MOBILE RADIO

LBI-31726

MAINTENANCE MANUAL FOR PST 16 PLUS™ VRS JUNCTION BOX

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GENERAL ELECTRIC

DESCRIPTION

The Junction Box for the PST Vehicular Repeater System provides the interconnect between the Mobile Unit, Vehicular Repeater and control unit. All operating functions for the Junction Box are controlled by software in the Vehicular Repeater System (VRS).

An overall understanding of the Vehicular Repeater System (VRS) is required before the operation of the junction box can be fully understood. Refer to the Vehicular Repeater maintenance manual for a detailed description of the vehicular repeater system.

Vehicular Repeater System

A PST mobile installation consists of a trunk mounted mobile radio controlled by a control unit in the passenger compartment over a serial data link. A VRS unit, a vehicular charger and a JUNCTION BOX are the three components which are interconnected to the PST mobile installation to make up a Vehicular repeater system. In addition, a personal radio is used but not interconnected to the system.

There are two communications subsystems within the vehicular repeater system. One is the control communications system. The mobile radio is the supervisor of the control system which utilizes inputs from the mobile control system which utilizes inputs from the mobile control unit and the vehicular repeater. The serial link connects both the control unit and the vehicular repeater microcomputers to the mobile microcomputer utilizing the JUNCTION BOX as an interconnecting device.

The other subsystem is a voice communications subsystem which is controlled by the VRS when in the repeat mode and by the mobile control unit when the system is not in the repeat mode.

OPERATION

VRS Repeater Enabled

The vehicular repeater is activated by the removal of the personal radio from the charger.

A request is made to the PST mobile for repeater status. When the request for repeater status is granted by the mobile, the mobile mutes audio to the speaker and informs the VRS that Repeater STATUS is granted.

The JUNCTION BOX provides the necessary switching of the speaker audio via relays K1 and K2. Buffers U1 and U2 are provided on the adapter board in the junction box to prevent any signal degradation in the repeat path during transmissions.

In Vehicle Audio

This option first causes speaker audio to be muted when the VRS is activated — no speaker audio from either VRS or PST mobile receiver after the personal radio is removed from the vehicular charger. Audio to the speaker is restored by pushing the microphone PTT switch once.

For a priority VRS, audio from the VRS receiver or PST mobile receiver, whichever is active, will be heard in the speaker. In addition, after the initial PTT the microphone audio will modulate both the VRS and PST mobile transmitters. Now the person in the vehicle will hear communications from either the base or personal and is able to talk to both.

Both speaker audio and mic audio are routed differently in a non-priority VRS. Audio via the VRS receiver will be inhibited in a non-priority VRS. Also mic audio will be routed only to the PST mobile for transmitting and to the personal radio via the priority VRS.

Other VRS functions are not affected by use of the in-vehicle audio option. For example, mic audio is inhibited during IN bound or OUT bound repeat. Also VRS status is maintained; that is, a priority VRS is not changed due to use of the in-vehicle audio option.

CIRCUIT ANALYSIS

The PST VRS Junction Board consists of an adapter board, and interconnect cabling for interfacing the PST VRS and the Mobile Radio to the Control Unit.

The Vehicular Repeater and the Mobile Radio interface with each other using serial data from a self-contained microprocessor in each unit. The repeater instructs the mobile to activate the relays in the junction box assembly depending upon which operating state the repeater is in. If the repeater is active (repeater enabled), the mobile radio energizes the relays in the junction box and audio is heard from the repeater. If the mobile radio is active (repeater disabled), then receive audio from the mobile is heard.

The adapter board provides the switching required for the mobile and repeater utilizing two relays (K1 and K2). K1 controls speaker 2 audio and K2 controls speaker 1 audio.

A regulated +5 VDC is provided by VR1 and associated circuitry.

TROUBLESHOOTING

This section describes how to check the junction box interconnections from plug to plug for broken wires or shorted connections. A functional check for relays K1 and K2 is also described along with a procedure for checking buffers U1 and U2.

Equipment Required:

- Volt/Ohm Meter
- Signal Generator
- 13.8 VDC Source

Junction Box Test Procedure

1. Apply 13.8 VDC to J1-19 and J1-21.
   a. Check continuity from J1-20 to mobile P1-20 and J1-18 to mobile P1-18. Ground mobile P1-10 and relays K1 and K2 will energize and continuity will change to the VRS P1-18 & 20.
   b. With a 1000Hz 300Mv signal applied to the following inputs, check for 190Mv ±10% at the outputs.

