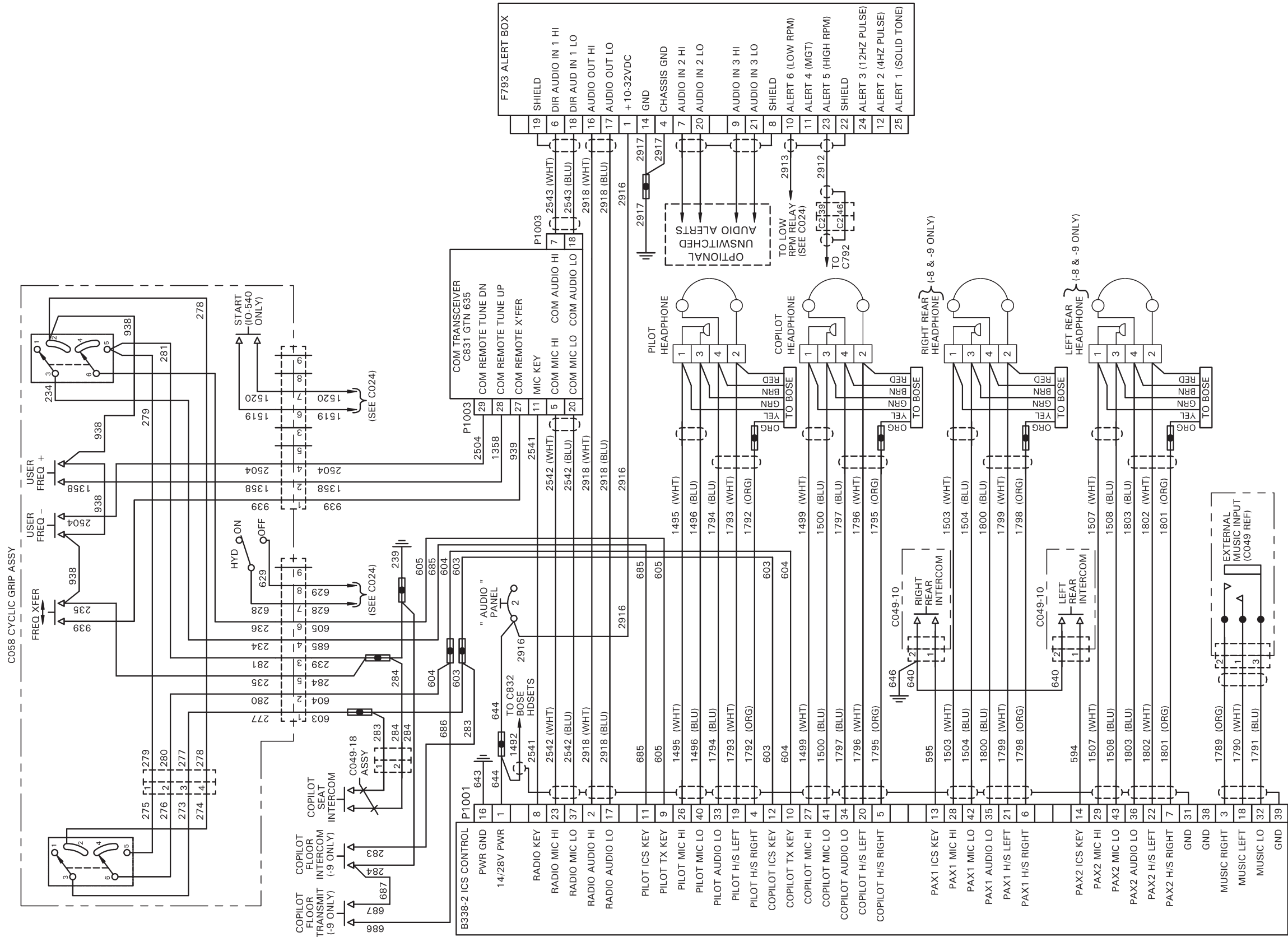
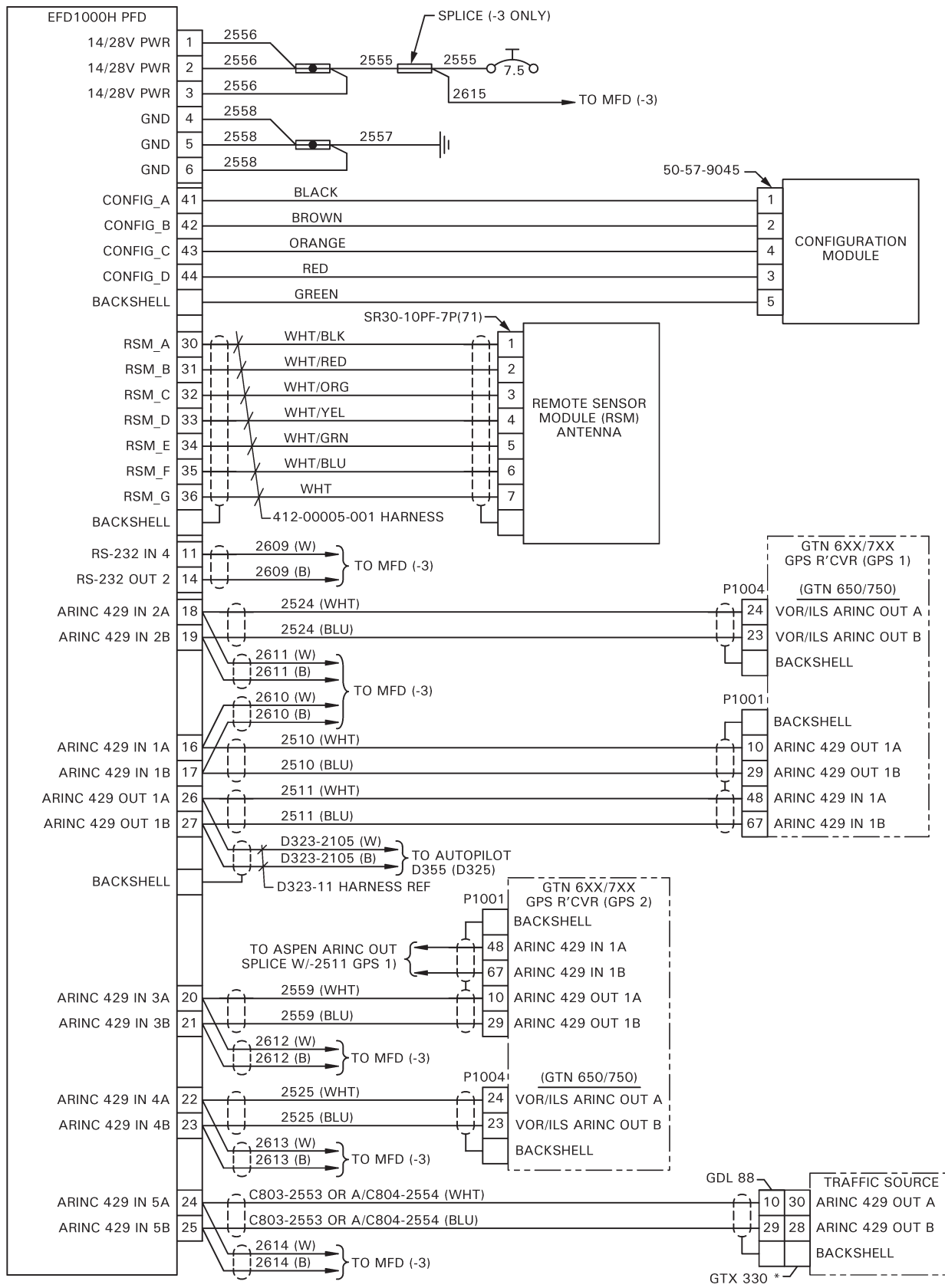


