



Type LCB II Relay Modules (with DIN Connectors)

Effective: March 1989
NEW INFORMATION

These instructions contain a brief description, schematic, component location and bill of material for the following LCB modules:

DTD	Demodulator/Time Delay
MD	Modulator/Demodulator
IFDT-1/2	Audio Dual Tone Interface
IFO-1/2	Fiber Optic Interface
RELAY	Relay Sensing Logic
DTT	Direct Transfer Trip
AXLM	Auxiliary Logic
ARTM-1/2	AR Trip Logic

CAUTION: Printed circuit modules should not be removed or inserted while the LCB is energized. Failure to observe this precaution can result in an undesired tripping output and/or component damage. In addition, modules should not be interchanged between relays without rechecking calibration.

All integrated circuits used on the modules are sensitive to and can be damaged by the discharge of static electricity. Electrostatic discharge precautions should be observed when handling modules or individual components.

CONSTRUCTION

The LCB modules are designed for insertions into a 3 rack unit LCB chassis. Module terminations are provided by means of a terminal connector.

Following is a tabulation of the module widths and number of connector terminals.

Module Name	Module Location Widths	No. Connector Terminals
ALS	2	32
DTD	1	32
MD	1	32
IFDT-1/2	1	32
IFO-1/2	1	32
RELAY	1.75	32
DTT	1	32
AXLM	1	32
ARTM-1/2	3	32

NOTE: 1 module location width equals 1.2 inches.

MODULE APPLICATION/DESCRIPTION

ALS — Analog Logic Power Supply

The ALS power supply covered in other instructions provides $\pm 15\text{Vdc}$ to power the LCB relay. Units are available for 48, 125 or 250 Vdc station batteries. This module is covered by I.L. 41-830.12.

DTD — Demodulator and Time Delay

The DTD module is used only for 3 terminal line applications and contains a demodulator for the second channel and a channel delay equalization circuit (TD) to compensate for possible different delays in the two channels.

All possible contingencies which may arise during installation, operation or maintenance, and all details and variations of this equipment do not purport to be covered by these instructions. If further information is desired by purchaser regarding this particular installation, operation or maintenance of this equipment, the local ABB Power T&D Company Inc. representative should be contacted.

MD – Modulator/Demodulator

The MD module contains both the modulator and demodulator for transmission and detection of the LCB communicated signal.

The modulator generates the 1.7 KHz carrier signal and contains the circuitry to provide the modulation of the carrier signal based on the sequence output voltage from the RELAY module. In turn, the modulated output connects to the channel interface for transmission to the remote terminal.

The demodulator receives its information from the respective channel interface (audio or optical) and reconstructs the remote LCB signal.

IFDT – Audio Dual Tone Interface

The IFDT module contains the circuitry to provide both the transmit and receive isolated interface with the user's audio tone equipment or equivalent.

The transmitter provides adjustable output for proper coordination with the communication medium.

In the receive portion, input level sensitivity is adjustable and stabilized with an AGC circuit. Detection circuits are employed for high and low level, excessive noise to signal levels, frequency translation and missing cycle periods.

For 3 terminal line applications, two channel interface modules are required.

IFO – Optical Interface

The IFO module contains the circuitry to provide both the transmit and receive interface to fiber optic cable.

The transmitter consists of a fiber optic LED emitter mounted on a bracket extending to the rear of the module.

For the receive portion, a bulkhead connector mounted on the same bracket as the emitter provides a means for connection of the receive fiber optic cable. From this connector, a larger core fiber connects to a fiber optic PIN photodiode

detector in a shielded receiver circuit. Following the detection, the receiver employs an AGC circuit, low level and missing cycle detection.

For 3 terminal line applications, two channel interface modules are required.

RELAY – Relay Sensing

The RELAY module contains the circuitry to generate, compare and determine trip for the LCB current differential system relaying quantities. Included are: a sequence network with independent sensitivity selection for positive (P), negative (N) and zero (Z), adjustable system pickup setting (T DIAL), adjustable channel delay equalizer, comparison circuits for the local versus remote quantities, trip detection and channel monitoring functions.

DTT – Direct Transfer Trip

The DTT module is used as an option to provide a direct transfer trip function utilizing the same channel as that employed for normal LCB relaying.

For tripping, the LCB system utilizes the ARTM-2 module, which provides 2 AR relays, with one dedicated for direct transfer trip.

AXLM – Auxiliary Logic

The AXLM module is used to provide auxiliary logic, timing, indication and input/output features associated with the LCB relay system. Such features include electrical target reset, trip desensitizing on breaker closing, overcurrent trip options on loss of channel(s), and sustained loss of channel monitoring and indication.

ARTM-1/2 – AR Trip Module

-1 (One AR)

-2 (Two AR)

The ARTM-1, single trip, or ARTM-2 double trip (for use with direct transfer trip option), module provides the final AR contact tripping output for the LCB relay system. Block of tripping and indication during dc power up/down as well as provision for manual reset are also provided on this module.