INPUT	OUTPUT
J1-2	P1-2 (Mobile and VRS)
VRS P1-1	Mobile P1-2 and J1-1
Mobile P1-1	VRS P1-2 and J1-1

   c. The 13.8 VDC input voltage should be measured by P1-19 on the VRS and Mobile Plug.

2. Remove the 13.8 VDC and check for continuity between the following points:

J1	P1 (Mobile)	P1 (VRS)
5	5	5
6	6	6
8	8	8
9	9	11
11	11	9
12	12	12
14	14	14
15	15	15
37	37	
38	38	

3. Check Diode CR3 for continuity. Check from J1-10 to P1-10 of the VRS plug. (anode to P1-10)

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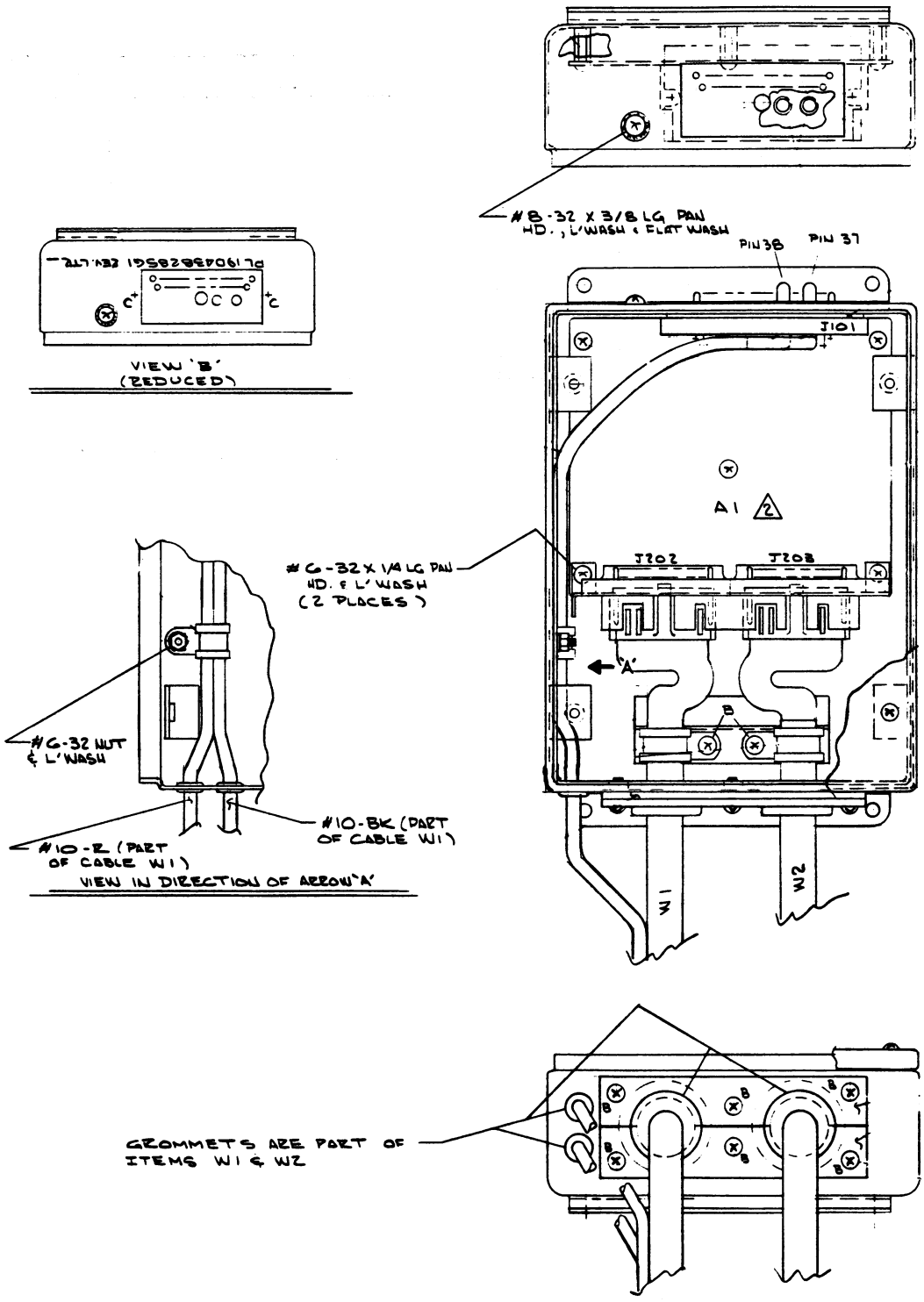

