Chris-Craft®

Total Command System Service Manual

Chris-Craft

Over the years, the electrical control circuits on pleasure boats have progressed from simple switches to sophisticated electronic controls. From a few electrical wires to a complex maze of interconnections. And, as the complexity of circuits increased, a need for a comprehensive service manual developed.

Now, for the first time in the pleasure-boating industry, Chris-Craft has developed this needed service manual. Now, for the first time, the serviceman has complete circuit wiring information--And, when circuit operation is not readily apparent, an explanation of the circuits operation. Chris-Craft is pleased to be the first company in the pleasure-boating industry to provide a book that will increase your customers boating pleasure and reduce your cost of maintenance.

INTRODUCTION

This book contains circuit diagrams and, when circuit operation is not readily apparent from the diagrams, a brief explanation of circuit operation. The book is designed so that it can be used without ever reading this introduction. However, to obtain the maximum benefit from the information contained in this book, this introduction should be read thoroughly.

SERVICING CONCEPT

The console has been designed to make servicing easier, all of the modules are easy to remove and plug in connections eliminate the need for unsoldering wires. Generally, repair should be accomplished by replacing defective modules. However when a malfunction has been isolated to a specific part, and that part is readily available, the part can and should be replaced.

Plugs are identified on the diagrams by the letters J or P and a number. A connector that is on a panel or chassis is identified by the letter J. The number is marked on the panel adjacent to the connector. Each pin in the connector is identified by a number that is marked on the connector. Figure 1 shows that the blower connects to the junction box at pin 14 of connectors 37.

MODULE IDENTIFICATION

Many of the modules have similar names and similar circuits. For examples, the GM Diesel Engine Control Module and the Engine Control Module. The names used to identify modules in this book are the same as the names in the Owners Custom Reference Book. However, when the circuits are the same between modules an abbreviated name has been used. For example, the Electrical Systems Key Switch Circuit is the same for both modules. And in the diagrams, the modules are called Engine Control Module. Refer to the Table of Contents to determine if circuits are different between modules or systems.

Some of the module names have been simplified on the diagrams. These are:

Module Name	Simplified Name
Circuit Breaker and Junction Box Panel	Junction Box or Circuit Breaker Panel
Control Station Changeover Unit	Changeover Box

CIRCUIT VARIATIONS

Similar Circuits are grouped so that the fact that there are variations becomes readily apparent. Always check the titles of the circuit diagrams immediately before and after the circuit diagram you are planning to use to be sure that you have the correct diagram.

The most common circuit variations are:

- With Command Bridge®--Without Command Bridge®
- 12 Volt System--32 Volt System
- Engine Differences
- Accessory Switch Module Differences
- Fisherman Hulls--Other Hulls

WIRE IDENTIFICATION

All of the wiring has been coded to make it easier to trace wires throughout the system. Wires may be coded by color banding or striping or they may be marked by a numerical code. In most cases, the numerical code has been used to identify wires in this book.

NOTE: On numbered wires, background color of the basic wire may be of different tints for manufacturing purposes only and not for circuit identification.

When color coding has been used in the wiring, the first digit in the numerical code represents the base color of the wire and the succeeding digits represent the colors of the bands or stripes in accordance with the following:

0 Black	3 Orange	6 Blue	8 Gray
1 Brown	4 Yellow	7 Violet	9 White
2 Red	5 Green		

9135--A white wire with brown, orange and green bands or stripes

9967--A white wire with blue and violet bands or stripes.

9994--A white wire with a yellow band or yellow stripe.

9999--A white wire without bands or stripes.

SERVICING HINTS

CORROSION PROBLEMS

Corrosion of electrical contacts can cause many problems that can be difficult to isolate. This is particularly true when the boat is operated in salt water. Corrosion that can not even be seen by the eye can cause problems to appear in every electrical instrument or device that is operating. Some of the problems caused by corrosion may not be readily apparent while some are highly visible.

For example, an indicator may be reading just a point or two low and, unless the indicator circuit is checked, this problem may never be noticed. Some problems that can be caused by corrosion are excessive radio noise or a lowering of source voltage when a circuit is first turned on. The most likely places for corrosion to appear are in the ground circuits. However, corrosion can cause problems at any point where two conducting surfaces meet. To check for corrosion in a ground circuit, check the resistance from the battery ground terminal to the ground at the device. To check for corrosion in other types of circuits, check the resistance from one end of the circuit to the other. The resistance of any ground or wiring circuit should never be greater than 0.005 ohms. Use number 7/0 garnet paper to clean any contacts suspected of being corroded or dirty.

One major source of corrosion problems is spilled battery acid. In order to neutralize spilled battery acid, use baking soda (sodium bicarbonate) or borax (sodium borate) in a solution consisting of one part baking soda or borax to four parts water, by weight. After neutralizing the spilled battery acid remove the resulting alkali salt by washing the area with large amounts of water.

LOCATING ELECTRICAL NOISE PROBLEMS

One of the most difficult troubles to locate in a boat is noise, especially the noise generated by the ignition system. Ordinarily, the electrical system is adequately shielded and bonded to effectively eliminate all noise generated. Sometimes, the bonding breaks loose and causes noise. Before a radio set is removed for repairs because of noise, first eliminate the boat itself as a possible source of noise by turning the engine off.

A visual inspection can reveal such obvious faults as loose or broken bonding or shielding, loose plugs, couplings and ground clamps. In general, any portion of the shielding on the installation that might permit exposed wiring to radiate noise from the ignition should be examined carefully.

When noise interference enters the radio, take the boat out to sea and away from all other boats. Then, check the radio with the engines and all other electrical equipment turned off.

If noise is present in the radio receiver output when the engine and all other electrical accessories are turned off (including any other radio sets), disconnect the antenna and ground the antenna terminal of the set being checked. If the noise continues, the trouble is in the radio set. Reconnect the antenna; if grounding the antenna terminal stops the noise, the noise was coming in on the antenna. If other radio equipment using a similar frequency range is installed, repeat this test to verify that the noise is caused externally. If the noise is external, move the boat to a new location, free from electrical noise, before continuing with further tests.

If no noise is present in the receiver with the antenna connected, turn on each of the accessories (including any other radio equipment) one at a time, and note whether any noise appears. Turn off each accessory before turning on the next one. If noise appears, check any input noise filter capacitors or chokes associated with the accessory producing the noise. With the accessory turned on, disconnect one side of the filter capacitor temporarily; if the noise level rises, the capacitor in question is good.

If a rhythmic, periodic popping noise is heard that changes in frequency as the speed of the engine is changed, the disturbance is probably caused by the ignition system. If trouble is traced to the ignition system, check all wiring for proper shielding and bonding. Tighten all cable clamps, conduit coupling connectors, and see that all ground wires are securely in place. In general, ignition noise is caused by defective bonding, loose, burned or improperly gapped spark plugs or burned distributor points.

MEASURING AND REPLACING TRANSISTORS AND DIODES

Transistors and diodes can be damaged if the battery voltage in the ohmmeter is higher than the rated voltage of the transistor or diode being checked. Most ohmmeters have a low battery voltage and this needn't be a cause for concern. However, always be sure you know the battery voltage of the ohmmeter being used to measure the resistance of transistors or diodes.

Always measure the resistance of a transistor from the base to the emitter or from the base to the collector.

To measure resistance from the emitter to collector circuit, first tie the emitter and base together. Then, measure across the emitter to collector circuit. Connect the negative lead to the collector for a PNP transistor or to the emitter for an NPN transistor. Never measure the emitter to collector circuit without having the emitter connected to the base.

When measuring a PNP transistor (emitter arrow points toward base) connect the positive lead of the ohmmeter to the base terminal of the transistor.

Connect the negative lead of the ohmmeter to the transistor emitter terminal and observe the indication on the meter. Because of the polarity of the small ohmmeter voltage applied, the emitter-base junction is biased in the reverse direction and the indication on the meter should be 0.5 megohm or greater.

Remove the negative lead from the emitter terminal and connect it to the collector lead. Observe the indication on the meter. The ohmmeter voltage biases the base-collector junction in the reverse direction and the indication on the ohmmeter should be 0.5 megohm or greater.

By connecting the negative lead on the base terminal and placing the positive lead, in turn, on the emitter and collector terminals, the two junctions will be biased in the forward direction. The meter reading in each case should be below 500 ohms.

The readings obtained when measuring an NPN transistor (emitter arrow points away from base) will be exactly opposite to those obtained when measuring a PNP transistor. That is, 500 ohms when the negative lead is connected to the emitter or collector and 0.5 megohm when the negative lead is connected to the base.

Transistors and diodes are extremely sensitive to heat and can be destroyed if subjected to excessive temperatures for even short periods of time. For this reason the soldering techniques used are very important. Whenever possible use a low-powered soldering iron, preferably from 25 to 50 watts. In addition a heat sink of some sort should be provided between the point of contact of the soldering iron and the transistor or diode. This can be done by grasping the lead being soldered with long-nosed pliers just above the point of soldering iron contact. The pliers then disipate any excess heat before it is conducted to the transistor or diode. The application of a heat sink is essential and should be employed whenever a soldering iron contacts a transistor or diode lead, regardless of how short the period of contact time. Apply the soldering iron to the lead only long enough to melt the solder to a workable state. Never bring the soldering iron into contact with the body of the transistor or diode or any metal surface in direct contact with the body. Do not use large, high-wattage irons. The heat radiated from the body of such an iron can be enough to damage any transistor or diode in the vicinity. If a large iron is all that is available it can be used by wrapping a piece of heavy-gage wire around the iron tip. The extension of wire, when used as the iron tip, allows the body of the soldering iron to be held away from the transistors and diodes. Also, some excess heat is lost through the loose wrapping of the wire around the iron tip.

Certain transistors, such as power transistors, generate considerable heat during normal operation. It is essential that this heat be adequately dissipated. The method most commonly used to accomplish this is to bolt the transistor to the chassis of the equipment. The chassis then acts as a heat sink. The heat is dissipated by a lug built on the body of the transistor or by a metal sleeve that fits over the body of the transistor and then bolts to the chassis. When such transistors are replaced, it is essential that the replacement transistor be bolted to the chassis before the equipment is operated, even for test purposes. When transistors are insulated from chassis, be sure to reapply heat sink grease when reinstalling.

Many soldering irons, when plugged into an ac line, have a voltage existing between the metal of the soldering iron and earth ground. This voltage causes leakage currents that can seriously damage a transistor when the iron is brought into contact with the transistor lead. These effects can be nullified by connecting a jumper lead from the metal body of the iron to the chassis of the equipment.

Always be sure that the soldering iron being used is appropriate for the job. A soldering iron with too little heat can cause as much damage as a soldering iron that generates too much heat. When possible, a thermostatically controlled iron should be used.

TROUBLESHOOTING

The quickest and most logical method of troubleshooting is to follow an organized plan of attack. All troubleshooting procedures are based on the observation of symptoms, the combination of which may tell an experienced serviceman exactly where the trouble lies. A vital rule of troubleshooting, therefore, is to observe and analyze. The presence of certain symptoms and the absence of others enable you to eliminate at once the impossible, or at least the improbable, causes of trouble. Thus, if a multiband receiver operates on all bands but one, the serviceman discards immediately the possibility of a blown fuse or the possibility of a defective power supply rectifier, because either of these two faults would prevent the receiver's operating on any band at all. With two possibilities out of the way, the serviceman concentrates upon the probable causes of the trouble.

The most likely places for trouble to occur are in the ground and power circuits. These should always be checked first.

After the power and ground circuits are proven to be good there are many possible methods that can be used. One such method is to check the signal at the input to the circuit first. If the signal at the input is good, check the signal near the middle of the circuit. If the signal at the middle is good, the first part of the circuit has been eliminated as a source of trouble. If the signal in the middle of the circuit is bad, the trouble is in the first part of the circuit. Next, check in the middle of the remainder of the circuit. By splitting the circuit into halves, a large circuit that contains a problem can quickly be converted to a small circuit that contains a problem.

INTERMITTENT PROBLEMS

Intermittent problems are the serviceman's worst headache, and not much can be done to reduce the problems they cause.

Sometimes, intermittents are caused by heat. When this is the case, placing the circuit under a heat lamp can help make the trouble more constant. Other troubles are caused by vibration. Jarring the chassis or tapping the components can make these troubles show up. And, when all else fails just replacing everything that you think may be the source of the problem is the best solution. The cost of the components may often be less than the cost of your time to find the problem.

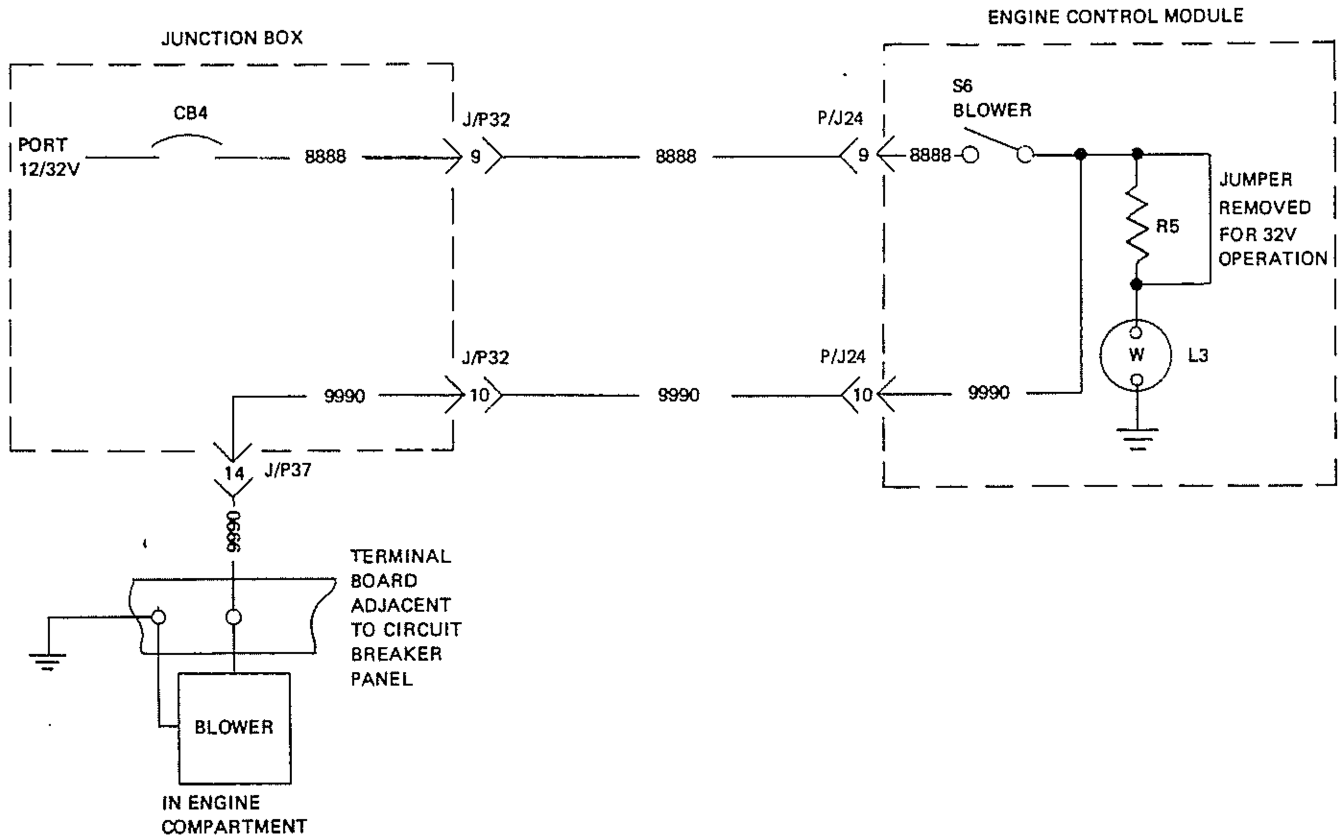
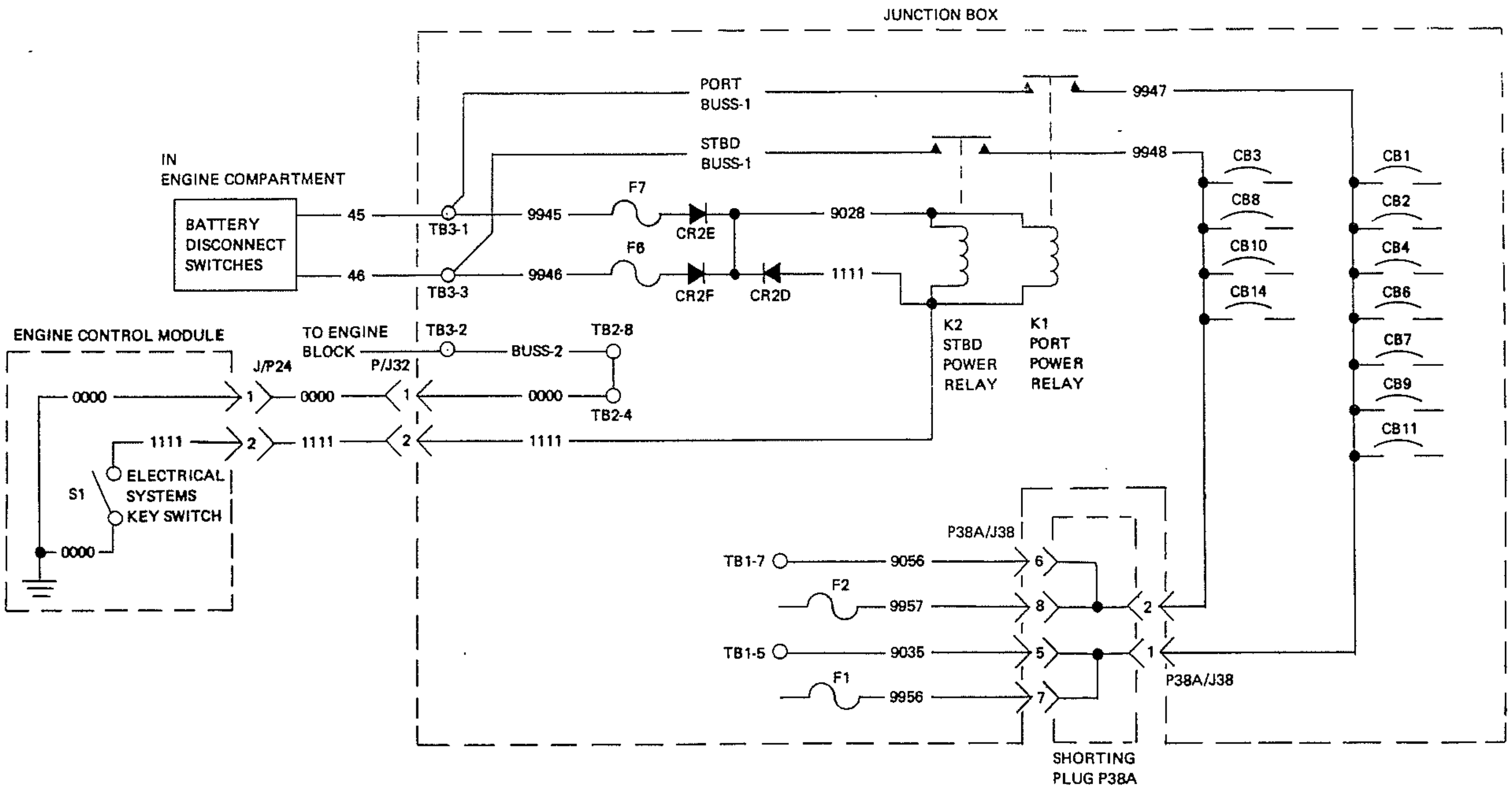


Figure 1. Blower Circuit



Closing S1 grounds the series connected power relays, causing the relay contacts to close and connect the batteries to the circuit breakers.

Diodes CR2E and CR2F are blocking diodes, and allow current to be drawn from both the port and starboard batteries to activate the power relays but prevent current flow between the two power sources. Diode CR2D shorts the inductive kick from the power relays to ground when switch S1 opens.

Figure 2. Electrical Systems Key Switch Circuit, 12 Volt System

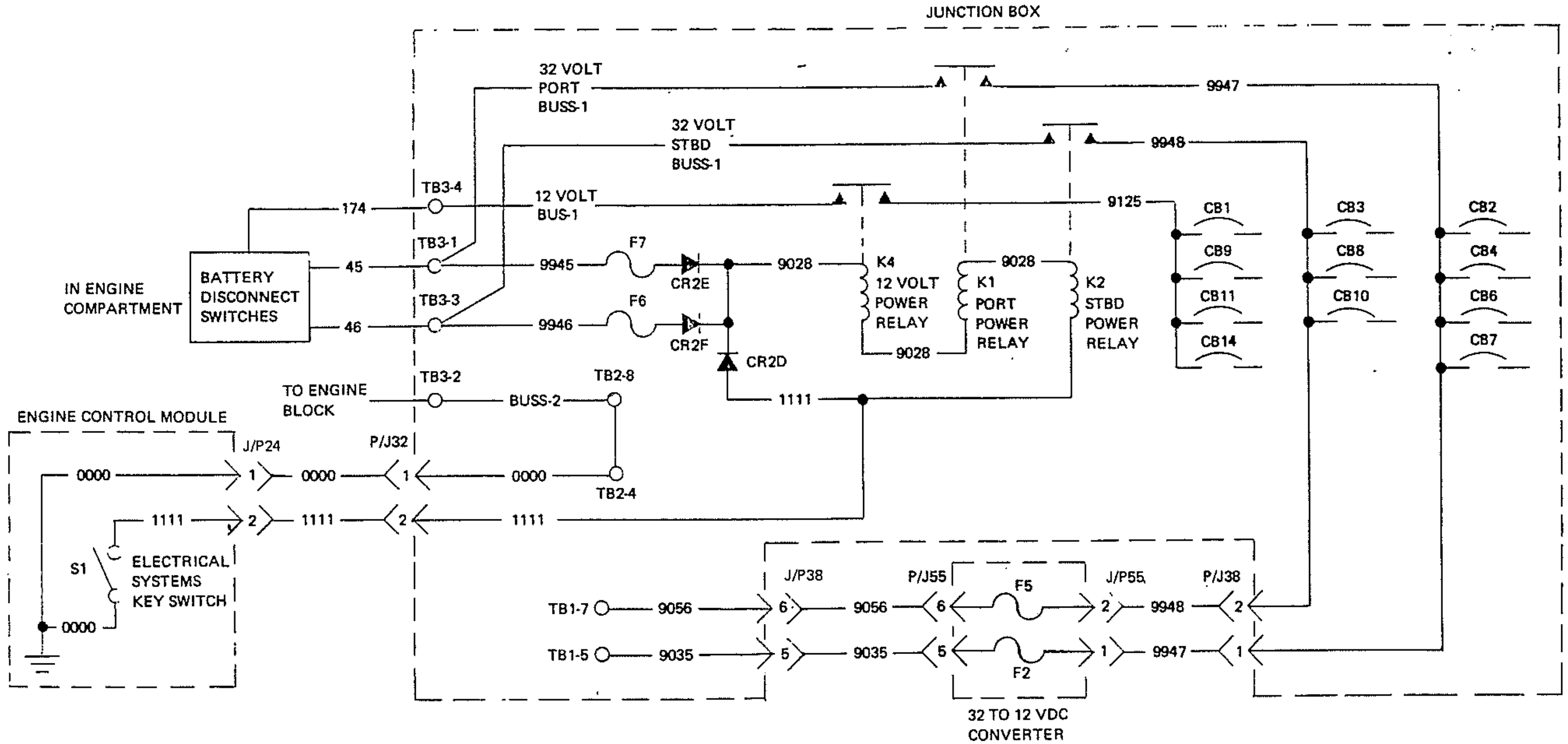


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Figure 3. Electrical Systems Key Switch Circuit, 32 Volt System

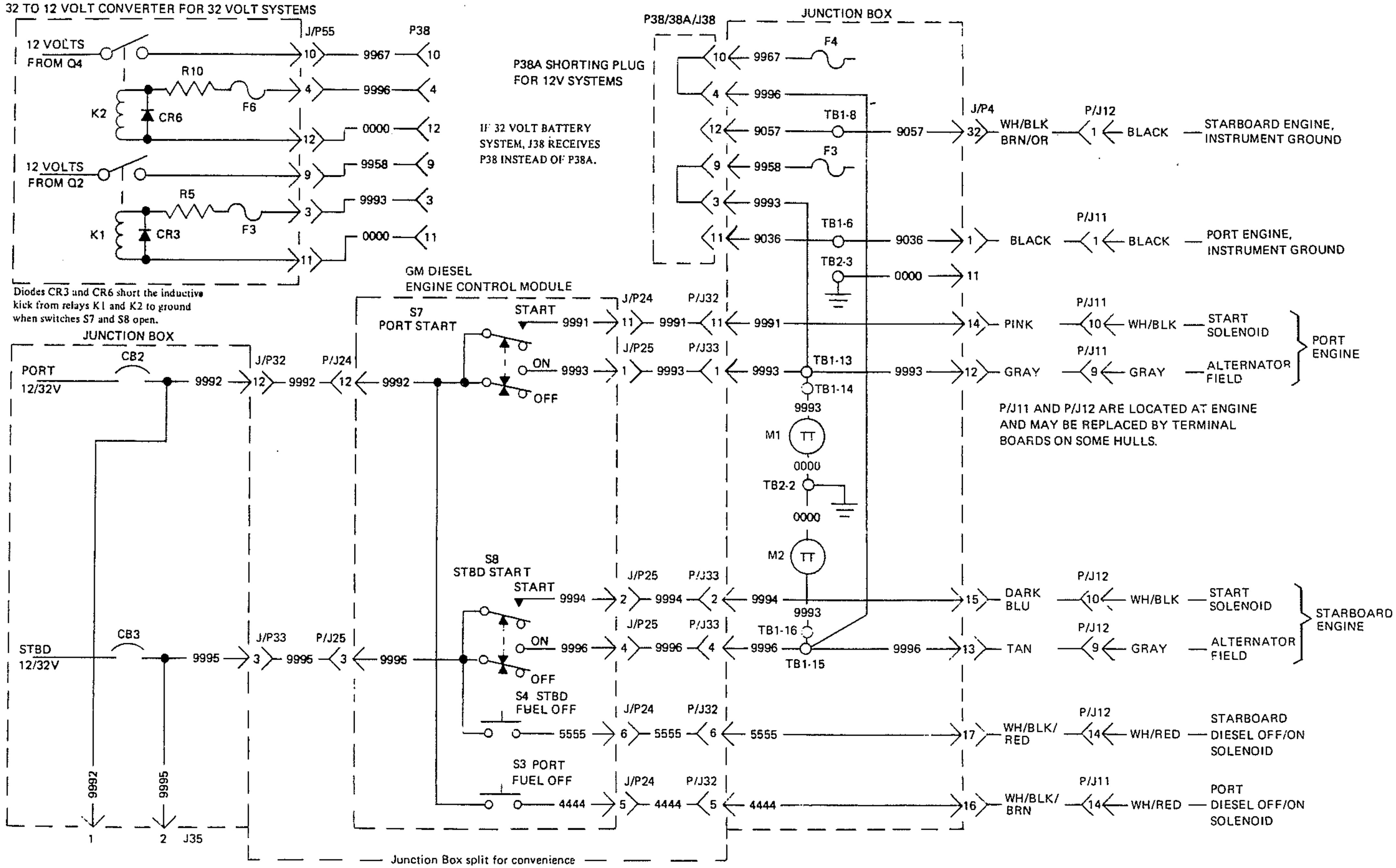


Figure 4. Start Switch Circuit, GM Diesel Engine Control Module, Without Command Bridge® Option

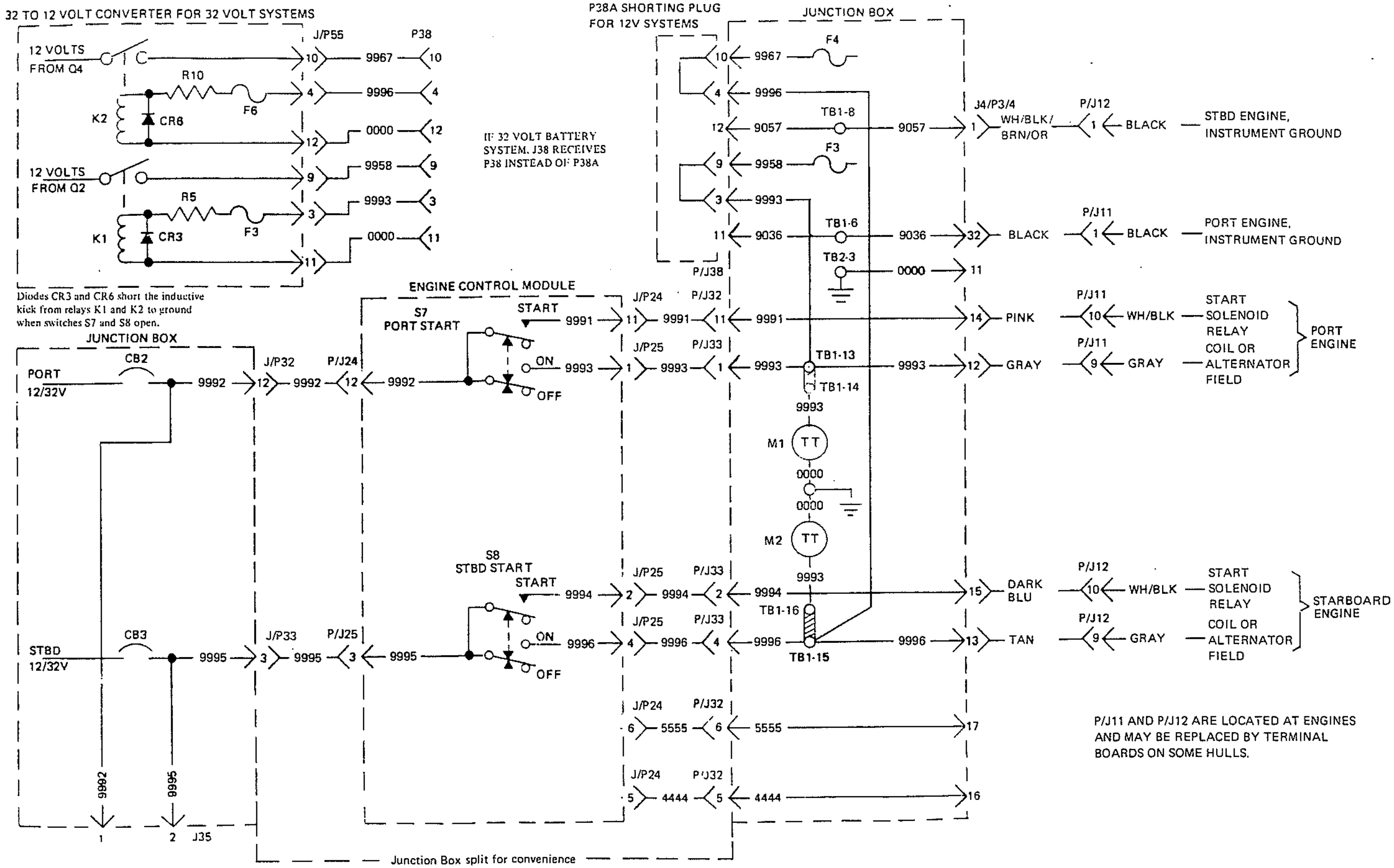


Figure 5. Start Switch Circuit, Engine Control Module; Without Command Bridge® Option

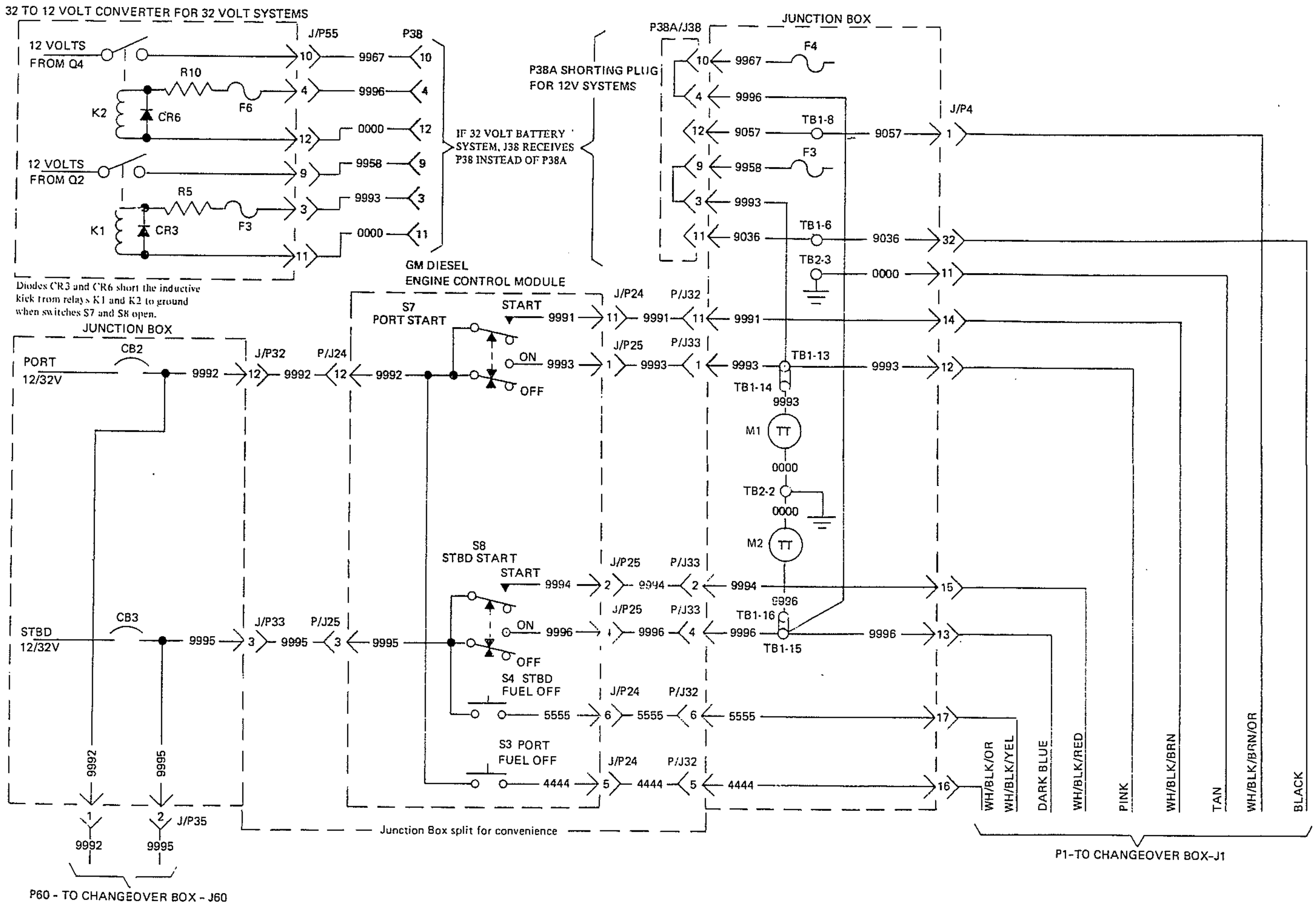


Figure 6. Start Switch Circuit, GM Diesel Engine Control Module, With Command Bridge® Option (Sheet 1 of 2)