FIGURE 14-22 C060-8 THRU -10 AUDIO SYSTEM & INTERIOR LIGHT SCHEMATIC

C060 REV AC

Intentionally Blank

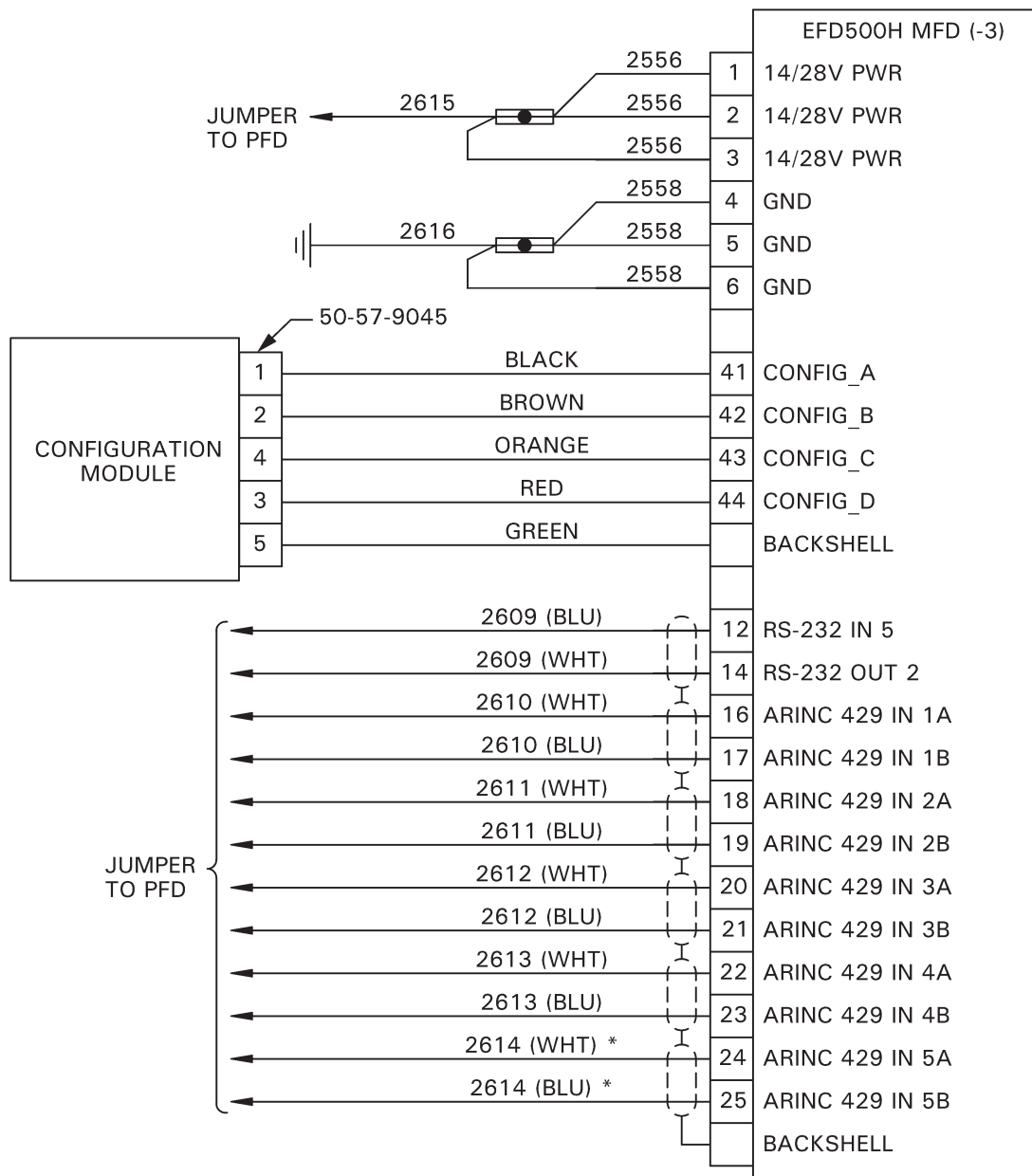


C800 REV E

* Connect to GTX 330 traffic (TIS-A) ONLY if no other traffic system installed, such as GDL 88 (TIS-B).

FIGURE 14-23 C800-1 ASPEN PFD

Intentionally Blank



C800 REV E

FIGURE 14-24 C800-3 ASPEN PFD & MFD

Intentionally Blank

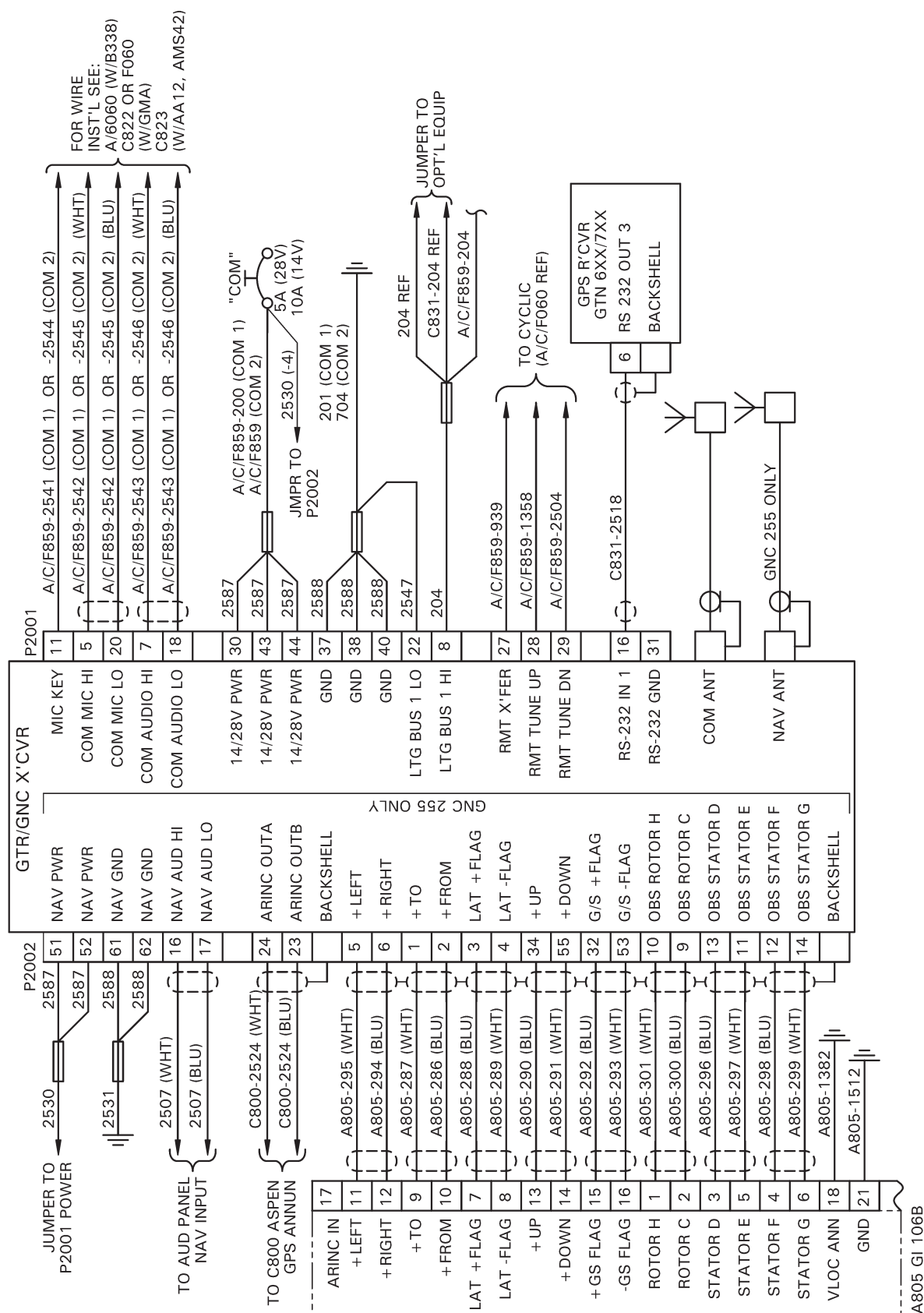
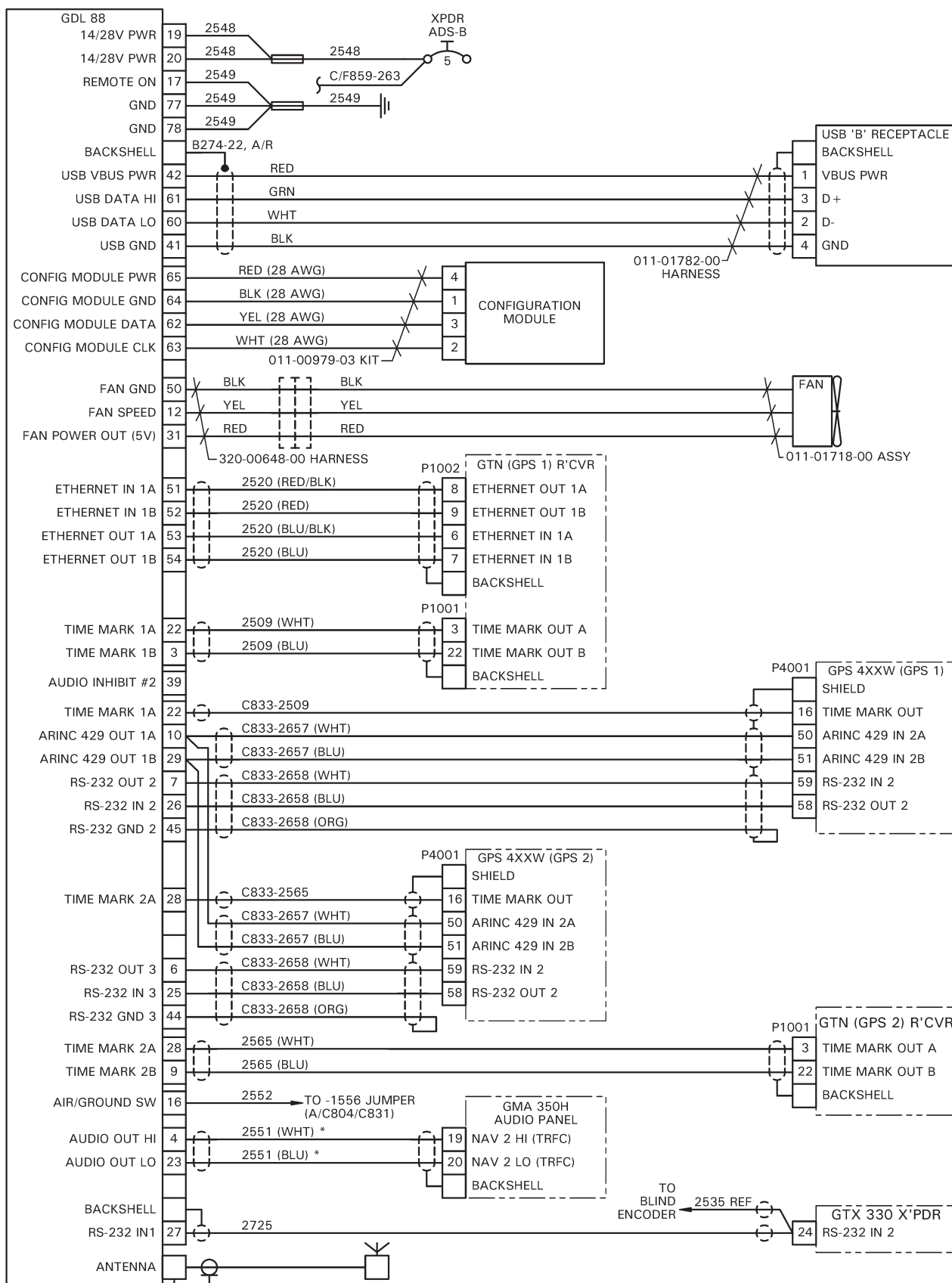