MODULE REFERENCE INFORMATION**DTD Module – Style 1609C38G02**

Internal Schematic: 1355D47
 Component Location: 1499B27C
 Chassis Location: POS. C

MD Module – Style 1609C38G01

Internal Schematic: 1355D39
 Component Location: 1499B27C
 Chassis Location: POS. D

IFDT Module – Style 1609C39G01

Internal Schematic: 1355D40
 Component Location: 1499B28C
 Chassis Location: POS. F
 (Channel 1)
 POS. E
 (Channel 2)

IFO Module**Style 1609C40G01 (850NM/SMA)****Style 1609C40G02 (1300NM/SMA)**

Internal Schematic: 1355D41
 Component Location: 1499B44
 Chassis Location: POS. F
 (Channel 1)
 POS. E
 (Channel 2)

RELAY Module – Style 1609C41G01

Internal Schematic: 1355D42
 Component Location: 1499B30C
 Chassis Location: POS. G

DTT Module – Style 1609C42G01 (2 Term.)**Style 1609C42G02 (3 Term.)**

Internal Schematic: 1355D43
 Component Location: 1499B31C
 Chassis Location: POS. K

AXLM Module – Style 1609C43G01

Internal Schematic: 1355D44
 Component Location: 1499B32C
 Chassis Location: POS. L

ARTM-1 Module – Style 1609C44G01

(No Transfer trip)

Internal Schematic: 1355D45
 Component Location: 1499B49
 Chassis Location: POS. M

ARTM-2 Module – Style 1609C44G02

(Transfer trip)

Internal Schematic: 1355D45
 Component Location: 1484B32
 (Subassembly) and 1499B49 (Main Assembly)
 Chassis Location: POS. M
 (NOTE: Subassembly Style is 1581C27G01)

RENEWAL PARTS

Repair work can be done most satisfactorily at the factory. However, interchangeable spare modules or components can be furnished to the customers who are equipped for doing repair work. When ordering parts (components, modules, etc.) always give the complete catalog number and appropriate Westinghouse style number(s).

ATTACHMENTS**A. Internal Schematics**

Figure	Module	Drawing
1	DTD	1355D47
2	MD	1355D39
3	IFDT	1355D40
4	IFO	1355D41
5	RELAY	1355D42
6	DTT	1355D43
7	AXLM	1355D44
8	ARTM-1/2	1355D45

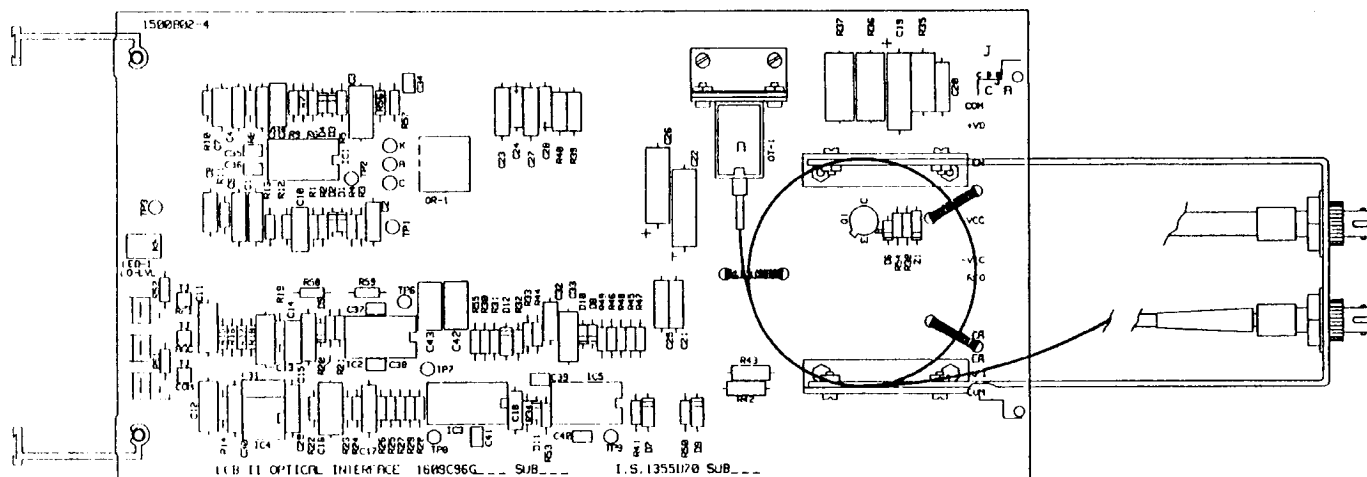
B. Component Locations

Figure	Module	Drawing
9	MD/DTD	1499B27C
10	IFDT	1499B28C
11	IFO	1499B44
12	RELAY	1499B30C
13	DTT	1499B31C
14	AXLM	1499B32C
15	ARTM-1	1499B49
16	ARTM-2	1484B32 (Subassembly) 1499B49 (Main Assembly)

