MAINTENANCE MANUAL
FOR
AUXILIARY BACKPLANE 19D902978G1

TABLE OF CONTENTS

DESCRIPTION

The Auxiliary backplane board 19D902978G1 contains the utility handset interface circuitry and the handset connector. This backplane allows the user to perform some programming and diagnostic functions using Utility Handset 19A705965P1 and cable 19D901619P2.

The auxiliary backplane also contains circuitry to drive a Squelch Operated Relay (SOR) and two auxiliary control relays. The relays are not included with the auxiliary backplane. However, the relays may be purchased as an option if required.

The auxiliary backplane is also required for Voice Guard and GEMARC installation.

Complete details on the handset are contained in Maintenance Manual LBI-38599.

CIRCUIT ANALYSIS

HANDSET INTERFACE

The auxiliary backplane serial interface circuitry is designed so that the control shelf will work with either a Personal Computer (PC) or a handset. It will not work properly with both connected. The handset transmits and receives 300 baud serial data at TTL levels. The system module transmits and receives serial data at RS232 levels. Therefore, some interface circuitry is required.

Transistor stage Q1 converts the handset keypad data output to levels the RS232 receiver on the system module can decode. This stage will not inhibit operation with a PC when a handset is not plugged in. A low from the handset turns Q1 off, causing a high (2.5V) to be output on PGM RXD. A high from the handset turns Q1 on causing a low (V) to be output on PGM RXD. Diode D3 prevents damage to Q1 when PGM RXD is being driven to RS232 levels by a PC.

Transistor stage Q2 converts RS232 level display data from the system module to TTL levels compatible with the handset. A high (+12V) from the system module is converted by R2, R3, and R4 to a level sufficient to turn Q2 on. This causes a low (V) on P2-3 to be applied to the handset. A low (-12V) from the system module is buffered by R2 and limited by D4 to approximately -0.7V. This low turns Q2 off. P2-3 is then pulled to +5V by pullup resistor R5.

Microphone audio from the handset is input on P2-6 and attenuated by R11. Since the System Module MIC HI input is DC biased, capacitors C3 and C4 are provided to AC-couple the handset's MIC audio into the System Module.

Speaker audio from the System Module is input on P1-7A. This audio is attenuated by resistor-divider network R6 and R7, and applied to the handset on P2-8.

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SOR CIRCUIT

The auxiliary backplane uses the RX MUTE output from the system module to drive the Squelch Operated Relay (SOR). This output is used by the System Module to control the Receiver Unsquelched Sensor (RUS) output.

The RX MUTE output is generated by the squelch circuitry located on the IFAS board in the front door, and is logically the same as the RUS output.

The system module's open collector RX MUTE output is pulled up to +5V by resistor R12. Transistor Q3 drives the relay. When the RX MUTE is in the open state, pullup resistor R12 supplies base current to Q3 causing the transistor to turn on. When Q3 is on, +13.8V is placed across the relay coil, causing the relay to energize. When RX MUTE is low, transistor Q3 is turned off. When Q3 is off, no voltage is applied to the relay coil, de-energizing the relay.

Diode D1 in the collector circuit protects Q3 from voltage spikes generated by the relay at turn off. Diodes D5 and D6 in the emitter of Q3 provide noise immunity. Transistor Q3 will sink approximately 50mA and may be used as an open collector type output if no relay is required.

AUXILIARY CONTROL

The auxiliary control relays are driven by the system module's RXF3 and RXF4 open collector outputs. These drivers function the same as the driver for the SOR. When auxiliary control is activated by a 1350 Hz function tone, RXF3 goes low and RXF4 goes high. This causes Q4 to turn off and Q5 to turn on. When auxiliary control is deactivated by a 1250 Hz function tone, RXF3 goes high and RXF4 goes low. This causes Q4 to turn on and Q5 to turn off.