FIGURE 14-25 C802-2 AND -4 COM INSTALLATION (GTR 225B AND GNC 255B, NAV/COM)

Intentionally Blank

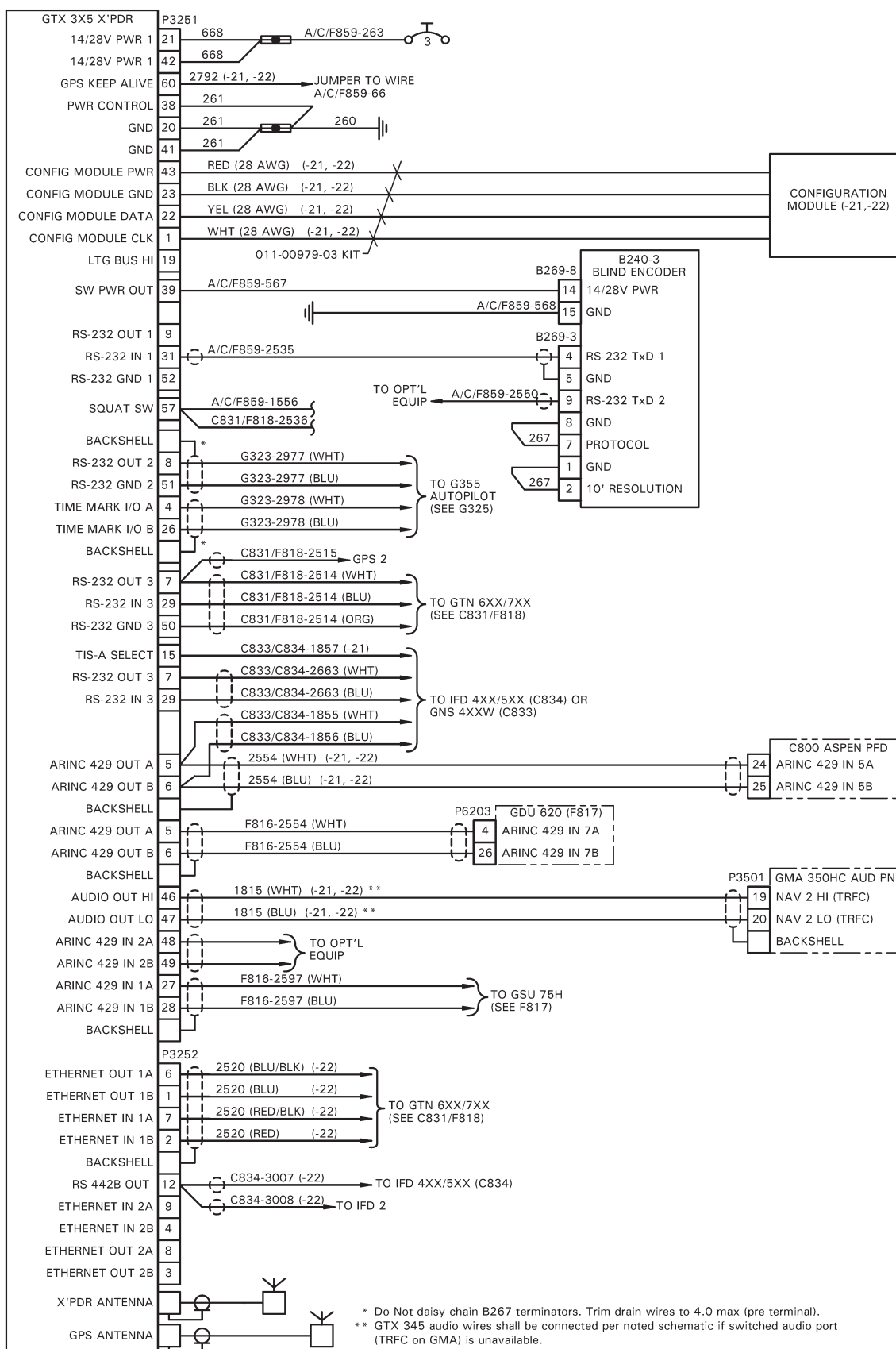


C803 REV D

* GDL 88 traffic wiring is in lieu of GTX 330 traffic wiring.