960609

COMPONENT LOCATION RELAY TYPE-LCB II IFO (HIGH POWER) BOARD

1500B02-001



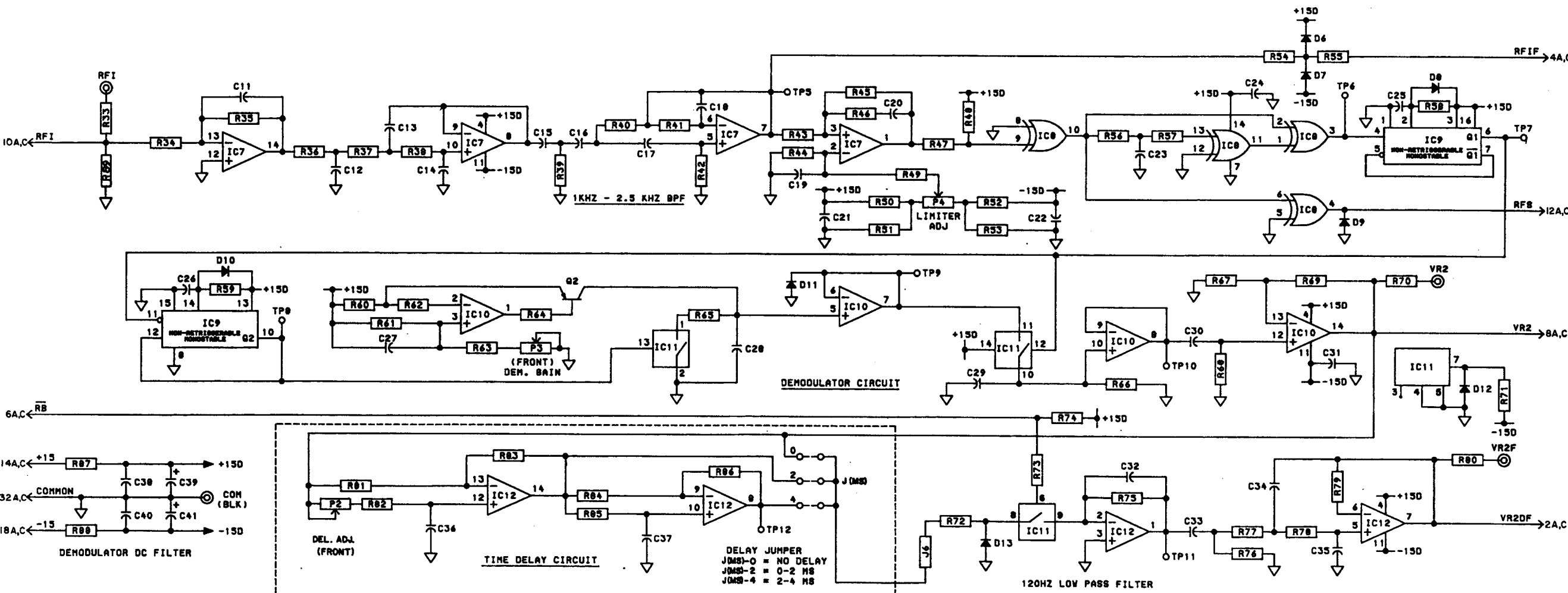
SUB TABLE		
COL. 1 STAMP MOD. SUB NO.	COL. 2 STAMP SCHEME SUB NO.	ARTWORK SUB NO.
3	2	3

PART NAME	APPR. TYPE	PART DESCRIPTION	SUB
MODULE	LCB II	OPTICAL INTERFACE	3
ABB POWER T&D COMPANY INC.			
MODULE ASSEMBLY DWG			
TITLE OPTICAL INTERFACE MODULE (IFO) - HIGH POWER			
LCB II RELAY			
DATE	APPD	DWG. NO. 1609C96	
CHKD.	APPD	SHEET 3 of 3	
	APPD		
RELAY DIVISION - CORAL SPRINGS, FLORIDA, U.S.A.			

ROUTING CODE

ABB

DEMODULATOR, TIME DELAY (DTD II)
MODULE ASSEMBLY - 1609C38
COMPONENT LOCATION - 1499B27



INTERNAL SCHEMATIC
BLOCK DIAGRAM
MODULE ASSEMBLY 1609C38
COMPONENT LOCATION 1499B27

CAPACITOR	STYLE
C11 .001 MFD 200V +-5% MET-POLY CARD	3534A68H02
C12 .015 MFD 200V +-2% MET-POLY CARD	3534A68H05
C13 .001 MFD 200V +-5% MET-POLY CARD	3534A68H02
C14 270 PF 500V +-2% NICA	763A257H13
C15 .022 MFD 100V +-2% MET-POLY CARD	3533A53H01
C16 .001 MFD 200V +-5% MET-POLY CARD	3534A68H02
C17 .001 MFD 200V +-5% MET-POLY CARD	3534A68H02
C18 .01 MFD 200V +-5% MET-POLY CARD	3534A68H03
C19 .1 MFD 100V +-5% MET-POLY CARD	3534A68H08
C20 10 PF 500V +-5% NICA	763A257H03
C21 .1 MFD 100V +-5% MET-POLY CARD	3534A68H08
C22 .1 MFD 100V +-5% MET-POLY CARD	3534A68H08
C23 47 PF 500V +-2% NICA	763A257H17
C24 .1 MFD 100V +-5% MET-POLY CARD	3534A68H08
C25 510 PF 500V +-2% NICA	061A044H10
C26 .001 MFD 200V +-1% MET-POLY CARD	3534A68H01
C27 .1 MFD 100V +-5% MET-POLY CARD	3534A68H08
C28 5100 PF 500V +-2% NICA	107A058H05
C29 5100 PF 500V +-2% NICA	107A058H05
C30 47 MFD 100V +-5% MET-POLY CARD	3534A68H03
C31 .1 MFD 100V +-5% MET-POLY CARD	3534A68H08
C32 .01 MFD 200V +-2% MET-POLY CARD	3533A53H02
C33 .1 MFD 100V +-5% MET-POLY CARD	3534A68H08
C34 .047 MFD 100V +-5% MET-POLY CARD	3534A68H07
C35 .01 MFD 200V +-2% MET-POLY CARD	3533A53H02
C36 .012 MFD 200V +-5% MET-POLY CARD	3534A68H04
C37 .01 MFD 200V +-5% MET-POLY CARD	3534A68H03
C38 .0.1 MFD 100V +-5% MET-POLY CARD	3534A68H08
C39 100 MFD 35V +-20% TANTALUM	000A363H01
C40 0.1 MFD 100V +-5% MET-POLY CARD	3534A68H08
C41 100 MFD 35V +-20% TANTALUM	000A363H01

