MAINTENANCE MANUAL
VOTER DIGITAL RELAY BOARD
19B802596G1

TABLE OF CONTENTS

	Page
SPECIFICATIONS	Front Cover
DESCRIPTION	1
CIRCUIT ANALYSIS	1
TROUBLESHOOTING	1
IC DATA	1
PARTS LIST	2
OUTLINE DIAGRAM	2
SCHEMATIC DIAGRAM	3
WIRING DIAGRAM	4

SPECIFICATIONS*

Input Voltage	+12 Vdc	
Regulated Voltage	+5 Vdc	
Termination	600 Ohms	
Inputs	Voter Data,	J2: 3, 4
	Voter Voice,	J2: 5, 6
	Switch In,	TB1: 4, 6
Outputs	Switch Out	TB1: 2, 5
	Site Data	TB1: 7, 8
	Site Voice	TB1: 1, 3

* These specifications are intended primarily for the use of the service technician. Refer to the appropriate Specifications Sheet in the applicable maintenance manual for the complete specifications.

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DESCRIPTION

Voter Digital Relay Board 19B802596G1 is used with the **E**nhanced **D**igital **A**ccess **C**ommunication **S**ystem (**EDACS**™) Voter, one relay board in each channel. The purpose of the relay board is to provide a means to route digital type call traffic to and from the Multisite Coordinator (switch). This traffic can be data calls, digitized voice or encrypted voice. From the coordinator, this digitized traffic can be routed to/from other sites (multisite) or to/from console (dispatch) positions.

The Voter Digital Relay Board consists of two basic blocks of circuitry. The first block contains the relays to accomplish balanced line switching and terminations to maintain constant impedance. The second block of circuitry contains the logic circuits required to control the relays. This logic is driven by two control lines, one from the voter and one from the coordinator.

This board requires E&M type signaling rather than using the 2175 Hz tone keying. The 2175 Hz tone is incompatible with the multiphase, multilevel encoding done by the modems to fit the digital signals into a voice band line.

In the non-energized state, the relay board is configured for local site clear voice repeat traffic, with the coordinator monitoring clear voice.

CIRCUIT ANALYSIS

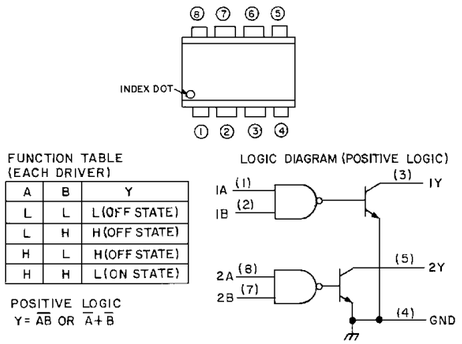
There are two lines (voice and data) from the voter, and two lines (voice and data) to the main site. There is also a line (voice/data) to and from the coordinator. Relays K1 through K4 provide the switching for these lines, with resistors R4, R6, R7 R8 and R9 providing 600 ohm terminations to replace terminations lost as an output line is switched to a different input line. Integrated circuit components U1 and U2, and diodes D1-4 are the relay drivers.

Voltage regulator U4 provides a regulated +5 volts for the logic circuits. The circuit board expects a supply voltage between +7 and +15 volts and draws less than 0.25 Amperes (both LED's on). Integrated circuits U3 and U5 provide the logic circuitry which creates the relay control signals from the two inputs, **V**oice **G**uard (**VG**) present and switch PTT. Each input is active when in a low state. Schematically this is indicated with a bar, $\overline{\textbf{VG}}$and $\overline{\textbf{PTT}}$. Each input has diode decoupling coupling/ protection. LED's DS1 and DS2 provide visual indication of the states of the two input lines.