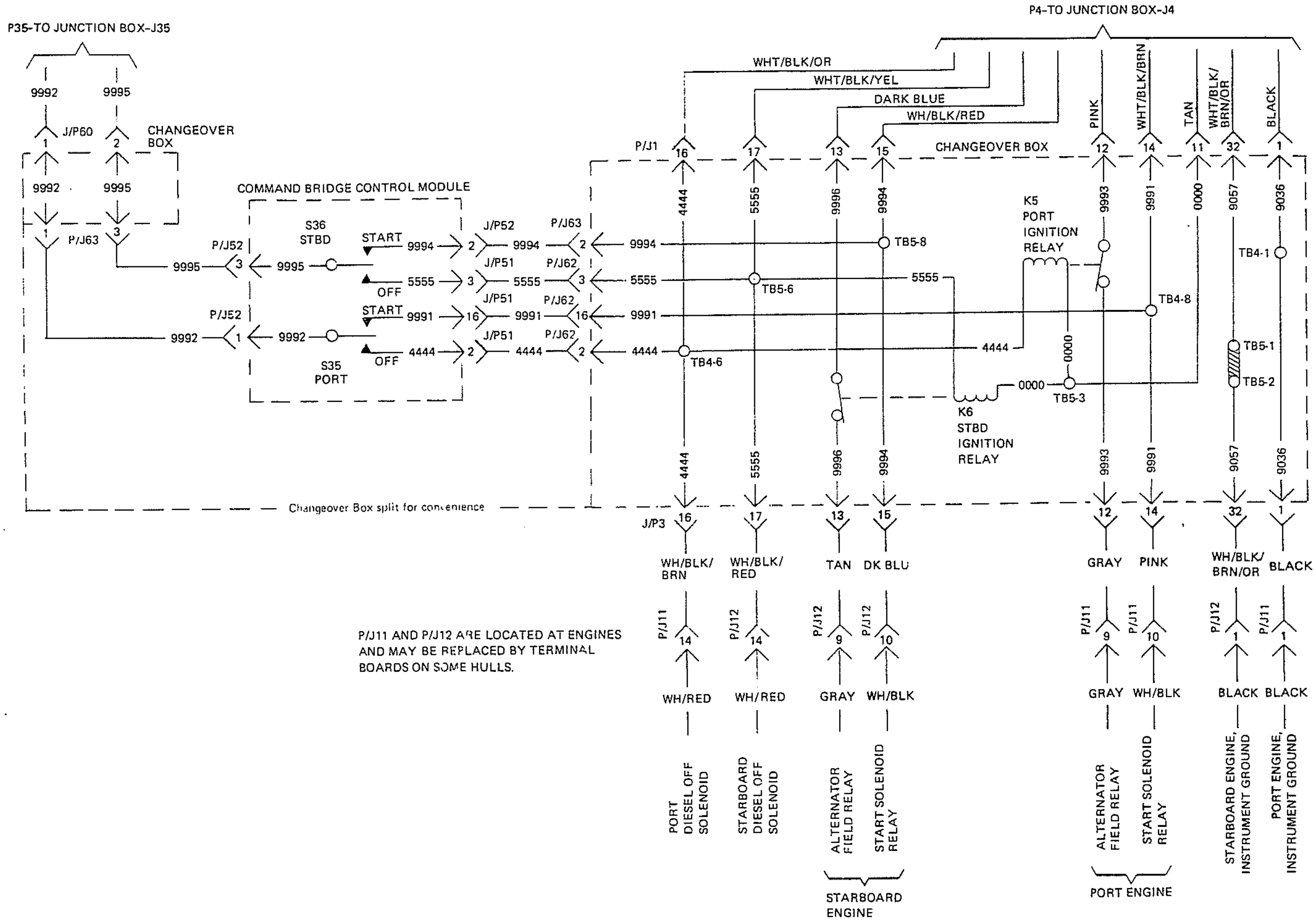


Figure 6. Start Switch Circuit, GM Diesel Engine Control Module, With Command Bridge® Option (Sheet 2 of 2)

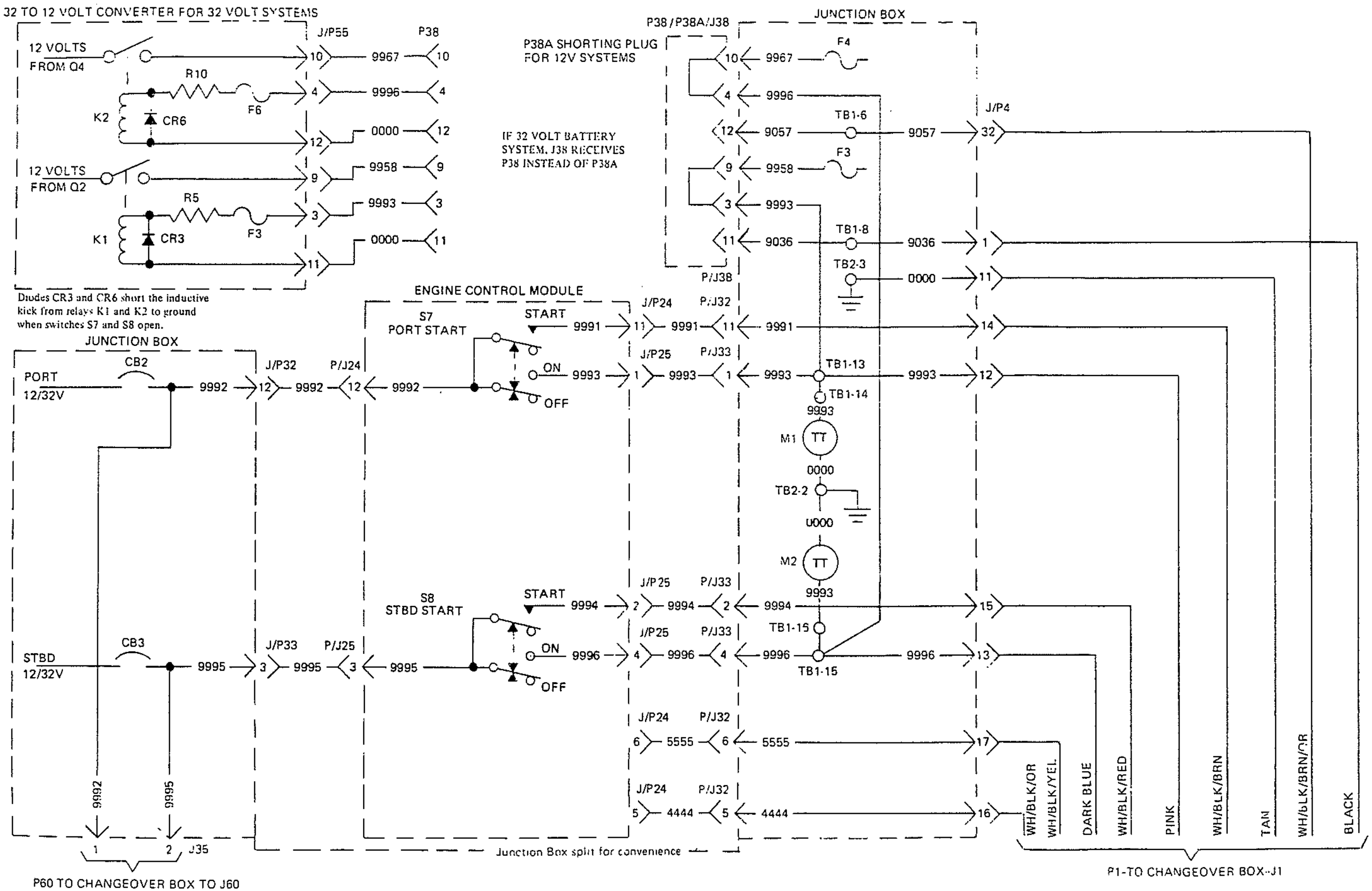
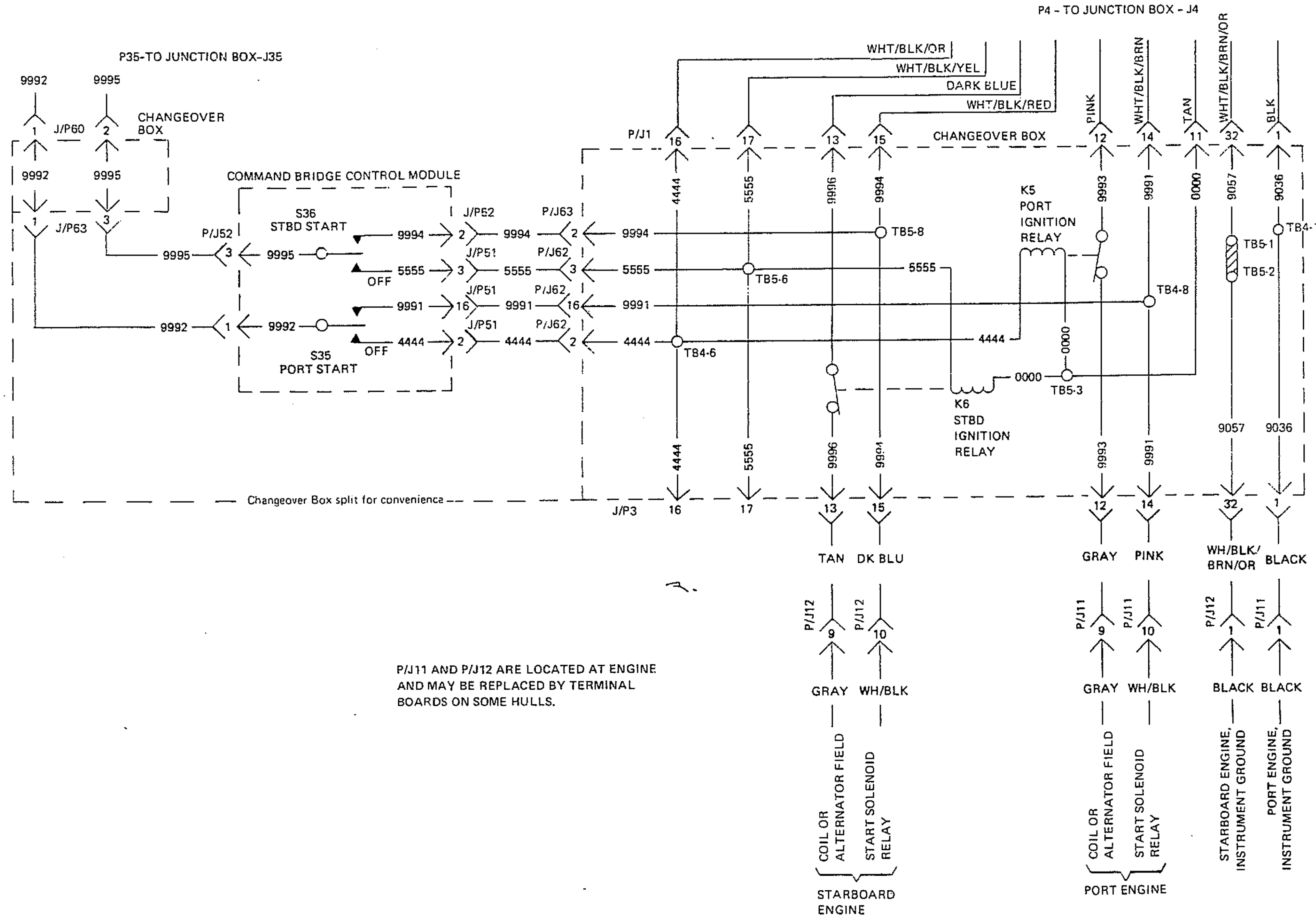


Figure 7. Start Switch Circuit, Engine Control Module, With Command Bridge® Option (Sheet 1 of 2)



P/J11 AND P/J12 ARE LOCATED AT ENGINE AND MAY BE REPLACED BY TERMINAL BOARDS ON SOME HULLS.

Figure 7. Start Switch Circuit, Engine Control Module, With Command Bridge® Option (Sheet 2 of 2)

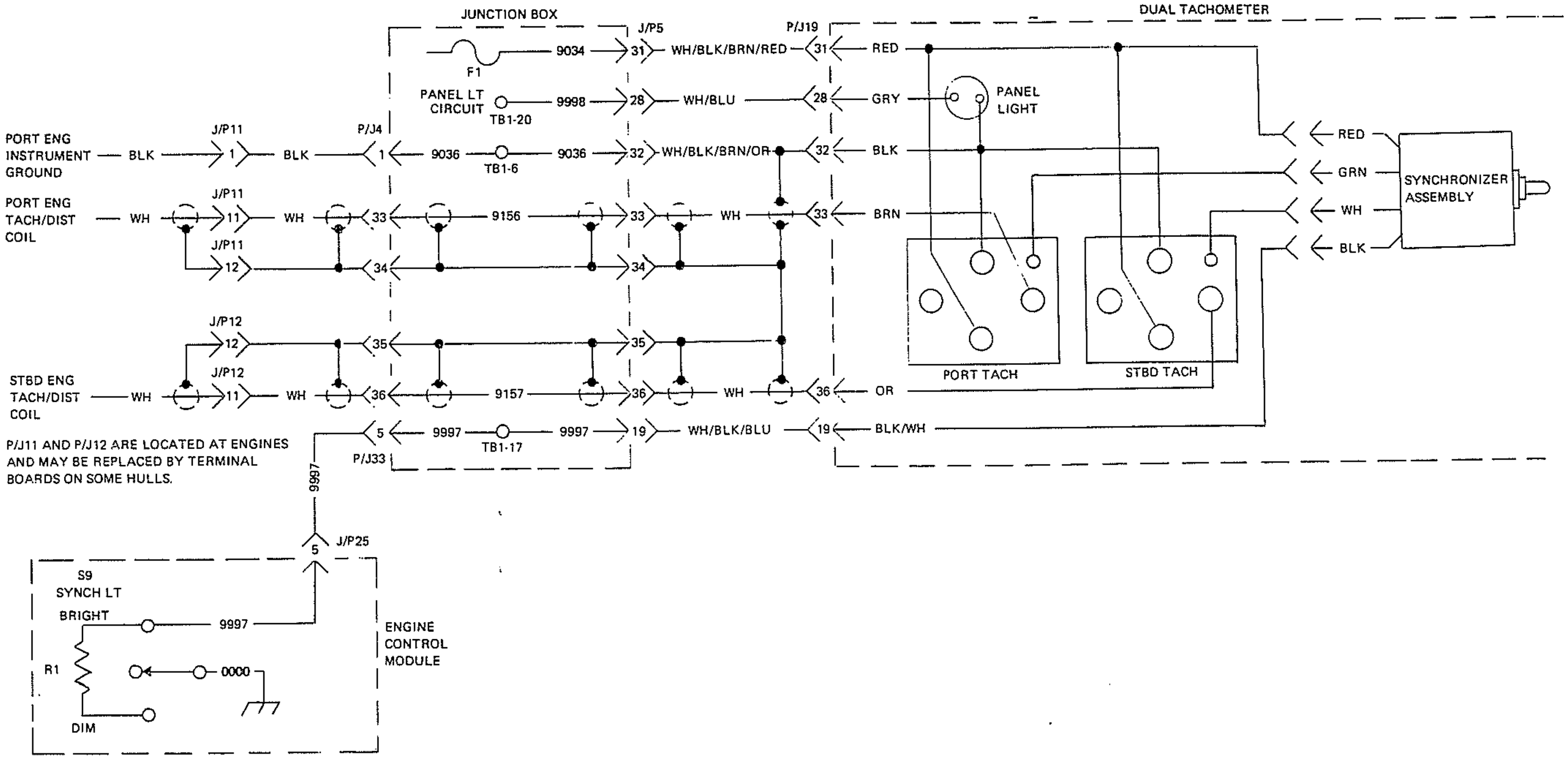


Figure 8. Dual Tachometer Input Circuits, Without Command Bridge® Option

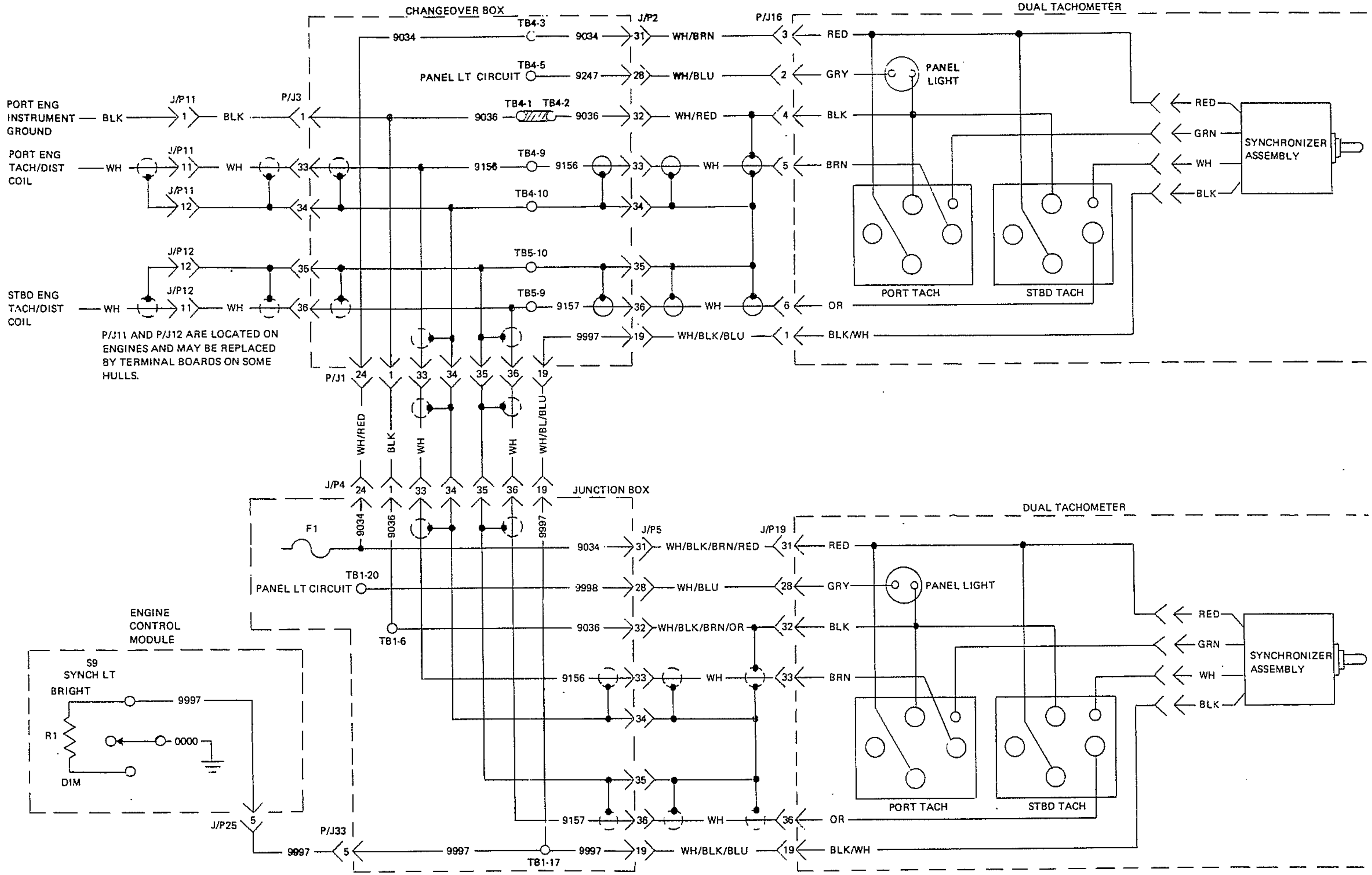


Figure 9. Dual Tachometer Input Circuits, With Command Bridge™ Option

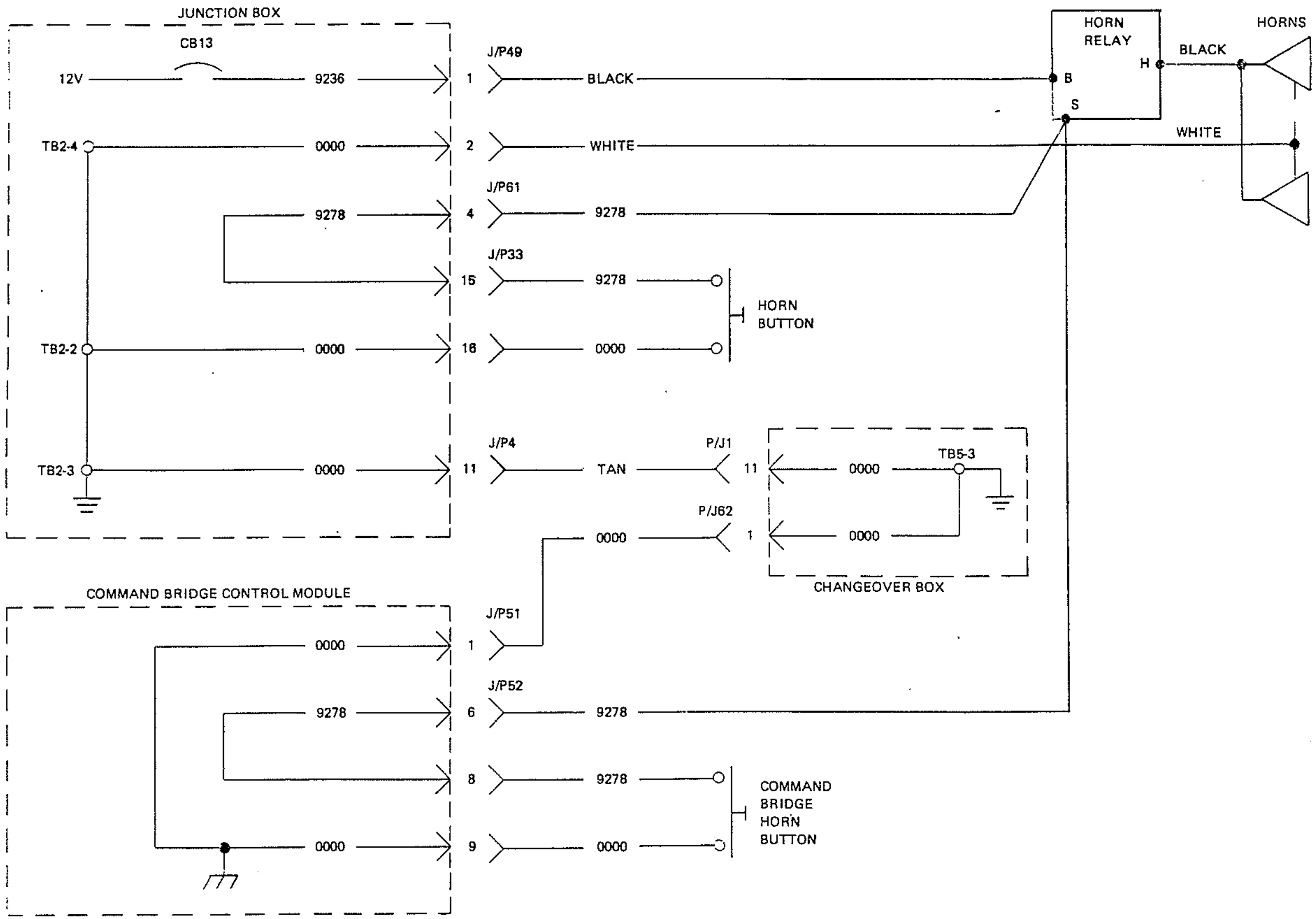


Figure 10. Horn Circuit

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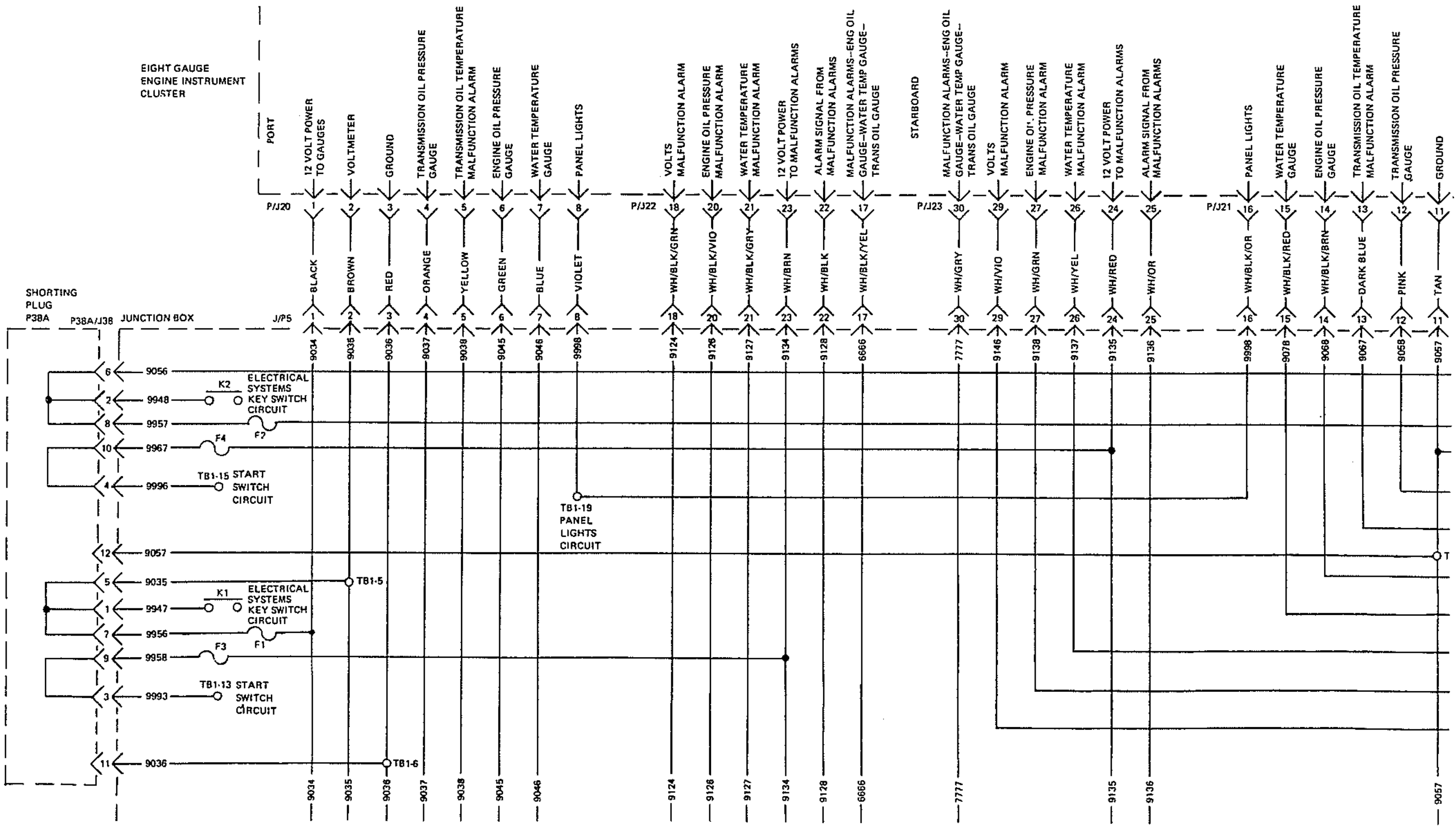
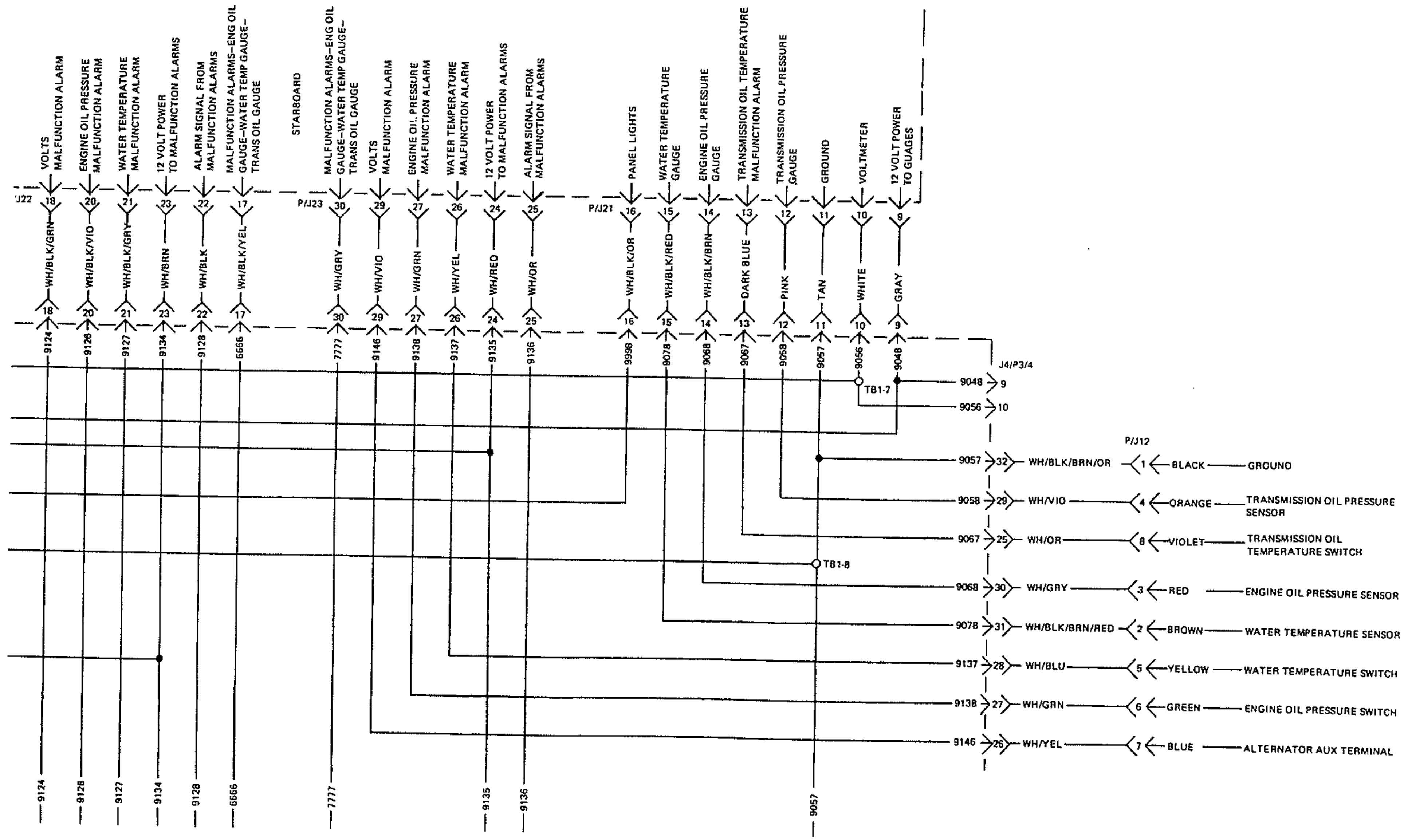


Figure 11. Engine Instruments and Alarms Circuit, 12 Volt System, Without Command Bridge® Option (Sheet 1 of 2)



J22
P/J23
P/J21
STARBOARD
VOLTS MALFUNCTION ALARM
ENGINE OIL PRESSURE MALFUNCTION ALARM
WATER TEMPERATURE MALFUNCTION ALARM
12 VOLT POWER TO MALFUNCTION ALARMS
ALARM SIGNAL FROM MALFUNCTION ALARMS
MALFUNCTION ALARMS–ENG OIL GAUGE–WATER TEMP GAUGE–TRANS OIL GAUGE
PANEL LIGHTS
WATER TEMPERATURE GAUGE
ENGINE OIL PRESSURE GAUGE
TRANSMISSION OIL TEMPERATURE MALFUNCTION ALARM
TRANSMISSION OIL PRESSURE GAUGE
GROUND
VOLTMETER
12 VOLT POWER TO GUAGES
WH/BLK/GRN
WH/BLK/VIO
WH/BLK/GRY
WH/BRN
WH/BLK
WH/BLK/YEL
WH/GRY
WH/VIO
WH/GRN
WH/YEL
WH/RED
WH/OR
WH/BLK/OR
WH/BLK/RED
WH/BLK/BRN
DARK BLUE
PINK
TAN
WHITE
GRAY
9124
9128
9127
9134
9128
6666
7777
9146
9138
9137
9135
9136
9998
9078
9068
9067
9058
9057
9056
9048
J4/P3/4
TB1-7
TB1-8
P/J12
9048 9
9056 10
9057 32 WH/BLK/BRN/OR 1 BLACK GROUND
9058 29 WH/VIO 4 ORANGE TRANSMISSION OIL PRESSURE SENSOR
9067 25 WH/OR 8 VIOLET TRANSMISSION OIL TEMPERATURE SWITCH
9068 30 WH/GRY 3 RED ENGINE OIL PRESSURE SENSOR
9078 31 WH/BLK/BRN/RED 2 BROWN WATER TEMPERATURE SENSOR
9137 28 WH/BLU 5 YELLOW WATER TEMPERATURE SWITCH
9138 27 WH/GRN 6 GREEN ENGINE OIL PRESSURE SWITCH
9146 26 WH/YEL 7 BLUE ALTERNATOR AUX TERMINAL
STARBOARD ENGINE

