

**MAINTENANCE MANUAL
INTERGRADED MULTISITE CONSOLE
TERMINATOR BOARD
19D903308P1**

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SPECIFICATIONS*

INPUT VOLTAGE	
+5 V EXT 1	+5 Vdc
REGULATED VOLTAGE	+2 Vdc
PULL-UP TERMINATIONS	63 (39 Ohms)

* 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.

DESCRIPTION

Terminator board 19D903308P1 is used in the Integrated Multisite Console (IMC) trunking system to provide line terminations for FUTUREBUS lines. Two of these boards are used in a system; one is located at each end of daisy chained backplanes. Each board plugs into a socket on the back side of the back-plane. This board provides two redundant 2 volt voltage regulator circuits and sixty three (63) thirty nine (39) ohm pull-up terminations. These lines include the Time Division Multiplexed (TDM) buses and clocks. The Terminator board also provides fault detect circuitry which automatically switches from the primary regulator circuit to the secondary regulator circuit when the primary regulator circuit fails. Relay closures provide closure alarm outputs for each regulated supply.

CIRCUIT ANALYSIS

LINE TERMINATIONS

Line termination is provided by seven resistor networks, RP300 through RP306. Each network provides nine 39 ohm resistors. The common connection of each resistor connects to the +2 Vdc supply. The other end of each resistor connects to a FUTUREBUS signal contained on the IMC backplane.

PRIMARY/SECONDARY REGULATOR CIRCUITS

The primary/secondary regulator circuits provide the +2 Vdc pull-up voltage for the pull-up resistors. +5 V EXT 1 connects to the input of the regulator circuit at terminal 1 of fuse F100/200.

The component 100 series designation indicates the primary regulator circuit and the component 200 series designation indicates the secondary regulator circuit. A component 300 series designation indicates a component common to both primary and secondary circuits.

With +5 V applied LED100/200 illuminates. +5V line filtering is provided by 0.1 μ F capacitor C100/200 and 100 μ F capacitor C101/C201. The filtered +5V is also used to power comparator circuits U101C/U201C and U101D/U201D and relay circuit K100/K200.

The +2 Vdc regulation is provided by voltage regulators U100/U200 and associated components resistors R100/R200,

R102/R202, capacitors C102/202 and diodes D100/D200 and D101/201. Zener diode VR100/V200 prevents the regulator output from ever going above 3.3 Vdc. Filtering for the +2 V line is provided by 0.1 μ F capacitor C103/C203 and 100 μ F capacitor C104/C204. The +2 Vdc pull-up voltage from the primary regulator is connected through relay K100 normally open contacts 9 and 13 to the resistor networks (RP300 through RP306). If the primary regulator has failed, the +2 Vdc from the secondary regulator is connected to the resistor networks through relay K100 normally closed contacts 11 and 13 to the resistor networks. In either case, when +2 Vdc is present, LED300 illuminates. This voltage can be measured at TP300. Additional filtering is provided by 100 μ F capacitor C307.

COMPARATOR CIRCUITS

The primary regulator voltage comparator circuit consists of voltage comparators U101C and U101D (LM339D), transistor Q103, LED101 and relay K100. The negative input to U101C and positive input to U101D connect directly to the regulated +2 Vdc line. The positive input U101C and negative input U101D connect to the +5 Vdc line through voltage dividers R104/R105 and R106/R107 respectively. If the +2 Vdc regulator should fail (< 1.8 Vdc or > 2.2 Vdc) comparators U101C and U101D will sense the imbalance established between the +2 Vdc and references. The outputs on pins 14 and 13 respectively will go low causing transistor Q100 to stop conducting. Transistor Q100 not conducting causes relay K100 to de-activate, opening relay contacts 9 and 13 and closing relay contacts 11 and 13. The +2 Vdc is now taken from the secondary voltage regulator circuit. When Q101 conducts LED101 illuminates to indicate the primary regulator circuit is operational. When Q101 does not conduct, LED101 is off indicating the primary regulator circuit has failed.

If the secondary voltage regulator should also fail, the comparator circuits U201C and U201D (LM339) will cause LED201 to go out indicating a failure. In the case of both regulator circuits failing, LED300 would not be illuminated indicating a complete loss of +2 Vdc.

ALARM RELAY CLOSURES

Two sets of alarm relay contacts are provided to initiate an external alarm should a supply fail. Relay K100 normally closed contacts 4 and 6 (J300-1 and J300-2) are provided for primary voltage regulator circuit. Relay K200 normally closed contacts 4 and 6 (J300-3 and J300-4) are provided for the secondary voltage regulator circuit.