FIGURE 14-26 C803-1 AND -3 ADS-B INSTALLATION (GDL 88)

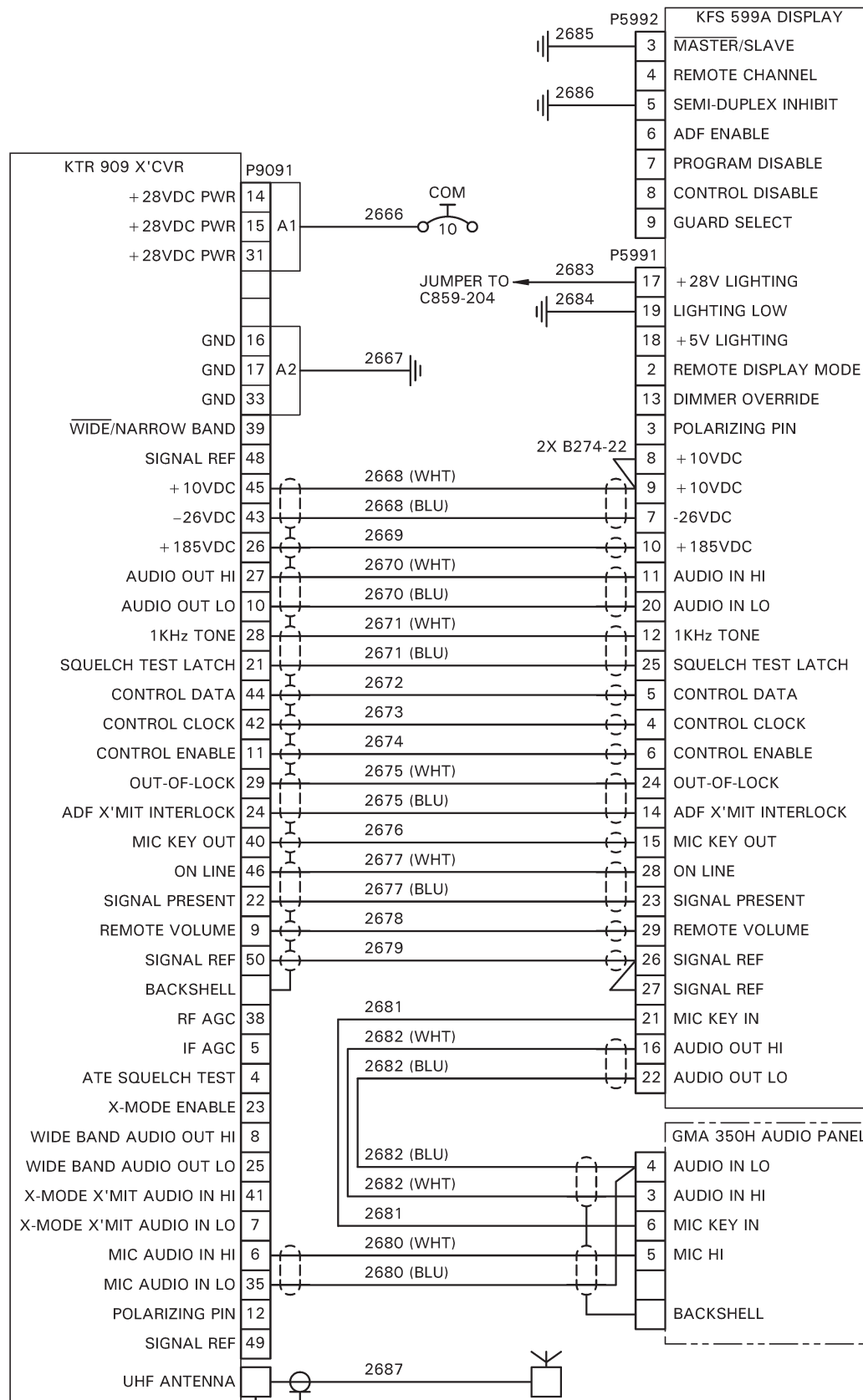
Intentionally Blank



C804 REV AC

FIGURE 14-27 C804-20, -21, AND -22 TRANSPONDER INSTALLATION (GTX 325, GTX 335, GTX 345)

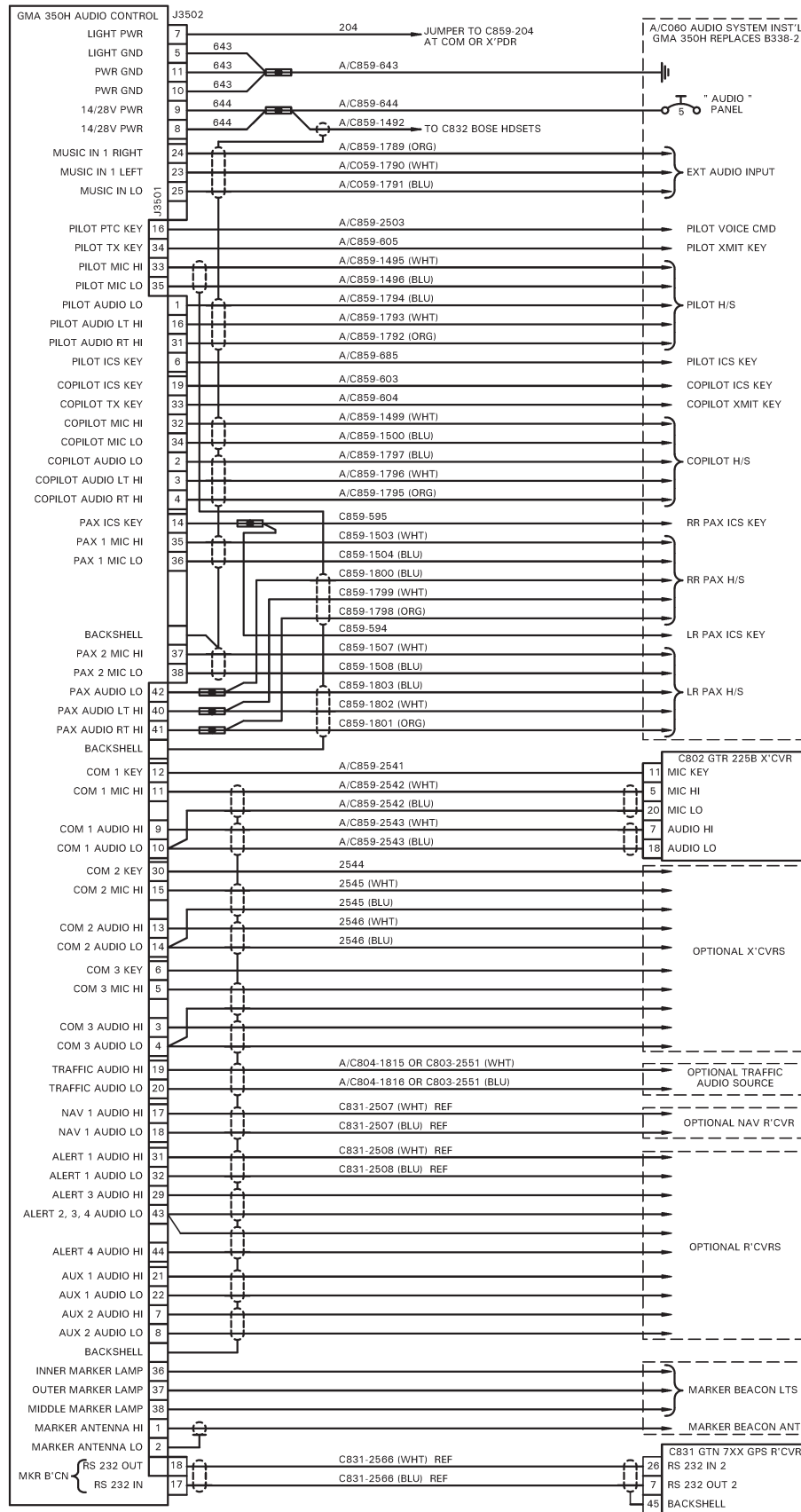
Intentionally Blank



C807 REV B

FIGURE 14-28 C807-1 TRANSCEIVER INSTALLATION (KING KTR 909 UHF)

Intentionally Blank



C822 REV C

FIGURE 14-29 C822-2 AUDIO CONTROL INSTALLATION (GMA 350H)