11 B

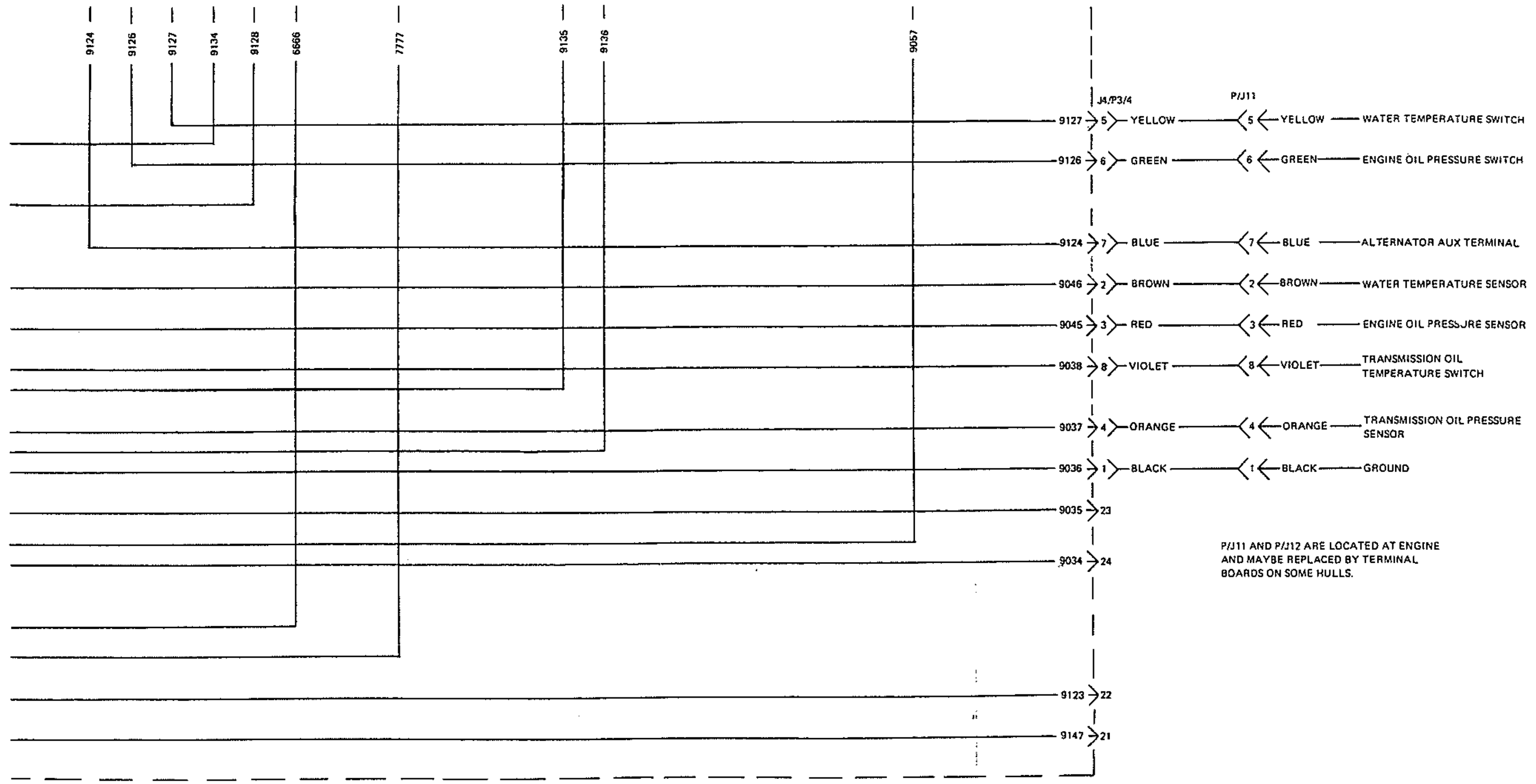
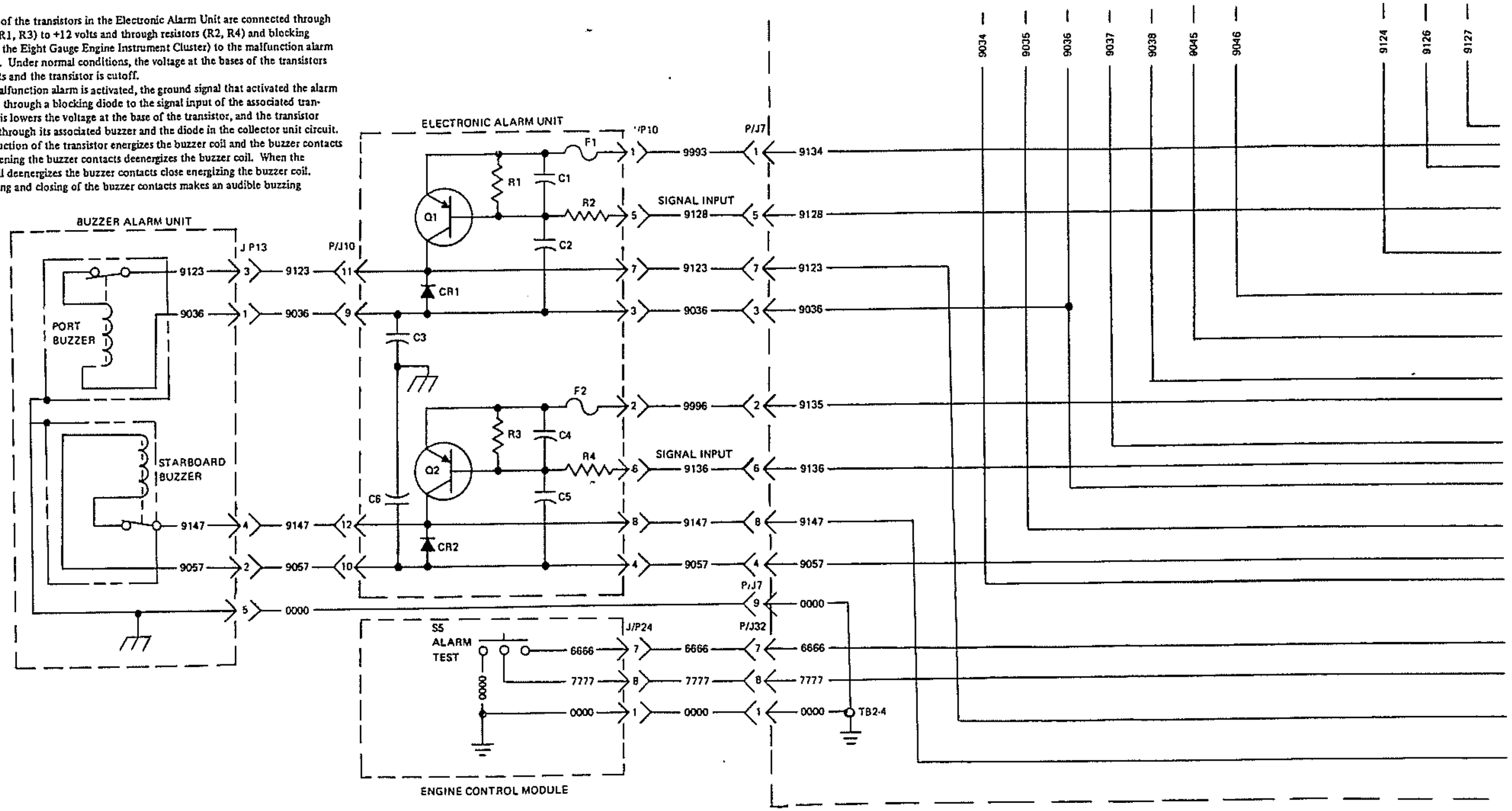


Figure 11. Engine Instruments and Alarms Circuit, 12 Volt System, Without Command Bridge® Option (Sheet 2 of 2)

The bases of the transistors in the Electronic Alarm Unit are connected through resistors (R1, R3) to +12 volts and through resistors (R2, R4) and blocking diodes (in the Eight Gauge Engine Instrument Cluster) to the malfunction alarm indicators. Under normal conditions, the voltage at the bases of the transistors is +12 volts and the transistor is cutoff.

When a malfunction alarm is activated, the ground signal that activated the alarm is coupled through a blocking diode to the signal input of the associated transistor. This lowers the voltage at the base of the transistor, and the transistor conducts through its associated buzzer and the diode in the collector unit circuit. The conduction of the transistor energizes the buzzer coil and the buzzer contacts open. Opening the buzzer contacts deenergizes the buzzer coil. When the buzzer coil deenergizes the buzzer contacts close energizing the buzzer coil. The opening and closing of the buzzer contacts makes an audible buzzing sound.



When the Electrical Systems Key Switch is turned on, the relay contacts of K1 and K2 close applying 32 volts to the 32 to 12 Volt DC Converter. Zener diode CR1 holds the base voltage of transistor Q1 at approximately 14 volts. With the base of Q1 at 14 volts the transistor conducts through R3 and the external load. The voltage drop across Q1 and R2 is approximately 20 volts and the output voltage from the emitter of Q1 is approximately 12 volts. With only 12 volts at its cathode, zener diode CR2 is nonconducting and transistor Q2 is cutoff. If the voltage at the emitter of Q1 tries to rise above 14 volts, CR2 conducts raising the base voltage of Q2. This causes Q2 to conduct holding the emitter voltage of Q1 to 14 volts.
The operation of the starboard circuit is identical to the operation of the port circuit.
Diodes CR3 and CR6 shunt the inductive kick from K1 and K2 when power is removed from the relays.

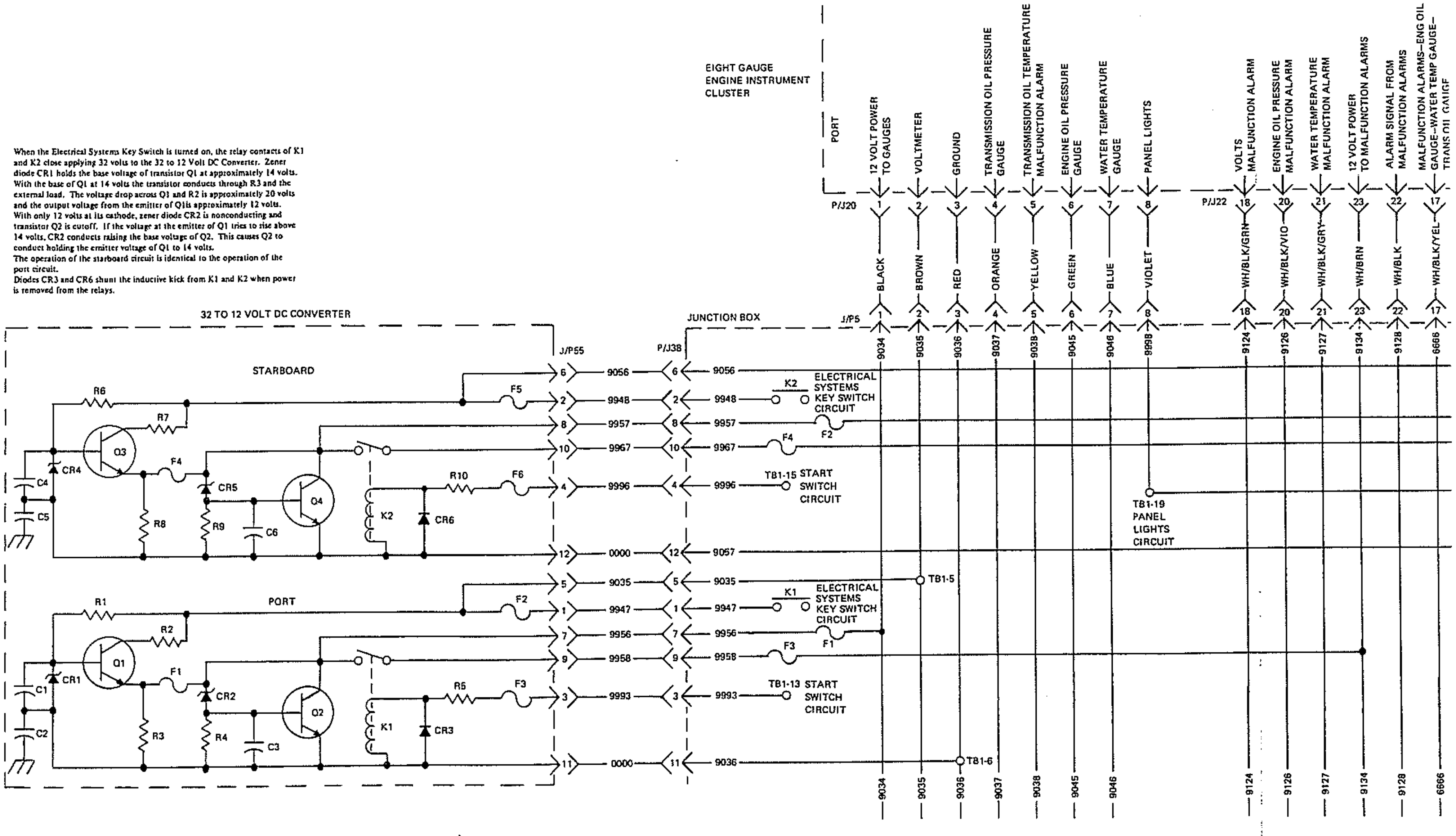
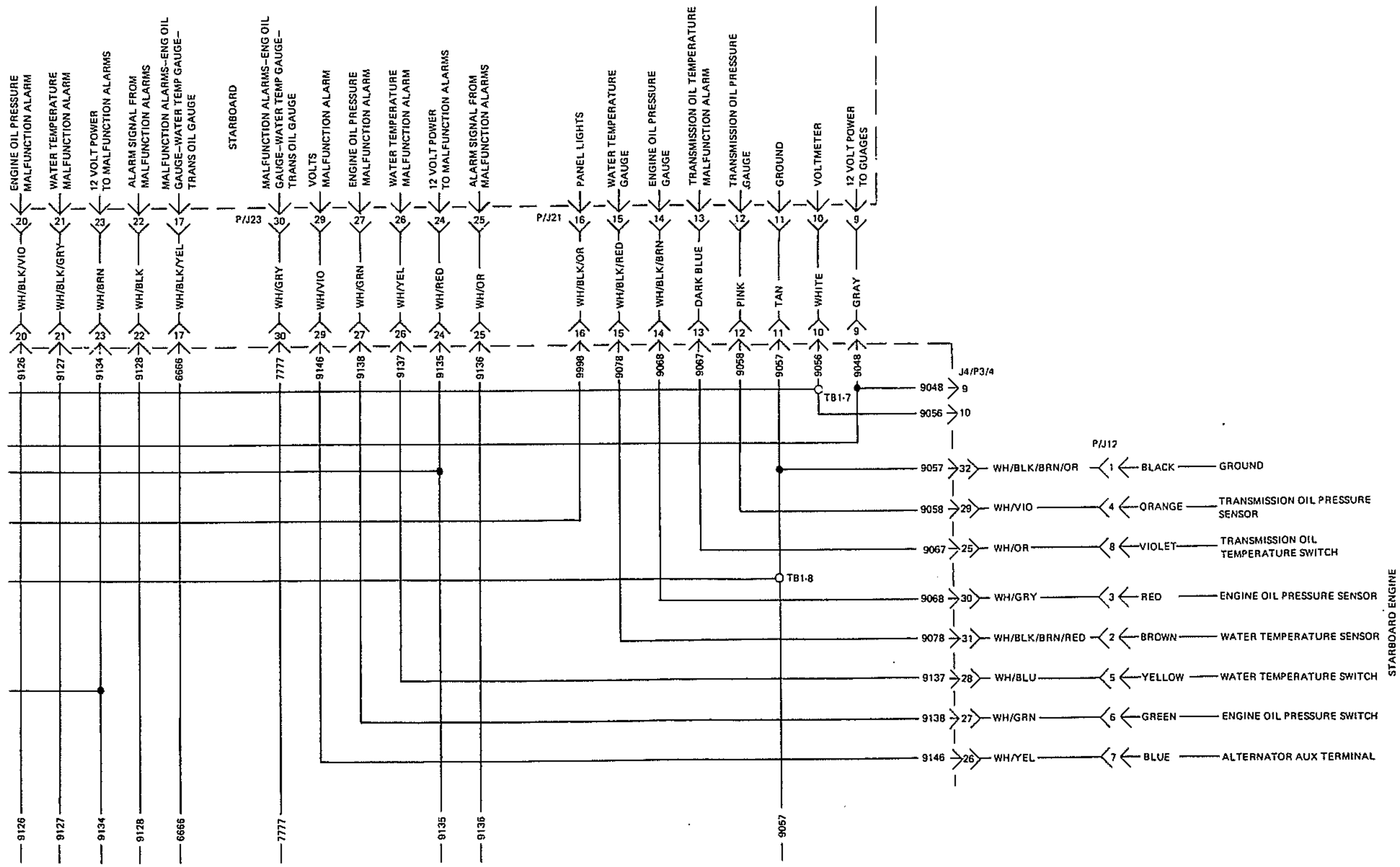


Figure 12. Engine Instruments and Alarms Circuit, 32 Volt System, Without Command Bridge® Option (Sheet 1 of 2)


ENGINE OIL PRESSURE MALFUNCTION ALARM
WATER TEMPERATURE MALFUNCTION ALARM
12 VOLT POWER TO MALFUNCTION ALARMS
ALARM SIGNAL FROM MALFUNCTION ALARMS
MALFUNCTION ALARMS–ENG OIL GAUGE–WATER TEMP GAUGE–TRANS OIL GAUGE
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12 VOLT POWER TO GUAGES
P/J23
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WH/GRY
WH/VIO
WH/GRN
WH/YEL
WH/RED
WH/OR
WH/BLK/OR
WH/BLK/RED
WH/BLK/BRN
DARK BLUE
PINK
TAN
WHITE
GRAY
9126
9127
9134
9128
6666
7777
9146
9138
9137
9135
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9078
9068
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9057
9056
9048
J4/P3/4
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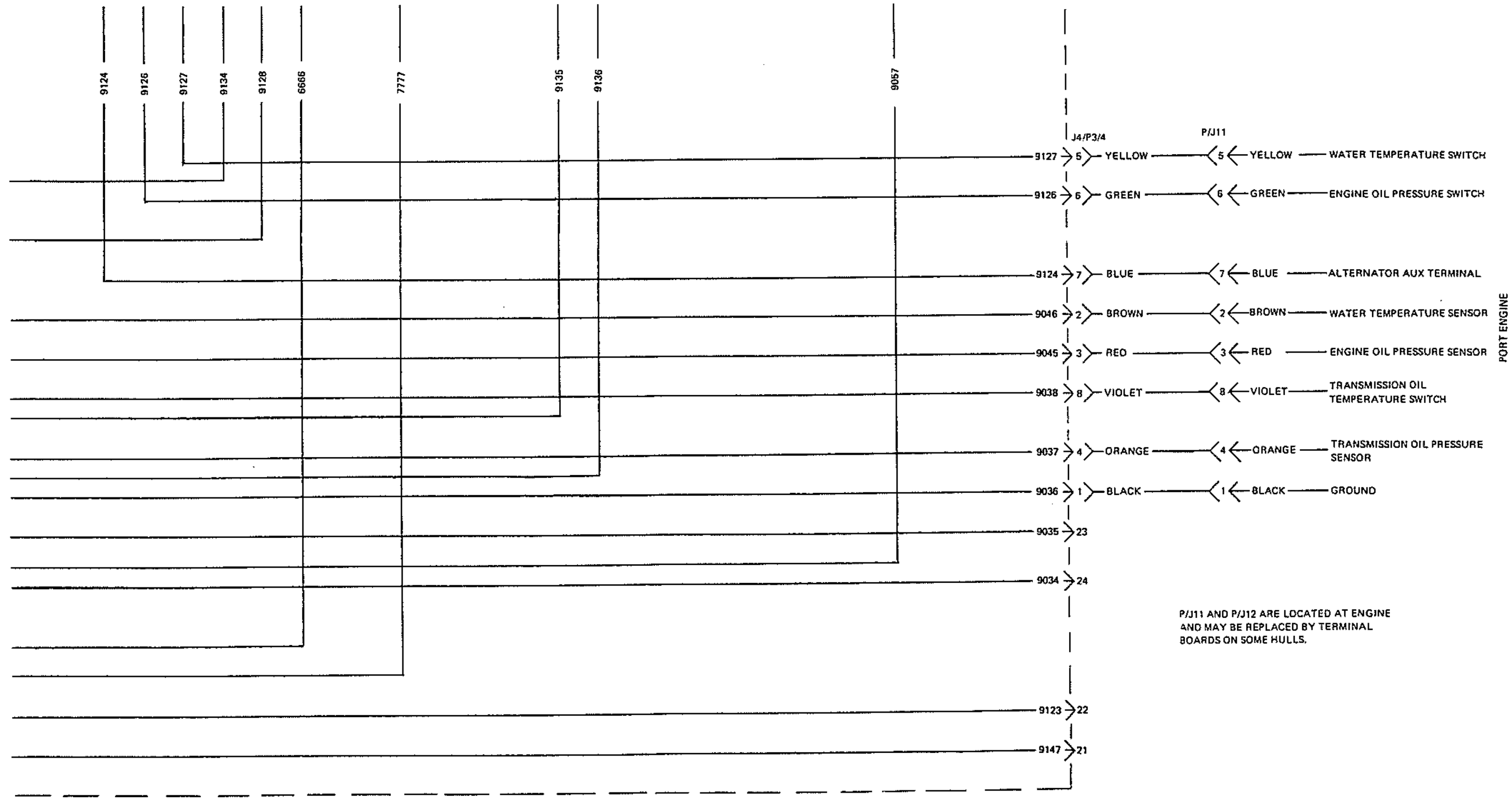

Figure 12. Engine Instruments and Alarms Circuit, 32 Volt System, Without Command Bridge® Option (Sheet 2 of 2)

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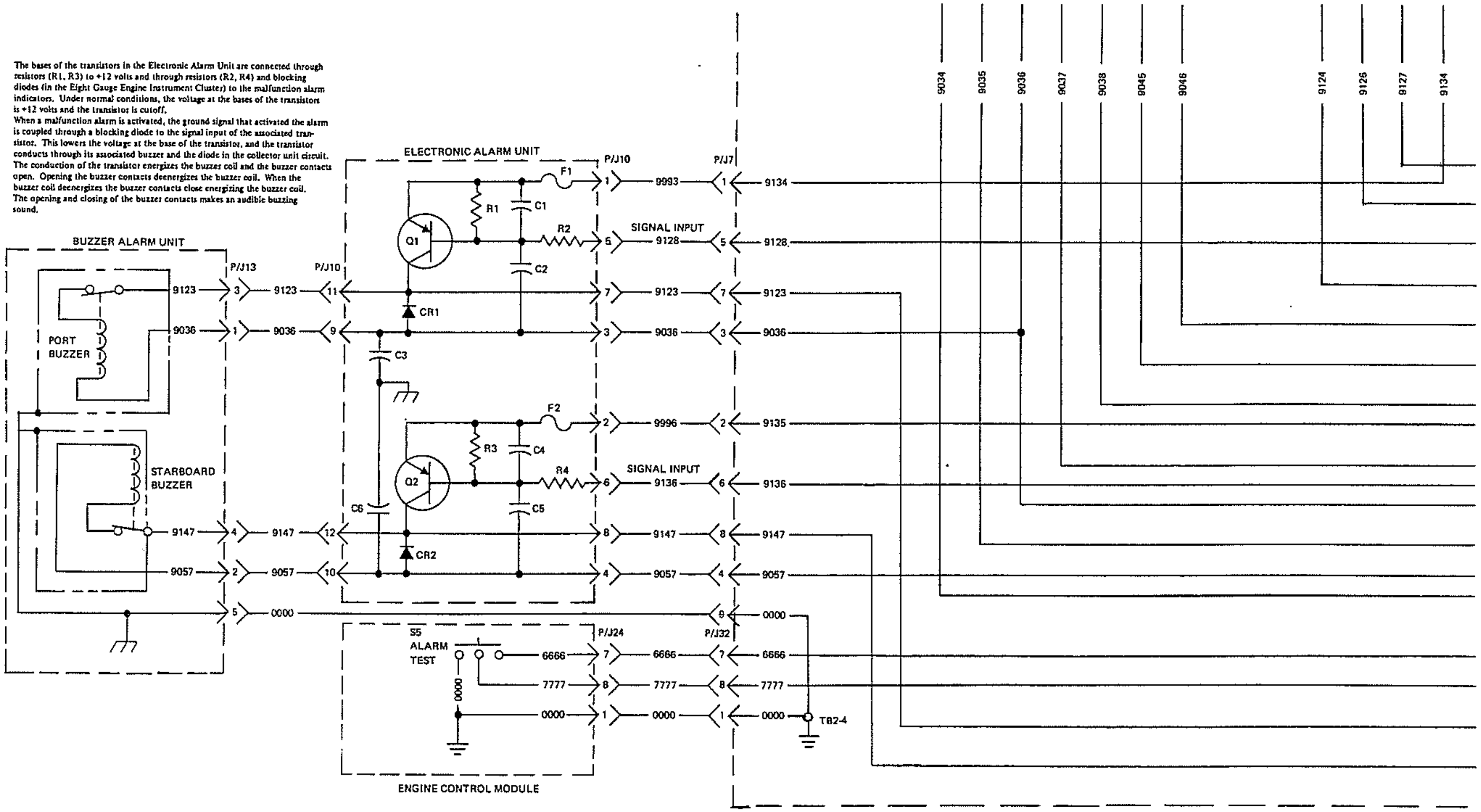

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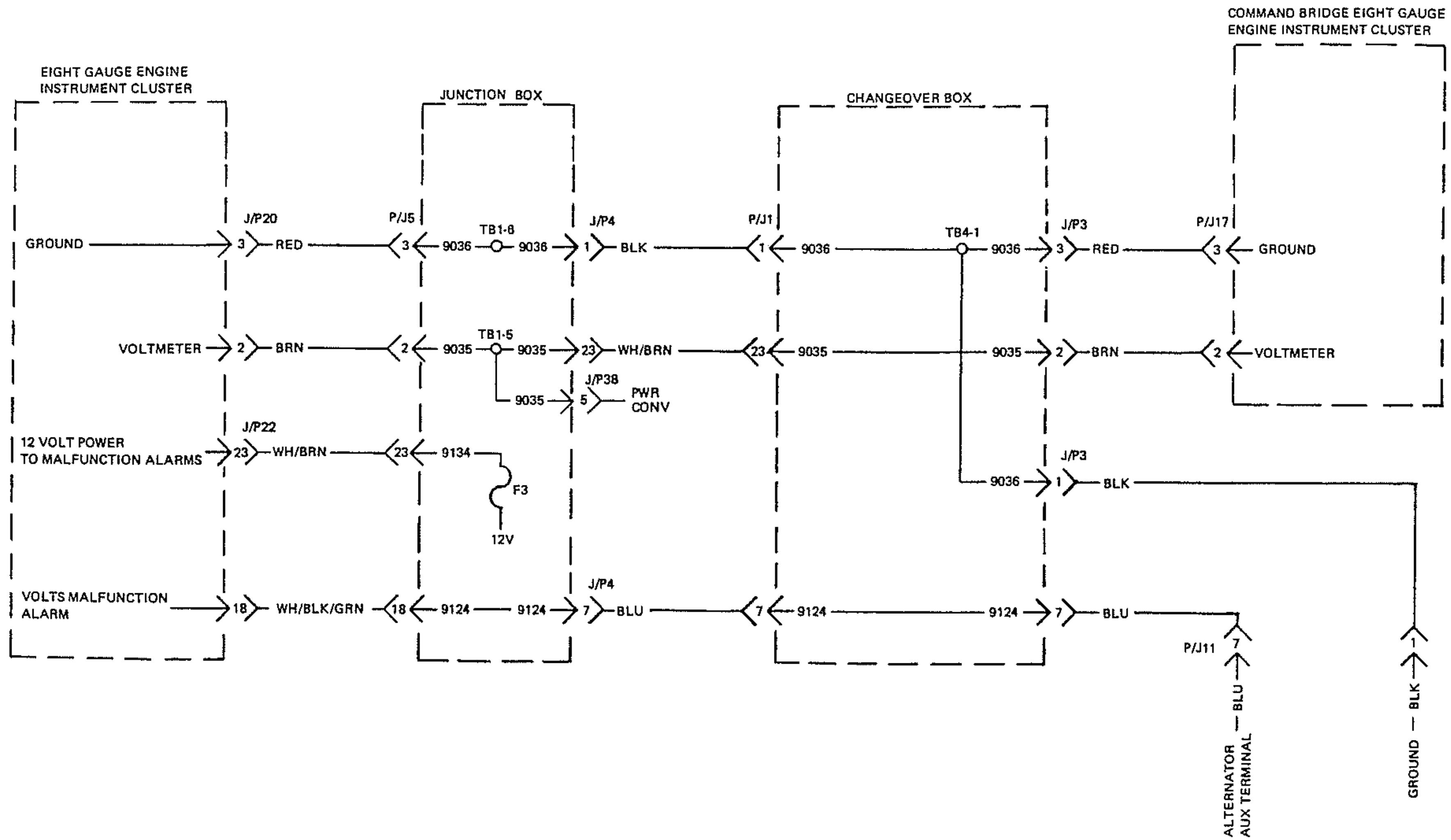


Figure 13. Port Engine Voltmeter Circuits, With Command Bridge® Option

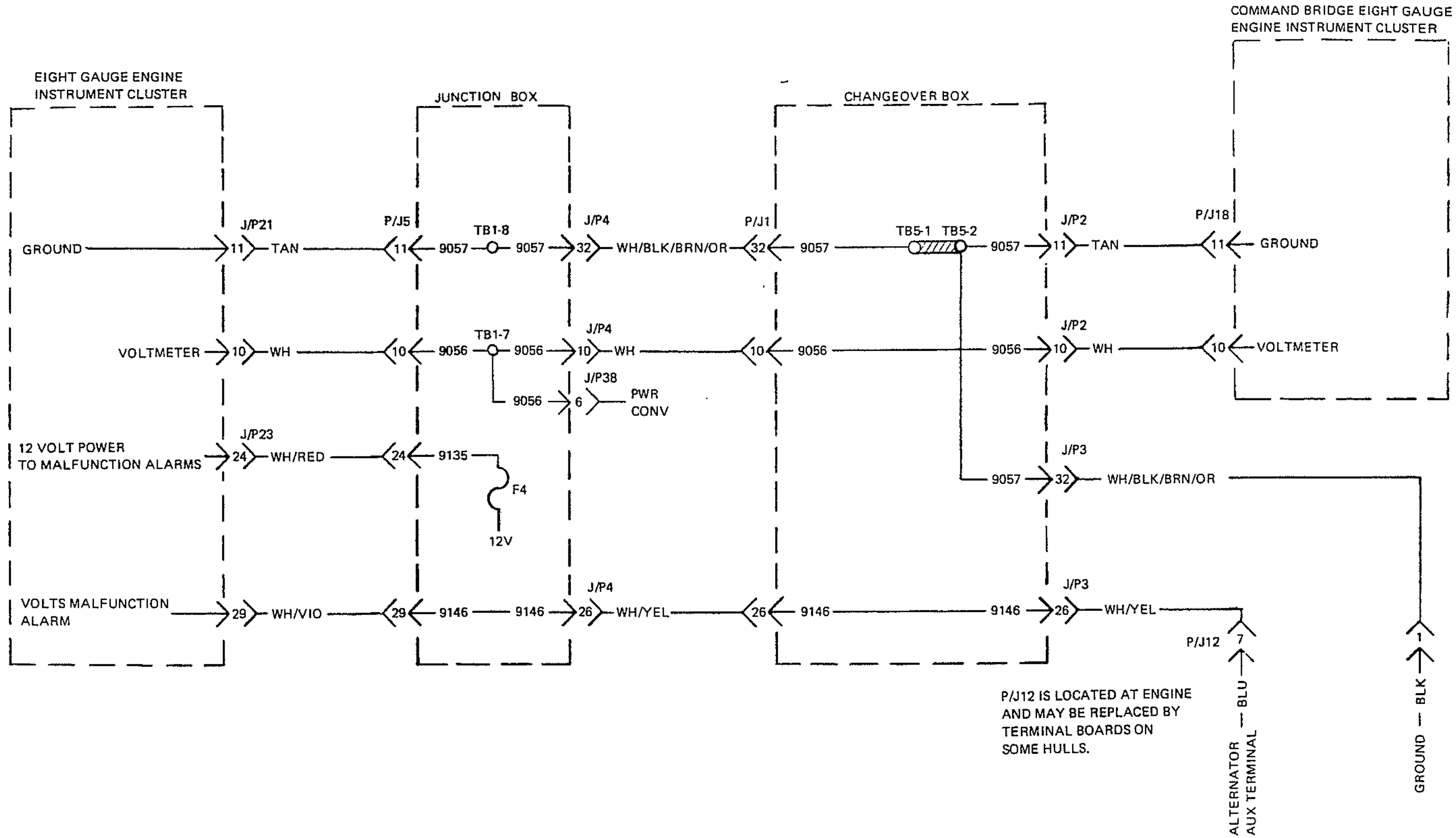


Figure 14. Starboard Engine Voltmeter Circuits, With Command Bridge® Option

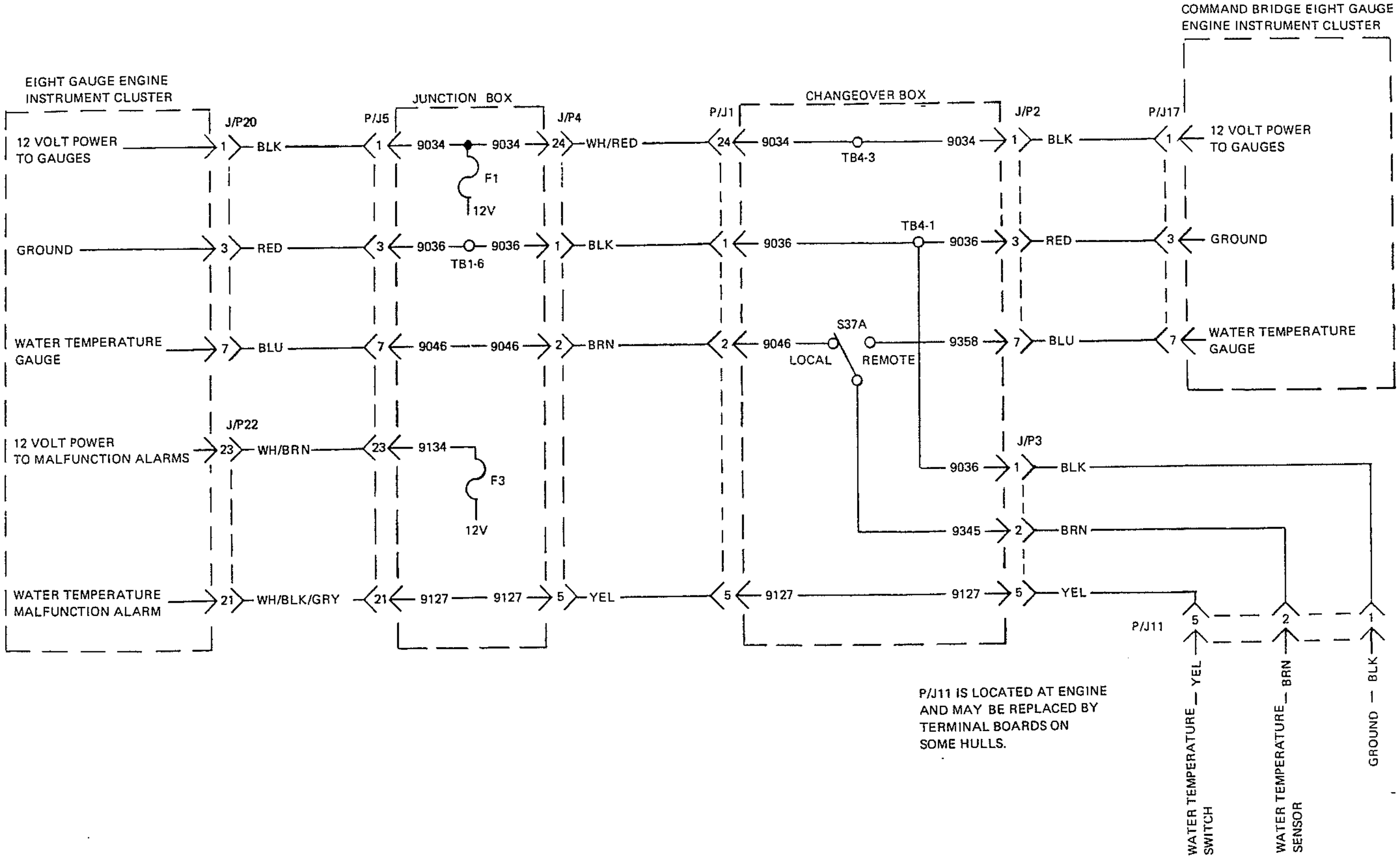


Figure 15. Port Engine Water Temperature Indicator Circuits, With Command Bridge® Option