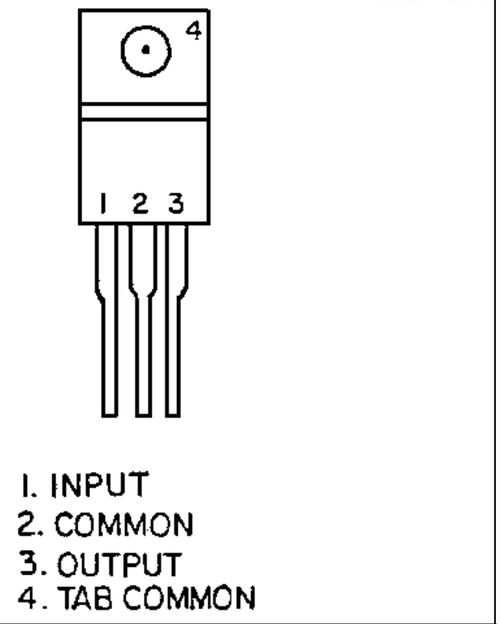
TROUBLESHOOTING

If the relay board appears not to be switching properly, make sure that the inputs are proper. The LED's (DS1 and DS2) can be used for this purpose. If the $\overline{\textbf{VG}}$ or $\overline{\textbf{PTT}}$ line is not sufficiently close to ground (about half a volt) it may not trip the logic gate. Poor signal ground could cause this condition.