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ISSUE 2

SYMBOL	PART NUMBER	DESCRIPTION
----- CAPACITORS -----		
C100	19A702052P26	Chip: .1 μ F.
C101	19A703314P1	Leaded: 100 μ F.
C102	19A703314P10	Leaded: 10 μ F.
C103	19A702052P26	Chip: .1 μ F.
C104	19A703314P1	Leaded: 100 μ F.
C105	19A702052P26	Chip: .1 μ F.
C106 and C200		
C201	19A703314P1	Leaded: 100 μ F.
C202	19A703314P10	Leaded: 10 μ F.
C203	19A702052P26	Chip: .1 μ F.
C204	19A703314P1	Leaded: 100 μ F.
C205 and C206	19A702052P26	Chip: .1 μ F.
C300 thru C306	19A702052P14	Chip: .01 μ F.
C307	19A703314P1	Leaded: 100 μ F.
----- DIODES -----		
D100 thru D103	19A700053P2	Chip: Diode.
D200 thru D203		
----- FUSE -----		
F100 and F200	344A3139P9	Fuse.
----- CONNECTORS -----		
J1 and J2	19B801587P5	Connector.
J300	19A704852P30	Connector: 4 pin.
J301	19A704852P32	Connector: 6 pin.
K100 and K200	LM44B00	Relay: sim to CPCLARE.
LED100	10A149932P2	LED.
LED101		
LED200		
LED201 and LED300		
----- TRANSISTORS -----		
Q100 and Q200	19A702503P1	Transistor (NPN).
----- RESISTORS -----		
R100	19A702931P85	Chip: Resistor 75 Ohms 1%.
R101	19A702931P109	Chip: Resistor 121 Ohms 1%.
R102 and R103	19A702931P217	Chip: Resistor 1470 Ohms 1%.
R104	19A702931P411	Chip: Resistor 127k Ohms 1%.
R105	19A702931P401	Chip: Resistor 100k Ohms 1%.

SYMBOL	PART NUMBER	DESCRIPTION
R106	19A702931P425	Chip: Resistor 178k Ohms 1%.
R107	19A702931P401	Chip: Resistor 100k Ohms 1%.
R108	19A702931P201	Chip: Resistor 1000 Ohms 1%.
R200	19A702931P85	Chip: Resistor 75 Ohms 1%.
R201	19A702931P109	Chip: Resistor 121 Ohms 1%.
R202 and R203	19A702931P217	Chip: Resistor 1470 Ohms 1%.
R204	19A702931P411	Chip: Resistor 127k Ohms 1%.
R205	19A702931P401	Chip: Resistor 100k Ohms 1%.
R206	19A702931P425	Chip: Resistor 178k Ohms 1%.
R207	19A702931P401	Chip: Resistor 100k Ohms 1%.
R208	19A702931P201	Chip: Resistor 1000 Ohms 1%.
R300	19A702931P173	Chip: Resistor 562 Ohms 1%.
--- RESISTOR NETWORKS ---		
RP300 thru RP306	344A3351P1	Resistor Network 39 Ohms.
----- TEST POINTS -----		
TP100, TP101, TP200, TP201		
TP300 thru TP302	344A3367P1	Test Point.
----- INTEGRATED CIRCUITS -----		
U100	19A134768P2	Voltage Regulator, Linear 3 Amp.
U101	19A704125P1	Quad Voltage Comparator.
U200	19A134768P2	Voltage Regulator, Linear 3 Amp.
U201	19A704125P1	Quad Voltage Comparator.
----- INNER DIODES -----		
VR100 and VR200	344A3364P1	Zener Diode 3.3 VOLTS.
XF101	19A116688P2	Fuse Clip.
XF102		
XXF201 and XF202		
----- HEAT SINKS -----		
XQ100 and XQ200	6107	Heat Sink Thermalloy.

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 the descriptions of parts affected by these revisions.