Intentionally Blank

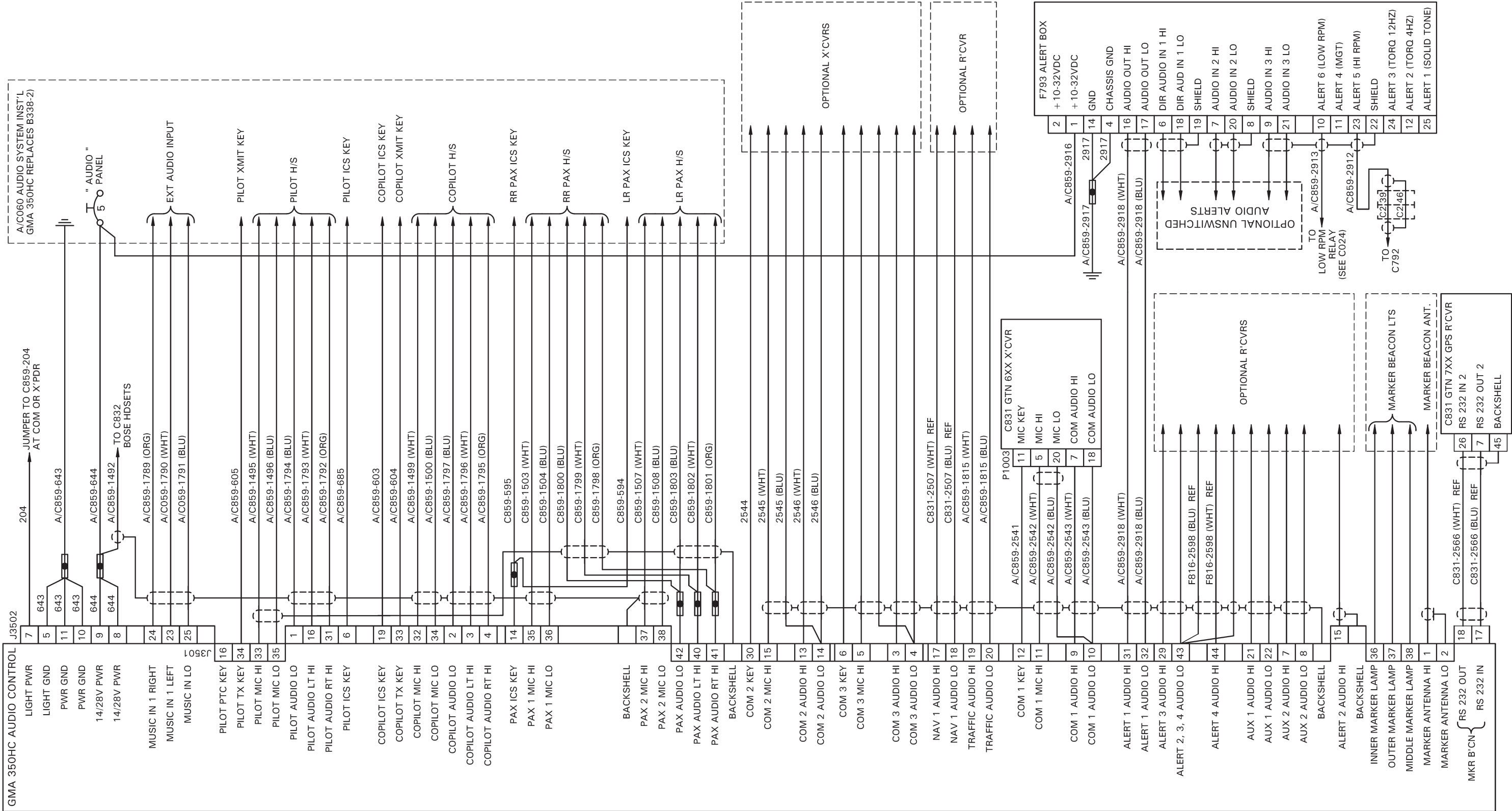


FIGURE 14-30 C822-2 AUDIO CONTROL (GMA 350HC)

Intentionally Blank

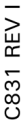


FIGURE 14-31 C831-4 THRU -11 GPS INSTALLATION (GTN 6XX/7XX, PILOT AVIONICS CONSOLE)