DIODE	STYLE
D04 1N445A 225V	037A692H03
D07 1N445A 225V	037A692H03
D08 1N4148 75V	036A920H06
D09 1N4148 75V	036A920H06
D10 1N4148 75V	036A920H06
D11 1N4148 75V	036A920H06
D12 1N4148 75V	036A920H06
D13 1N4148 75V	036A920H06

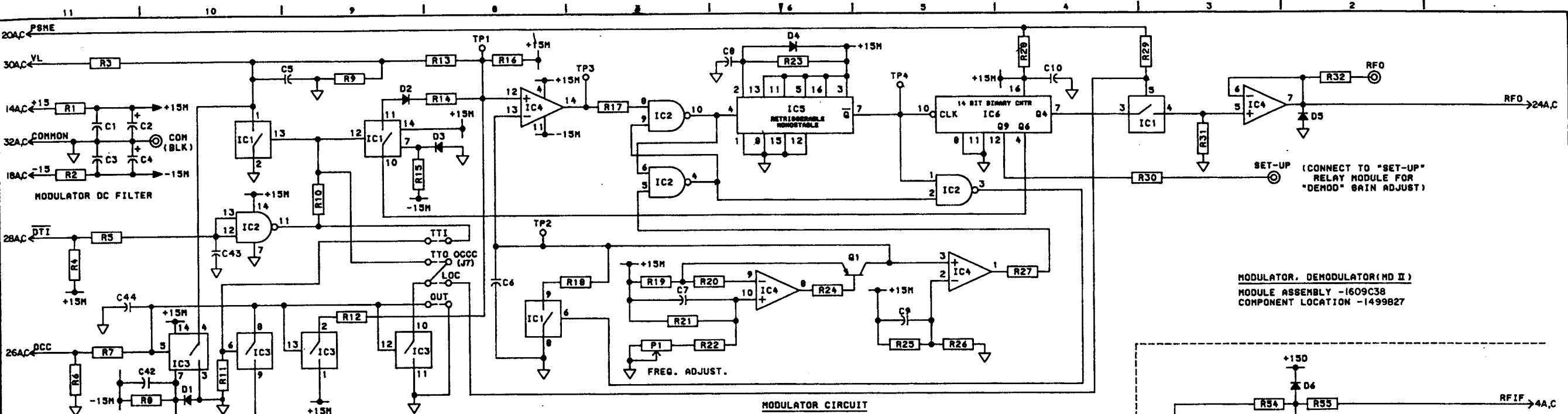
INT CKT	STYLE
IC07 TL074IJ QUAD OP AMP	3520A90H01
IC08 MC14070BAL QUAD EXCLUSIVE OR	3527A26H01
IC09 MC14030BAL DUAL PREC MONO MULTIVIB	3527A09H01
IC10 TL074IJ QUAD OP AMP	3520A90H01
IC11 MC14060BAL QUAD BILATERAL SWITCH	3527A09H06
IC12 TL074IJ QUAD OP AMP	3520A90H01

POT	STYLE
P02 100K 3/4W 20% TRIMPOT	3527A30H07
P03 20K 3/4W +-10% TRIMPOT	3527A30H04
P04 500 OHM 3/4W +-10% TRIMPOT	3527A30H02

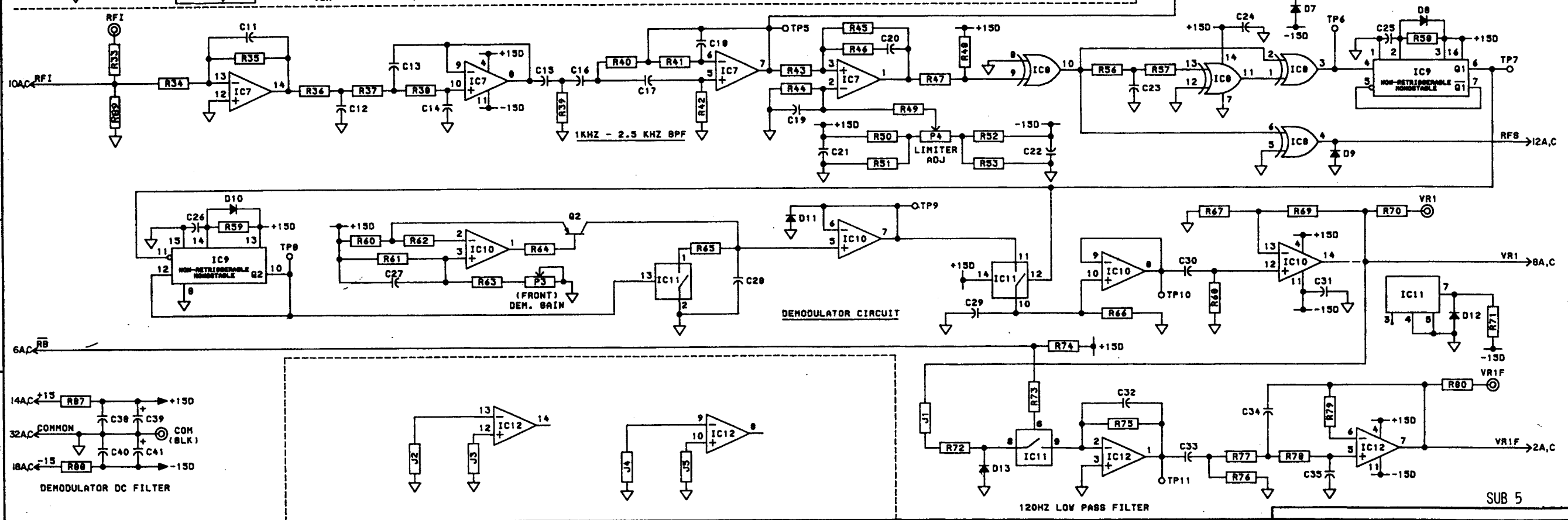
TRANSISTOR	STYLE
Q02 2N3799 PNP	3527A33H01