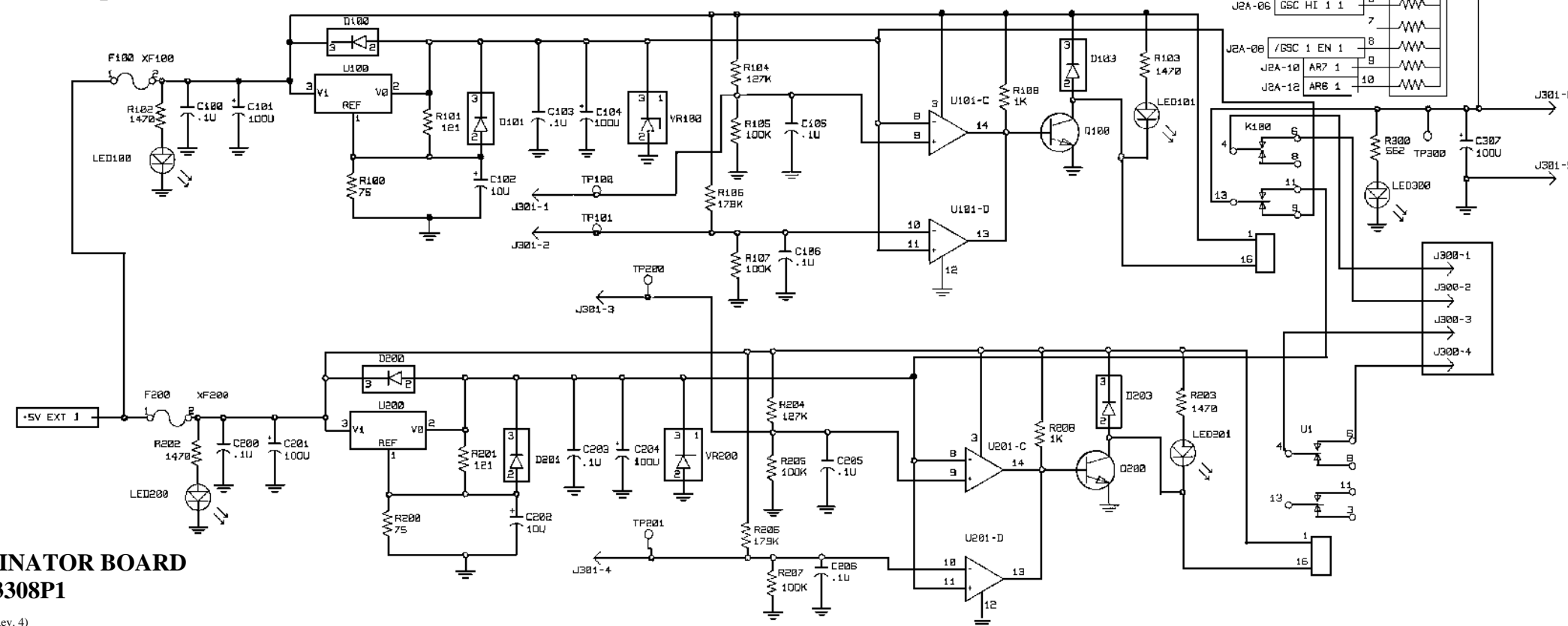
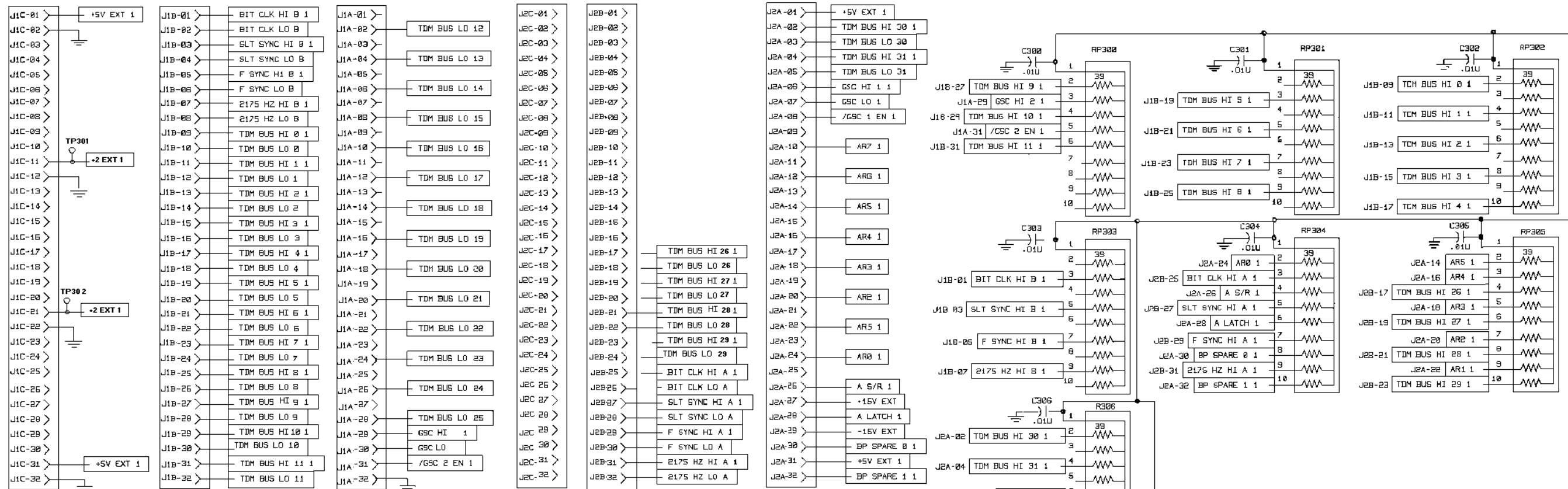
Rev. A - Terminator Board 19D903308P1

To reduce audio distortion caused by a noisy Bit Clock signal, disconnected the following pins on connector J1 from their respective pull-up resistors: J1A-01, J1A-03, J1A-05, J1A-07, J1A-09, J1A-11, J1A-13, J1A-15, J1A-17, J1A-19, J1A-21, J1A-23A, J1A-25A and J1A-27. This change coincides with Clock Board 19D903305P1 Rev. D change.