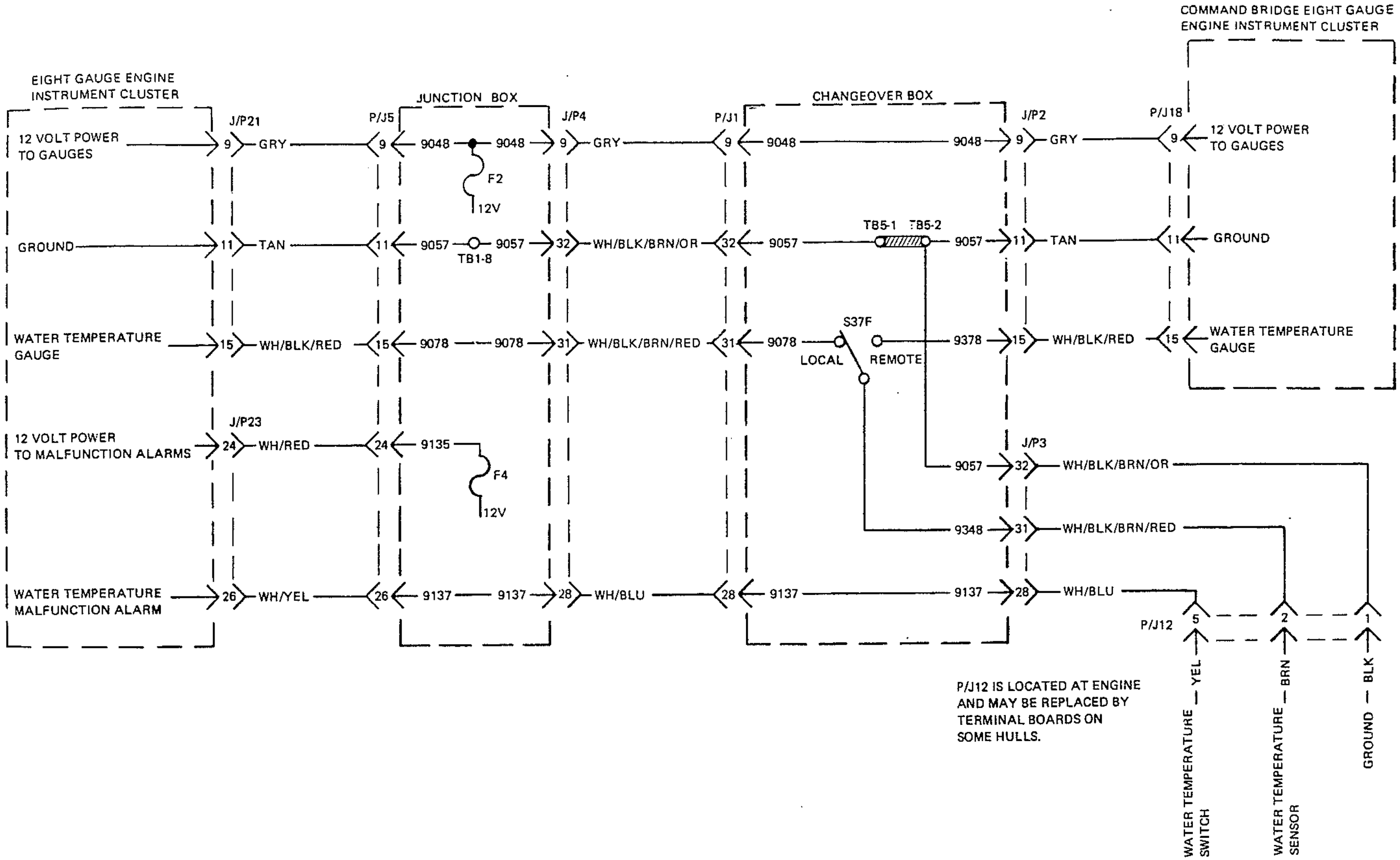


Figure 16. Starboard Engine Water Temperature Indicator Circuits, With Command Bridge® Option

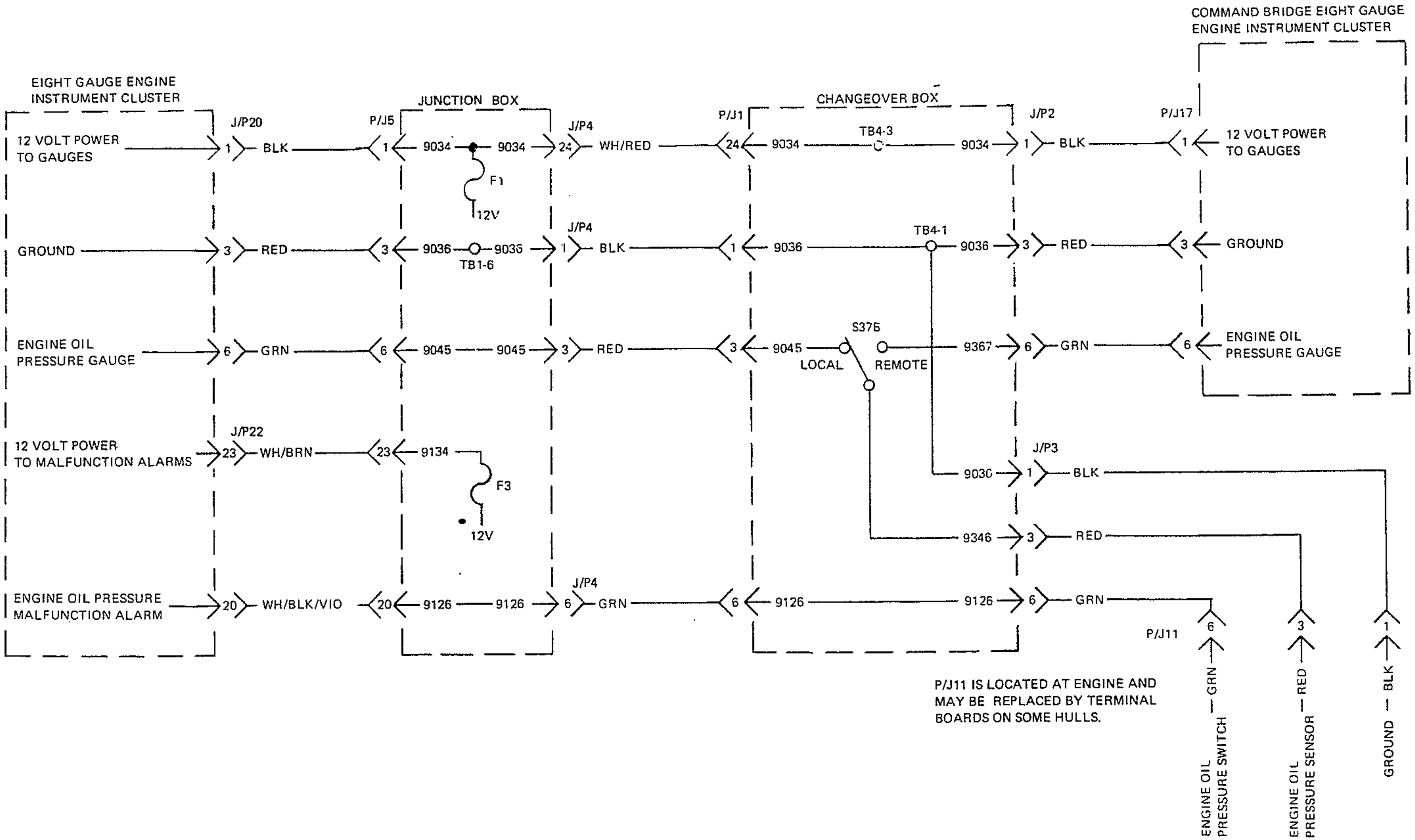


Figure 17. Port Engine Oil Pressure Indicator Circuits, With Command Bridge® Option

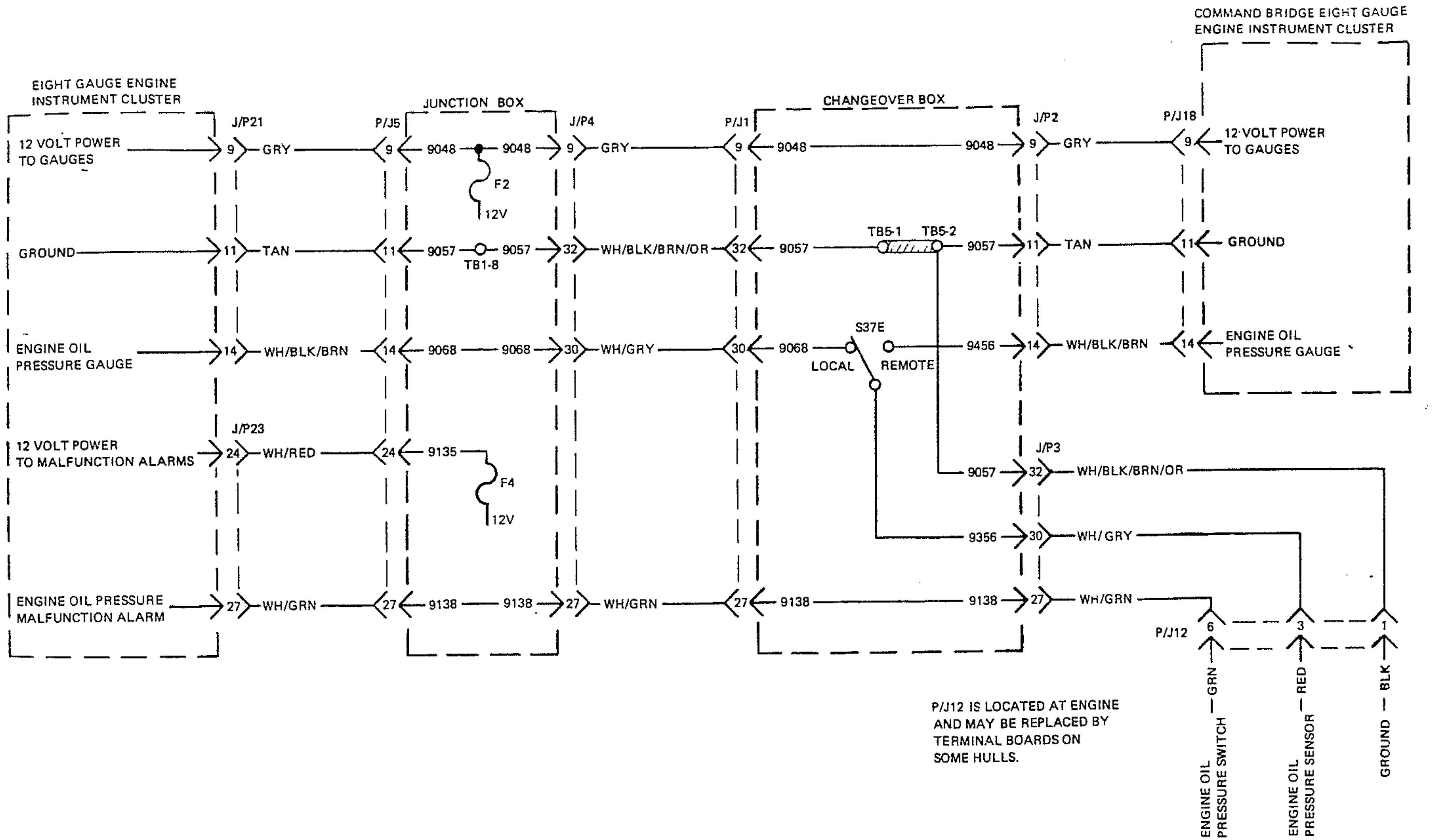


Figure 18. Starboard Engine Oil Pressure Indicator Circuits, With Command Bridge® Option

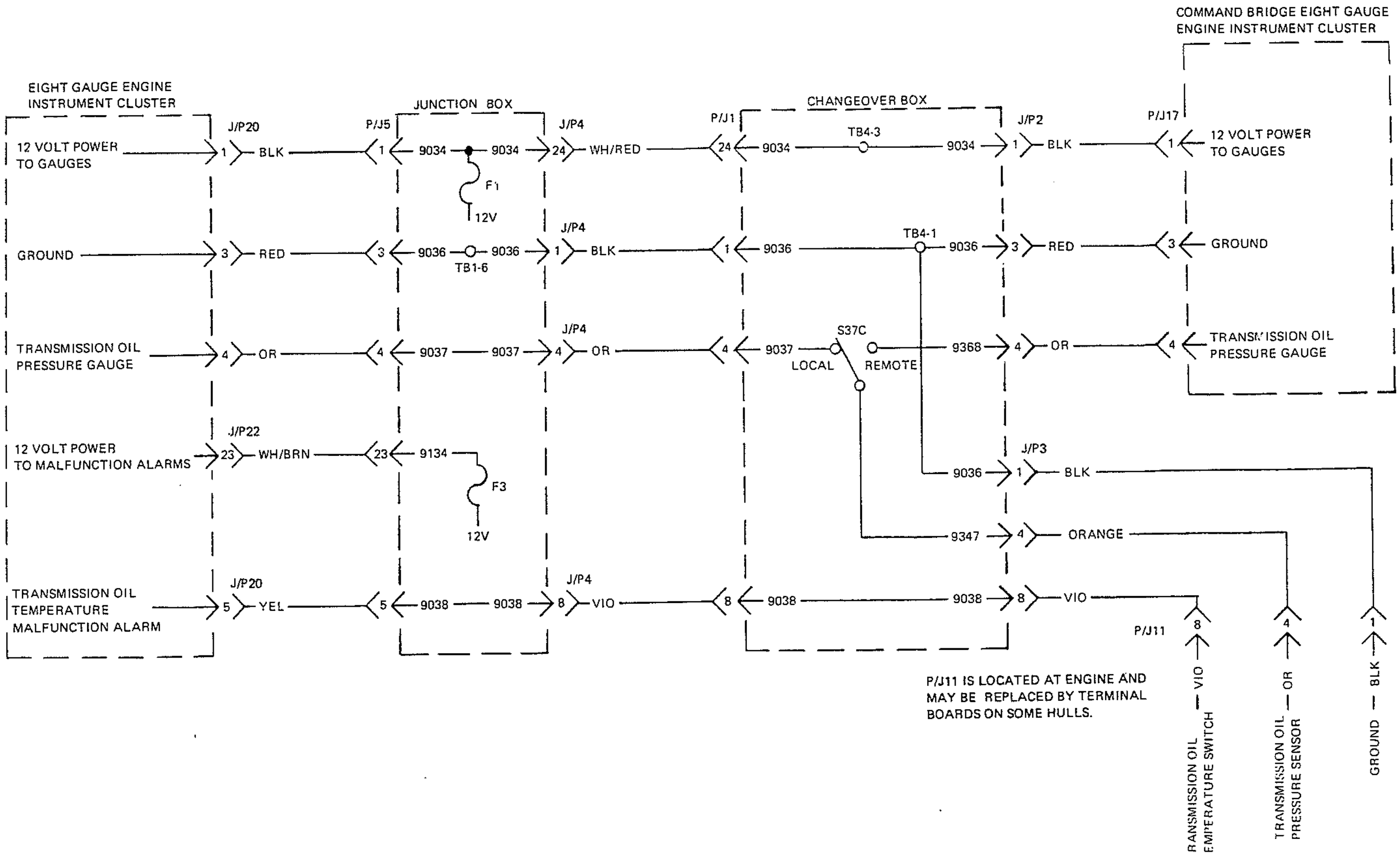


Figure 19. Port Engine Transmission Oil Pressure Indicator Circuits, With Command Bridge® Option

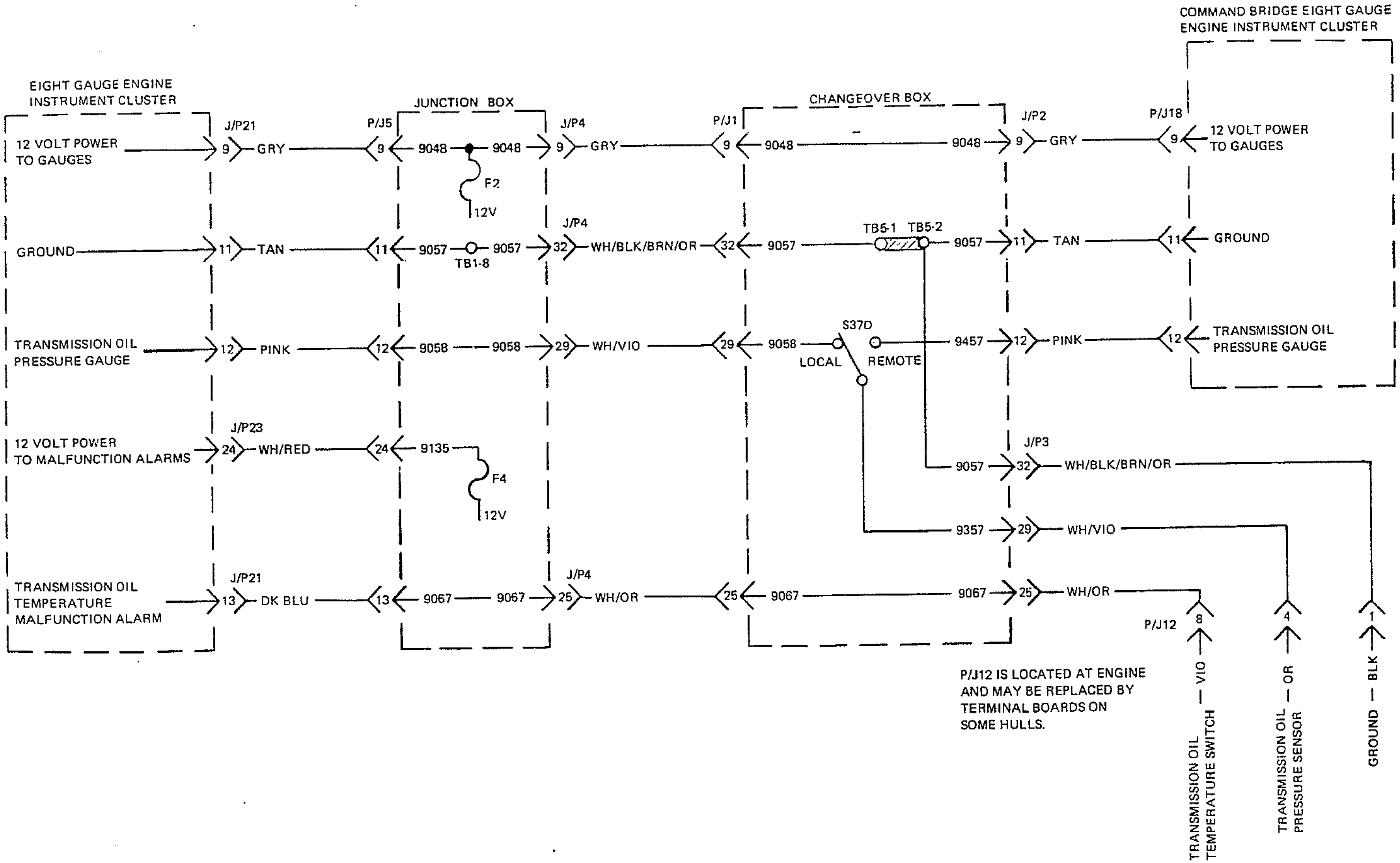
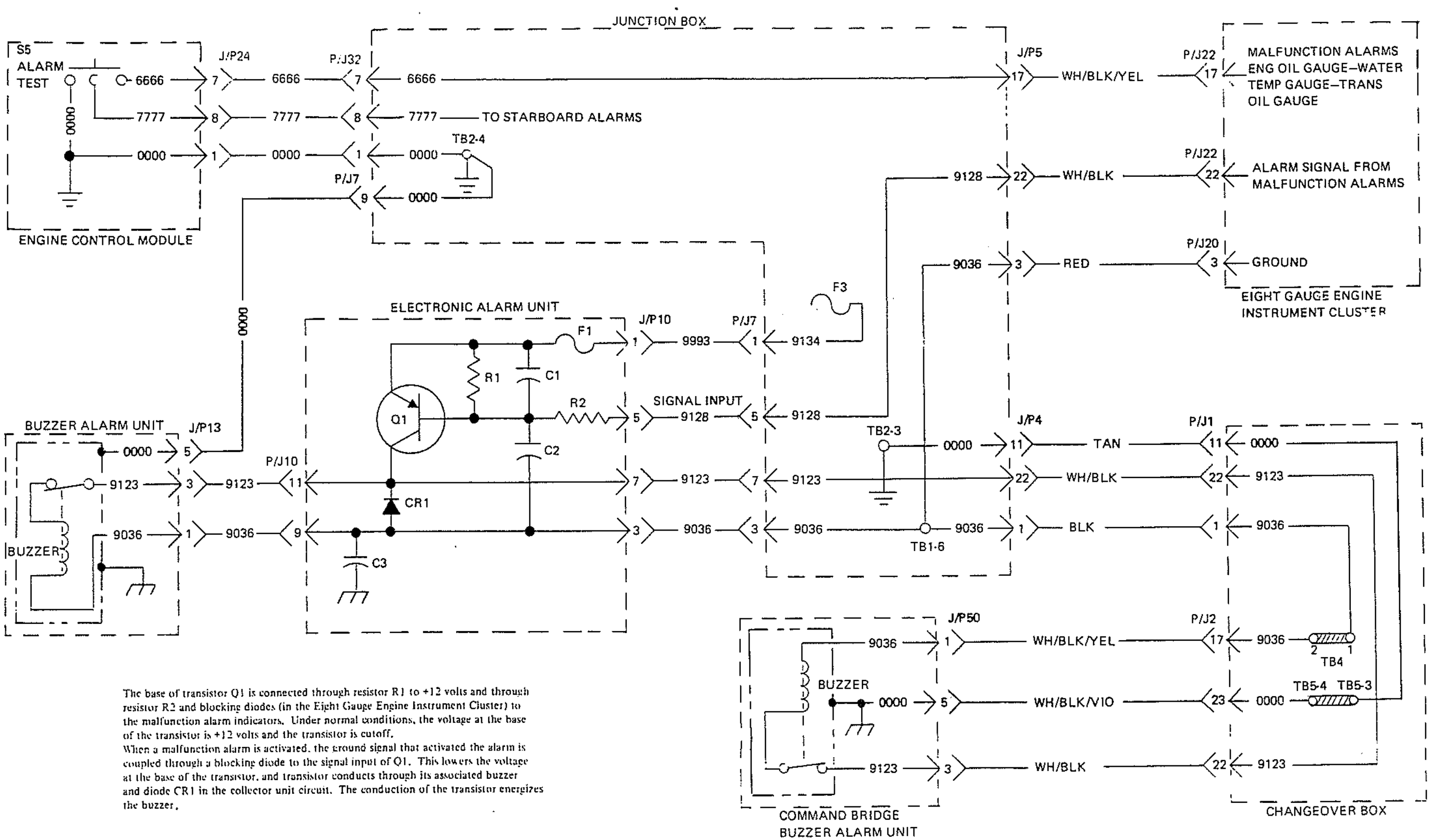


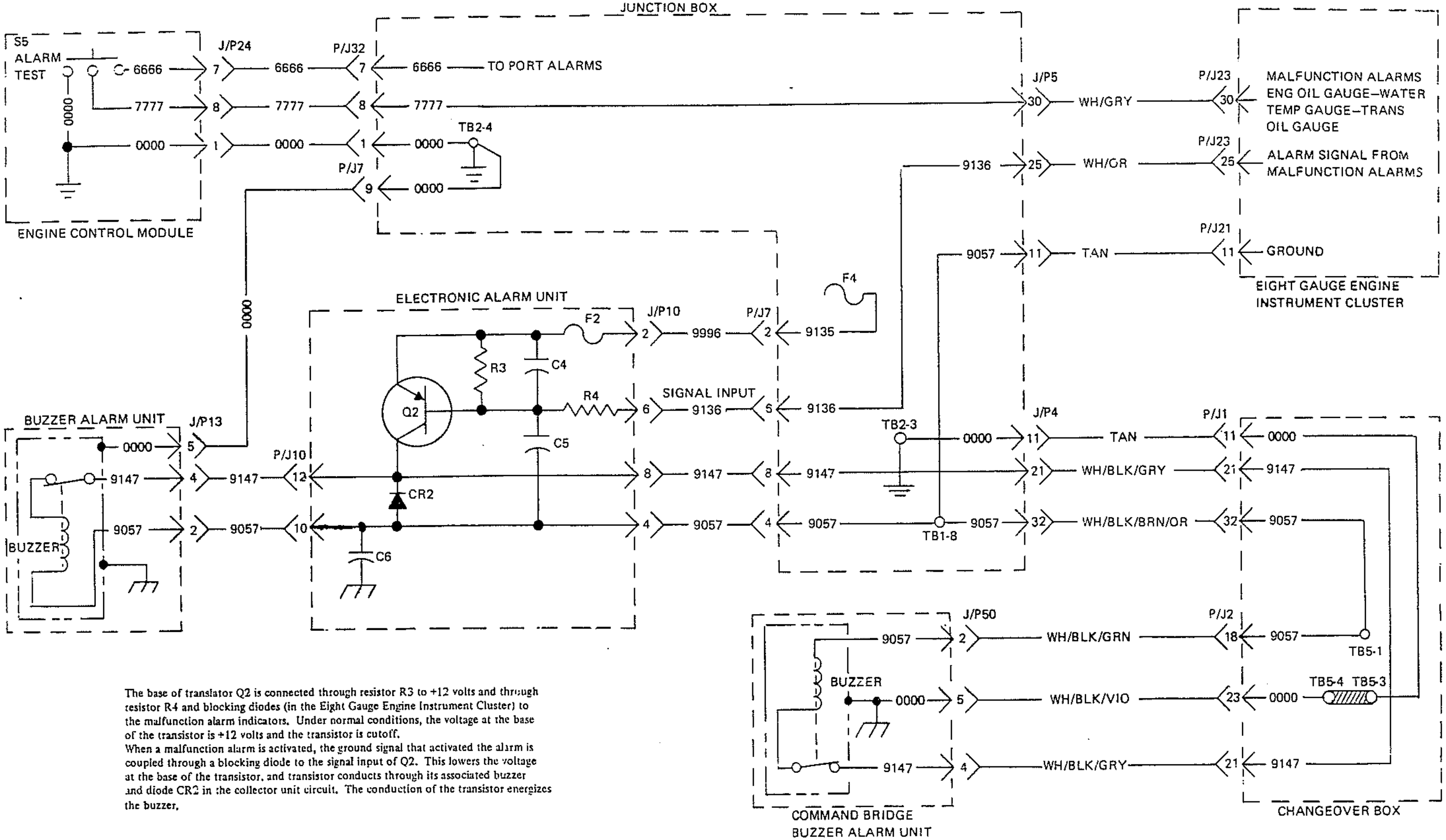
Figure 20. Starboard Engine Transmission Oil Pressure Indicator Circuits, With Command Bridge® Option



The base of transistor Q1 is connected through resistor R1 to +12 volts and through resistor R2 and blocking diodes (in the Eight Gauge Engine Instrument Cluster) to the malfunction alarm indicators. Under normal conditions, the voltage at the base of the transistor is +12 volts and the transistor is cutoff.

When a malfunction alarm is activated, the ground signal that activated the alarm is coupled through a blocking diode to the signal input of Q1. This lowers the voltage at the base of the transistor, and transistor conducts through its associated buzzer and diode CR1 in the collector unit circuit. The conduction of the transistor energizes the buzzer.

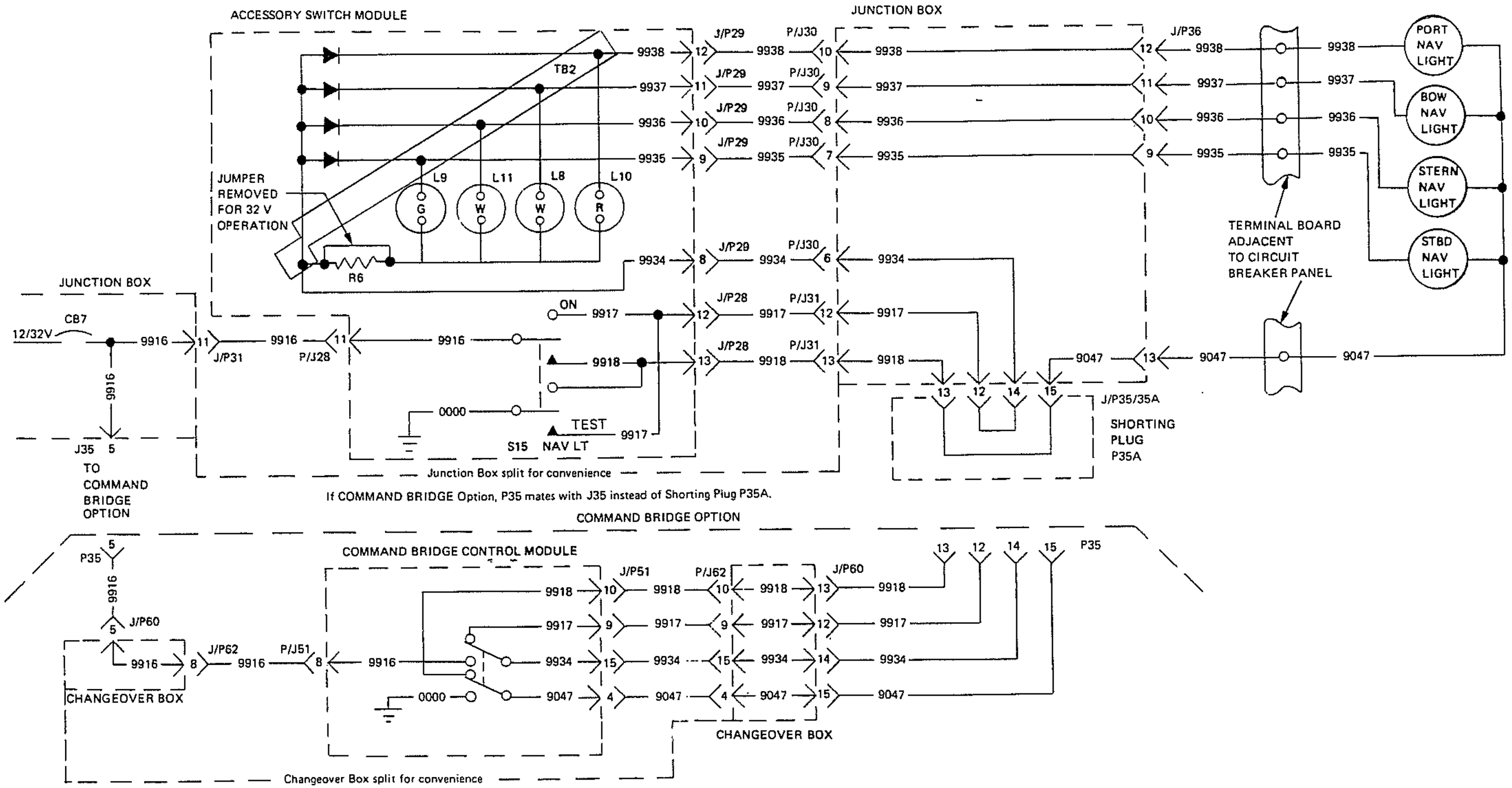
Figure 21. Port Engine Malfunction Indicators Circuit, With Command Bridge® Option



The base of translator Q2 is connected through resistor R3 to +12 volts and through resistor R4 and blocking diodes (in the Eight Gauge Engine Instrument Cluster) to the malfunction alarm indicators. Under normal conditions, the voltage at the base of the transistor is +12 volts and the transistor is cutoff.