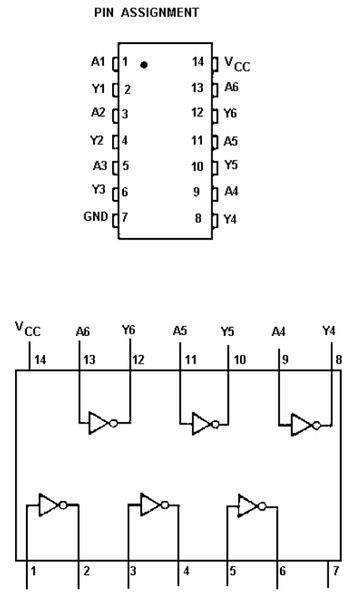
RELAY DRIVERS U1, U2
344A3290P2



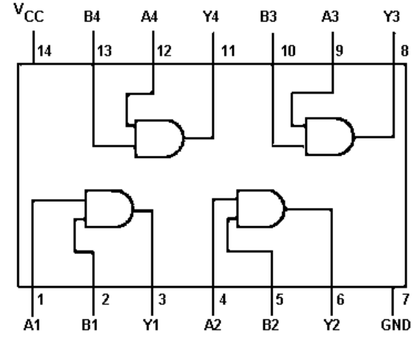
VOLTAGE REGULATOR U4
19A134717P1



HEX INVERTER U3
19A700037P305



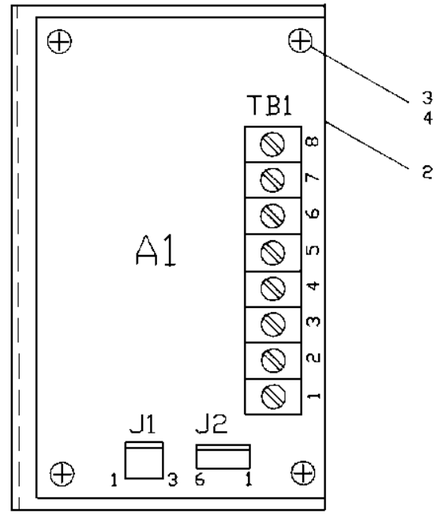
QUAD 2-INPUT AND GATE U5
19A700037P307

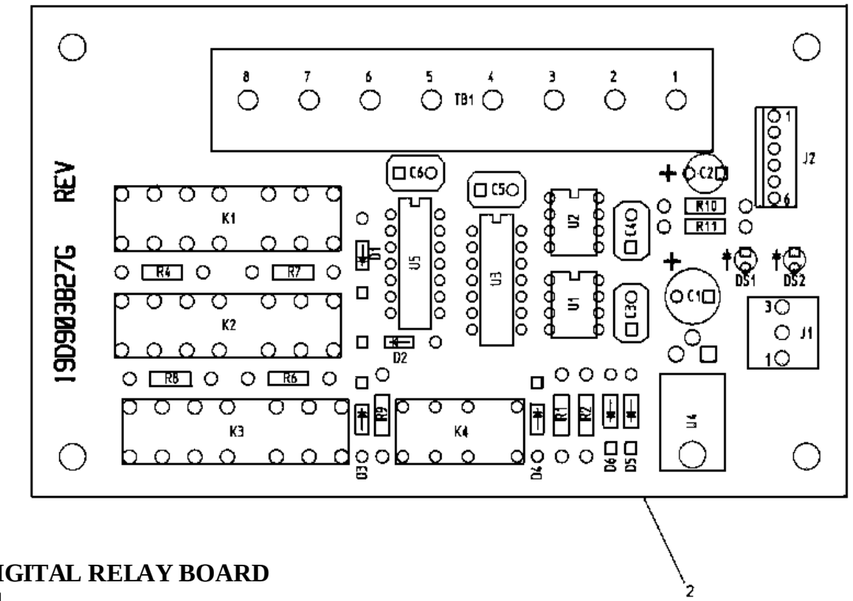


VOTER DIGITAL RELAY BOARD
19B802596G1
Issue 1

SYMBOL	PART NUMBER	DESCRIPTION
		- - - - - - ASSEMBLIES - - - - - -
A1	19D903827G1	BD, CPNT, RELAY.
		- - - - - CAPACITORS - - - - - -
C1	19A703314P12	CAP ELECT, MSI FORM
C2	19A703314P5	Electrolytic: 22 µF -10+50% tol, 25 VDCW; sim to Panasonic LS Series.
C3 thru C6	19A702250P113	Polyester: 0.1 µF + or -10%, 50 VDCW.
		- - - - - - - - DIODES - - - - - - -
D1 thru D4	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
D5 and D6	19A700047P3	Silicon: 100 mW; sim to 1N6263.
		- - - - - INDICATING DEVICES - - - -
DS1 and DS2	19A703595P4	Optoelectronic red; sim to Hewlett Packard HLMP-1301.
		- - - - - - - - JACKS - - - - - - - -
J1	19A116659P55	Connector, printed wiring: 3 contacts rated at 5 amps; sim to Molex 09 65-1031.
J2	19A704852P32	Printed wire, two part: 6 contacts, sim to Molex 22-29-2061.
		- - - - - - - - RELAYS - - - - - - -
K1 thru K3	19B235003P2	RELAY.
K4	19B235003P1	Relay: sim to AROMAT DS2E-N-12V.
		- - - - - - - RESISTORS - - - - - - -
R1 and R2	19A700106P87	Composition: 10K ohms + or - 5%, 1/4 w.
R4 thru R9	19A701250P176	Metal film: 604 ohms + or -1%, 1/4 w.
R10 and R11	19A700106P55	Composition: 470 ohms + or - 5%, 1/4 w.
		- - - - - - TERMINAL BOARDS - - - - - -
TB1	19A134790P3	8 Contacts rated at 20 amps @300 VRMS; sim to Beau 72508C.
		- - - - - INTEGRATED CIRCUITS - - - - -
U1 and U2	344A3290P2	INT CKT, DRV.
U3	19A700037P305	Digital: Hex Inverter; sim to 74LS04.
U4	19A134717P1	Linear: 5 Volt Regulator; sim to MC7805CT.
U5	19A700037P307	Digital: Quad 2-Input AND gate; sim to 74LS08.
		- - - - - - - MISCELLANEOUS - - - - - -
2	19C337058G1	SPT, CIB.
3	N80P13004B6	Screw, machine: Pan head; No. 6-32 x 1/4".
4	N404P13B6	Lockwasher, internal tooth: No. 6.