RESISTOR	STYLE
R33 3.01K 1/8W 1% METAL FILM	3535A30H47
R34 20K 1/8W 1% METAL FILM	3535A37H30
R35 20K 1/8W 1% METAL FILM	3535A37H30
R36 3.92K 1/8W 1% METAL FILM	3535A30H50
R37 121K 1/8W 1% METAL FILM	3532A30H09
R38 121K 1/8W 1% METAL FILM	3532A30H09
R39 8.20K 1/4W 1% METAL FILM	3535A30H09
R40 82.0K 1/8W 1% METAL FILM	3535A37H09
R41 301K 1/8W 1% METAL FILM	3532A30H47
R42 301K 1/8W 1% METAL FILM	3532A30H47
R43 10K 1/8W 1% METAL FILM	3535A37H01
R44 1 NEG 1/4W 1% METAL FILM	040A022H39
R45 15M 5% CARB 1/2W	107A290H40
R46 100K 1/8W 1% METAL FILM	3532A30H01
R47 51.1K 1/8W 1% METAL FILM	3535A37H49
R48 51.1K 1/8W 1% METAL FILM	3535A37H49
R49 10K 1/8W 1% METAL FILM	3535A37H01
R50 15K 1/8W 1% METAL FILM	3535A37H10
R51 30.1 OHM 1/8W 1% METAL FILM	3535A42H47
R52 10K 1/8W 1% METAL FILM	3535A37H10
R53 30.1 OHM 1/8W 1% METAL FILM	3535A42H47
R54 10K 1/8W 1% METAL FILM	3535A37H01
R55 10K 1/8W 1% METAL FILM	3535A37H01
R56 51.1K 1/8W 1% METAL FILM	3535A37H49
R57 10K 1/8W 1% METAL FILM	3535A37H01
R58 15K 1/8W 1% METAL FILM	3535A37H10
R59 100K 1/8W 1% METAL FILM	3532A30H01
R60 15K 1/8W 1% METAL FILM	3535A37H10
R61 30.1K 1/8W 1% METAL FILM	3535A37H47
R62 10K 1/8W 1% METAL FILM	3535A37H10
R63 000K 1/8W 1% METAL FILM	000A037H01
R64 511 OHM 1/4W 1% METAL FILM	040A010H20
R65 100 OHM 1/4W 1% METAL FILM	040A010H51
R66 50M 1/8W 1% METAL OXIDE CERMET	107A440H24
R67 133K 1/8W 1% METAL FILM	3532A30H13
R68 110K 1/8W 1% METAL FILM	3532A30H05
R69 750K 1/8W 1% METAL FILM	3532A30H05
R70 3.01K 1/8W 1% METAL FILM	3535A30H47
R71 3.01K 1/4W 1% METAL FILM	040A010H94
R72 200K 1/8W 1% METAL FILM	3532A30H30
R73 10K 1/8W 1% METAL FILM	3535A37H01
R74 51.1K 1/8W 1% METAL FILM	3535A37H49
R75 100K 1/8W 1% METAL FILM	3532A30H01
R76 150K 1/8W 1% METAL FILM	3532A30H10
R77 75K 1/8W 1% METAL FILM	3535A37H05
R78 75K 1/8W 1% METAL FILM	3535A37H05
R79 301K 1/8W 1% METAL FILM	3532A30H47
R80 3.01K 1/8W 1% METAL FILM	3535A30H47
R81 200K 1/8W 1% METAL FILM	3532A30H30
R82 1K 1/8W 1% METAL FILM	3535A30H01
R83 200K 1/8W 1% METAL FILM	3532A30H30
R84 200K 1/8W 1% METAL FILM	3532A30H30
R85 100K 1/8W 1% METAL FILM	3532A30H01
R86 200K 1/8W 1% METAL FILM	3532A30H30
R87 2.7 OHM 1/2W 5% CARB	107A290H31
R88 2.7 OHM 1/2W 5% CARB	107A290H31
R89 10K 1/8W 1% MAF	RM0022PQ49