AUXILIARY BACKPLANE
19D902978G1
ISSUE 2

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1 thru C4	19A703314P9	Electrolytic: 4.7 uF -10+50% tol. 50 VDCW; sim to Panasonic LS Series.
		- - - - - - - - - - - - DIODES - - - - - - - - - - - -
D1	T324ADP1041	Silicon: Rectifier; sim to 1N4004.
D2 thru D7	19A115250P1	Silicon: Fast recovery, 225 mA, 50 PIV.
D8	T324ADP1041	Silicon: Rectifier; sim to 1N4004.
		- - - - - - - - - - - - JACKS - - - - - - - - - - - -
J1 and J2	19A116647P4	Connector, printed wiring: 12 terminals; sim to Molex 09-18-5121.
J3	19B801587P3	Connector: 96 Pin: sim to AMP 535032-4.
		- - - - - - - - - - - - PLUGS - - - - - - - - - - - -
P1	19B801587P5	Connector: Right Angle, 96 Female Contacts; sim to AMP 531796-1.
P2	344A3288P2	Connector: Telephone Jack.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1 thru Q4	19A700023P2	Silicon, NPN: sim to 2N3904.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	M212CRP310C	Deposited carbon: 10K ohms ±5%, 1/4 w.
R2 and R3	M212CRP347C	Deposited carbon: 47K ohms ±5%, 1/4 w.
R4	M212CRP410C	Deposited carbon: 100K ohms ±5%, 1/4 w.
R5	M212CRP268C	Deposited carbon: 6.8K ohms ±5%, 1/4 w.
R6	M212CRP322C	Deposited carbon: 22K ohms ±5%, 1/4 w.
R7	M212CRP310C	Deposited carbon: 10K ohms ±5%, 1/4 w.
R8	M212CRP210C	Deposited carbon: 1K ohms ±5%, 1/4 w.
R9	M212CRP222C	Deposited carbon: 2.2K ohms ±5%, 1/4 w.
R10	M212CRP327C	Deposited carbon: 27K ohms ±5%, 1/4 w.
R12	M212CRP210C	Deposited carbon: 1K ohms ±5%, 1/4 w.
		- - - - - - - - - - - - SOCKETS - - - - - - - - - - - -
XK1	5491595P7	Relay: 10 contacts; sim to Allied Control 30054-4.
XK2	5491595P6	Relay: 10 contacts; sim to Allied Control 30054-3.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
6	19A700032P3	Lockwasher, tooth, steel, metric: 2.5.
7	19A700034P3	Hex nut, metric: M2.5 x 0.45.
8	19A702364P210	Machine screw, metric: M2.5-.45 x 10.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PRODUCTION CHANGES

Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

REV A. AUXILIARY BACKPLANE BOARD 19D902978G1

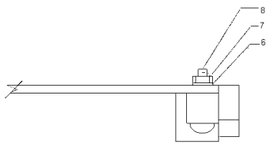
To improve performance by reducing background noise during alignment.

1. R11 was removed. However, it may be added in the field to make the handset operational.
2. If handset microphone is used, it must be disconnected from the microphone input to reduce background noise during alignment.

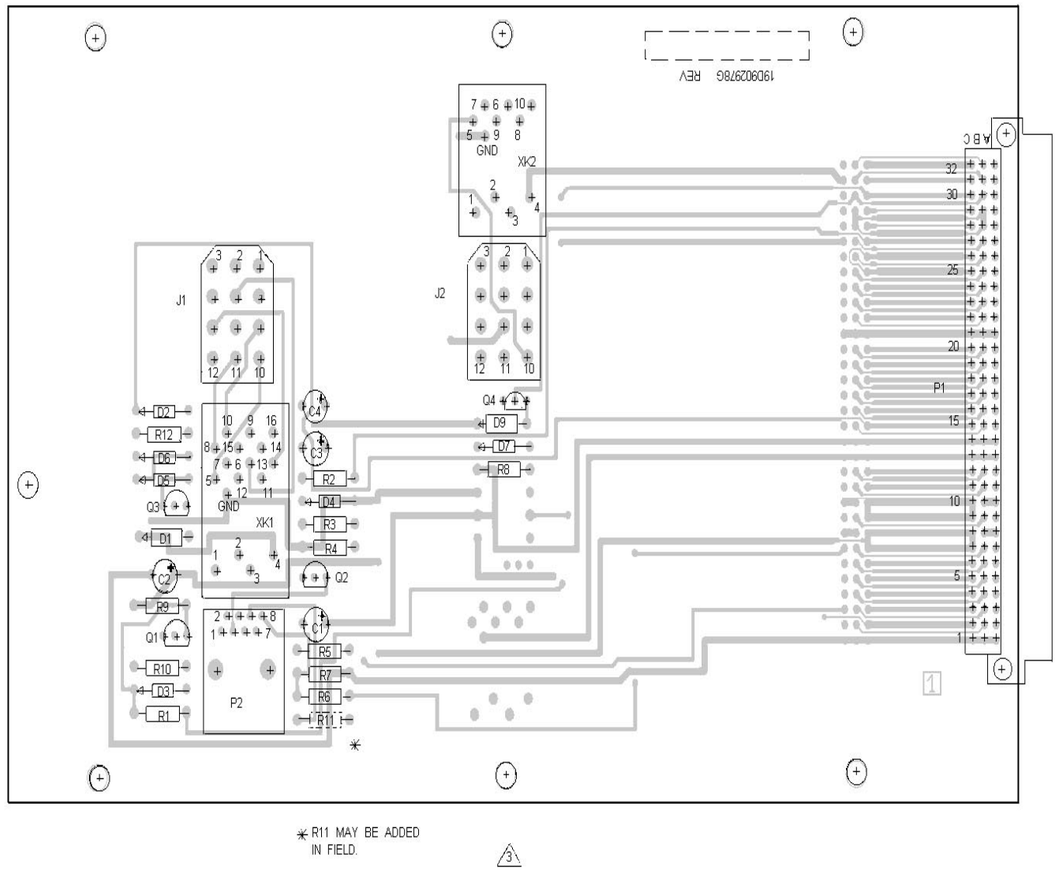
To improve producibility, the following unused auxiliary control relay driver components were removed:

D9	19A115250P1	Diode, silicon.
D10	T324ADP1032	Diode, silicon.
Q5	19A700023P4	Transistor, NPN.
R11	H212CRP122C	Resistor, carbon film: 220 ohms, 0.2 w.
R13	H212CRP210C	Resistor, carbon film: 1K ohm, 0.2 w.

COMPONENT SIDE



△5 TORQUE SCREWS (ITEM 8) TO 4 LB. IN.

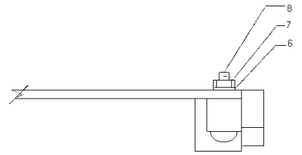


✳R11 MAY BE ADDED IN FIELD.

△3

(19D902978, Sh. 1, Rev. 3)
(19D902979, Sh. 1, Rev. 1)

SOLDER SIDE



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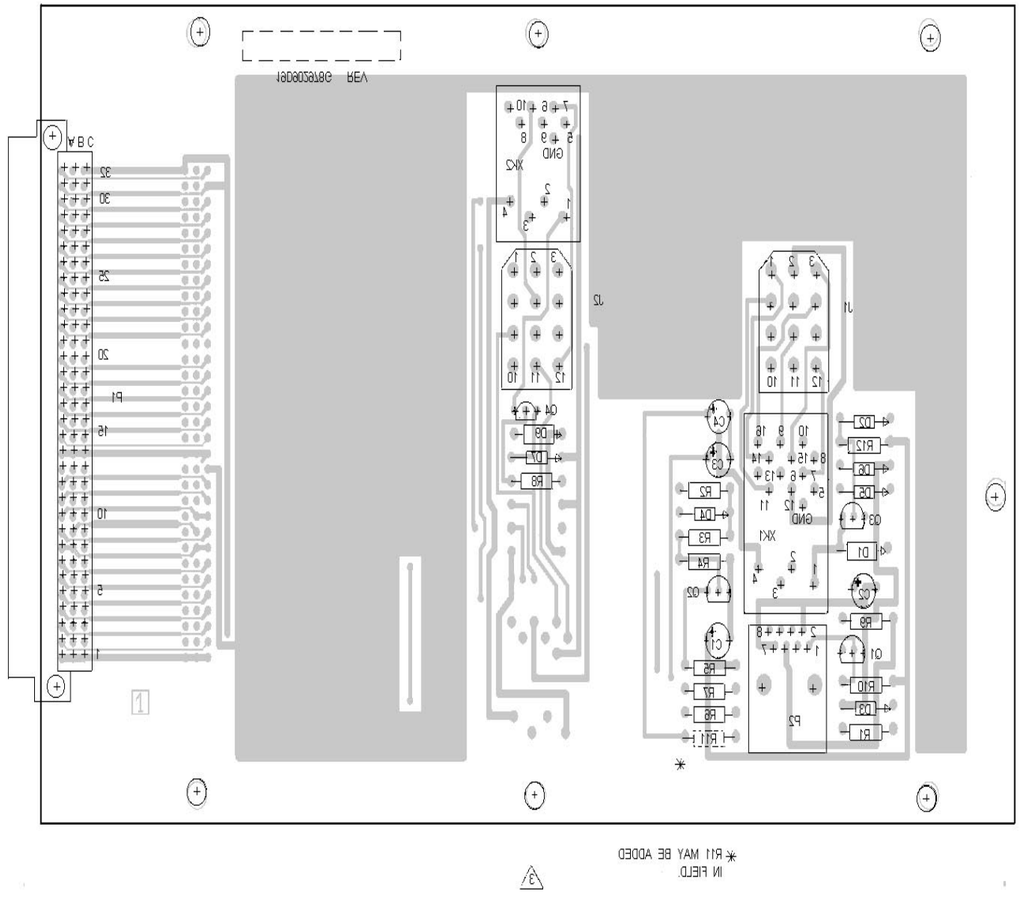
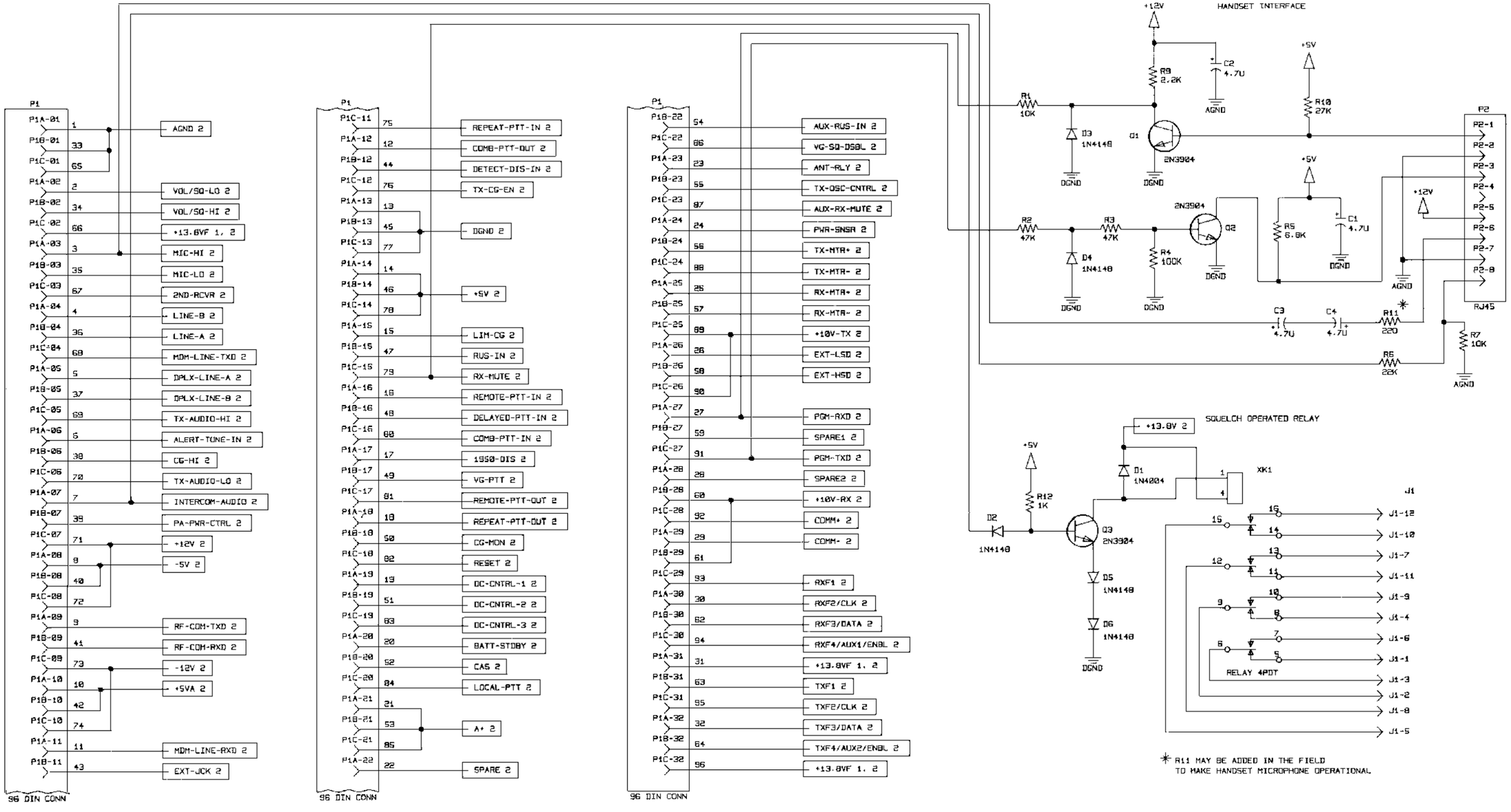


✳R11 MAY BE ADDED IN FIELD.