When a malfunction alarm is activated, the ground signal that activated the alarm is coupled through a blocking diode to the signal input of Q2. This lowers the voltage at the base of the transistor, and transistor conducts through its associated buzzer and diode CR2 in the collector unit circuit. The conduction of the transistor energizes the buzzer.

Figure 22. Starboard Engine Malfunction Indicators Circuit, With Command Bridge® Option



With S15 (or S31 if COMMAND BRIDGE Option) on, the Navigation Lights are on. The voltage at the anodes of the diodes is positive and the indicator lights are shorted. With S15 in the TEST position (S15 must be off if COMMAND BRIDGE Option), the voltage at the cathodes of the diodes is positive. The indicator lights have a higher resistance than the Navigation Lights and are illuminated but current through the Navigation Lights is not great enough to cause them to illuminate.

Figure 23. Navigation Lights Circuit, Luxury Accessory Switch Module

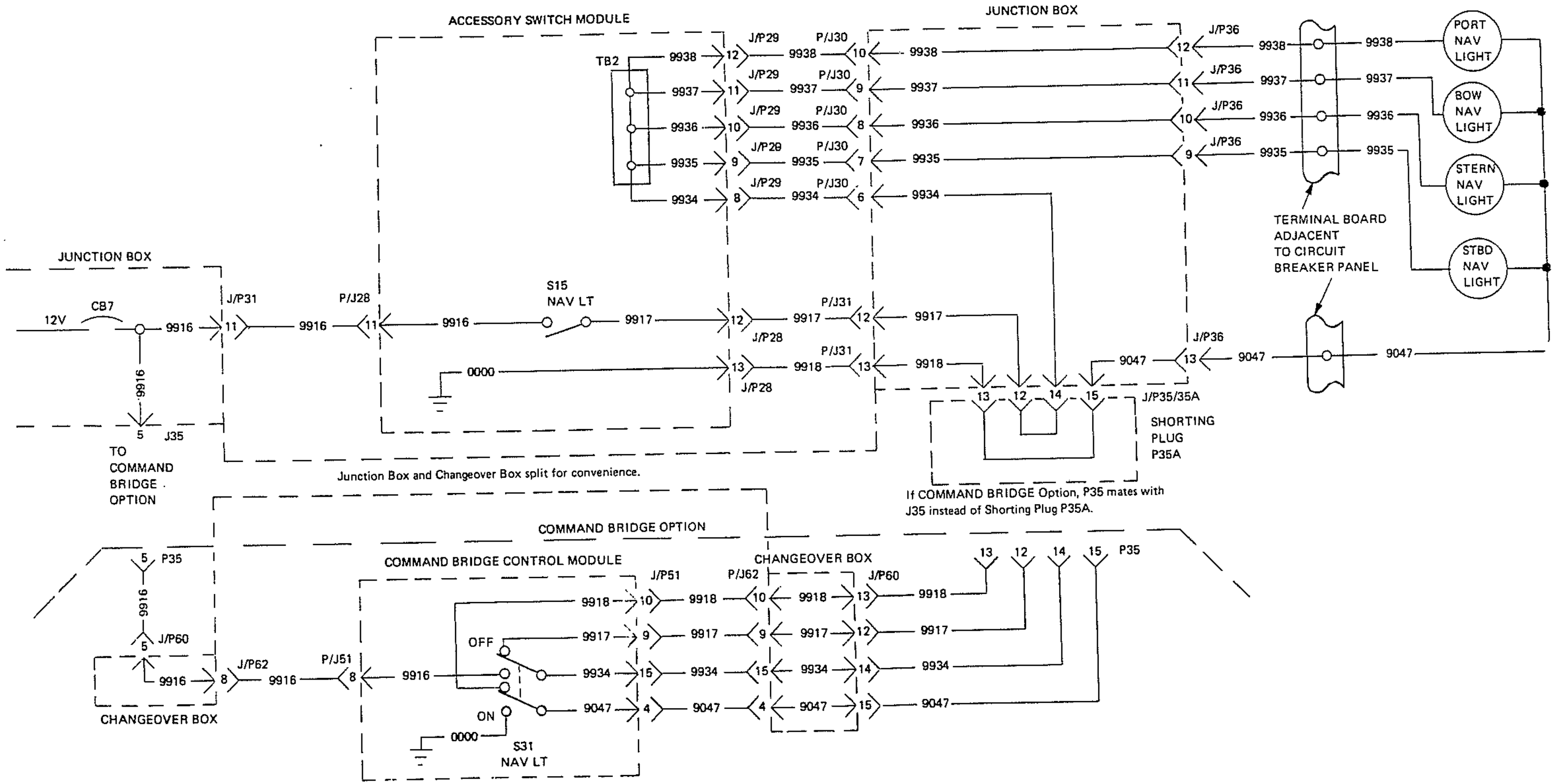
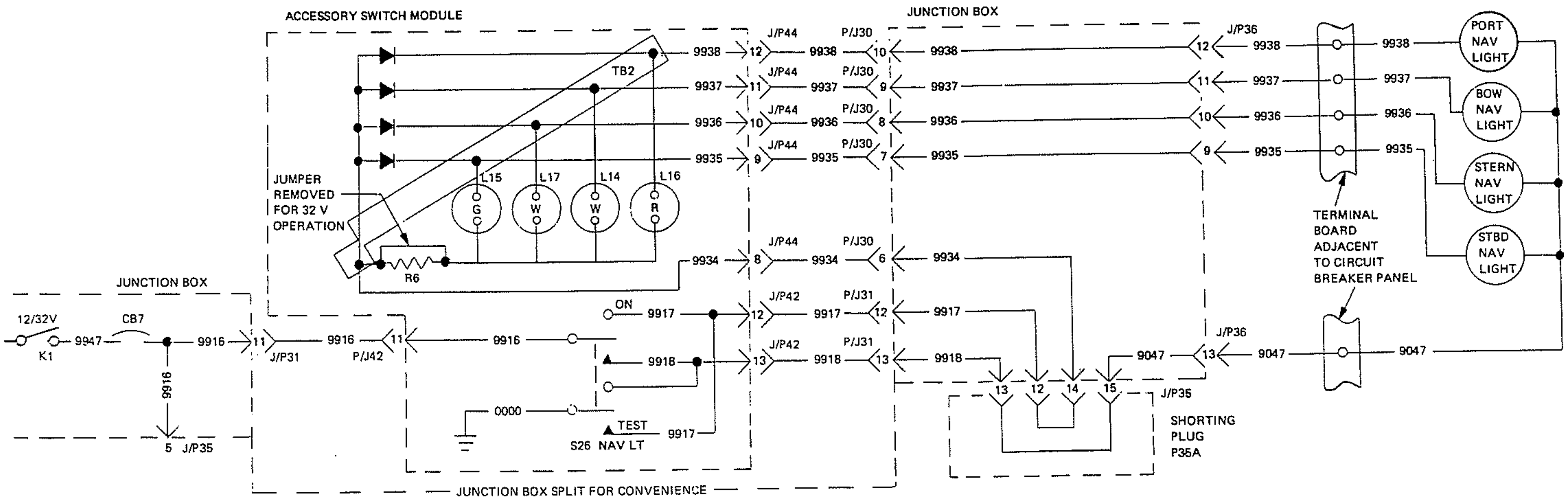
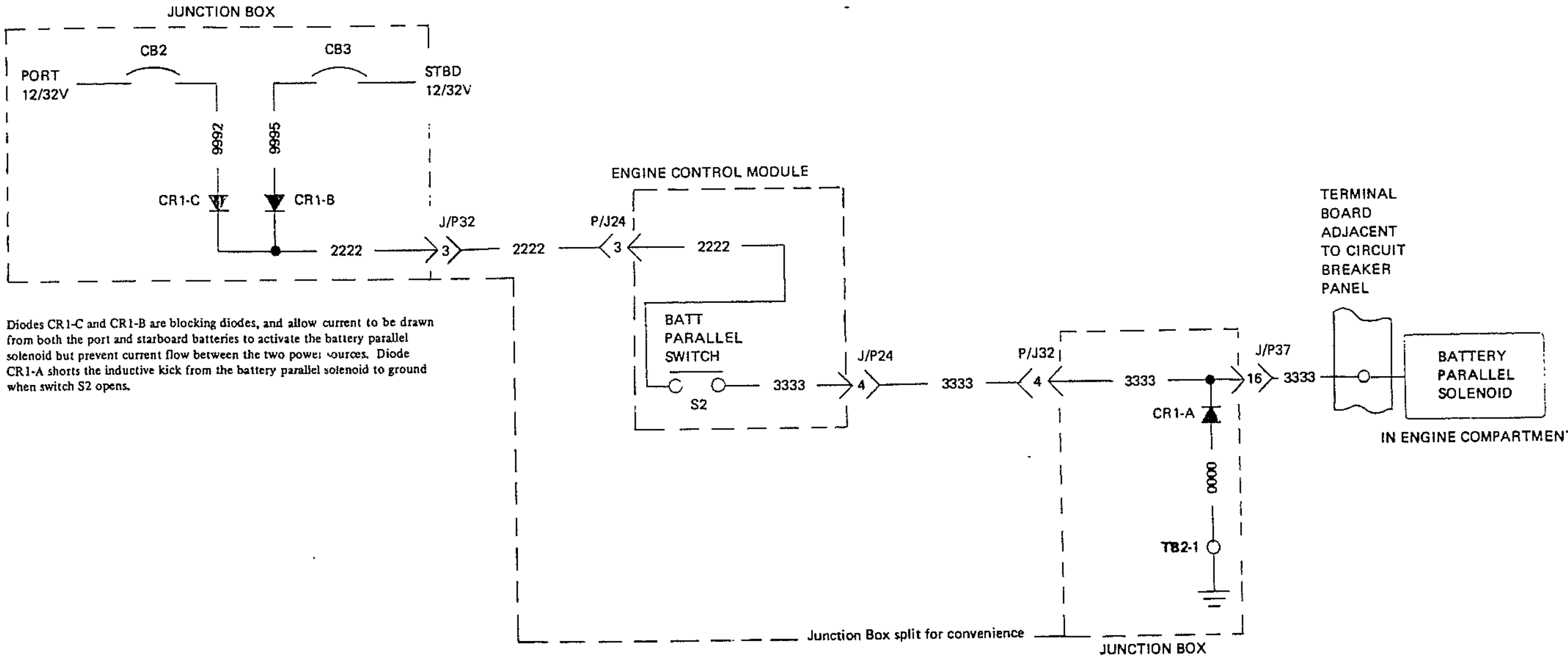


Figure 24. Navigation Lights Circuit, Standard Accessory Switch Module



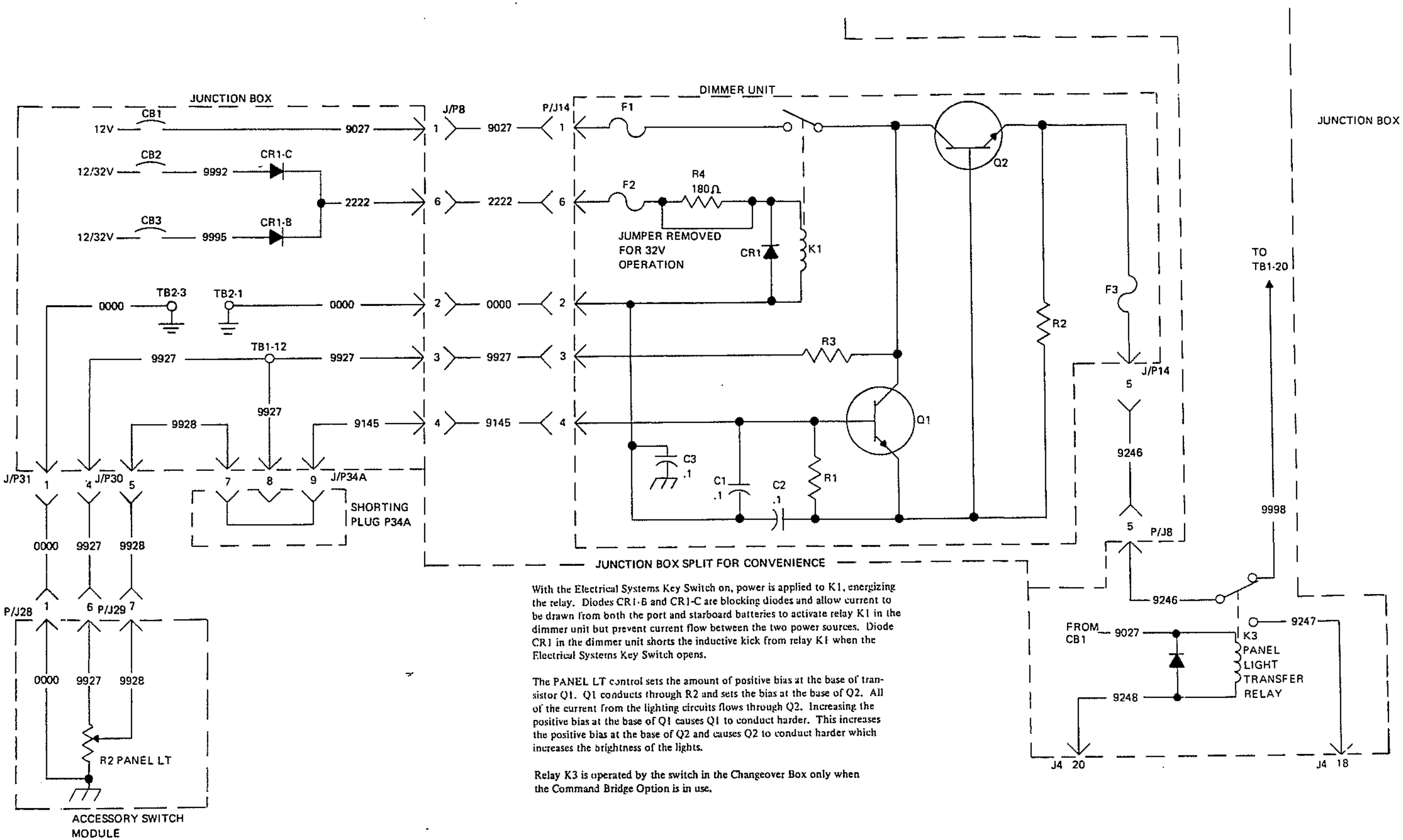
With S26 on, the Navigation Lights are on. The voltage at the anodes of the diodes is positive and the indicator lights are shorted. With S26 in the TEST position the voltage at the cathodes of the diodes is positive. The indicator lights have a higher resistance than the Navigation Lights and are illuminated but current through the Navigation Lights is not great enough to cause them to illuminate.

Figure 25. Navigation Lights Circuit, Tournament Fisherman



Diodes CR1-C and CR1-B are blocking diodes, and allow current to be drawn from both the port and starboard batteries to activate the battery parallel solenoid but prevent current flow between the two power sources. Diode CR1-A shorts the inductive kick from the battery parallel solenoid to ground when switch S2 opens.

Figure 26. Battery Parallel Switch Circuit



With the Electrical Systems Key Switch on, power is applied to K1, energizing the relay. Diodes CR1-B and CR1-C are blocking diodes and allow current to be drawn from both the port and starboard batteries to activate relay K1 in the dimmer unit but prevent current flow between the two power sources. Diode CR1 in the dimmer unit shorts the inductive kick from relay K1 when the Electrical Systems Key Switch opens.

The PANEL LT control sets the amount of positive bias at the base of transistor Q1. Q1 conducts through R2 and sets the bias at the base of Q2. All of the current from the lighting circuits flows through Q2. Increasing the positive bias at the base of Q1 causes Q1 to conduct harder. This increases the positive bias at the base of Q2 and causes Q2 to conduct harder which increases the brightness of the lights.

Relay K3 is operated by the switch in the Changeover Box only when the Command Bridge Option is in use.

Figure 27. Panel Light Control Circuit, Standard and Luxury Accessory Switch Modules, Without Command Bridge® Option (Sheet 1 of 2)

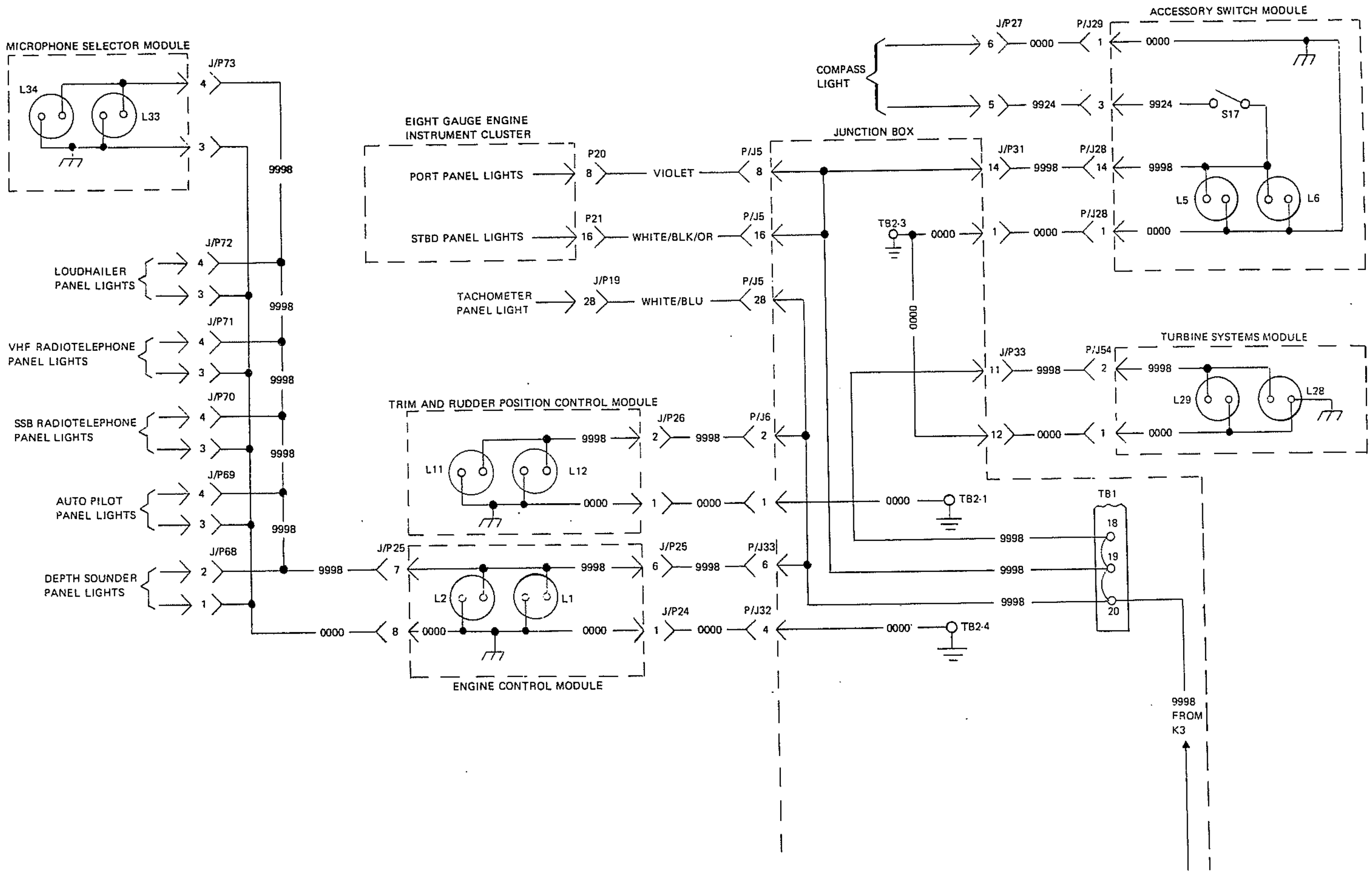


Figure 27. Panel Light Control Circuit, Standard and Luxury Accessory Switch Modules, Without Command Bridge® Option (Sheet 2 of 2)

With the Electrical Systems Key Switch on, power is applied to K1, energizing the relay. Diodes CR1-B and CR1-C are blocking diodes and allow current to be drawn from both the port and starboard batteries to activate relay K1 in the dimmer unit but prevent current flow between the two power sources. Diode CR1 in the dimmer unit shorts the inductive kick from relay K1 when the Electrical Systems Key Switch opens.

The PANEL LT control (R2 or R8) selected by switch 37H sets the amount of positive bias at the base of transistor Q1. Q1 conducts through the selected PANEL LT control and sets the bias at the base of Q2. All of the current from the lighting circuits flows through Q2. Increasing the positive bias at the base of Q1 causes Q1 to conduct harder. This increases the positive bias at the base of Q2 and causes Q2 to conduct harder which increases the brightness of the lights.

Relay K3 is energized by S37I when the switch is set to REMOTE.

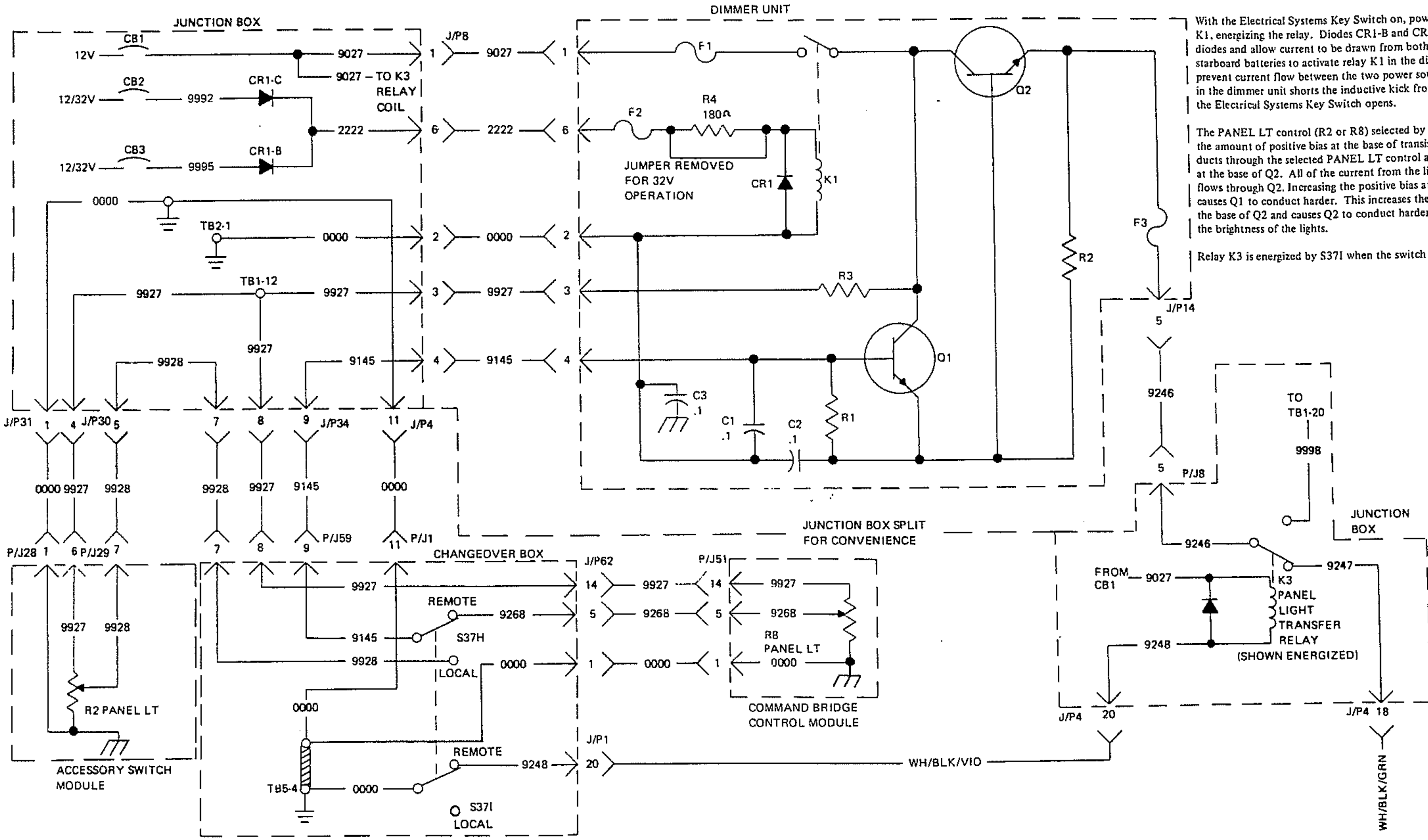


Figure 28. Panel Light Control Circuit, Standard and Luxury Accessory Switch Modules, With Command Bridge® Option (Sheet 1 of 2)

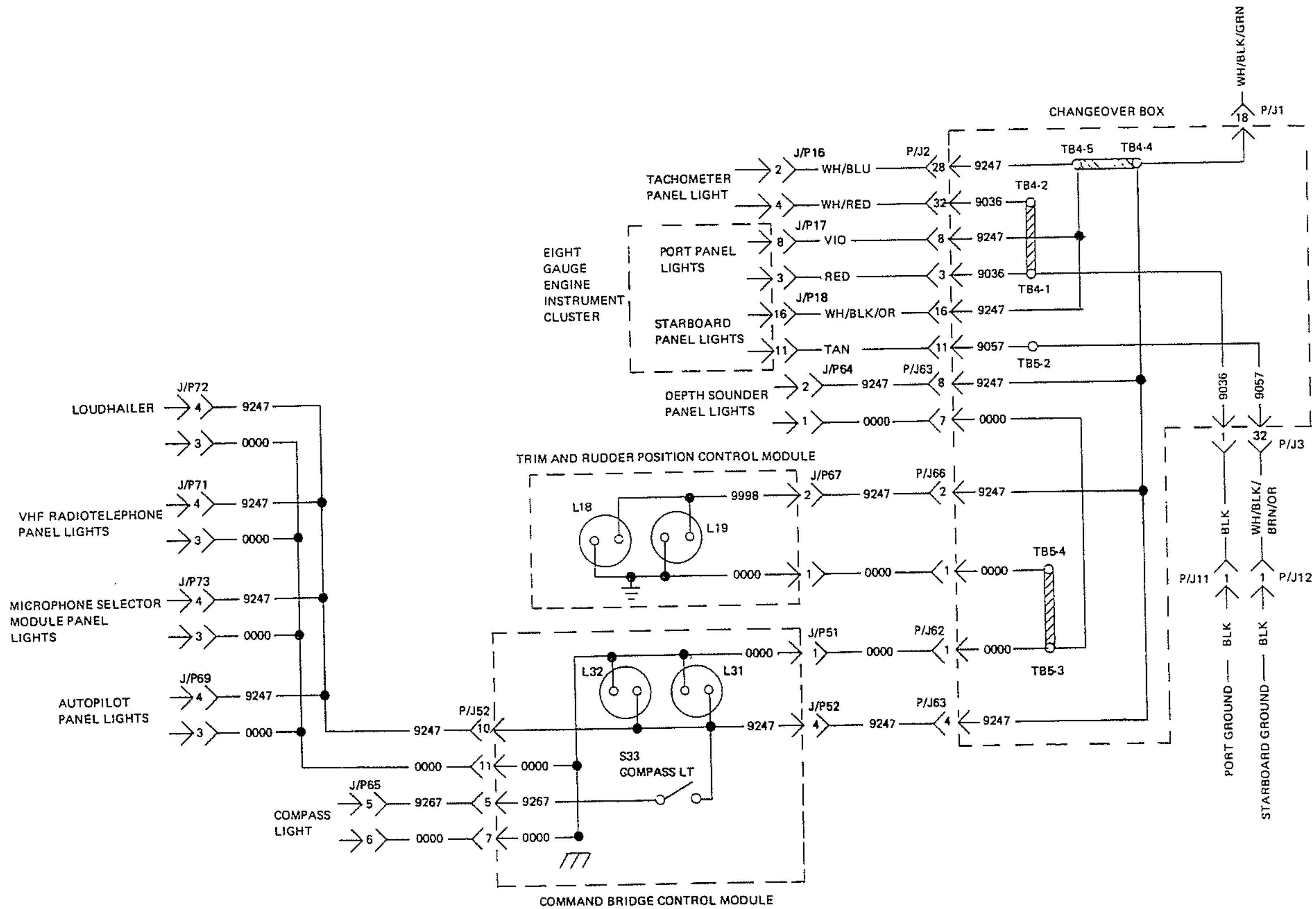
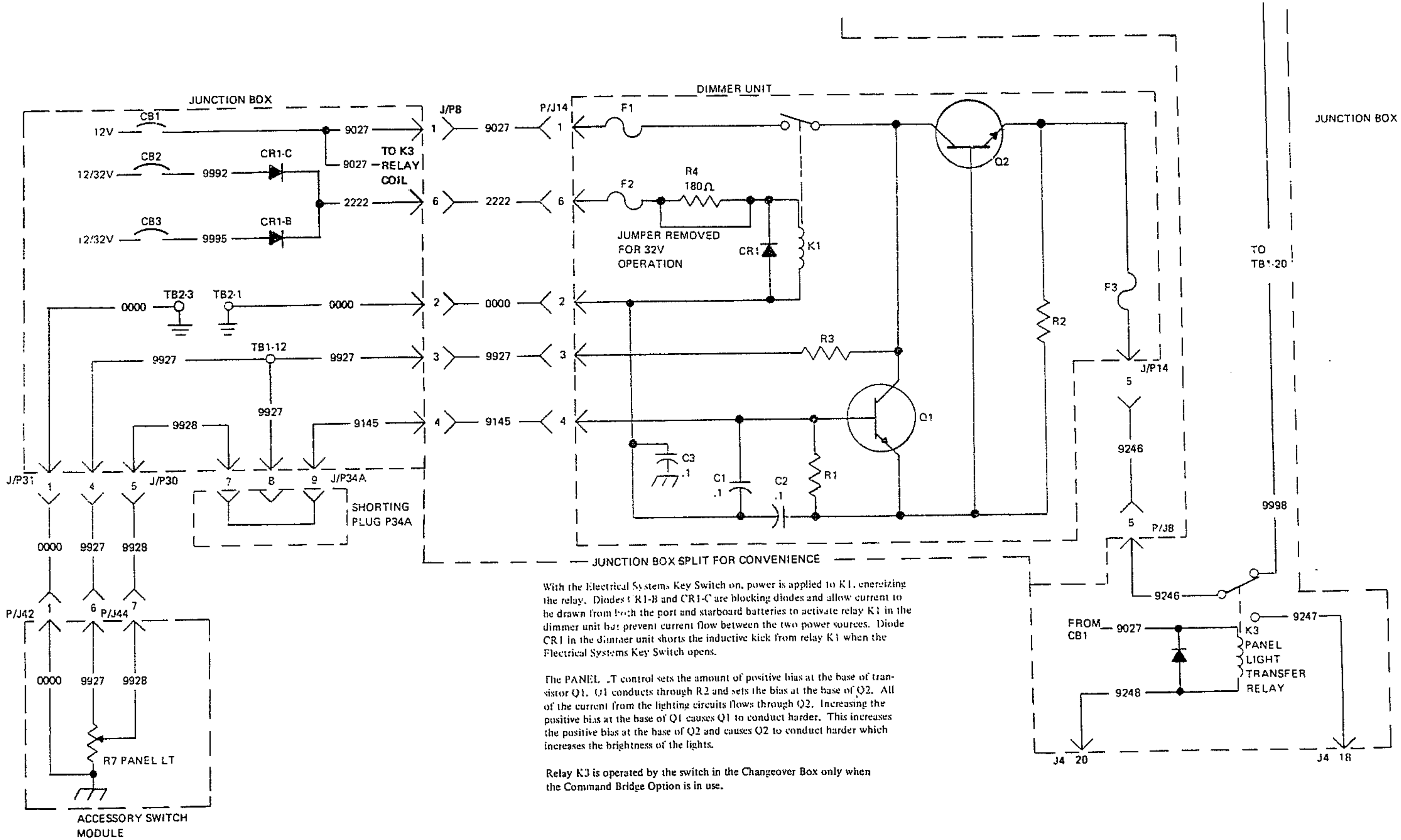


Figure 28. Panel Light Control Circuit, Standard and Luxury Accessory Switch Modules, With Command Bridge® Option (Sheet 2 of 2)



With the Electrical Systems Key Switch on, power is applied to K1, energizing the relay. Diodes CR1-B and CR1-C are blocking diodes and allow current to be drawn from both the port and starboard batteries to activate relay K1 in the dimmer unit but prevent current flow between the two power sources. Diode CR1 in the dimmer unit shorts the inductive kick from relay K1 when the Electrical Systems Key Switch opens.

The PANEL LT control sets the amount of positive bias at the base of transistor Q1. Q1 conducts through R2 and sets the bias at the base of Q2. All of the current from the lighting circuits flows through Q2. Increasing the positive bias at the base of Q1 causes Q1 to conduct harder. This increases the positive bias at the base of Q2 and causes Q2 to conduct harder which increases the brightness of the lights.

Relay K3 is operated by the switch in the Changeover Box only when the Command Bridge Option is in use.