Intentionally Blank

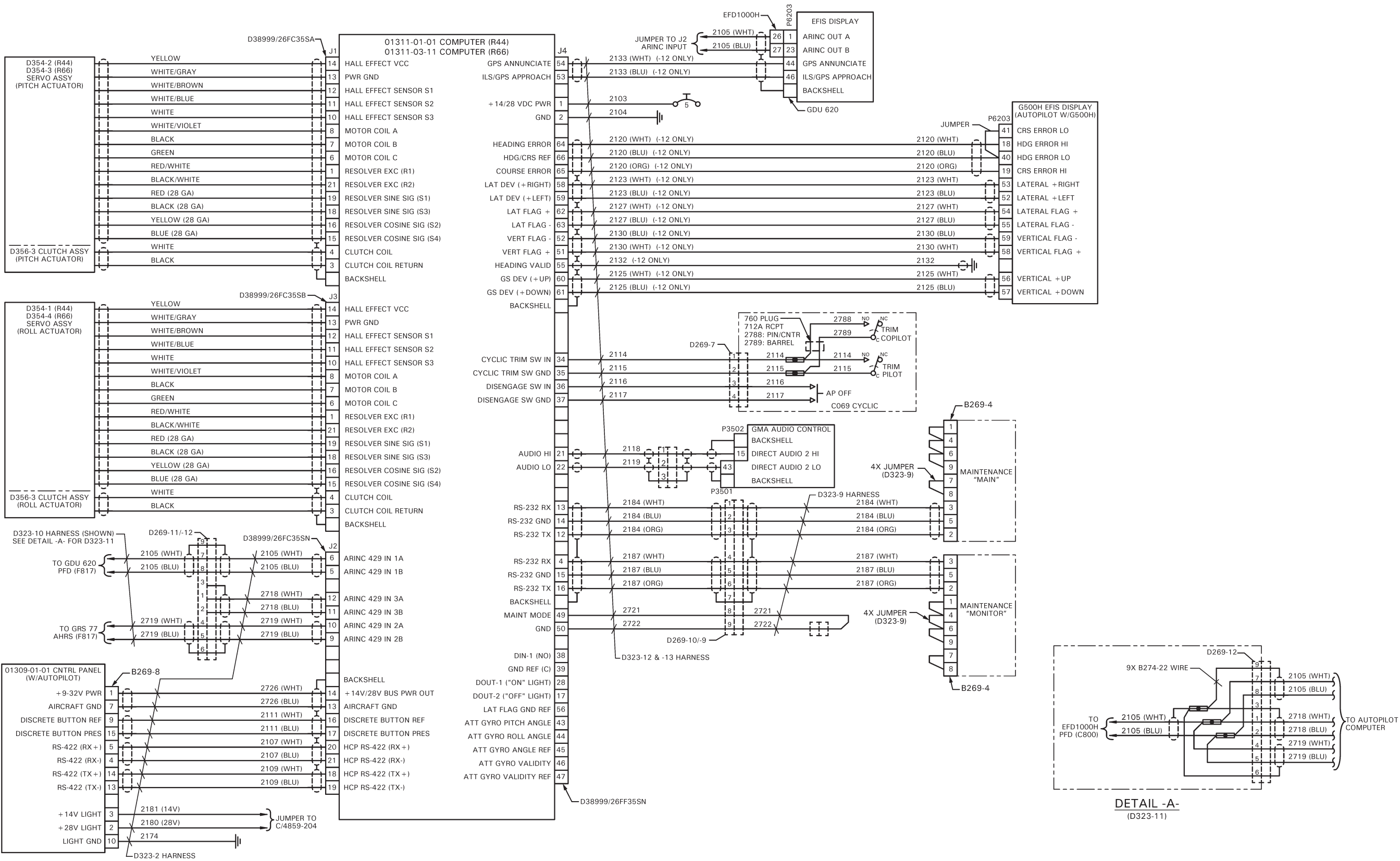
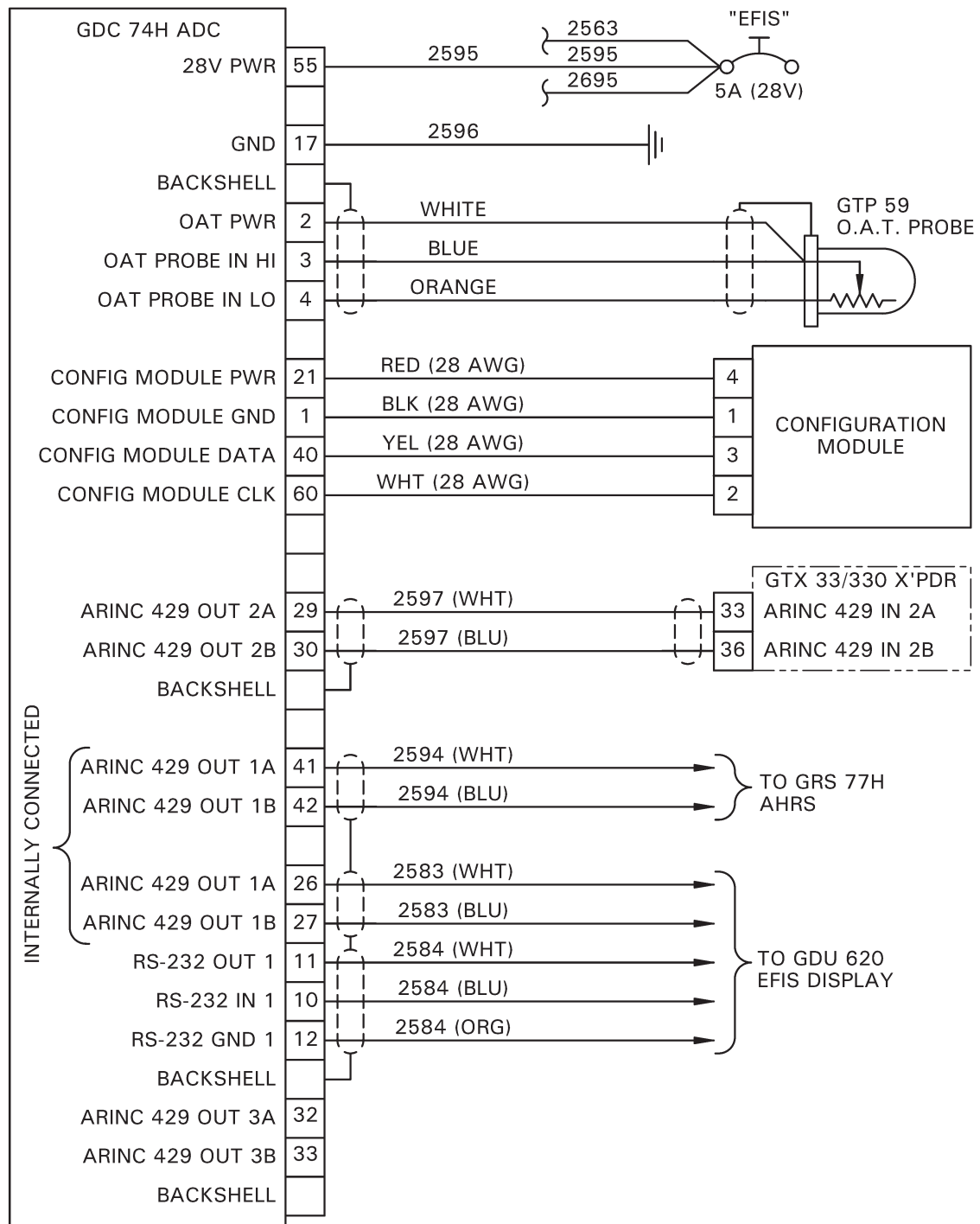