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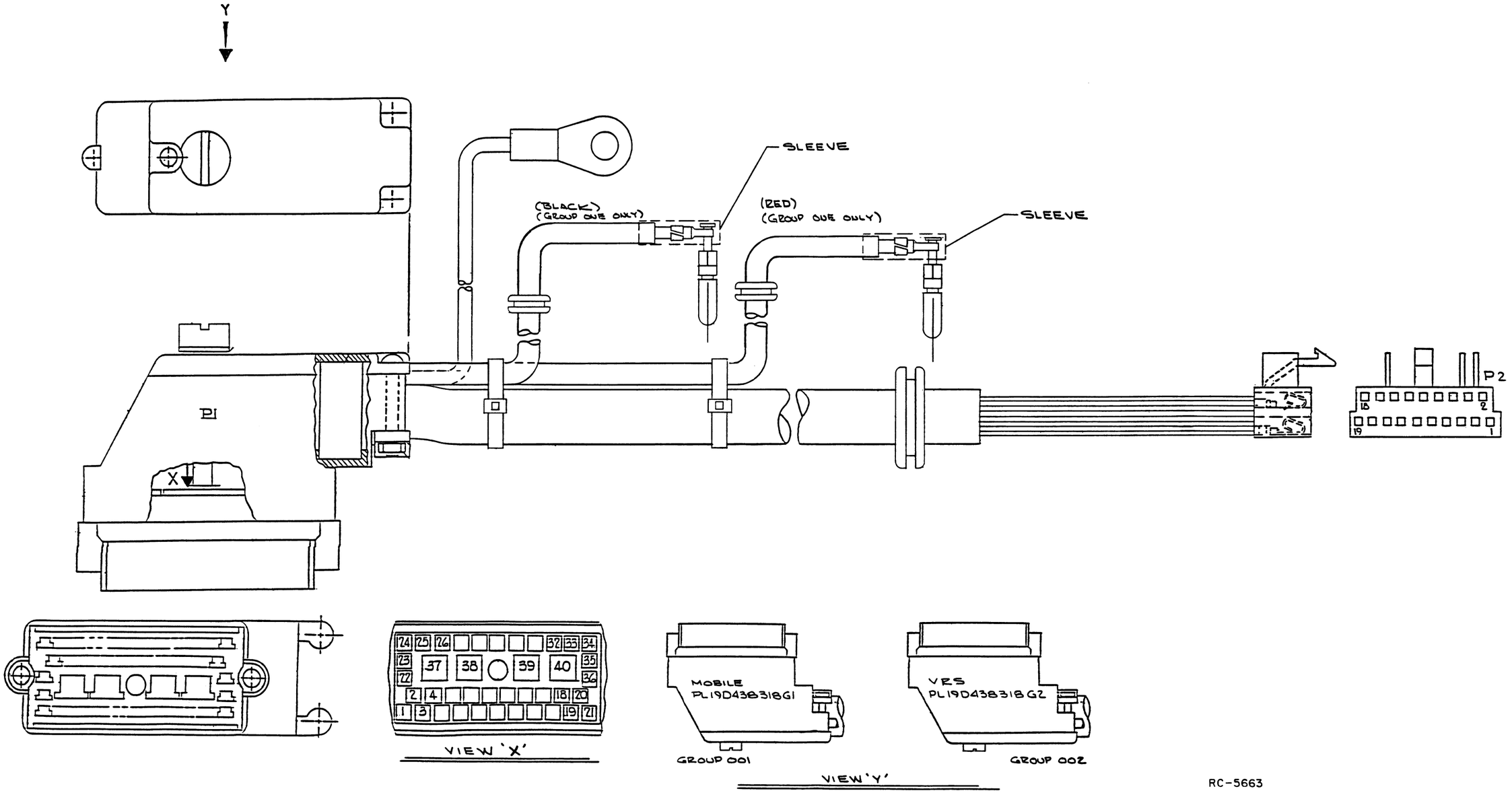
ASSEMBLY DIAGRAM