△3

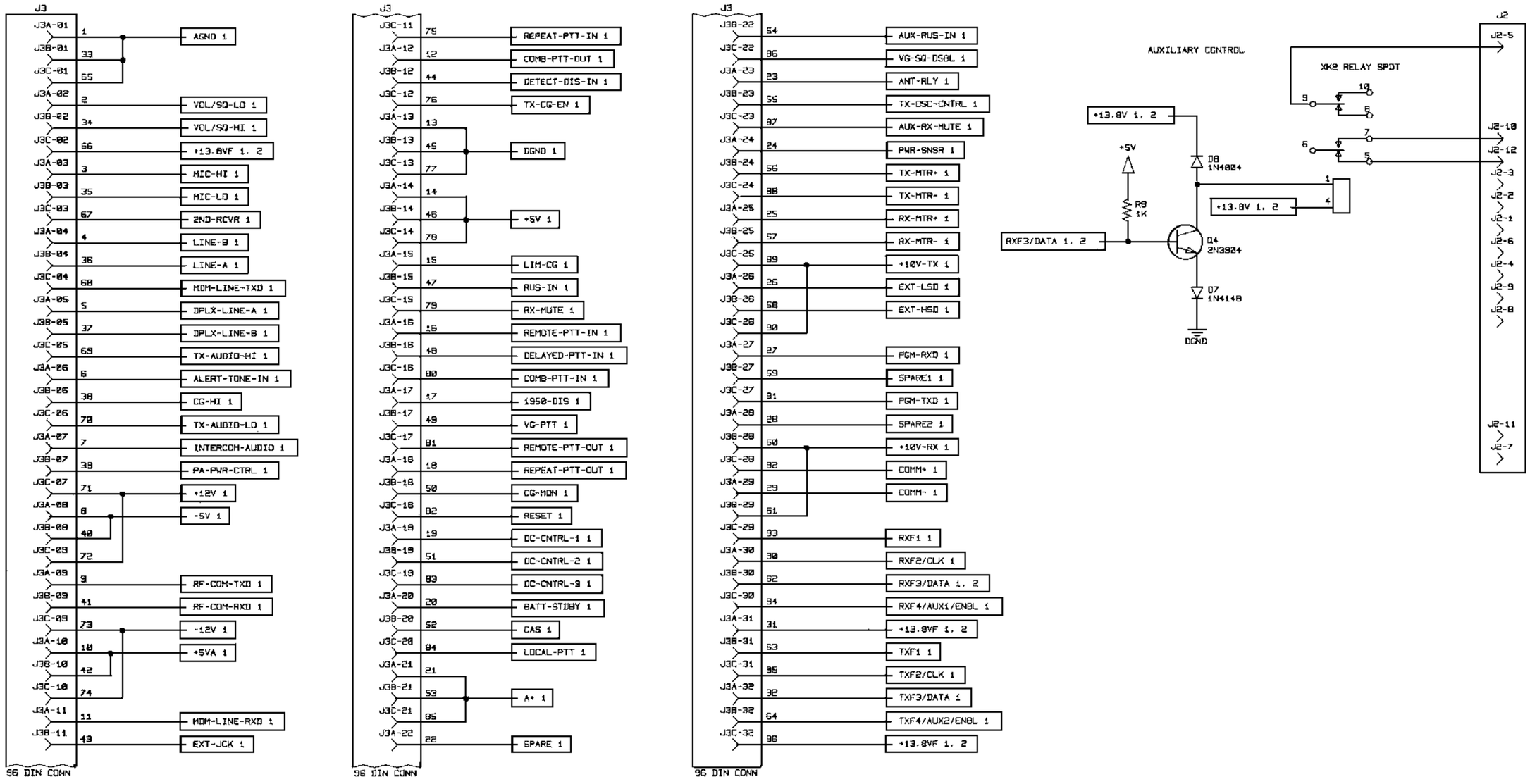
(19D902978, Sh. 1, Rev. 3)
(19D902979, Sh. 2, Rev. 1)

AUXILIARY BACKPLANE BOARD
19D902978G1



AUXILIARY BACKPLANE BOARD
19D902978G1

(19D902980, Sh. 1, Rev. 2)



AUXILIARY BACKPLANE BOARD
19D902978G1

(19D902980, Sh. 2, Rev. 2)

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