LINK	STYLE
J(M8)	BLUE CLIP LINK 3532A04H01

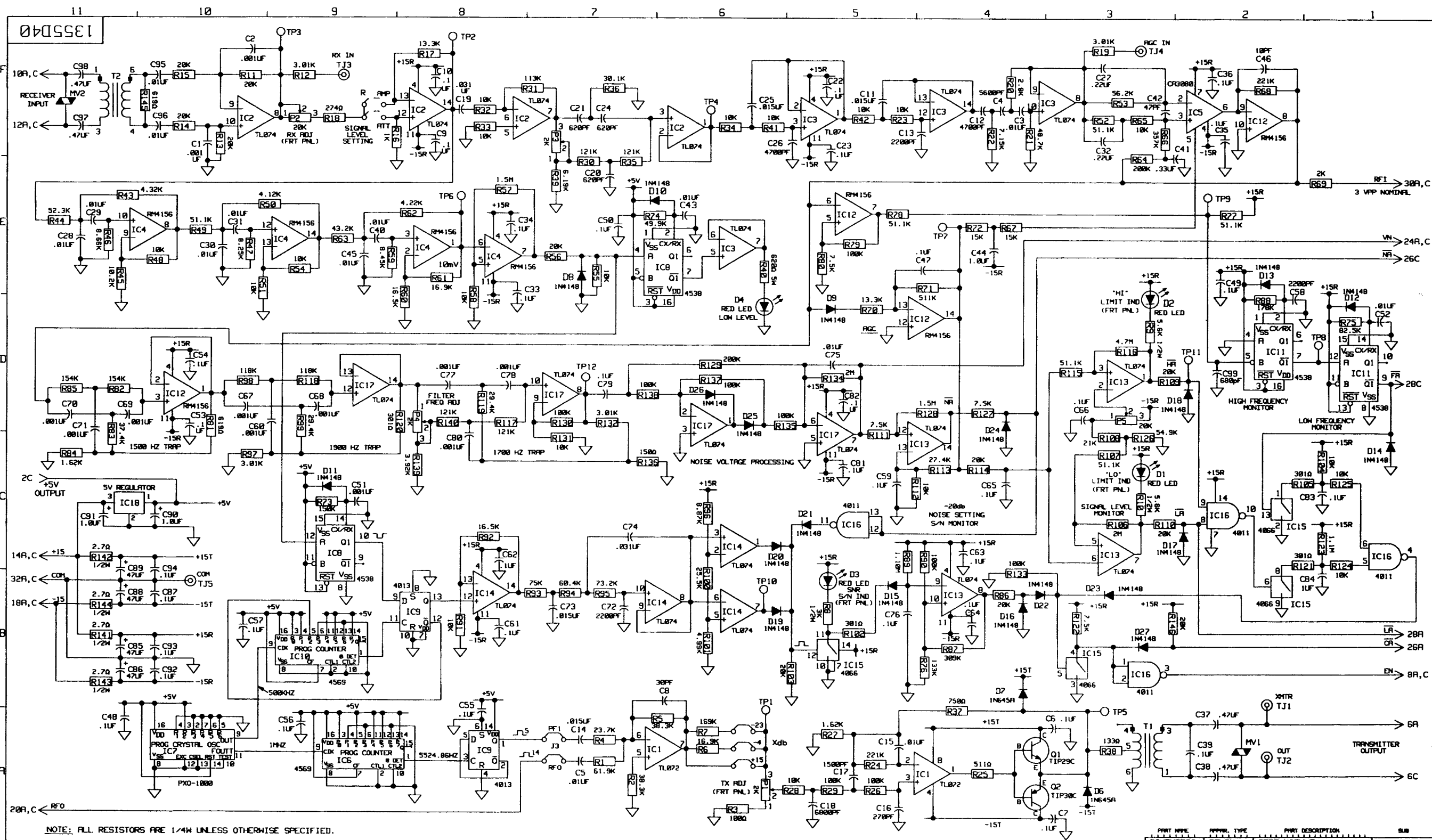


MODULATOR, DEMODULATOR (MD II)
MODULE ASSEMBLY -1609C38
COMPONENT LOCATION -1499B27



LINK	STYLE
J7 (CCCC) BLUE CLIP LINK	3532A54HOI

1355D41



NOTE: ALL RESISTORS ARE 1/4W UNLESS OTHERWISE SPECIFIED.