Jacket Box

2 Issue 1



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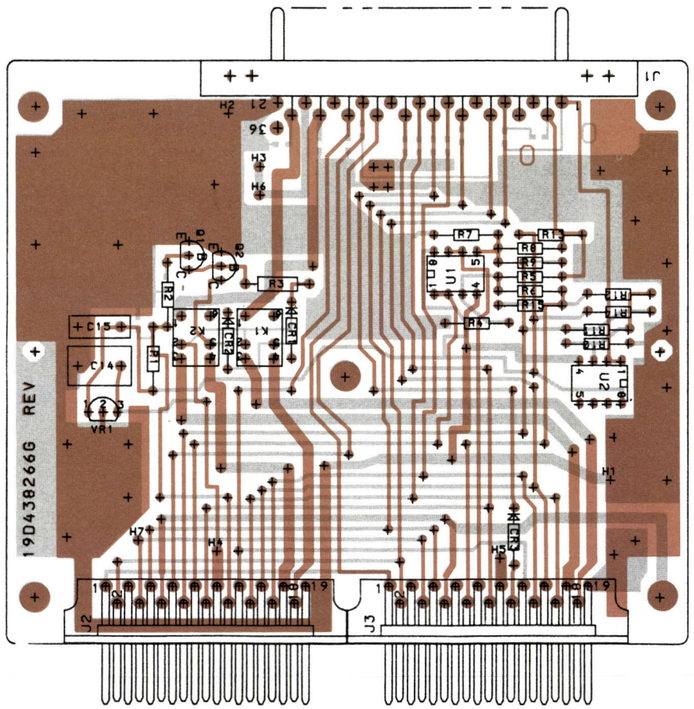
OUTLINE DIAGRAM

Vehicular Repeater Adapter Board

Issue 1



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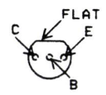
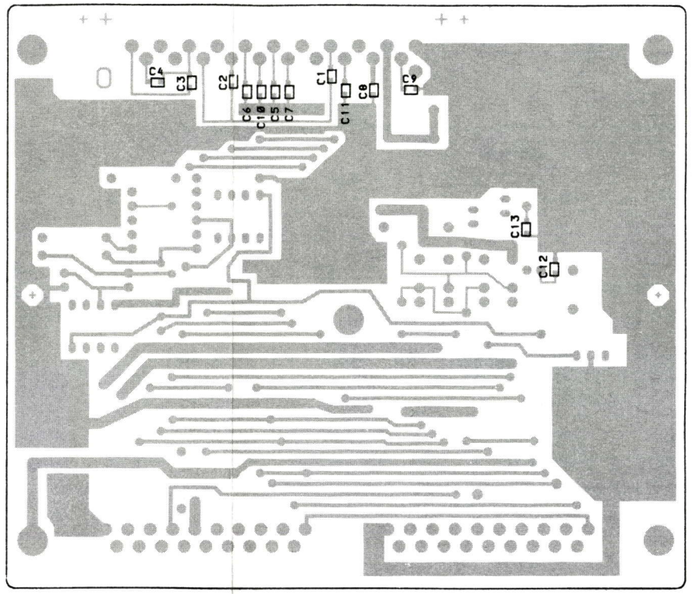
(19A149231, Sh. 2, Rev. 0)

LEAD IDENTIFICATION
FOR Q1 AND Q2



TOP VIEW

NOTE: LEAD ARRANGEMENT, AND NOT CASE SHAPE, IS DETERMINING FACTOR FOR LEAD IDENTIFICATION.