FIGURE 14-32 D325-1 AUTOPILOT SCHEMATIC

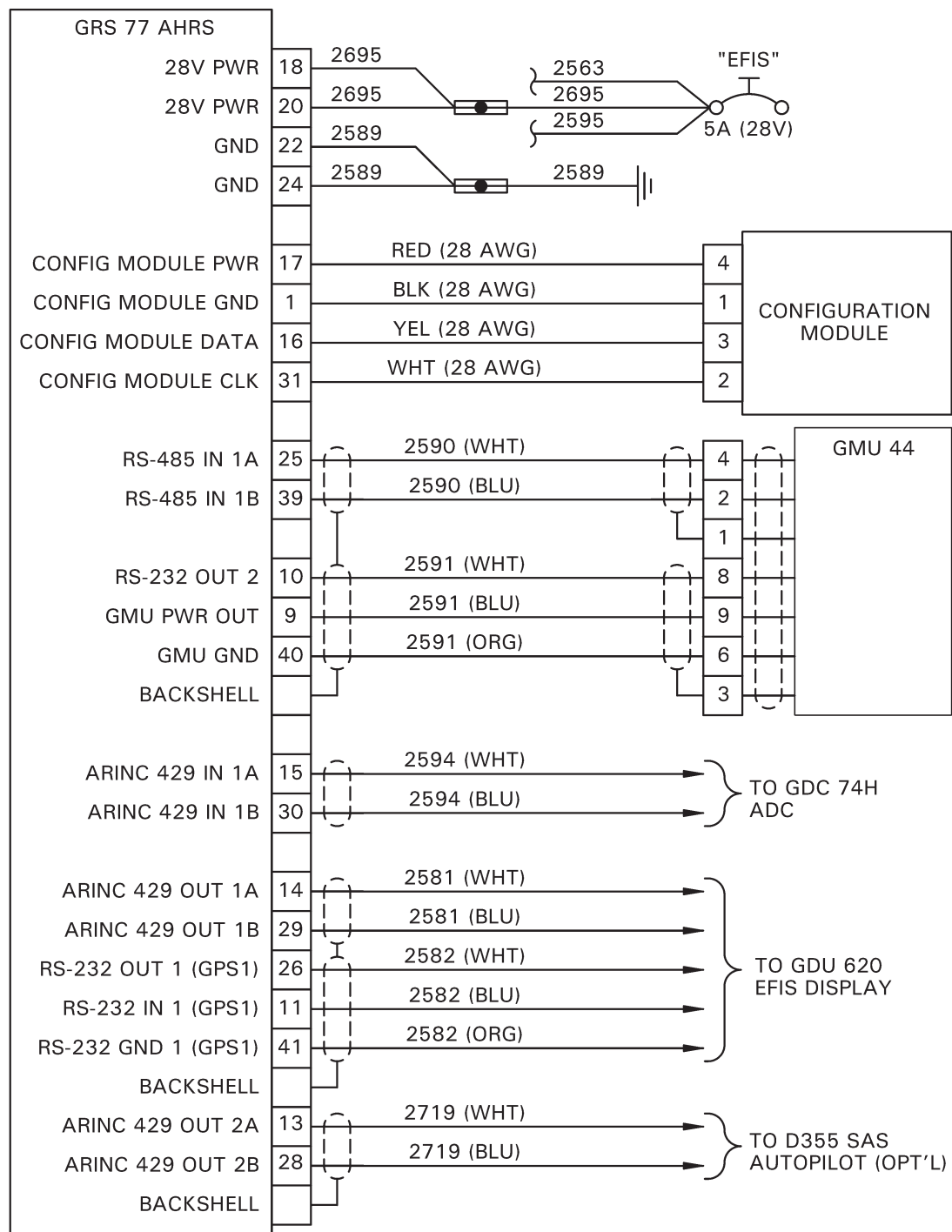
Intentionally Blank



F817 REV E

FIGURE 14-33 F817-1 G500H LRU INSTALLATION — GDC 74H AIR DATA COMPUTER

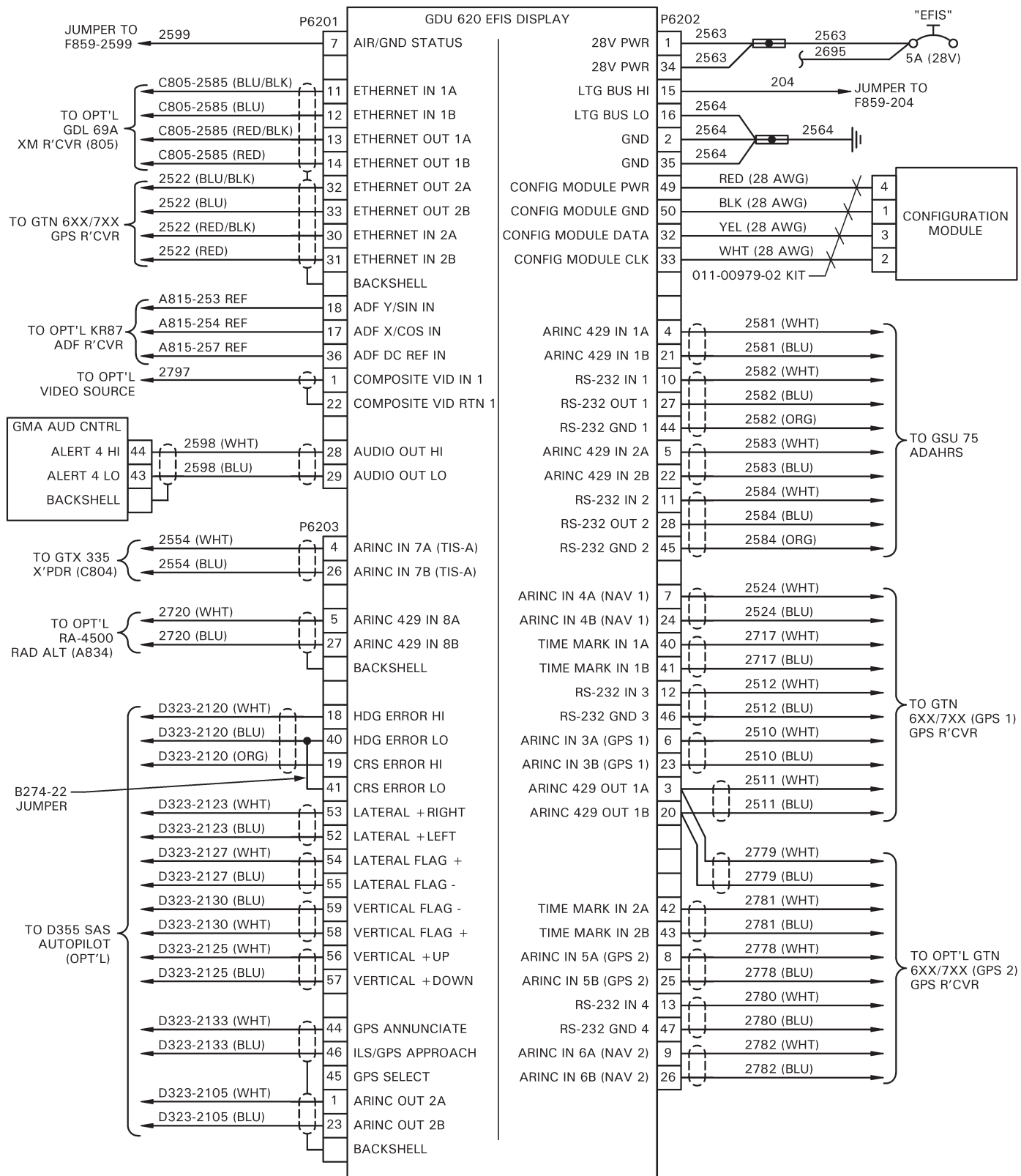
Intentionally Blank



F817 REV E

FIGURE 14-34 F817-1 G500H LRU INSTALLATION — GRS 77 AHRS

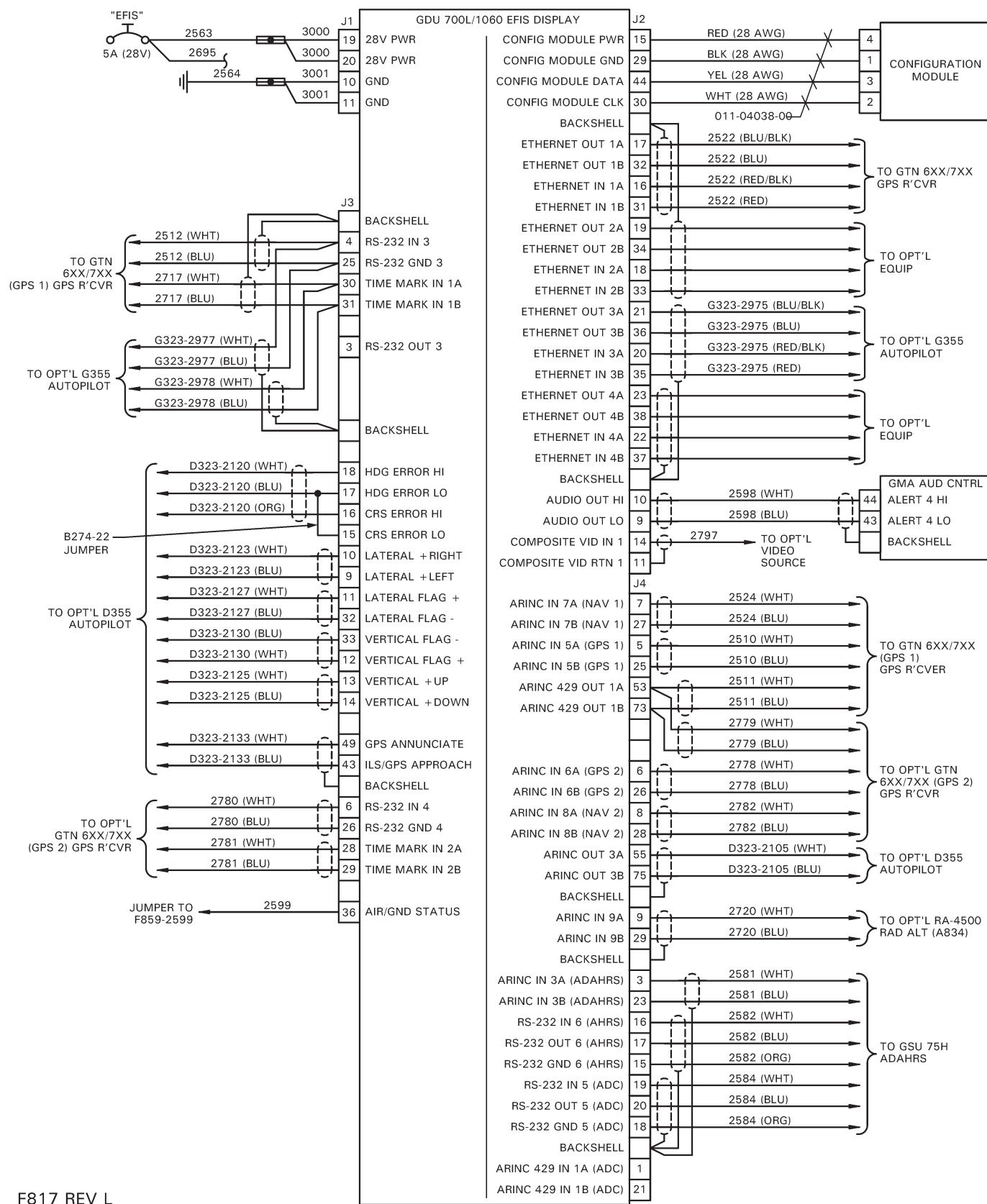
Intentionally Blank



F817 REV J

FIGURE 14-35 F817-2, -4, AND -5 G500H LRU INSTALLATION — GDU 620