Figure 29. Panel Light Control Circuit, Tournament Fisherman (Sheet 1 of 2)

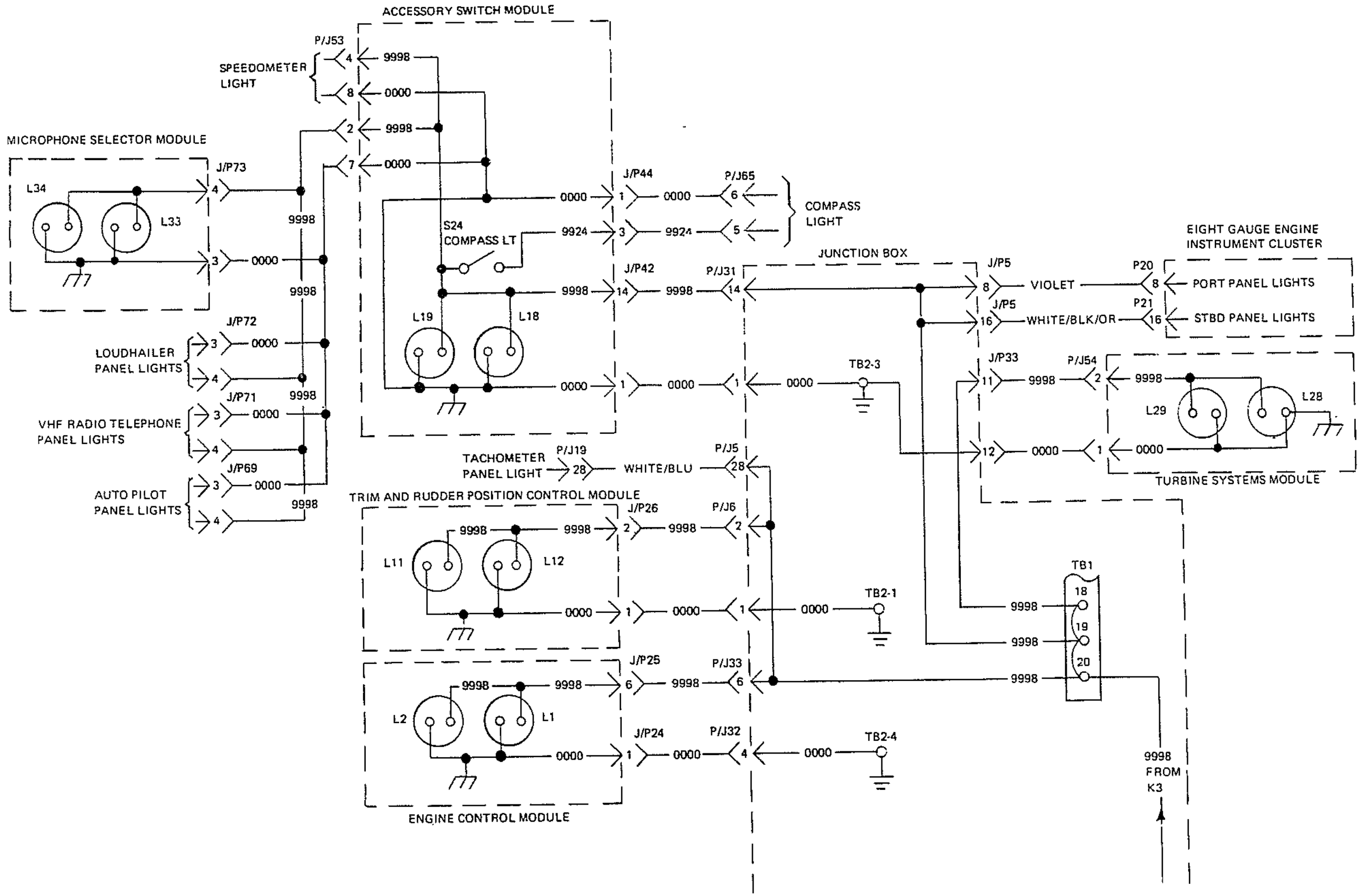
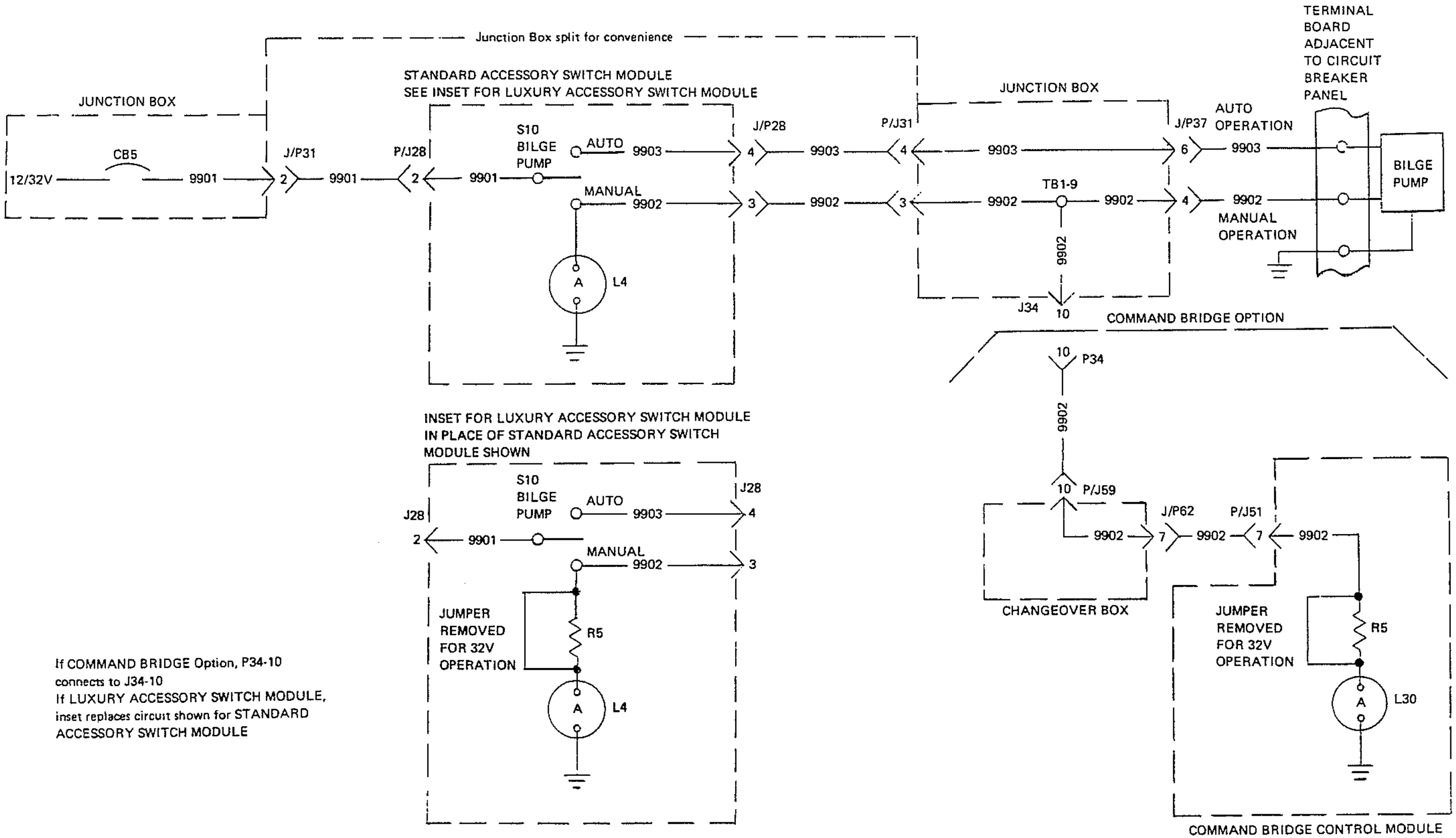


Figure 29. Panel Light Control Circuit, Tournament Fisherman (Sheet 2 of 2)



If COMMAND BRIDGE Option, P34-10 connects to J34-10
If LUXURY ACCESSORY SWITCH MODULE, inset replaces circuit shown for STANDARD ACCESSORY SWITCH MODULE

Figure 30. Bilge Pump Circuit, Standard and Luxury Accessory Switch Modules

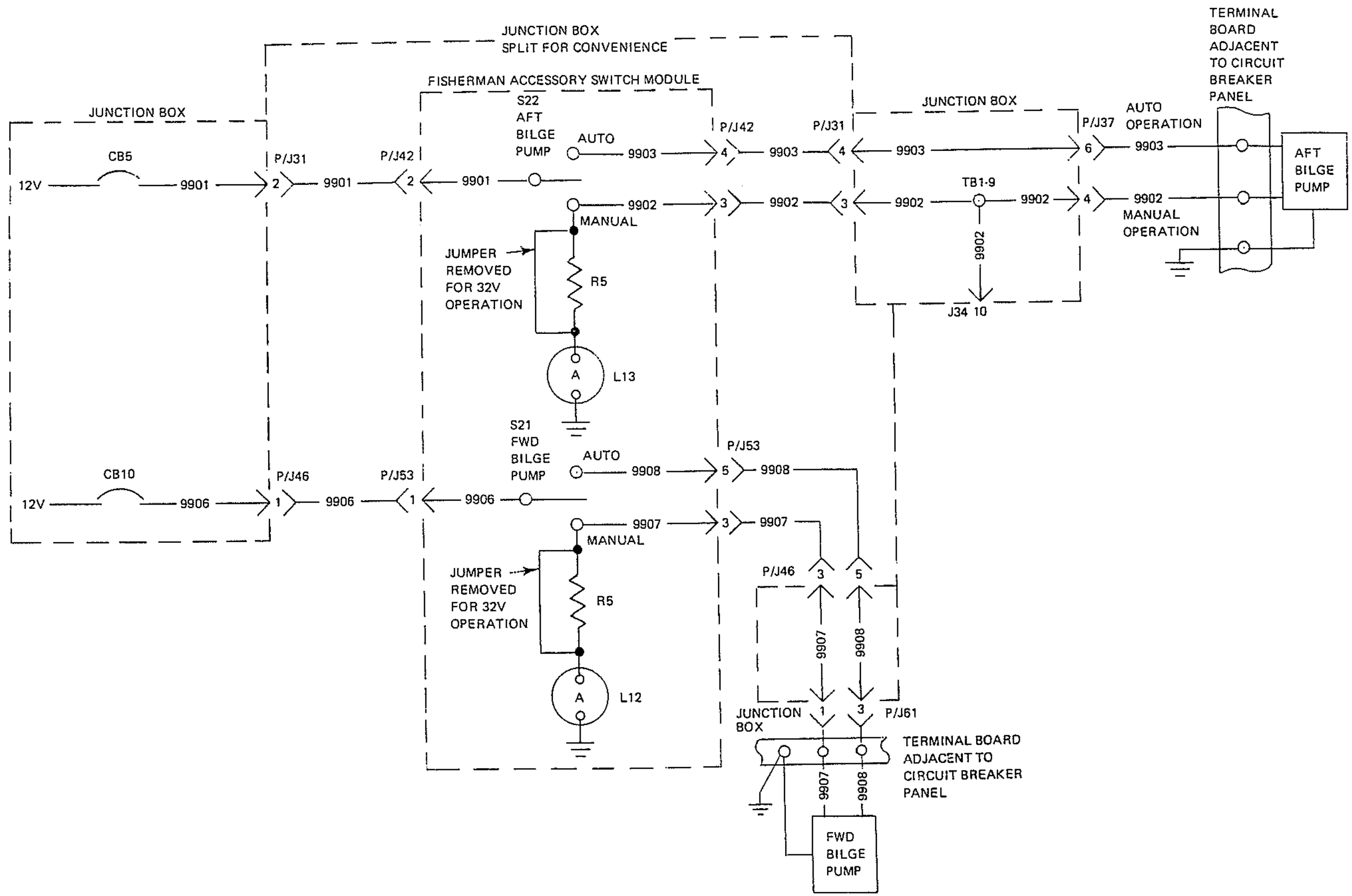
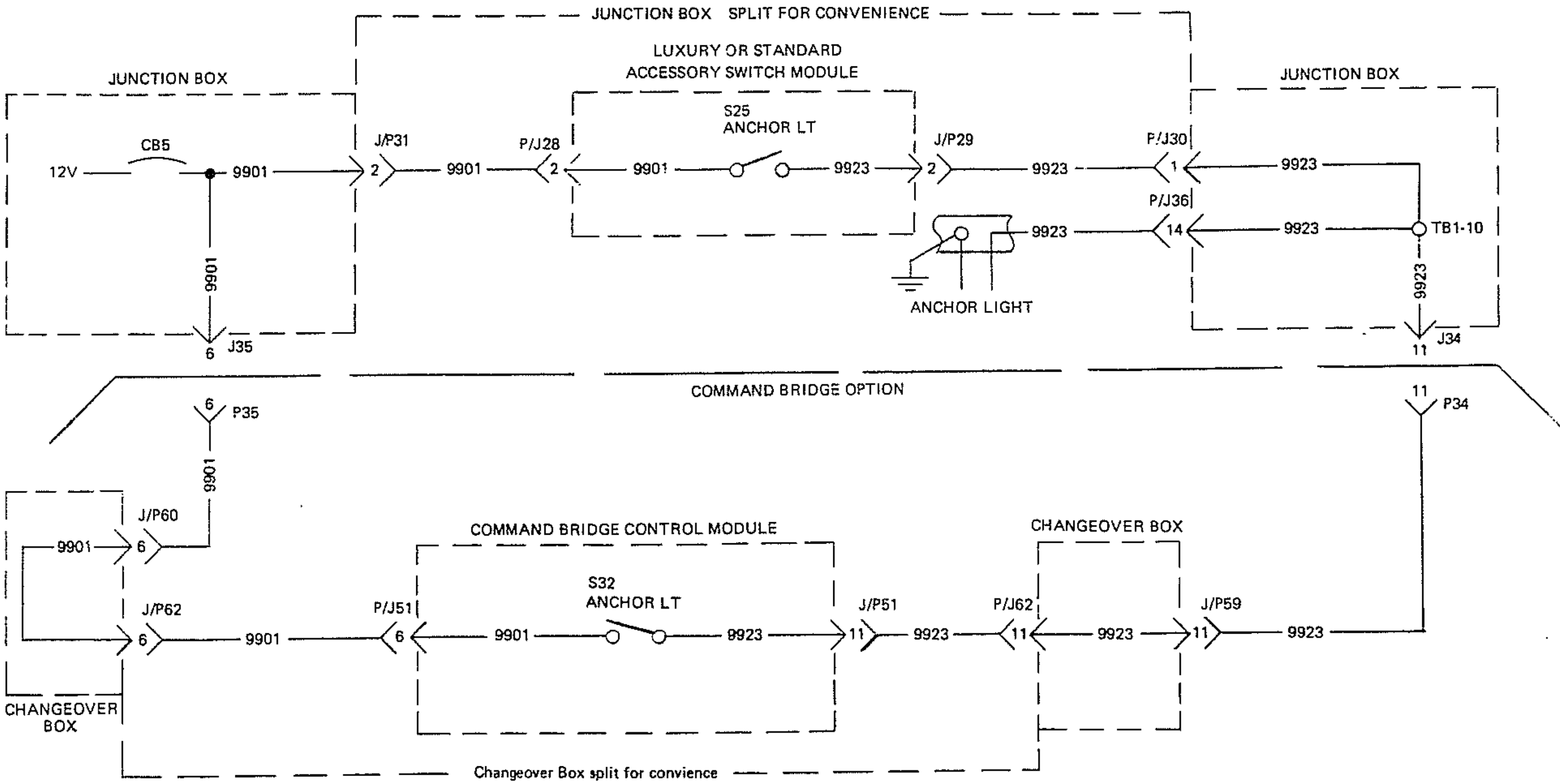


Figure 31. Bilge Pump Circuit, Tournament Fisherman



If COMMAND BRIDGE Option, P34-11 connects to J34-11 and P35-6 connects to J35-6

Figure 32. Anchor Light Circuit, Standard and Luxury Accessory Switch Modules

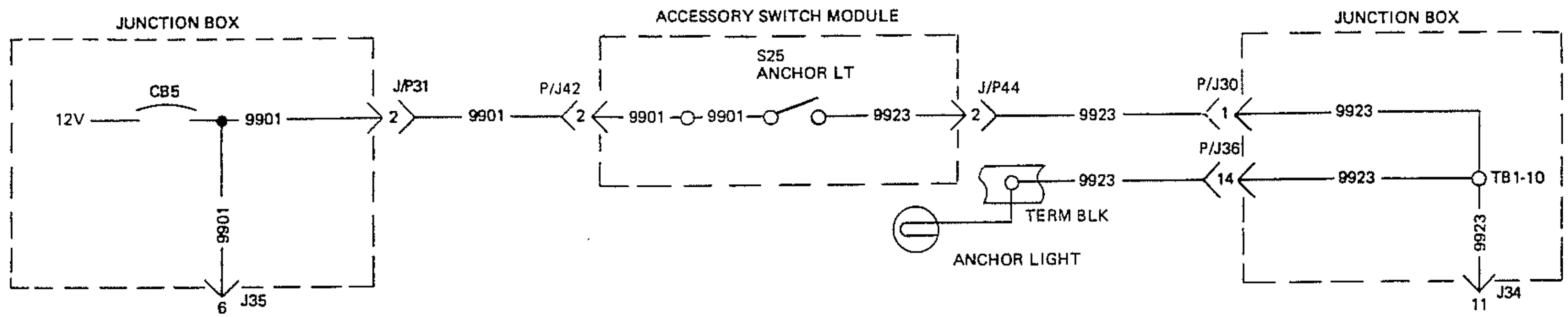
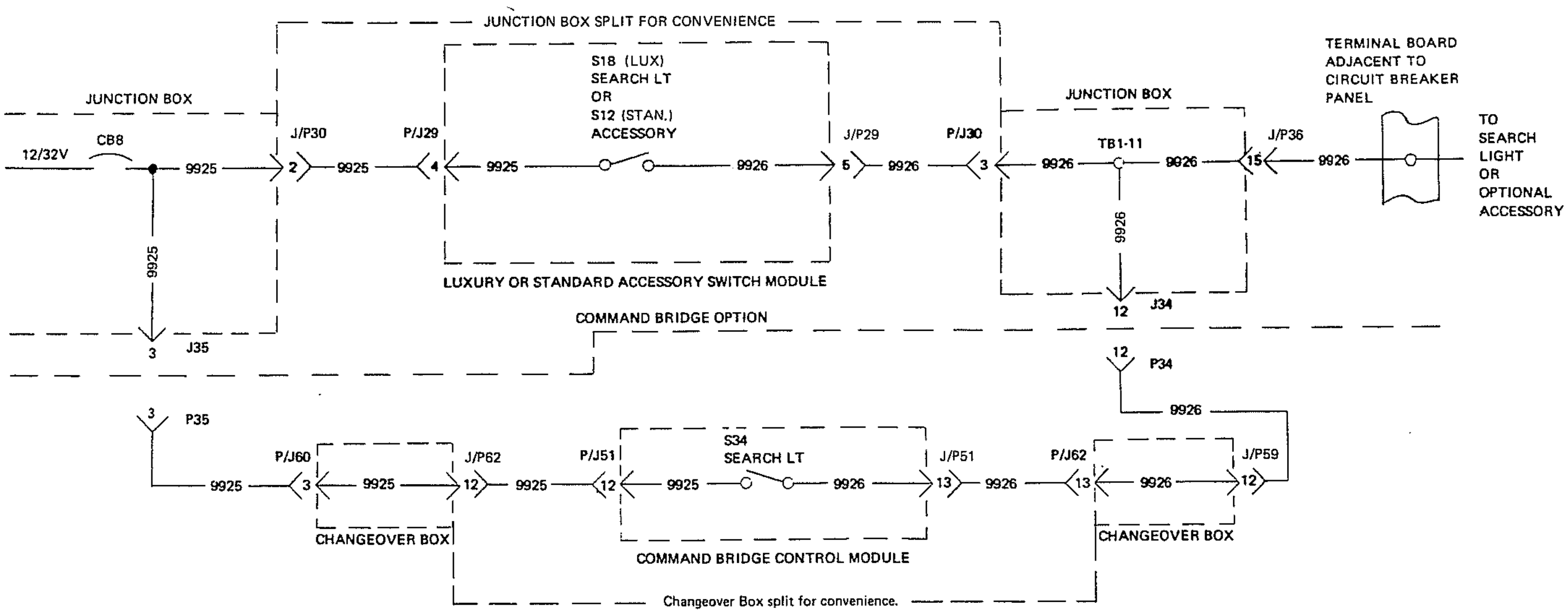


Figure 33. Anchor Light Circuit, Tournament Fisherman



If COMMAND BRIDGE Option, P35-3 connects to J35-3 and P34-12 connects to J34-12.

Figure 34. Searchlight Circuit, Luxury Accessory Switch Module; Optional Accessory, Standard Accessory Switch Module

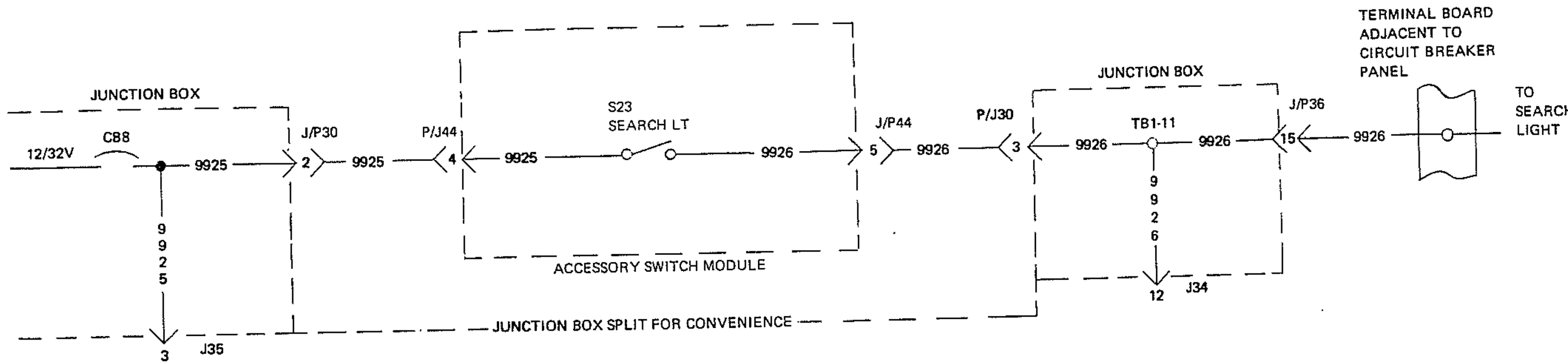


Figure 35. Searchlight Circuit, Tournament Fisherman

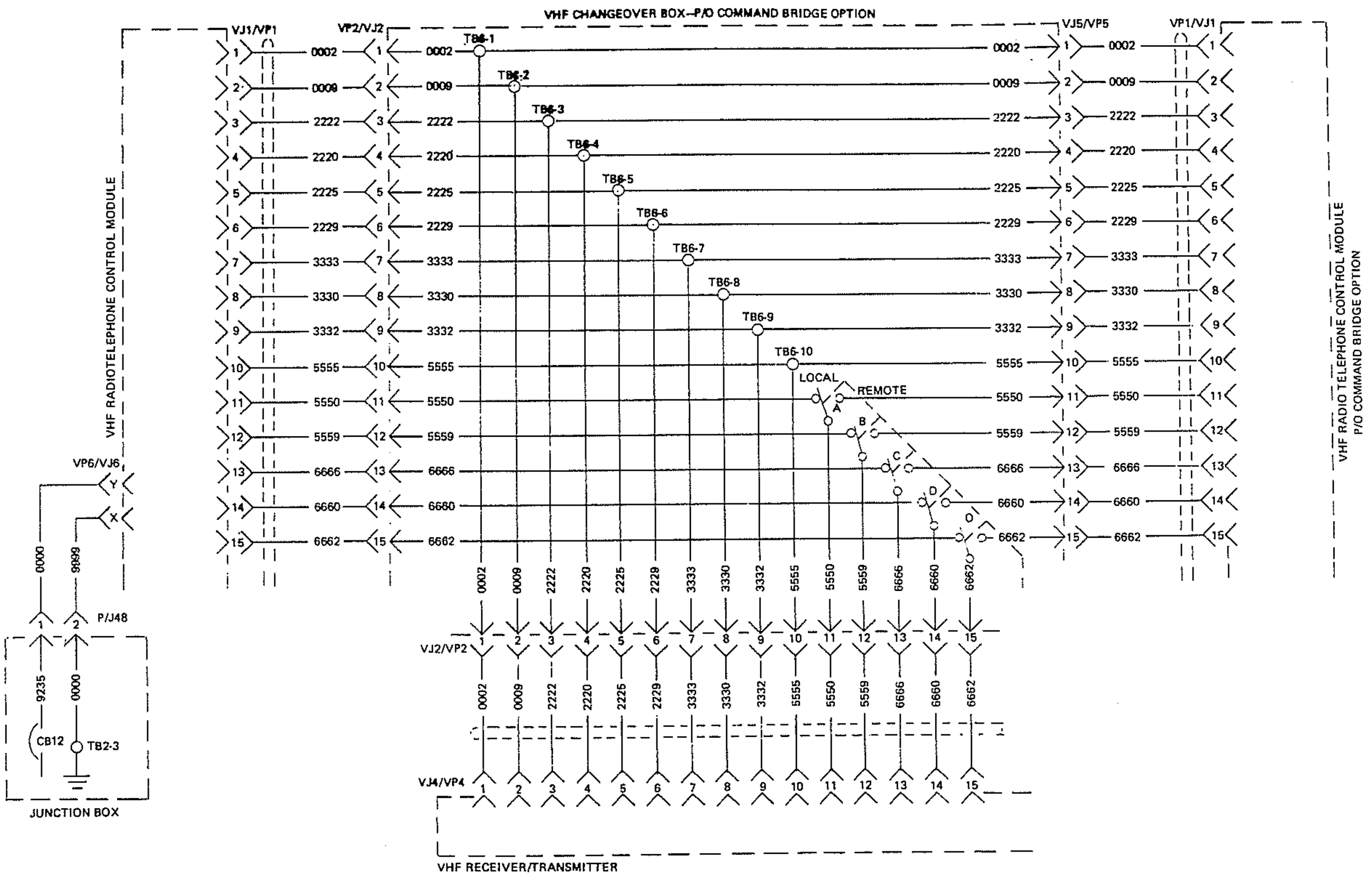


Figure 36. VHF System Interconnect Wiring, With Command Bridge® Option (Sheet 1 of 2)

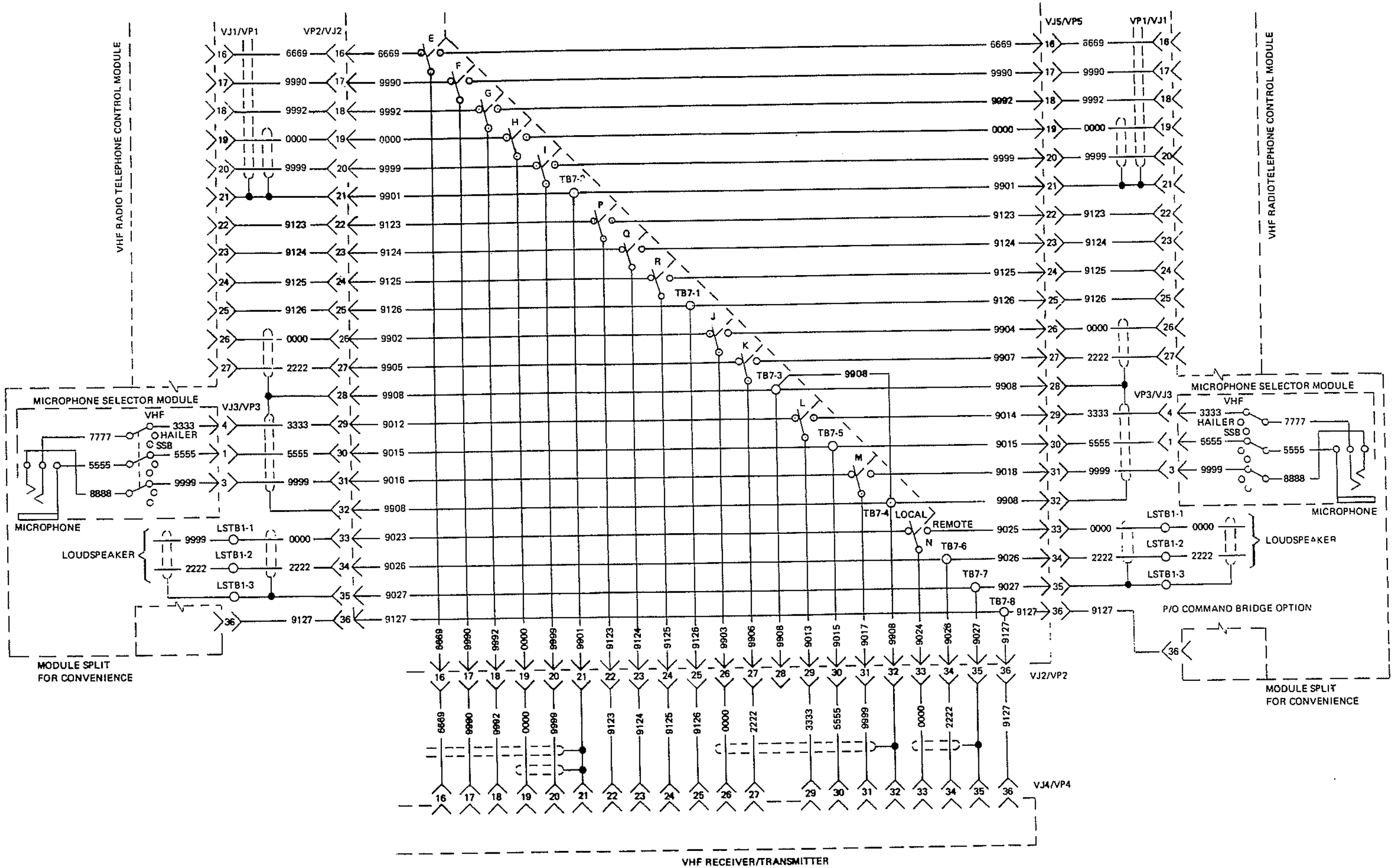


Figure 36. VHF System Interconnect Wiring, With Command Bridge® Option (Sheet 2 of 2)

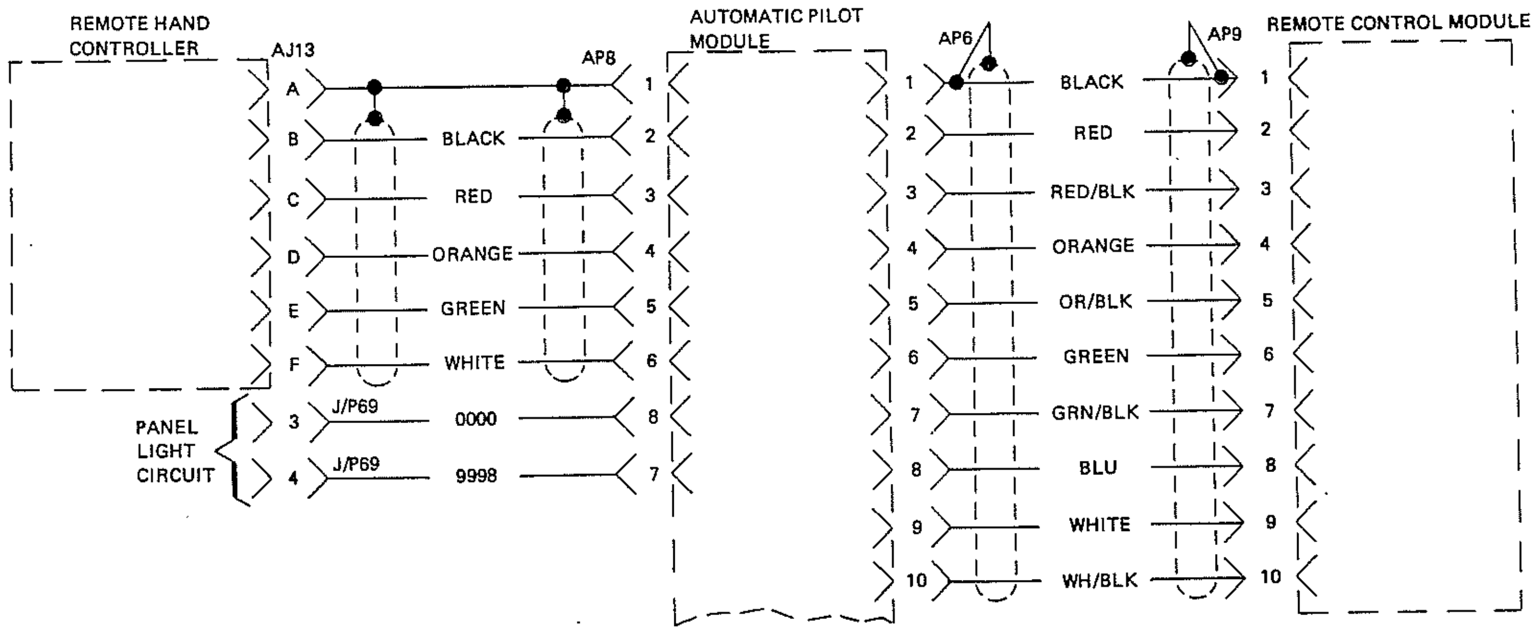


Figure 37. Automatic Pilot Interconnect Wiring (Sheet 1 of 2)