CAPACITOR

C01	3534R68H01	.001uF, 200V, 1% POLYCARB
C02	3534R68H01	.001uF, 200V, 1% POLYCARB
C03	3533R53H02	.01uF, 200V, 2% MET POLYCARB
C04	3533R53H12	5600pF, 100V, 2% MET POLYCARB
C05	3533R53H02	.01uF, 200V, 2% MET POLYCARB
C06	3534R68H08	.1uF, 100V, 5% POLYCARB
C07	3534R68H08	.1uF, 100V, 5% POLYCARB
C08	3532R29H13	30pF, 50V, 20% MONO CERAMIC
C09	3532R29H13	.1uF, 50V, 20% MONO CERAMIC
C10	3533R53H11	.1uF, 50V, 20% MONO CERAMIC
C11	3534R68H05	.015uF, 200V, 2% MET POLYCARB
C12	3533R53H11	4700pF, 100V, 2% MET POLYCARB
C13	3533R53H05	2200pF, 400V, 2% POLYCARB
C14	3534R68H05	.015uF, 200V, 2% POLYCARB
C15	3533R53H02	.01uF, 200V, 2% MET POLYCARB
C16	762P75H12	270pF, 500V, 5% MICA
C17	3533R53H08	1500pF, 600V, 2% POLYCARB
C18	3533R53H08	6800pF, 200V, 2% POLYCARB
C19	3526R65H02	.031uF, 100V, 1% MET MYLAR
C20	3532R31H08	620pF, 300V, 1% DIPPED MICA
C21	3532R31H08	620pF, 300V, 1% DIPPED MICA
C22	3532R29H13	.1uF, 50V, 20% MONO CERAMIC
C23	3532R29H13	.1uF, 50V, 20% MONO CERAMIC
C24	3532R31H08	620pF, 300V, 1% DIPPED MICA
C25	3534R68H05	.015uF, 200V, 2% POLYCARB
C26	3533R53H11	4700pF, 100V, 2% MET POLYCARB
C27	3534R68H10	.22uF, 100V, 5% POLYCARB
C28	3533R53H02	.01uF, 200V, 2% MET POLYCARB
C29	3533R53H02	.01uF, 200V, 2% MET POLYCARB
C30	3533R53H02	.01uF, 200V, 2% MET POLYCARB
C31	3533R53H02	.01uF, 200V, 2% MET POLYCARB
C32	3534R68H10	.22uF, 100V, 5% POLYCARB
C33	3532R29H13	.1uF, 50V, 20% MONO CERAMIC
C34	3532R29H13	.1uF, 50V, 20% MONO CERAMIC
C35	3534R68H08	.1uF, 100V, 5% MET POLYCARB
C36	3534R68H08	.1uF, 100V, 5% MET POLYCARB
C37	3526R65H06	.47uF, 100V, 1% MET MYLAR
C38	3526R65H06	.47uF, 100V, 1% MET MYLAR
C39	3534R68H08	.1uF, 100V, 5% MET POLYCARB
C40	3533R53H02	.01uF, 200V, 2% MET POLYCARB
C41	863R166H16	.33uF, 50V, 5% MET POLYCARB
C42	763P208H17	47pF, 500V, 2% MICA
C43	3532R29H13	.01uF, 50V, 20% MONO CERAMIC
C44	3534R68H11	.1uF, 50V, 5% POLYCARB
C45	3533R53H02	.01uF, 200V, 2% MET POLYCARB
C46	763P208H03	10pF, 500V, 5% MICA
C47	3534R68H08	.1uF, 100V, 5% POLYCARB
C48	3532R29H13	.1uF, 50V, 20% MONO CERAMIC
C49	3534R68H08	.1uF, 100V, 5% MET POLYCARB
C50	3534R68H08	.1uF, 100V, 5% MET POLYCARB
C51	3534R68H01	.001uF, 200V, 1% POLYCARB
C52	3533R53H02	.01uF, 200V, 2% MET POLYCARB
C53	3532R29H13	.1uF, 50V, 20% MONO CERAMIC
C54	3532R29H13	.1uF, 50V, 20% MONO CERAMIC
C55	3532R29H13	.1uF, 50V, 20% MONO CERAMIC
C56	3532R29H13	.1uF, 50V, 20% MONO CERAMIC
C57	3532R29H13	.1uF, 50V, 20% MONO CERAMIC
C58	3533R53H05	2200pF, 400V, 2% POLYCARB
C59	3534R68H08	.1uF, 100V, 5% POLYCARB
C60	3534R68H01	.001uF, 200V, 1% POLYCARB
C61	3532R29H13	.1uF, 50V, 20% MONO CERAMIC
C62	3532R29H13	.1uF, 50V, 20% MONO CERAMIC
C63	3532R29H13	.1uF, 50V, 20% MONO CERAMIC
C64	3532R29H13	.1uF, 50V, 20% MONO CERAMIC
C65	3534R68H08	.1uF, 100V, 5% POLYCARB
C66	3534R68H08	.1uF, 100V, 5% POLYCARB
C67	3534R68H01	.001uF, 200V, 1% POLYCARB
C68	3534R68H01	.001uF, 200V, 1% POLYCARB
C69	3534R68H01	.001uF, 200V, 1% POLYCARB
C70	3534R68H01	.001uF, 200V, 1% POLYCARB
C71	3534R68H01	.001uF, 200V, 1% POLYCARB
C72	3533R53H05	2200pF, 400V, 2% POLYCARB
C73	3534R68H05	.015uF, 200V, 2% MET POLYCARB
C74	3526R65H02	.031uF, 100V, 1% MET MYLAR
C75	3533R53H02	.01uF, 200V, 2% MET POLYCARB
C76	3533R53H03	.1uF, 50V, 2% MET POLYCARB
C77	3534R68H01	.001uF, 200V, 1% POLYCARB
C78	3534R68H01	.001uF, 200V, 1% POLYCARB
C79	3534R68H08	.1uF, 100V, 5% POLYCARB
C80	3534R68H01	.001uF, 200V, 1% POLYCARB
C81	3532R29H13	.1uF, 50V, 20% MONO CERAMIC
C82	3532R29H13	.1uF, 50V, 20% MONO CERAMIC
C83	3533R53H03	.1uF, 50V, 2% MET POLYCARB
C84	3534R68H11	1.0uF, 50V, 5% POLYCARB
C85	3533R75H13	47uF, 35V, 20% DIPPED TANT.
C86	3533R75H13	47uF, 35V, 20% DIPPED TANT.

POTENTI

P1	3527R30H06	2K, .75W, 10% TRIMPOT
P2	3527R30H06	20K, .75W, 10% TRIMPOT
P3	3534R25H05	2K, .5W, 10% (TOP ADJUST)
P4	3534R25H05	2K, .5W, 10% (TOP ADJUST)
P5	3523R42H02	20K, .5W, 10% (TOP ADJUST)