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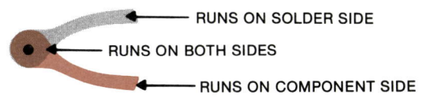
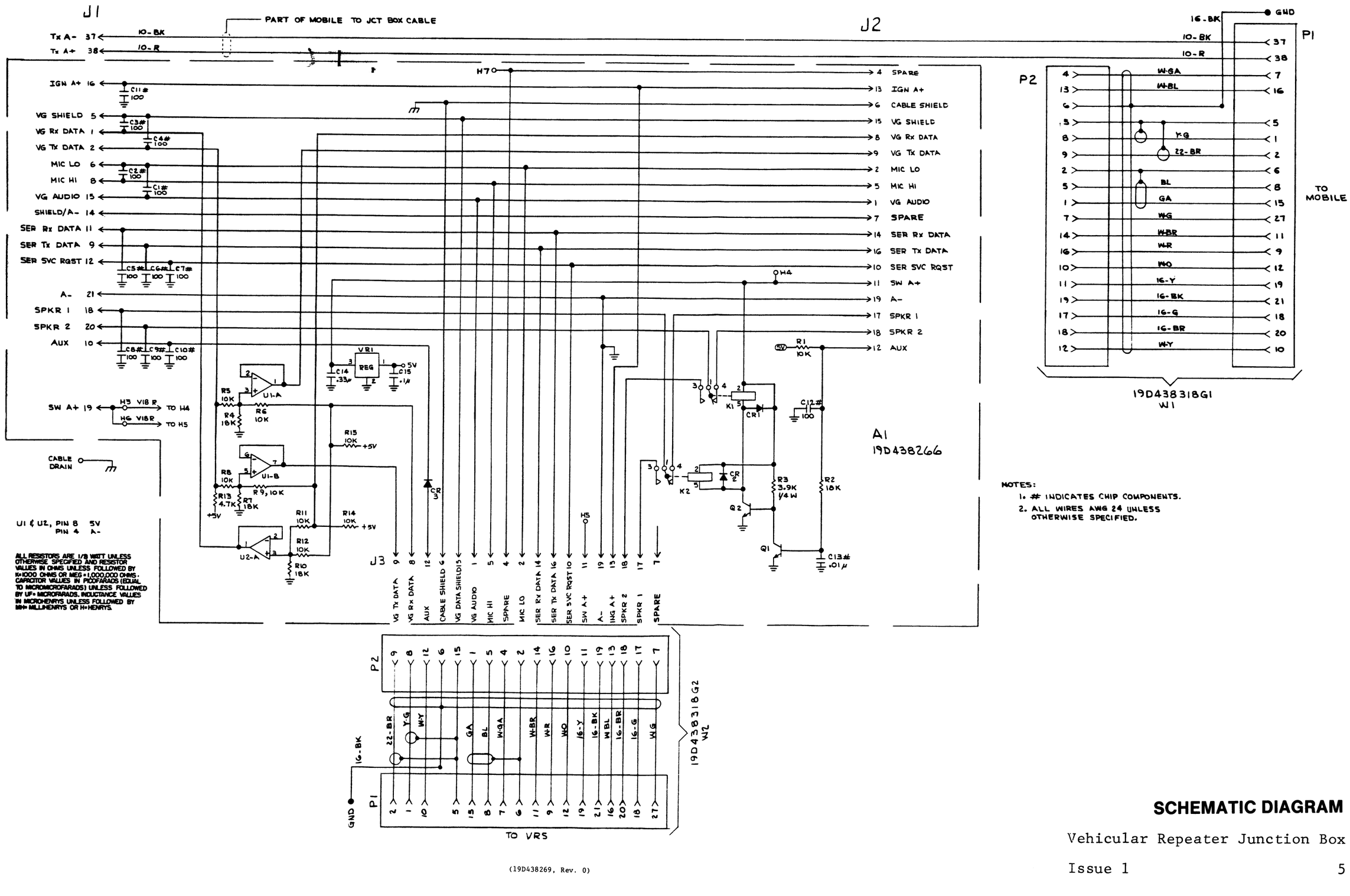
(19A149231, Sh. 2, Rev.0)