Intentionally Blank



F817 REV L

FIGURE 14-36 F817-6 AND -7 G500H LRU INSTALLATION — GDU 700L/1060

Intentionally Blank

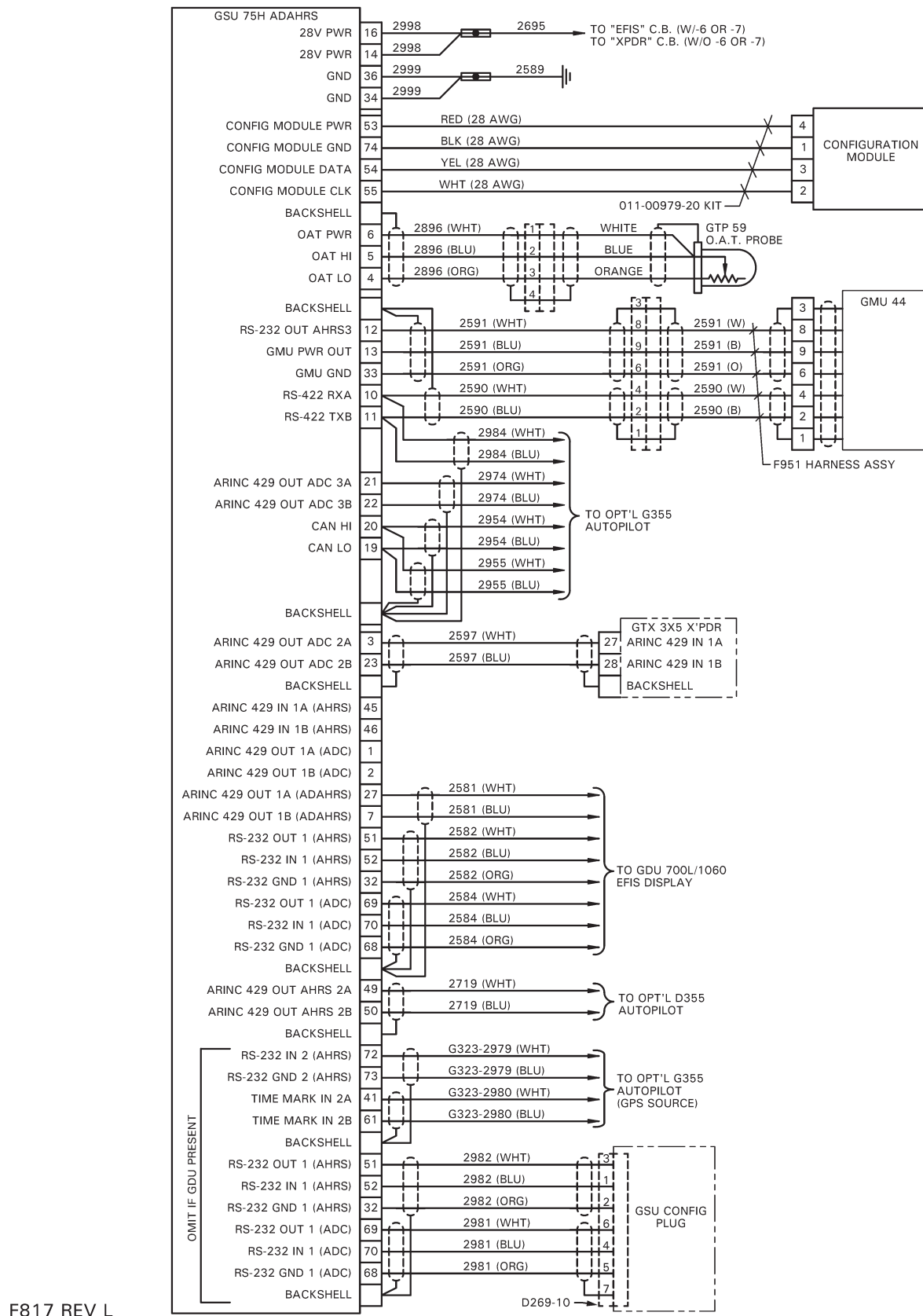


FIGURE 14-37 F817-8 G500H LRU INSTALLATION — GSU 75 ADAHRS

Intentionally Blank

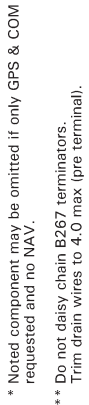
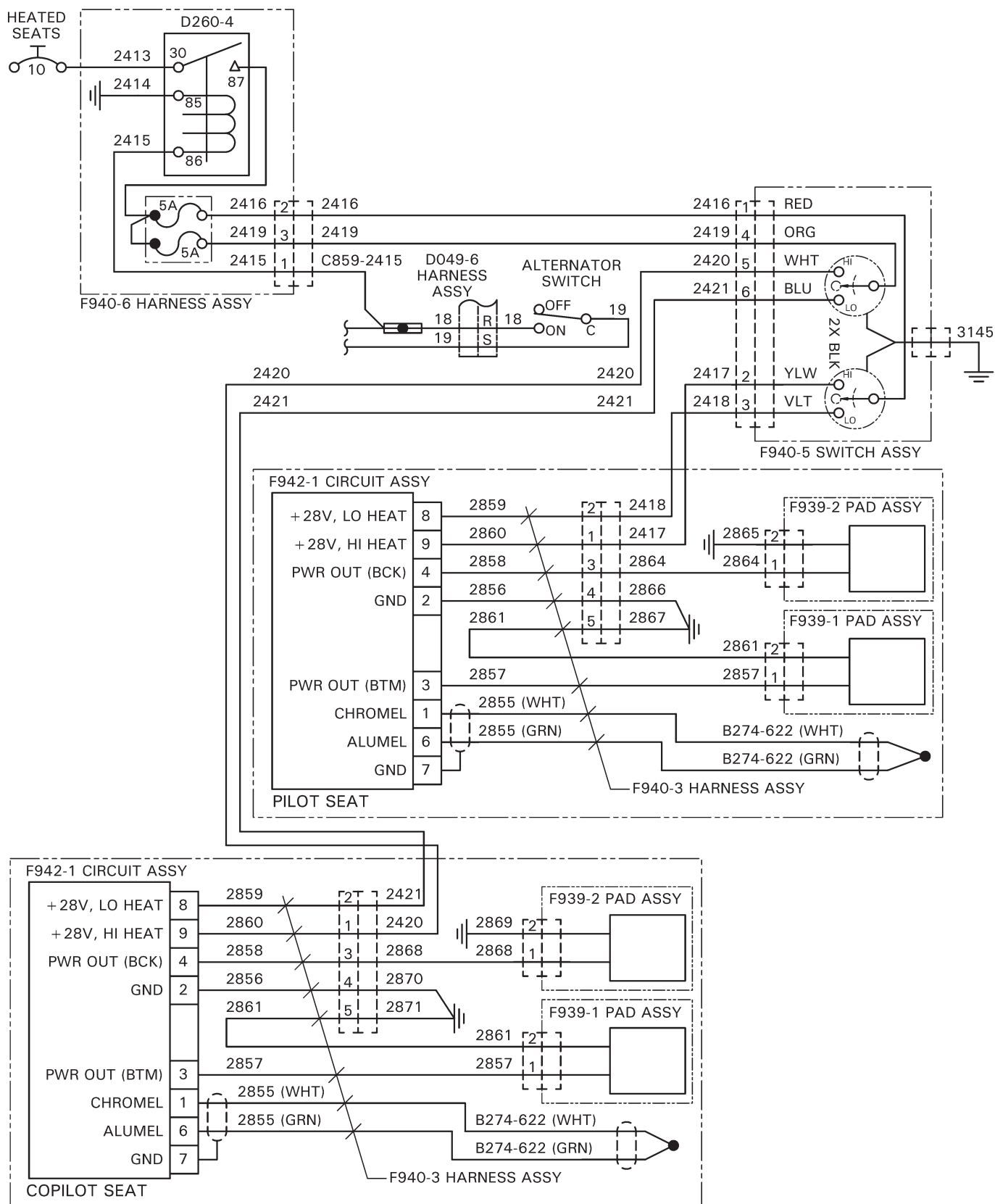


FIGURE 14-38 F818-1 THRU -11 GPS INSTALLATION (GTN 6XX/7XX, G500H CONSOLE)

Intentionally Blank



C938 REV A

FIGURE 14-39 HEATED SEATS

Intentionally Blank