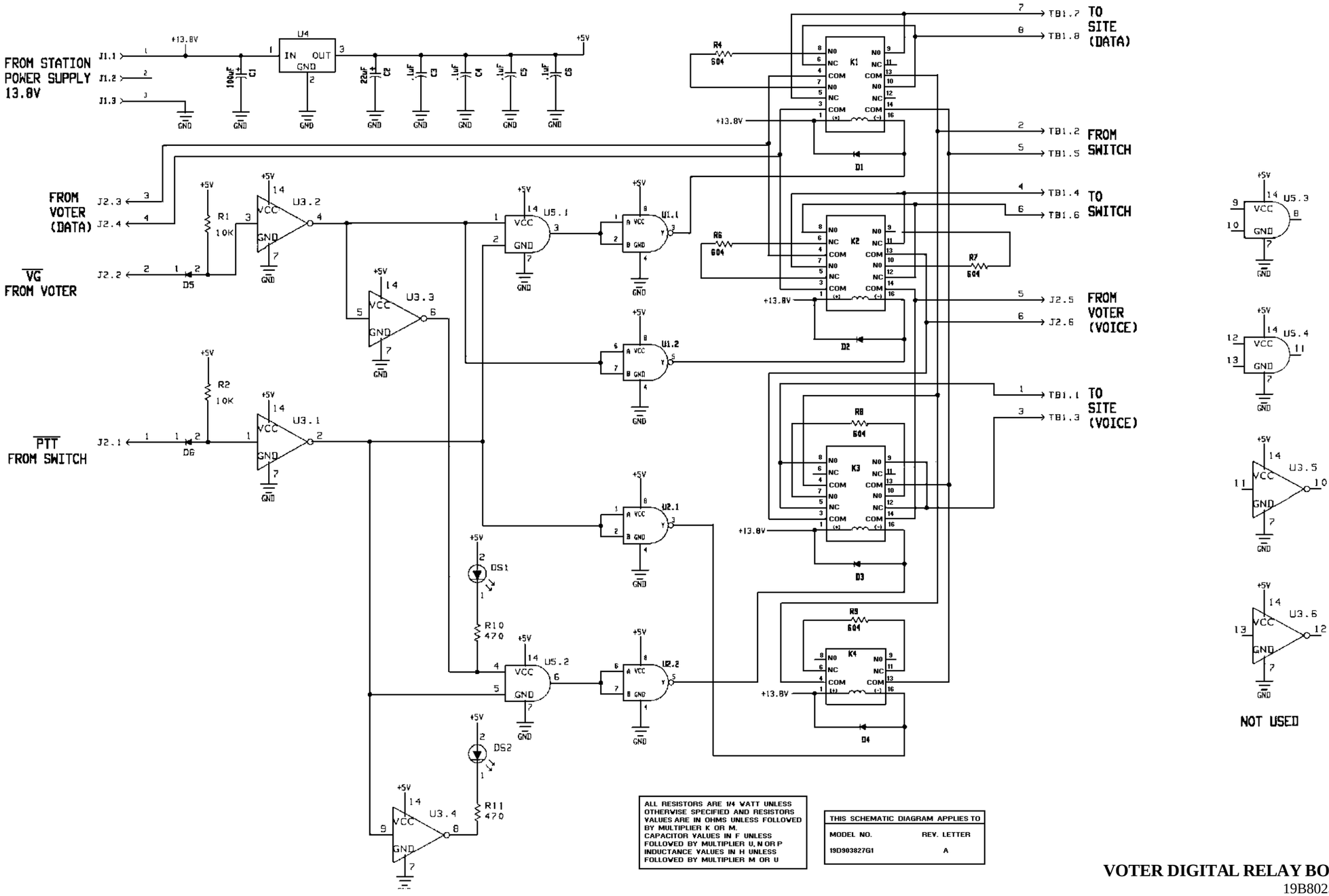
*COMPONENTS, ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES





VOTER DIGITAL RELAY BOARD
19B802596G1

(19B802596, Rev. 0)
(19D903827, Rev. 4)