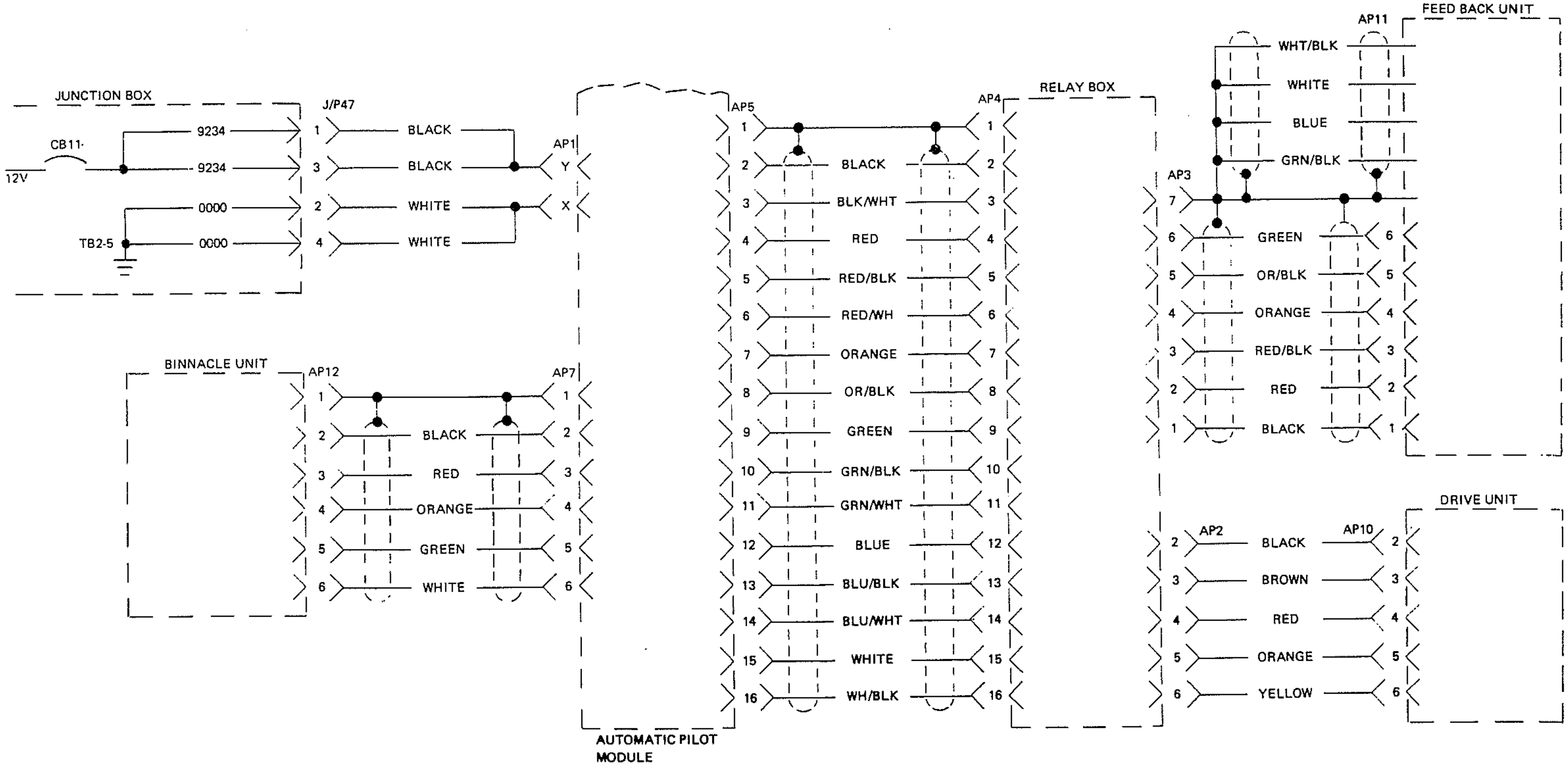
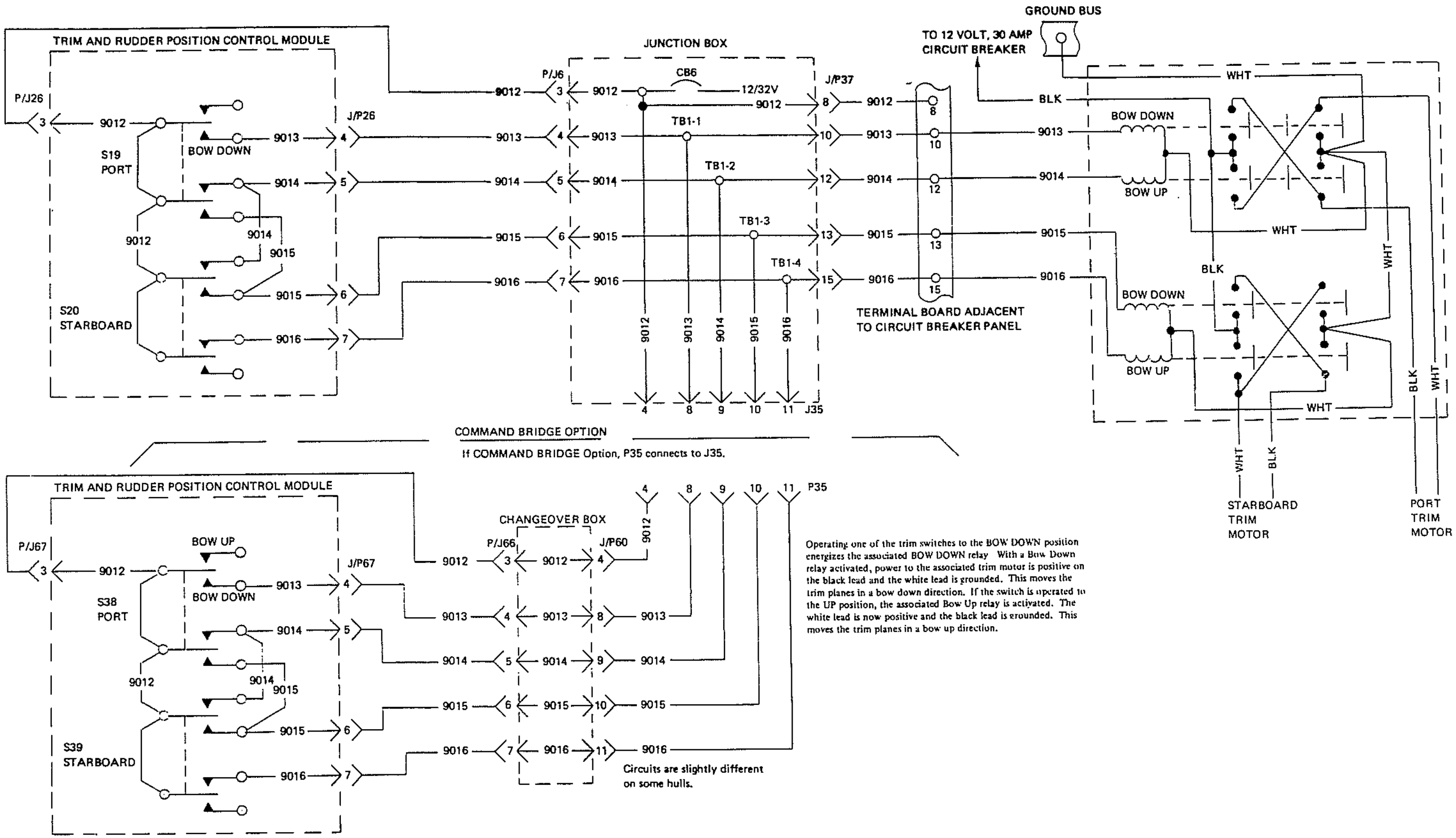
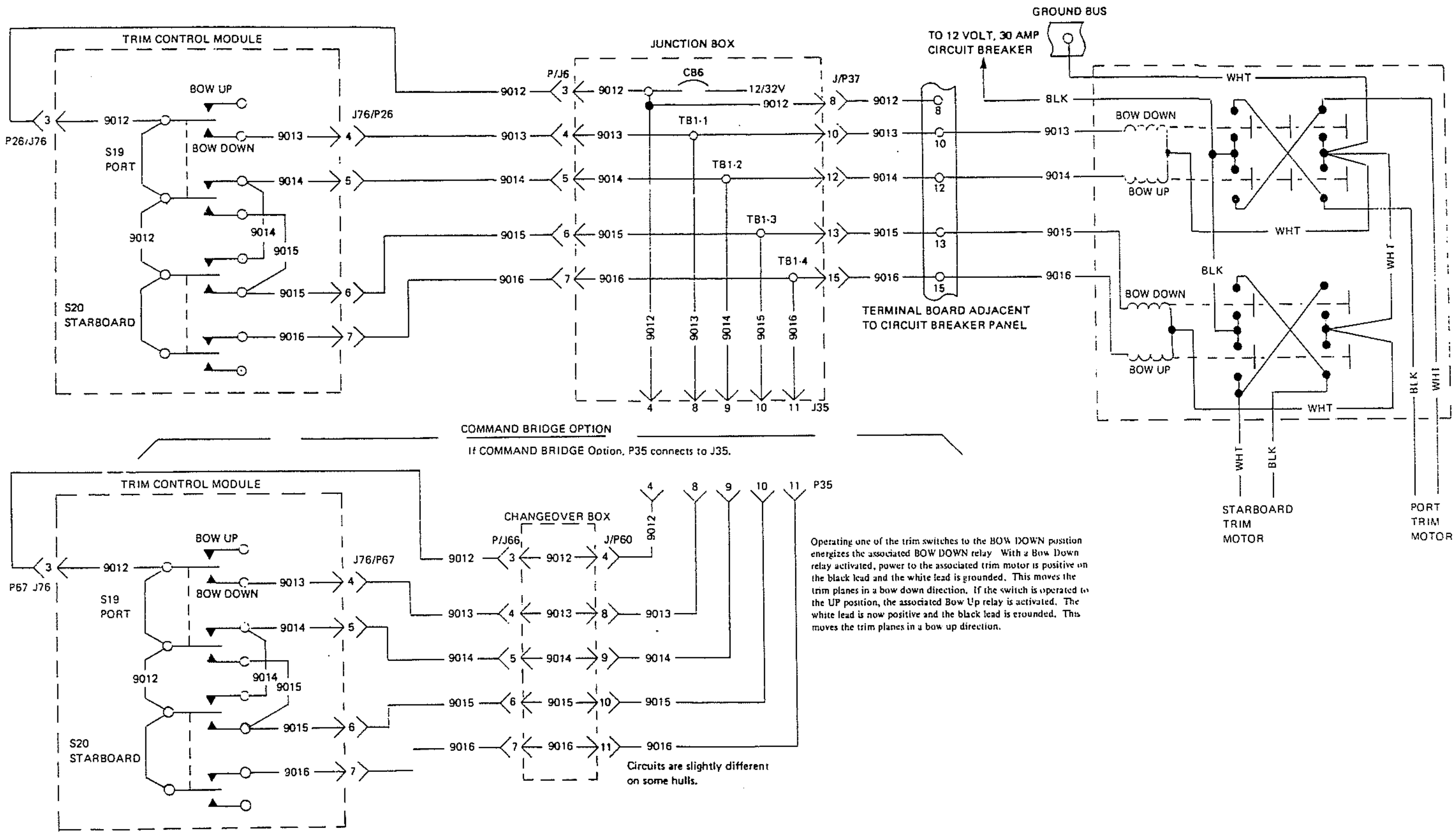


Figure 37. Automatic Pilot Interconnect Wiring (Sheet 2 of 2)



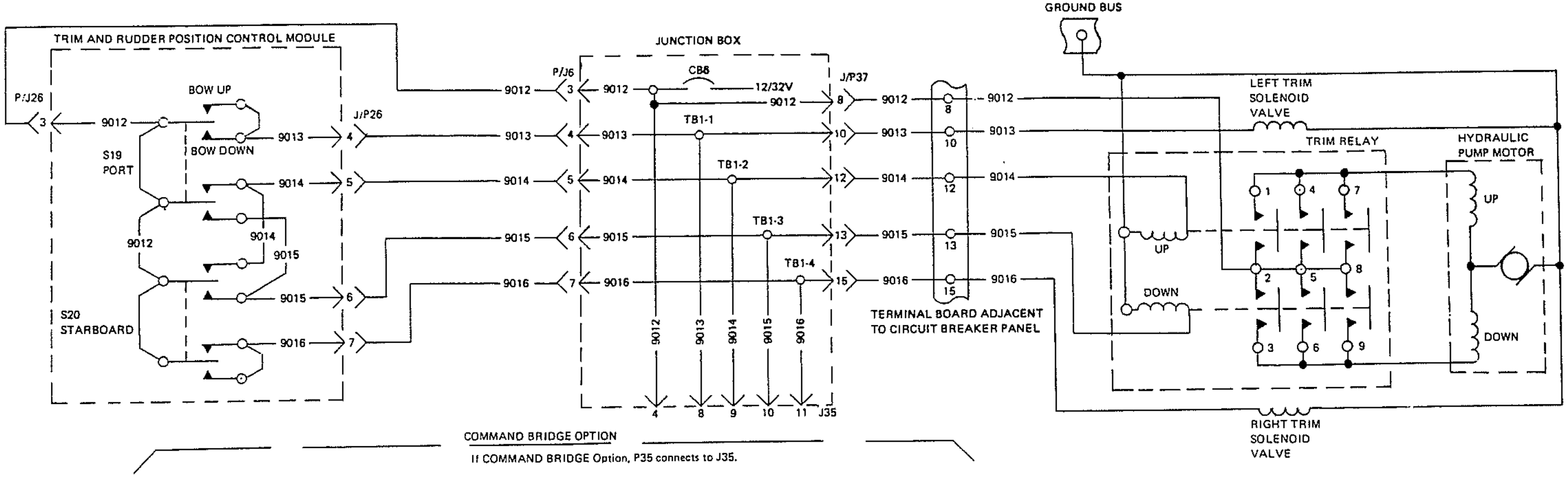
Operating one of the trim switches to the BOW DOWN position energizes the associated BOW DOWN relay With a Bow Down relay activated, power to the associated trim motor is positive on the black lead and the white lead is grounded. This moves the trim planes in a bow down direction. If the switch is operated to the UP position, the associated Bow Up relay is activated. The white lead is now positive and the black lead is grounded. This moves the trim planes in a bow up direction.

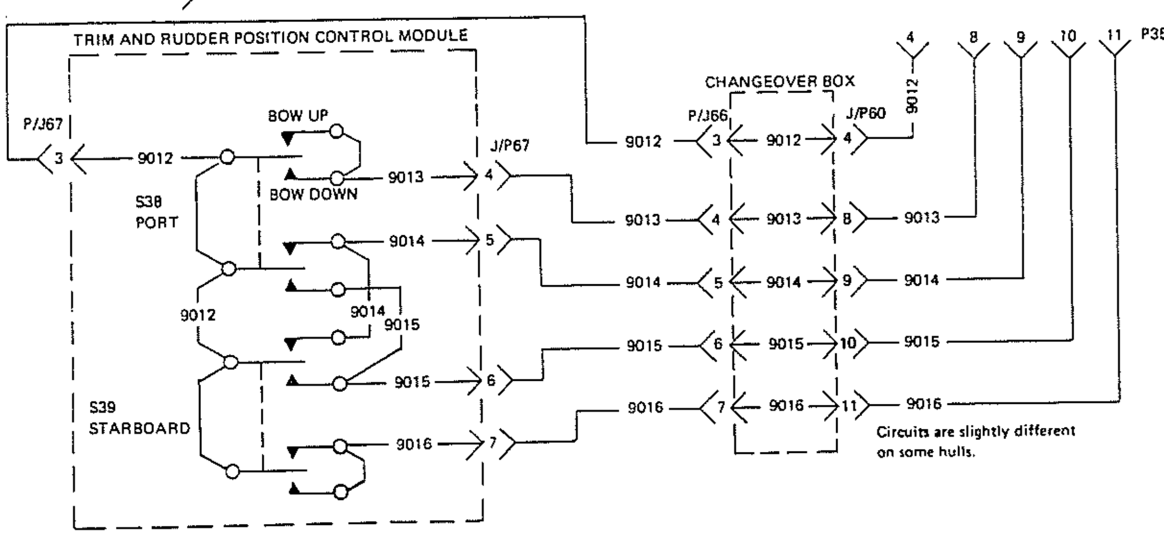
Figure 38. Trim Activating Circuits, Electro-Mechanically Driven Trim Planes, Trim and Rudder Position Control Module



Operating one of the trim switches to the BOW DOWN position energizes the associated BOW DOWN relay With a Bow Down relay activated, power to the associated trim motor is positive on the black lead and the white lead is grounded. This moves the trim planes in a bow down direction. If the switch is operated to the UP position, the associated Bow Up relay is activated. The white lead is now positive and the black lead is grounded. This moves the trim planes in a bow up direction.

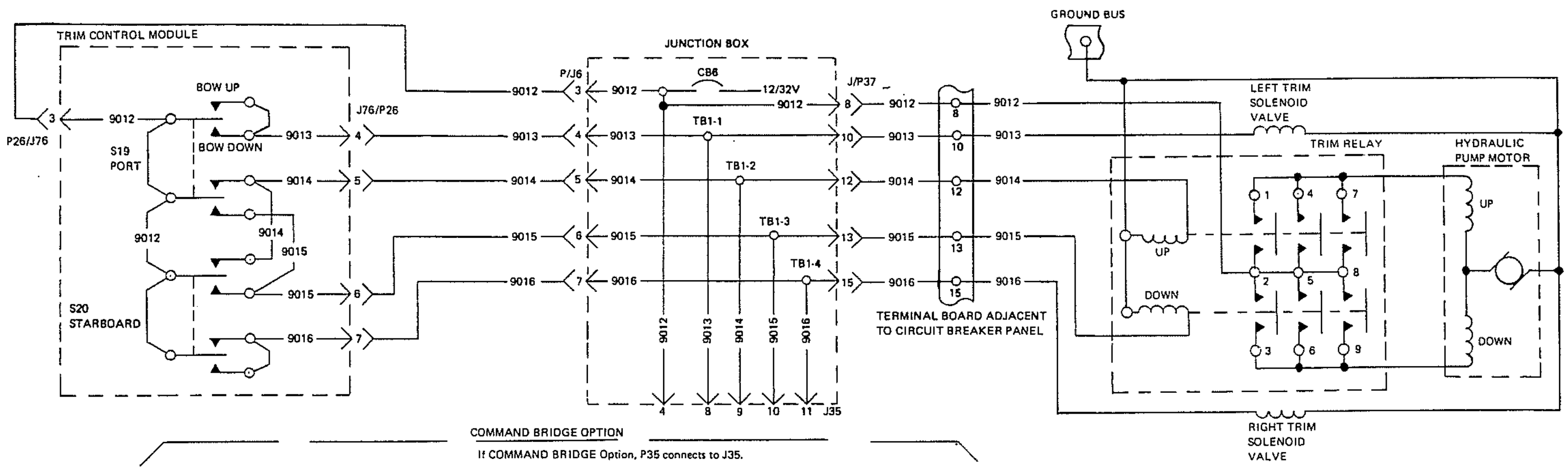
Figure 39. Trim Activating Circuits, Electro-Mechanically Driven Trim Planes, Trim Control Module

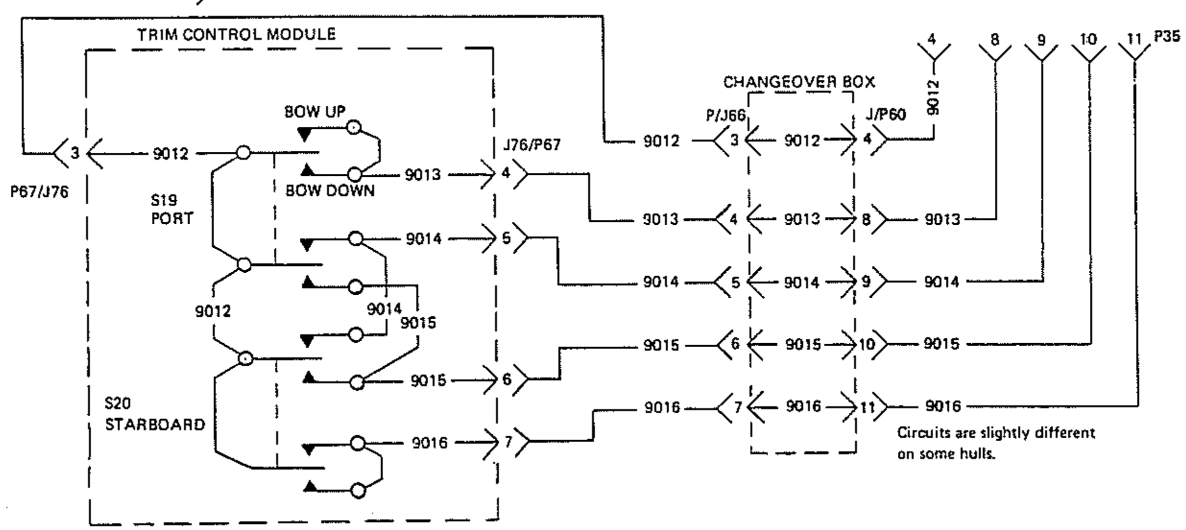




Operating one of the trim switches activates the associated solenoid valve. With a solenoid valve activated, the pump motor is hydraulically connected to the associated trim plane. Operating one of the trim switches to the BOW DOWN position energizes the down coil in the trim relay. Power is applied through the trim relay down contacts to the down field in the pump motor causing the trim planes to move in the bow down direction. If the switch is operated to the BOW UP position, the up coil in the trim relay is energized. Power is applied through the trim relay up contacts to the up field in the pump motor causing the trim planes to move in the bow up direction.

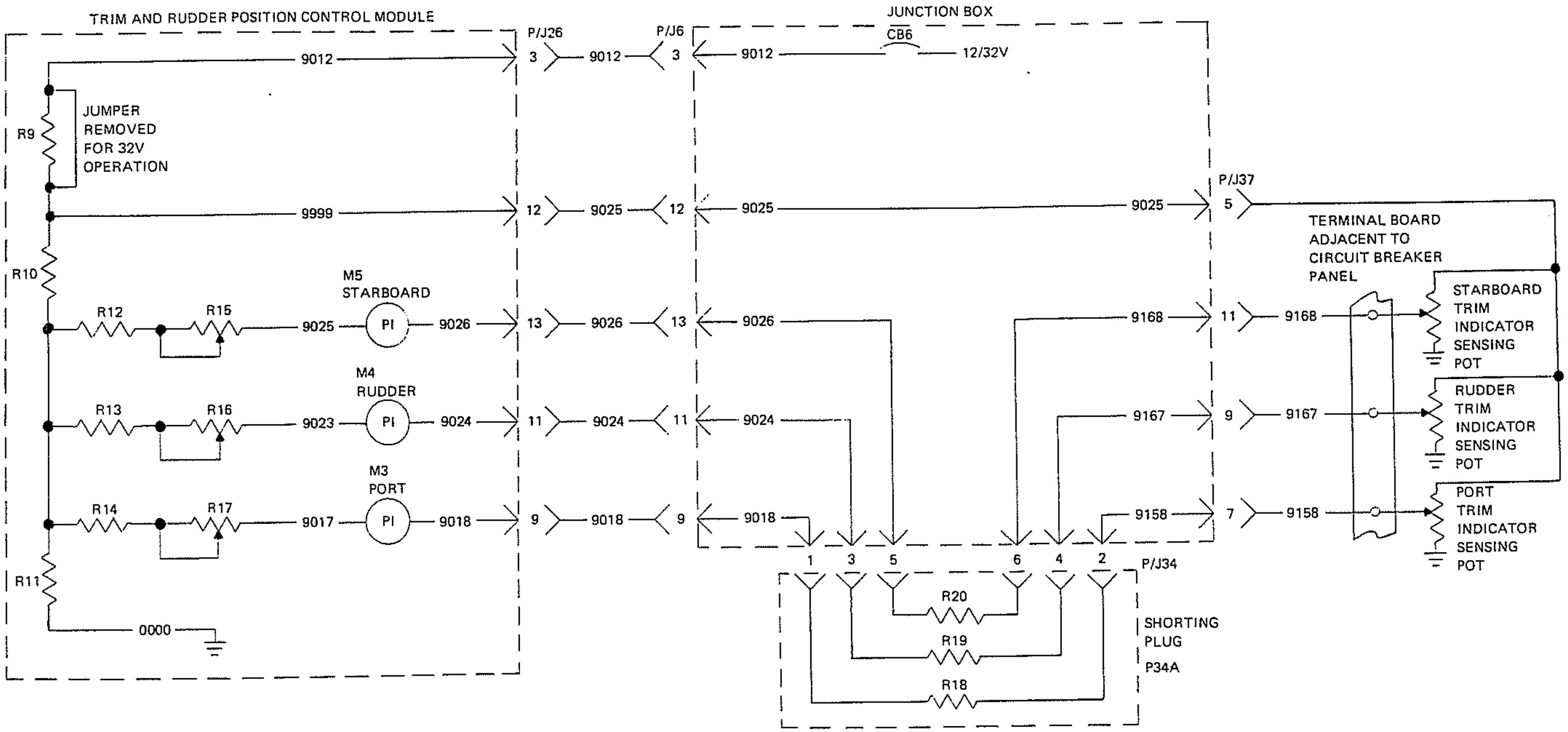
Figure 40. Trim Activating Circuits, Electro-Hydraulically Driven Trim Planes, Trim and Rudder Position Control Module





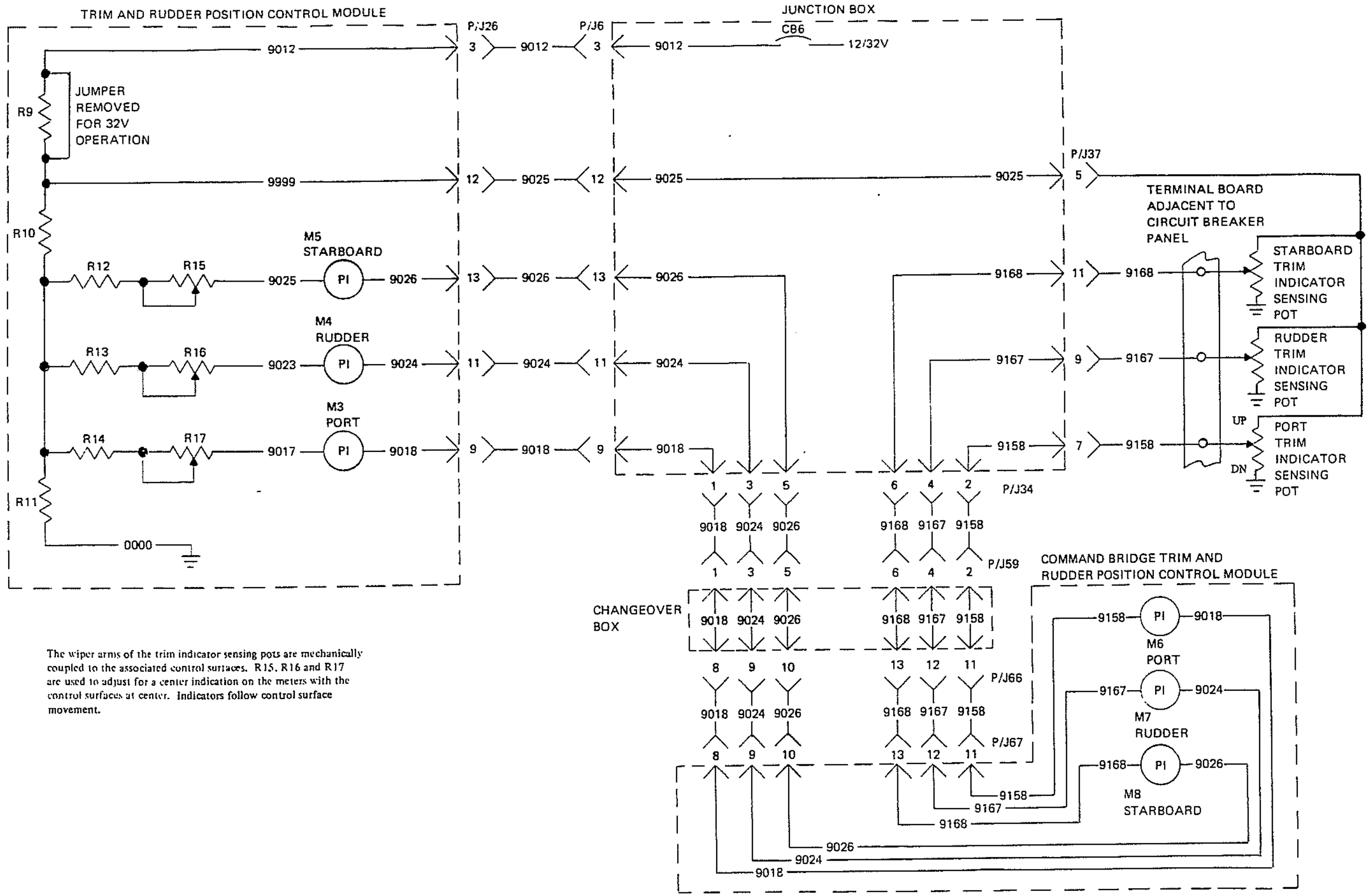
Operating one of trim switches activates the associated solenoid valve. With a solenoid valve activated, the pump motor is hydraulically connected to the associated trim plane. Operating one of the trim switches to the BOW DOWN position energizes the down coil in the trim relay. Power is applied through the trim relay down contacts to the down field in the pump motor causing the trim planes to move in the bow down direction. If the switch is operated to the BOW UP position, the up coil in the trim relay is energized. Power is applied through the trim relay up contacts to the up field in the pump motor causing the trim planes to move in the bow up direction.

Figure 41. Trim Activating Circuits, Electro-Hydraulically Driven Trim Planes, Trim Control Module



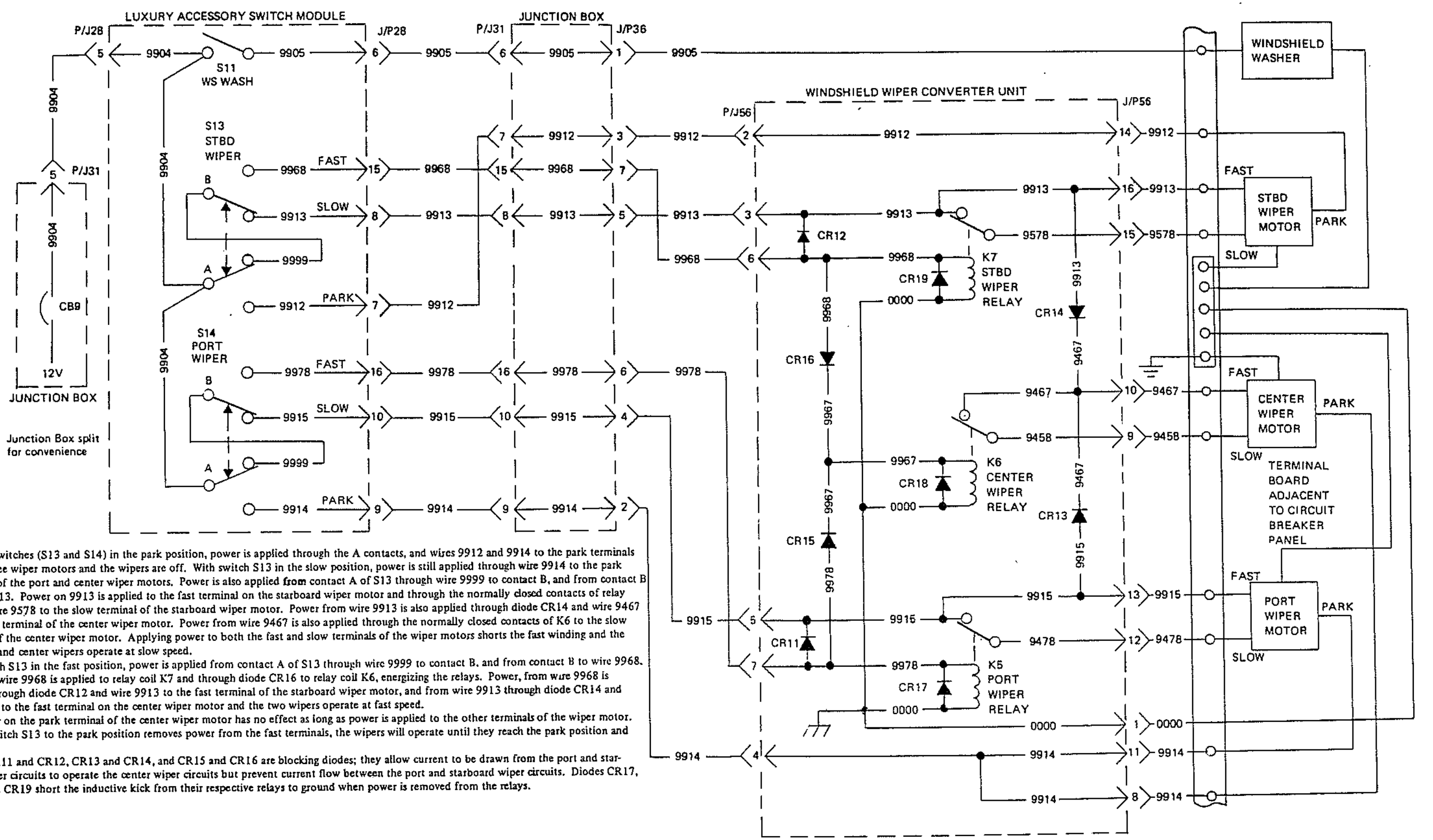
The wiper arms of the trim indicator sensing pots are mechanically coupled to the associated control surfaces. R15, R16 and R17 are used to adjust for a center indication on the meters with the control surfaces at center. Indicators follow control surface movement.

Figure 42. Trim and Rudder Position Indicators Circuit, Without Command Bridge® Option



The wiper arms of the trim indicator sensing pots are mechanically coupled to the associated control surfaces. R15, R16 and R17 are used to adjust for a center indication on the meters with the control surfaces at center. Indicators follow control surface movement.

Figure 43. Trim and Rudder Position Indicators Circuit, With Command Bridge® Option



With the switches (S13 and S14) in the park position, power is applied through the A contacts, and wires 9912 and 9914 to the park terminals on the three wiper motors and the wipers are off. With switch S13 in the slow position, power is still applied through wire 9914 to the park terminals of the port and center wiper motors. Power is also applied from contact A of S13 through wire 9999 to contact B, and from contact B to wire 9913. Power on 9913 is applied to the fast terminal on the starboard wiper motor and through the normally closed contacts of relay K7 and wire 9578 to the slow terminal of the starboard wiper motor. Power from wire 9913 is also applied through diode CR14 and wire 9467 to the fast terminal of the center wiper motor. Power from wire 9467 is also applied through the normally closed contacts of K6 to the slow terminal of the center wiper motor. Applying power to both the fast and slow terminals of the wiper motors shorts the fast winding and the starboard and center wipers operate at slow speed.

With switch S13 in the fast position, power is applied from contact A of S13 through wire 9999 to contact B, and from contact B to wire 9968. Power on wire 9968 is applied to relay coil K7 and through diode CR16 to relay coil K6, energizing the relays. Power, from wire 9968 is applied through diode CR12 and wire 9913 to the fast terminal of the starboard wiper motor, and from wire 9913 through diode CR14 and wire 9467 to the fast terminal on the center wiper motor and the two wipers operate at fast speed.