REV. B - Terminator Board 19D903308P1

To improve audio performance when an Audio Board is installed in the last slot of the Card Cage (slot 21), removed grounds from the following pins at connector J2: J2C-09, J2C-11, J2C-13, J2C-15, J2C-17, J2C-19, J2C-21, J2C-23, J2C-25.

*COMPONENTS, ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

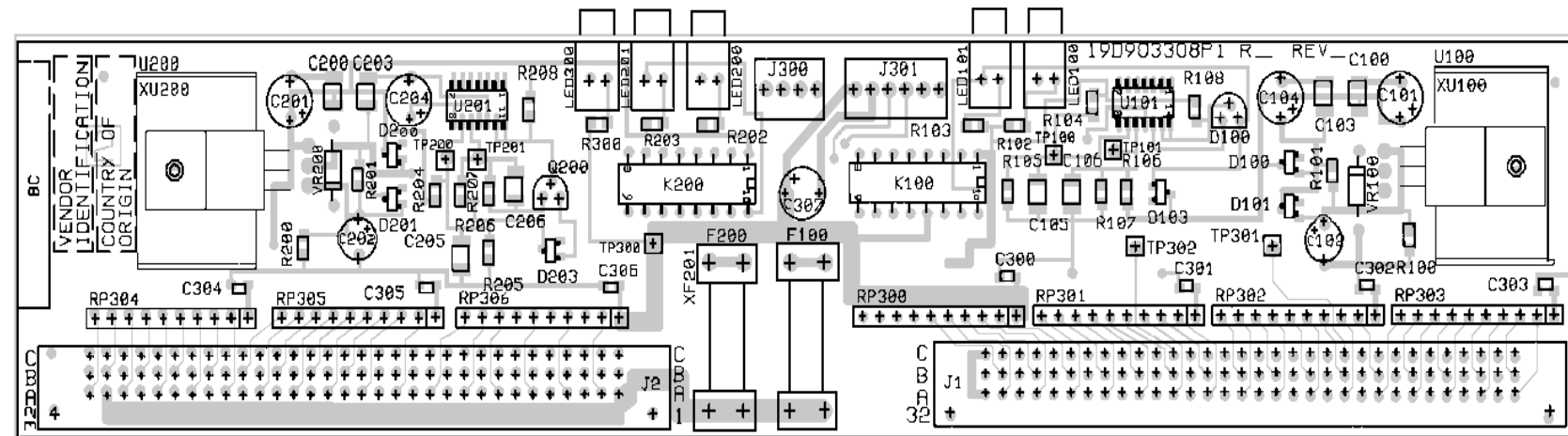


NOTES:
 REVISION A AND EARLIER BOARDS HAVE J2C PINS
 9, 11, 13, 15, 17, 19, 21, 23 & 25 CONNECTED
 GROUND ON PWB.

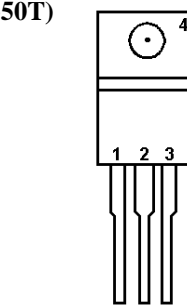
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(19D903157, Rev. 4)

COMPONENT SIDE

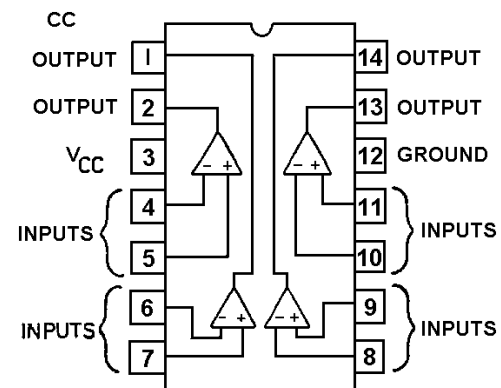


ADJUSTABLE VOLTAGE REGULATOR U100/U200
19A134768P2 (LM350T)

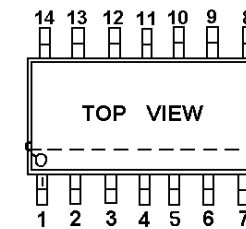


ADJUSTABLE REGULATOR
SIMILAR TO LM350T (TO-220 PKG)
PIN NO. 1. ADJUST
2. V OUT
3. V IN

QUAD VOLTAGE COMPARATOR U101/U201
19A704125P1 (LM339D)



NOTE: OUTPUTS ARE OPEN COLLECTOR



TERMINATOR BOARD
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(19D903308, Rev. 4)
(19D903152, Component Side, Rev. 2)