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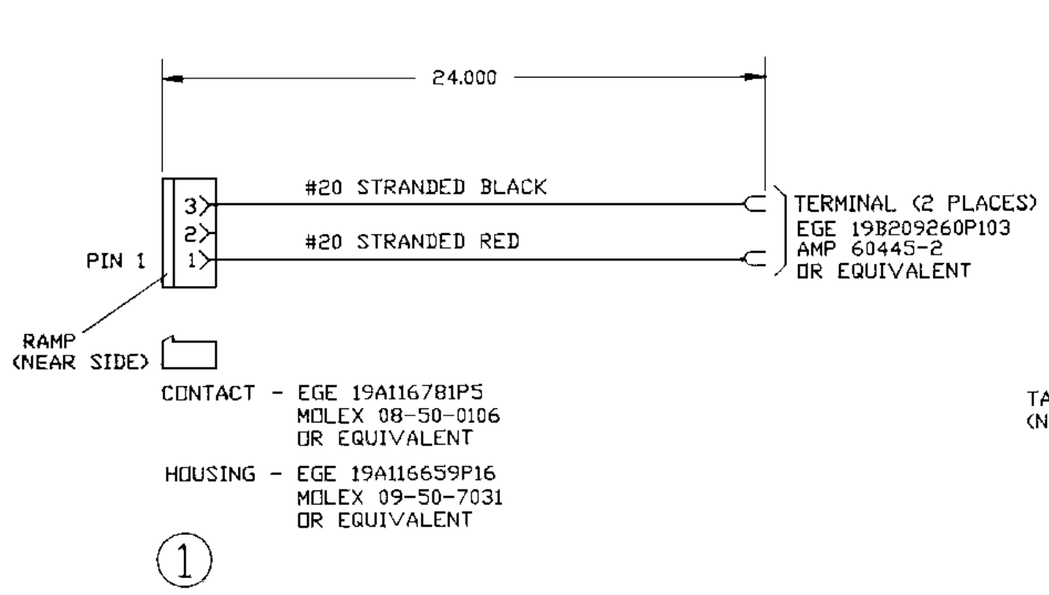
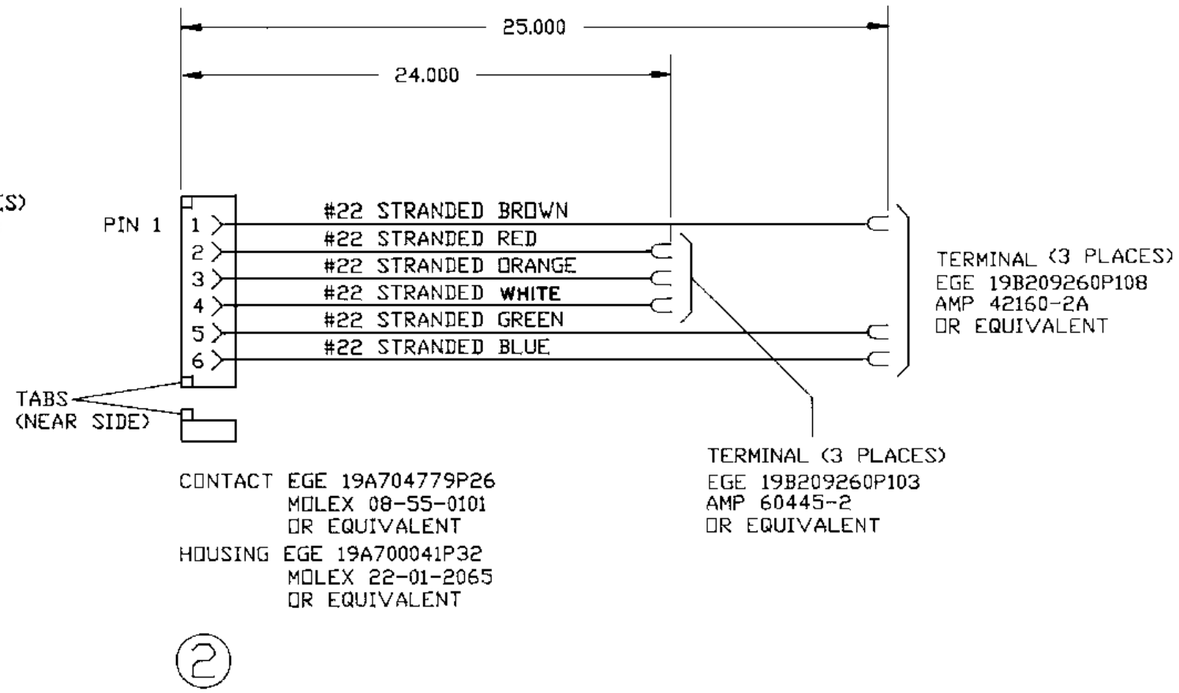
19B802596G1

(19D903825, Rev. 4)

FOR ALL PARTS:

1. CABLE LENGTH IS IN INCHES.
2. LENGTH IS MEASURED OVER CONNECTORS.
3. ALL CONNECTORS SHALL PROVIDE STRAIN RELIEF.
4. CABLE SHALL BE MARKED WITH EGE DRAWING AND PART NUMBER.
5. CABLE ASSEMBLY OPERATING TEMPERATURE RANGE -20 TO +80 DEG C.





CABLE ASSEMBLY
19C852342P1 & P2

(19C852342, Rev. 0)

LBI-38890

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