The power on the park terminal of the center wiper motor has no effect as long as power is applied to the other terminals of the wiper motor. Moving switch S13 to the park position removes power from the fast terminals, the wipers will operate until they reach the park position and stop.

Diodes CR11 and CR12, CR13 and CR14, and CR15 and CR16 are blocking diodes; they allow current to be drawn from the port and starboard wiper circuits to operate the center wiper circuits but prevent current flow between the port and starboard wiper circuits. Diodes CR17, CR18, and CR19 short the inductive kick from their respective relays to ground when power is removed from the relays.

Figure 44. Windshield Washers and Wipers Circuits, Luxury Accessory Switch Module

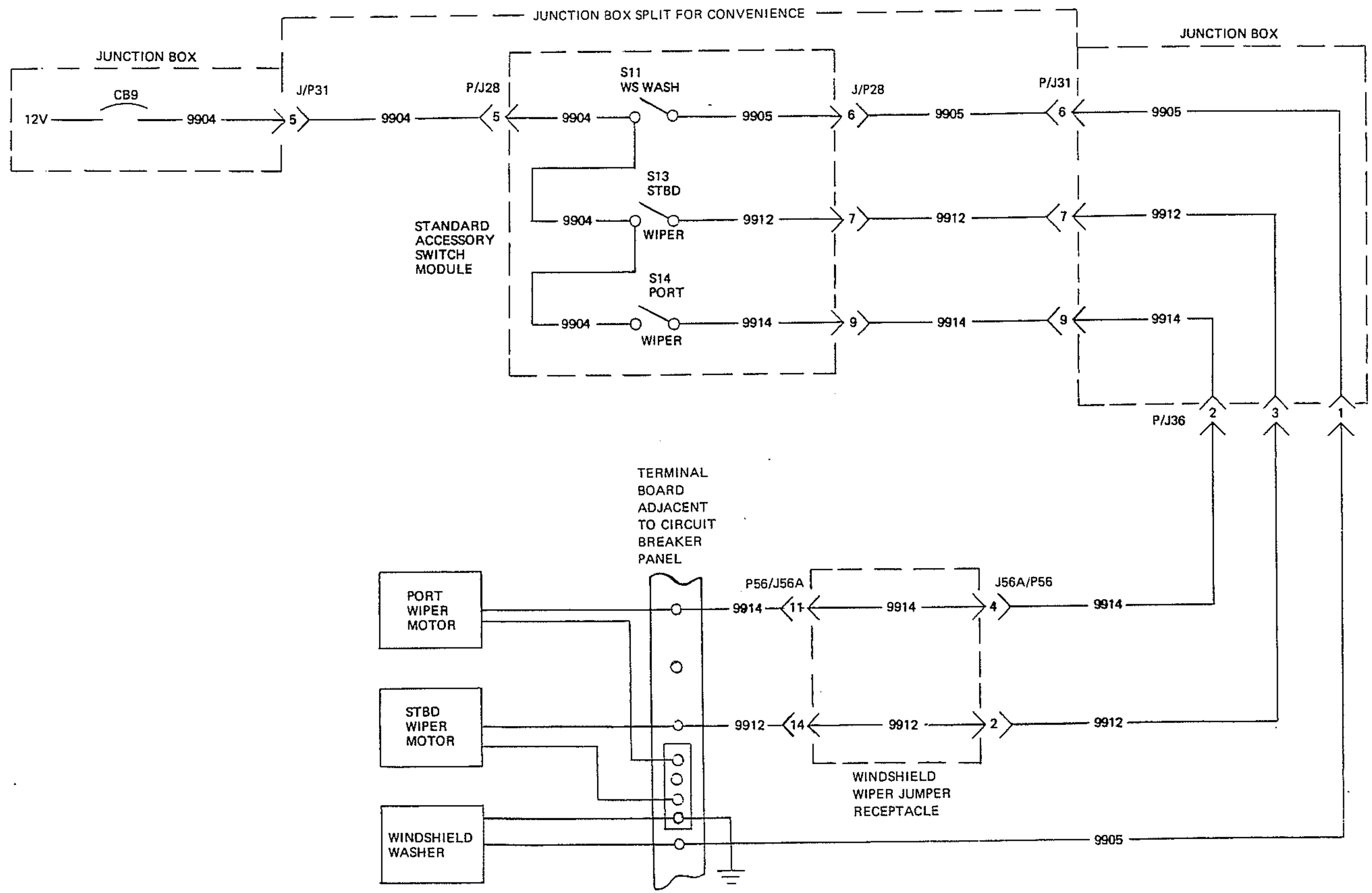
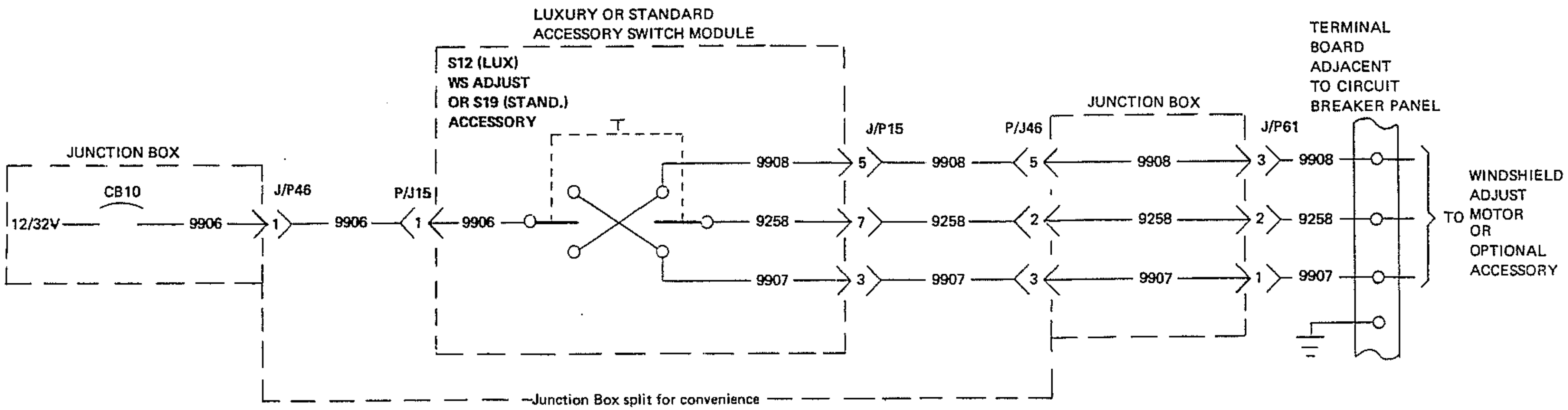


Figure 45. Windshield Washers and Wipers Circuits, Standard Accessory Switch Module



Wire 9258 connects only to the wound field of the windshield motor.
Wires 9907 and 9908 connect to opposite sides of the armature winding.

Figure 46. Windshield Open Circuit, Luxury Accessory Switch Module; Optional Accessory, Standard Accessory Switch Module

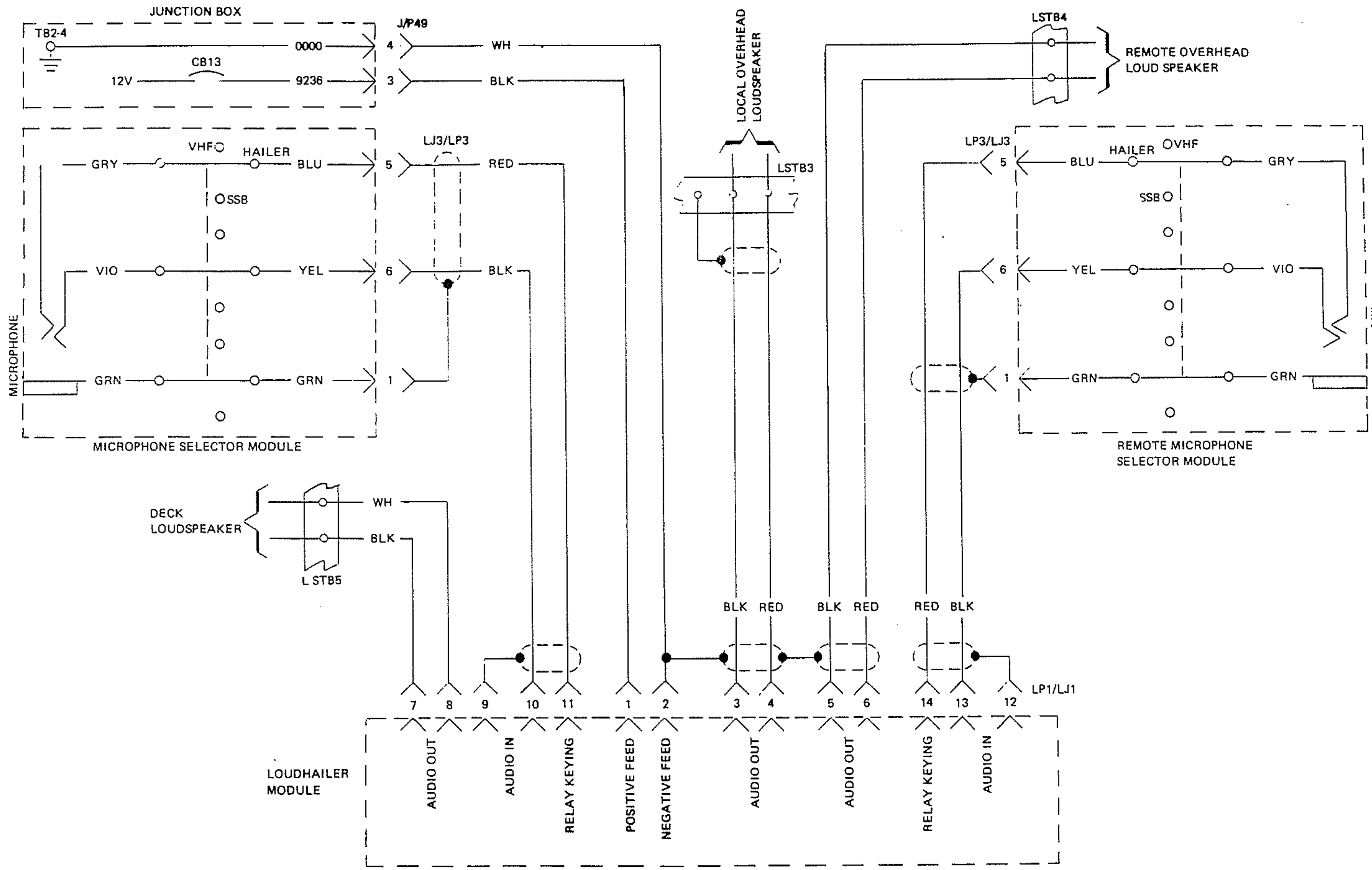


Figure 47. Loudhailer Interconnect Wiring

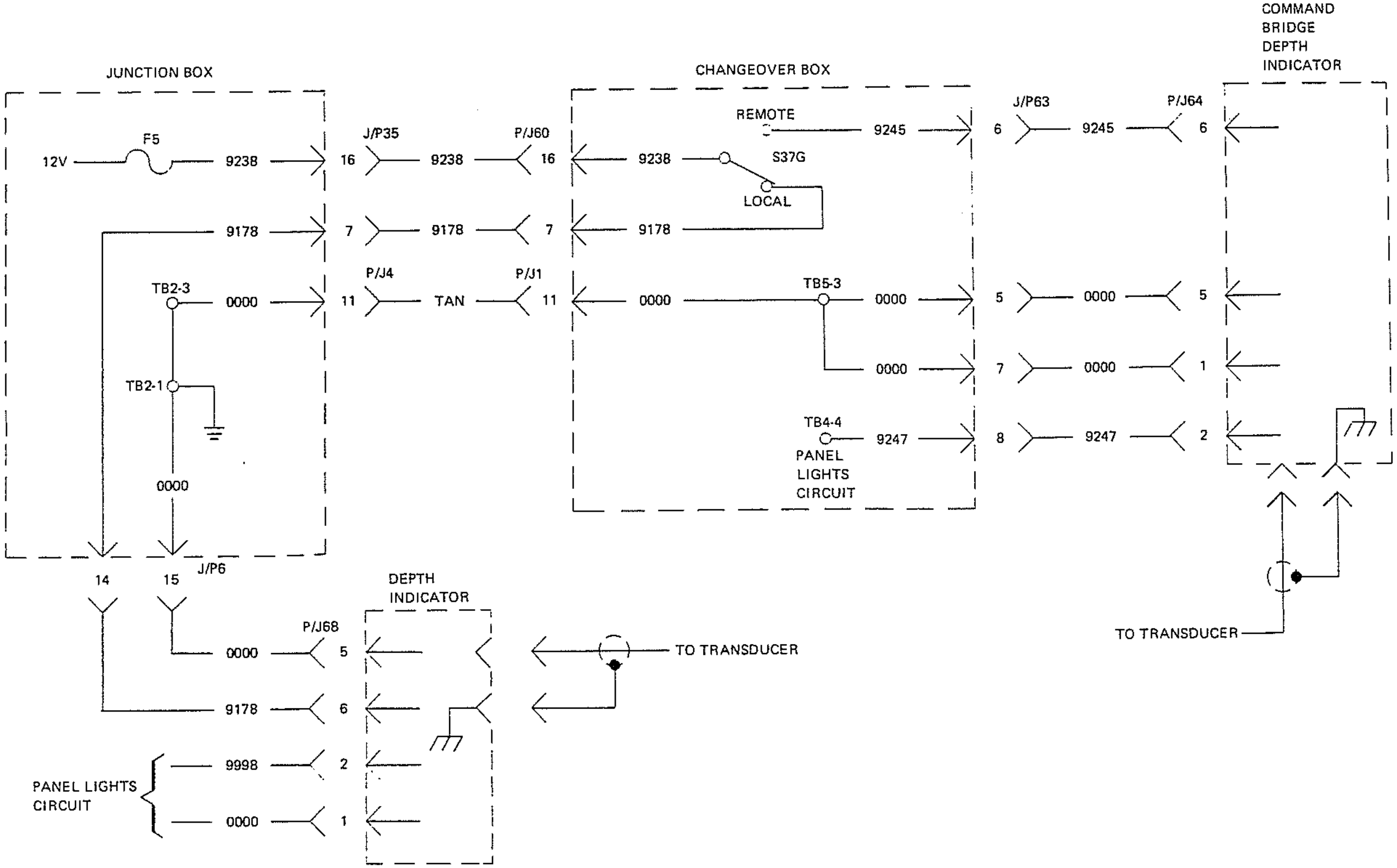


Figure 48. Depth Indicator Interconnect Wiring

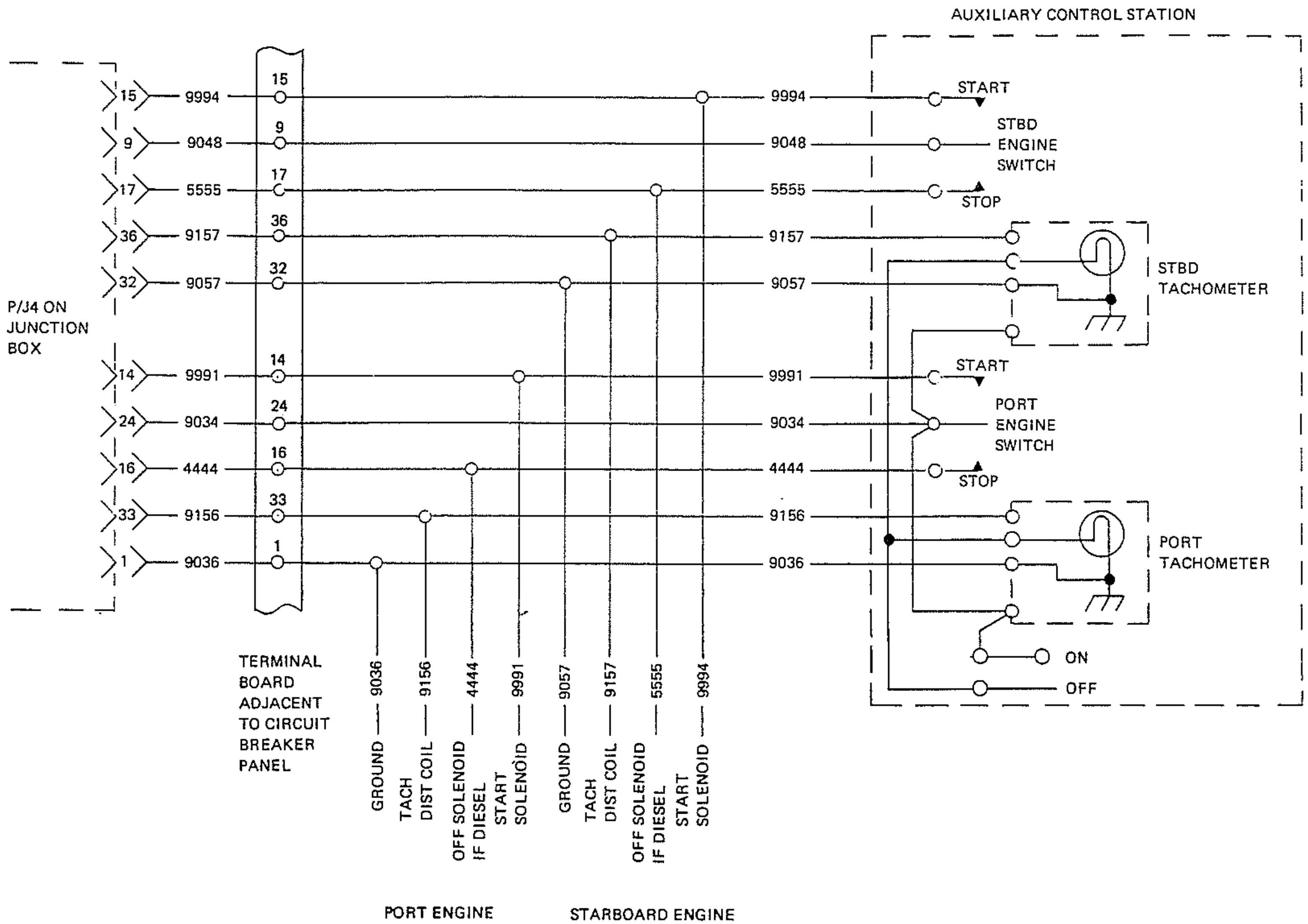


Figure 49. Auxiliary Control Station Engine Switches and Tachometers Circuit, Tournament Fisherman

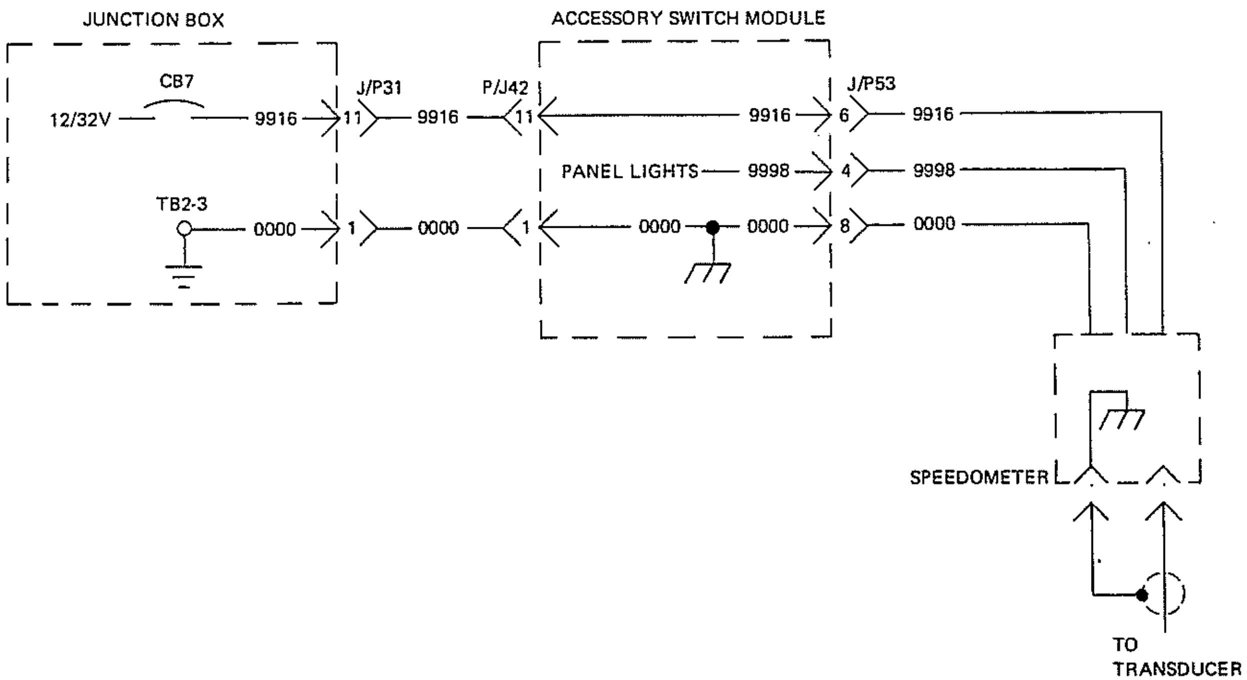


Figure 50. Speedometer Interconnect Wiring Tournament Fisherman

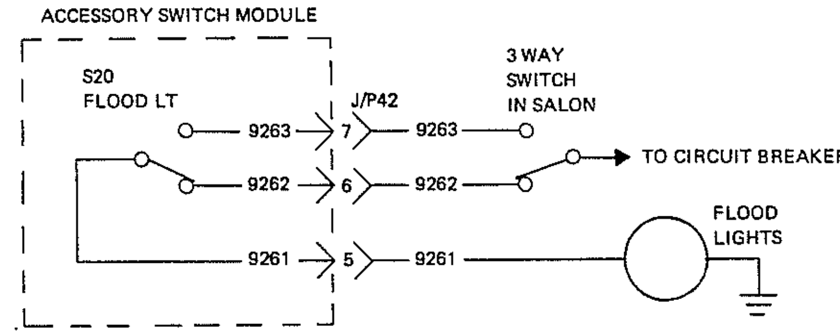


Figure 51. Flood Light Circuit Tournament Fisherman

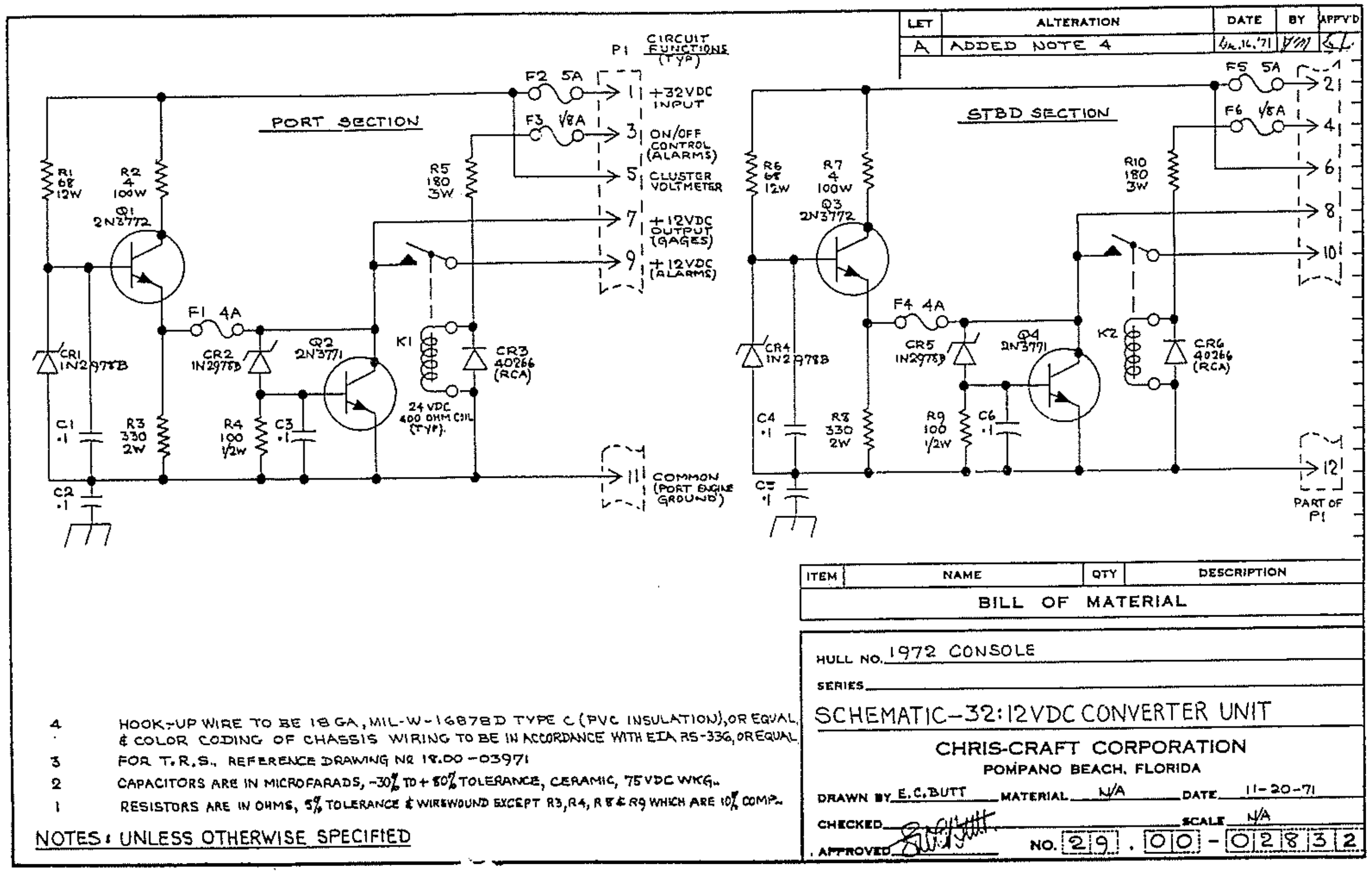
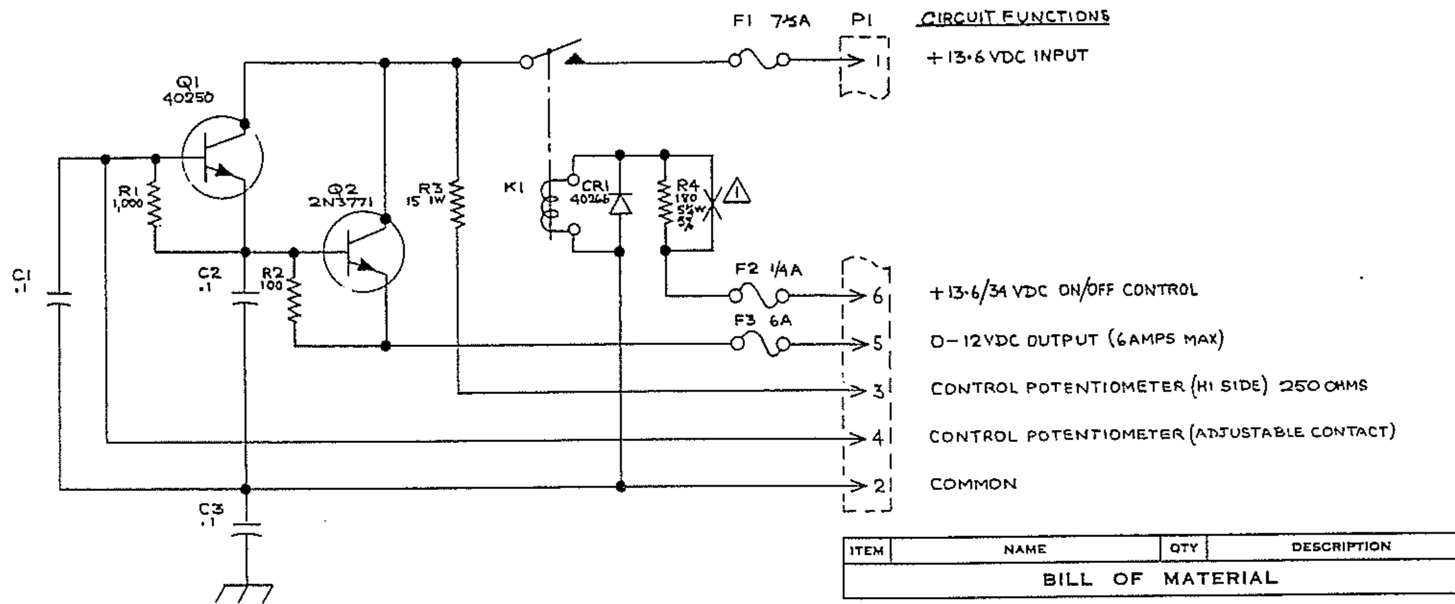


Figure 52. 32 to 12 VDC Converter Unit, Manufacturing Schematic

LET	ALTERATION	DATE	BY	APP'D
A	ADDED NOTE 6.	12-16-71	ECB	



ITEM	NAME	QTY	DESCRIPTION

BILL OF MATERIAL

6 HOOK-UP WIRE TO BE 18GA, MIL-W-16878D TYPE C (PVC INSULATION), OR EQUAL, & COLOR CODING OF CHASSIS WIRING TO BE IN ACCORDANCE WITH EIA RS-336 OR EQUAL

5 FOR T.R.S. REF. DRAWING NO. 18.00-03951

4 SEMICONDUCTOR P/N ARE R.C.A

3 CAPACITORS ARE IN MICROFARADS, 75VDC WKG, –30% TO +80% TOLERANCE

2 RESISTORS ARE IN OHMS, 1/2 WATT RATING, 10% TOLERANCE

△1 FOR 32 VOLT ON/OFF CONTROL, CUT JUMPER AT R4

NOTES: UNLESS OTHERWISE SPECIFIED

HULL NO. 1972 CONSOLE

SERIES

SCHEMATIC – DIMMER UNIT

CHRIS-CRAFT CORPORATION
POMPANO BEACH, FLORIDA

DRAWN BY E.C.BUTT MATERIAL N/A DATE 11-10-71

CHECKED SCALE N/A

APPROVED E.C.Butt NO. 29.00-02792

Figure 53. Dimmer Unit, Manufacturing Schematic

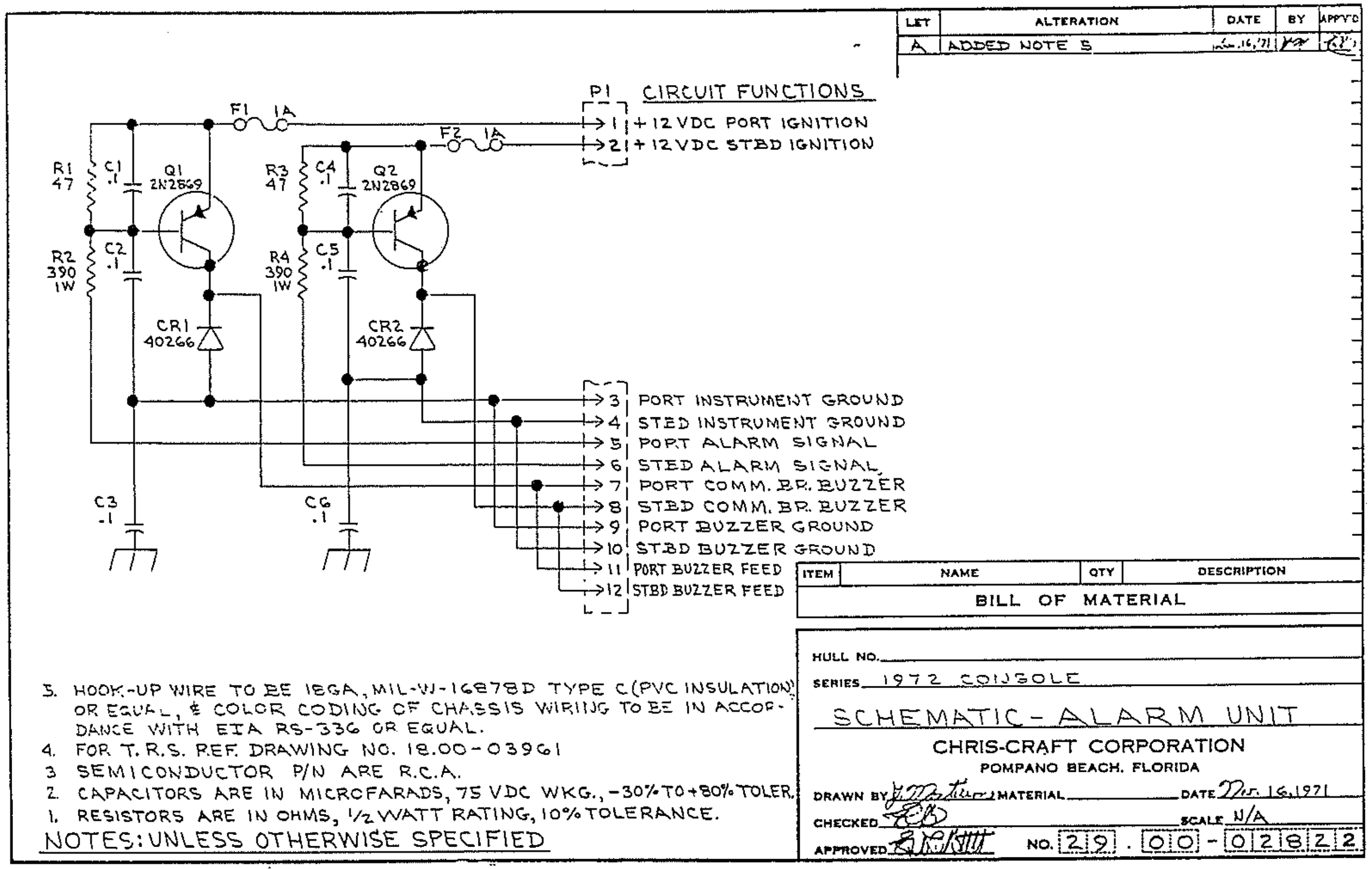


Figure 54. Alarm Unit, Manufacturing Schematic