CONNECTION CHART		
FROM	TO	WIRE SIZE
H3	H4	V18-R
H5	H6	V18-R



Power Control Cable

4 Issue 1



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SCHEMATIC DIAGRAM

Vehicular Repeater Junction Box

Issue 1

PARTS LIST

JUNCTION BOX ASSEMBLY
19D438285G1

ISSUE 1

SYMBOL	GE PART NO.	DESCRIPTION
A1		VEHICULAR REPEATER ADAPTER BOARD 19D438266G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1 thru C12	19A700007P61	Ceramic: 100 pF ±5%, 50 VDCW; temp coef 0 ±30 PPM.
C13	19A702052P14	Ceramic: 0.01 uF ±10%, 50 VDCW.
C14	19A700004P5	Metallized polyester: 0.33 uF ±10%, 63 VDCW.
C15	19A700004P2	Metallized polyester: 0.1 uF ±10%, 63 VDCW.
		- - - - - - - - - - - DIODES - - - - - - - - - -
CR1 thru CR3	19A700028P1	Silicon, fast recovery: fwd current 75 mA, 75 PIV; sim to Type 1N4148.
		- - - - - - - - - - - JACKS - - - - - - - - - - -
J1	19C850591G1	System Connector.
J2 and J3	19C320257P2	Pin wafer assembly: 19 contacts.
		- - - - - - - - - - - RELAYS - - - - - - - - - -
K1 and K2	19A149374P1	Relay, 12V.
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q1 and Q2	19A700023P2	Silicon, NPN: sim to 2N3904.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	19A702585P87	Composition: 10K ohms ±5%, 150 VDCW, 1/8 w.
R2	19A702585P93	Composition: 18K ohms ±5%, 150 VDCW, 1/8 w.
R3	19A700106P77	Composition: 3.9K ohms ±5%, 1/4 w.
R4	19A702585P93	Composition: 18K ohms ±5%, 150 VDCW, 1/8 w.
R5 and R6	19A702585P87	Composition: 10K ohms ±5%, 150 VDCW, 1/8 w.
R7	19A702585P93	Composition: 18K ohms ±5%, 150 VDCW, 1/8 w.
R8	19A702585P87	Composition: 10K ohms ±5%, 150 VDCW, 1/8 w.
R9	19A702585P89	Composition: 12K ohms ±5%, 150 VDCW, 1/8 w.
R10	19A702585P93	Composition: 18K ohms ±5%, 150 VDCW, 1/8 w.
R11 and R12	19A702585P87	Composition: 10K ohms ±5%, 150 VDCW, 1/8 w.
R13 thru R15	19A702585P79	Composition: 4.7K ohms ±5%, 150 VDCW, 1/8 w.
		- - - - - - - - INTEGRATED CIRCUITS - - - - - - - -
U1 and U2	19A701789P2	DUAL OP AMP; sim to LM358.
		- - - - - - - - VOLTAGE REGULATORS - - - - - - - -
VR1	19J706031P1	Linear: POSITIVE VOLTAGE REGULATOR.

SYMBOL	GE PART NO.	DESCRIPTION
W1 and W2		POWER CONTROL CABLE 19D438318G1 & G2
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P1		Connector. Includes:
	19C850508P1	Connector Cover.
	19D900037P1	Connector.
	19D900015P1	Shell.
P2	19B226516G1	Connector.
P2	19B226516G2	Connector.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B800513P1	Gasket. (Secures Connector).
	19C850508P1	Connector Cover.
	19A701376P1	Contact, electrical rated @ 4 amps; sim to AMP 350657-1. (Quantity 14). (Used with P1-9 through P1-12).
	19A701376P3	Contact, electrical rated @ 35 amps; sim to AMP 350655-1. (Quantity 2). (Used with P1-37 and P1-38).
	19A701376P2	Contact, electrical rated @ 4 amps; sim to AMP 350656-1. (Quantity 4). (Used with P1-18 through P1-21).
	19D900037P1	Connector.
	19D900015P1	Shell.
	19A701077P1	Clip. (Used with hex nut).
	19A701488P4	Retaining ring. (Secures Connector).
	19A705055P1	Screw, threaded. (Secures Connector).
	19A701312P6	Flatwasher: 1.7 - 1.85 ID. (Used with P1).
	19A700032P5	Lockwasher, internal tooth: No. 3MM. (Used with P1).
	19A700034P4	Nut, hex: No. M3 x 0.5MM. (Used with P1).
	19A700031P425	Machine screw, No. M3-0.5 x 25. (Used with cover).
	19A701507P606	Screw, thd forming: M3.5-1.27 x 9.60. (Quantity 1). (Used with P1).
	19A701507P608	Screw, thd. forming: No. 3.5-1.27 x 12.7. (Quantity 2). (Secures shell to connector).
	19B800629P6	Solderless terminal. (Quantity 1).
	19A116781P3	Contact, electrical: wire range No. 16-20 AWG; sim to Molex 08-50-0105. (Used with P2).
	19A116781P4	Contact, electrical: wire range No. 22-26 AWG; sim to Molex 08-50-0107. (Used with P2).
	19A701658P1	Solderless terminal. (Used with Black and Red cable).
	19B800557P1	Contact. (Used with Red cable).
	5490407P2	Grommet. (Used with Black cable).
	5490407P36	Grommet. (Used with Main cable).
	19B234927G1	Can Assembly.
	19B234926G1	Cover. (Junction Box Cover).
	5491480P7	Clamp loop. (Secures W1 & W2).
	19A149263P1	Gasket. (Used with W1 & W2).
	19A149259P1	Plate. (Mounts on Can).
	19B800655P2	Gasket. (Used with J101).
	19A701289P1	Retaining ring: 3/16 inches; sim to National Lockwasher WA 510. (Used with J101).
	19A702364P308	Machine screw, TORZ Drive: No. M3-0.5 x 8. (Quantity 2). (Used with J101).
	5491480P5	Clamp loop. (Used with W1).
	N80P13008P2	Screw. (Quantity 8). (Secures plate).
	N80P13012P2	Screw. (Quantity 4). (Used with Can Assembly).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.