RESISTOR

R1	3535R37H77	61.9K, .25W, 1% METAL FILM
R2	3535R37H57	38.3K, .25W, 1% METAL FILM
R3	3535R39H01	100 OHM, .25W, 1% METAL FILM
R4	3535R37H37	23.7K, .25W, 1% METAL FILM
R5	3535R37H57	38.3K, .25W, 1% METAL FILM
R6	3535R37H23	16.9K, .25W, 1% METAL FILM
R7	3532R30H23	169K, .25W, 1% METAL FILM
R8	629R531H43	3.0K, .50W, 2% METAL FILM
R9	629R531H50	5.6K, .5W, 2% METAL FILM
R10	629R531H50	5.6K, .5W, 2% METAL FILM
R11	3535R37H30	20K, .25W, 1% METAL FILM
R12	3535R39H47	3.01K, .25W, 1% METAL FILM
R13	3535R37H30	20K, .25W, 1% METAL FILM
R14	3535R37H30	20K, .25W, 1% METAL FILM
R15	3535R37H30	20K, .25W, 1% METAL FILM
R16	3535R39H01	1K, .25W, 1% METAL FILM
R17	3535R37H13	13.3K, .25W, 1% METAL FILM
R18	3535R39H43	274 OHM, .25W, 1% METAL FILM
R19	3535R39H47	3.01K, .25W, 1% METAL FILM
R20	3535R39H44	2.8K, .25W, 1% METAL FILM
R21	3535R37H67	48.7K, .25W, 1% METAL FILM
R22	3535R39H83	7.15K, .25W, 1% METAL FILM
R23	3535R37H01	10K, .25W, 1% METAL FILM
R24	3532R30H34	221K, .25W, 1% METAL FILM
R25	3535R39H69	511 OHM, .25W, 1% METAL FILM
R26	3532R30H01	100K, .25W, 1% METAL FILM
R27	3535R39H21	1.62K, .25W, 1% METAL FILM
R28	3535R37H01	10K, .25W, 1% METAL FILM
R29	3532R30H01	100K, .25W, 1% METAL FILM
R30	3532R30H09	121K, .25W, 1% METAL FILM
R31	3532R30H06	113K, .25W, 1% METAL FILM
R32	3535R37H01	10K, .25W, 1% METAL FILM
R33	3535R37H01	10K, .25W, 1% METAL FILM
R34	3535R37H01	10K, .25W, 1% METAL FILM
R35	3532R30H09	121K, .25W, 1% METAL FILM
R36	3535R37H47	30.1K, .25W, 1% METAL FILM
R37	3535R39H05	750 OHM, .25W, 1% METAL FILM
R38	3535R39H13	133 OHM, .25W, 1% METAL FILM
R39	3535R30H77	6.19K, .25W, 1% METAL FILM
R40	629R531H27	620 OHM, .5W, 2% METAL FILM
R41	3535R37H01	10K, .25W, 1% METAL FILM
R42	3535R37H01	10K, .25W, 1% METAL FILM
R43	3535R30H52	4.32K, .25W, 1% METAL FILM
R44	3535R37H70	52.3K, .25W, 1% METAL FILM
R45	3535R37H02	10.2K, .25W, 1% METAL FILM
R46	3535R30H91	8.66K, .25W, 1% METAL FILM
R47	3535R39H69	8.25K, .25W, 1% METAL FILM
R48	3535R37H01	10K, .25W, 1% METAL FILM
R49	3535R37H69	51.1K, .25W, 1% METAL FILM
R50	3535R30H60	4.12K, .25W, 1% METAL FILM
R51	3535R37H01	10K, .25W, 1% METAL FILM
R52	3535R37H69	51.1K, .25W, 1% METAL FILM
R53	3535R37H73	56.2K, .25W, 1% METAL FILM
R54	3535R37H01	10K, .25W, 1% METAL FILM
R55	3535R37H01	10K, .25W, 1% METAL FILM
R56	3535R37H30	20K, .25W, 1% METAL FILM
R57	3535R41H53	1.5M, .25W, 5% METAL FILM
R58	3535R37H01	10K, .25W, 1% METAL FILM
R59	3535R38H80	8.45K, .25W, 1% METAL FILM
R60	3535R37H22	16.5K, .25W, 1% METAL FILM
R61	3535R37H23	16.9K, .25W, 1% METAL FILM
R62	3535R38H61	4.22K, .25W, 1% METAL FILM
R63	3535R37H62	43.2K, .25W, 1% METAL FILM
R64	3532R30H30	200K, .25W, 1% METAL FILM
R65	3535R37H01	10K, .25W, 1% METAL FILM
R66	3532R30H54	357K, .25W, 1% METAL FILM
R67	3535R37H18	15K, .25W, 1% METAL FILM
R68	3532R30H34	221K, .25W, 1% METAL FILM
R69	3535R38H30	2K, .25W, 1% METAL FILM
R70	3535R37H13	13.3K, .25W, 1% METAL FILM
R71	3532R30H69	511K, .25W, 1% METAL FILM
R72	3535R37H18	15K, .25W, 1% METAL FILM
R73	3532R30H18	150K, .25W, 1% METAL FILM
R74	3535R37H68	49.9K, .25W, 1% METAL FILM
R75	3535R37H89	82.5K, .25W, 1% METAL FILM
R76	3532R30H13	133K, .25W, 1% METAL FILM
R77	3535R37H69	51.1K, .25W, 1% METAL FILM
R78	3535R37H69	51.1K, .25W, 1% METAL FILM

C87	3534R68H08	.1uF, 100V, 5% POLYCARB
C88	3533R75H13	47uF, 35V, 20% DIPPED TANT.
C89	3533R75H13	47uF, 35V, 20% DIPPED TANT.
C90	837R241H15	1uF, 35V, 10% SOLID TANTALUM
C91	837R241H15	1uF, 35V, 10% SOLID TANTALUM
C92	3534R68H08	.1uF, 100V, 5% MET POLYCARB
C93	3534R68H08	.1uF, 100V, 5% POLYCARB
C94	3534R68H08	.1uF, 100V, 5% POLYCARB
C95	3533R53H02	.01uF, 200V, 2% MET POLYCARB
C96	3533R53H02	.01uF, 200V, 2% MET POLYCARB
C97	3526R65H06	.47uF, 100V, 1% MET MYLAR
C98	3526R65H06	.47uF, 100V, 1% MET MYLAR
C99	3532R31H57	680pF, 300V, 1% DIPPED MICA

DIODE

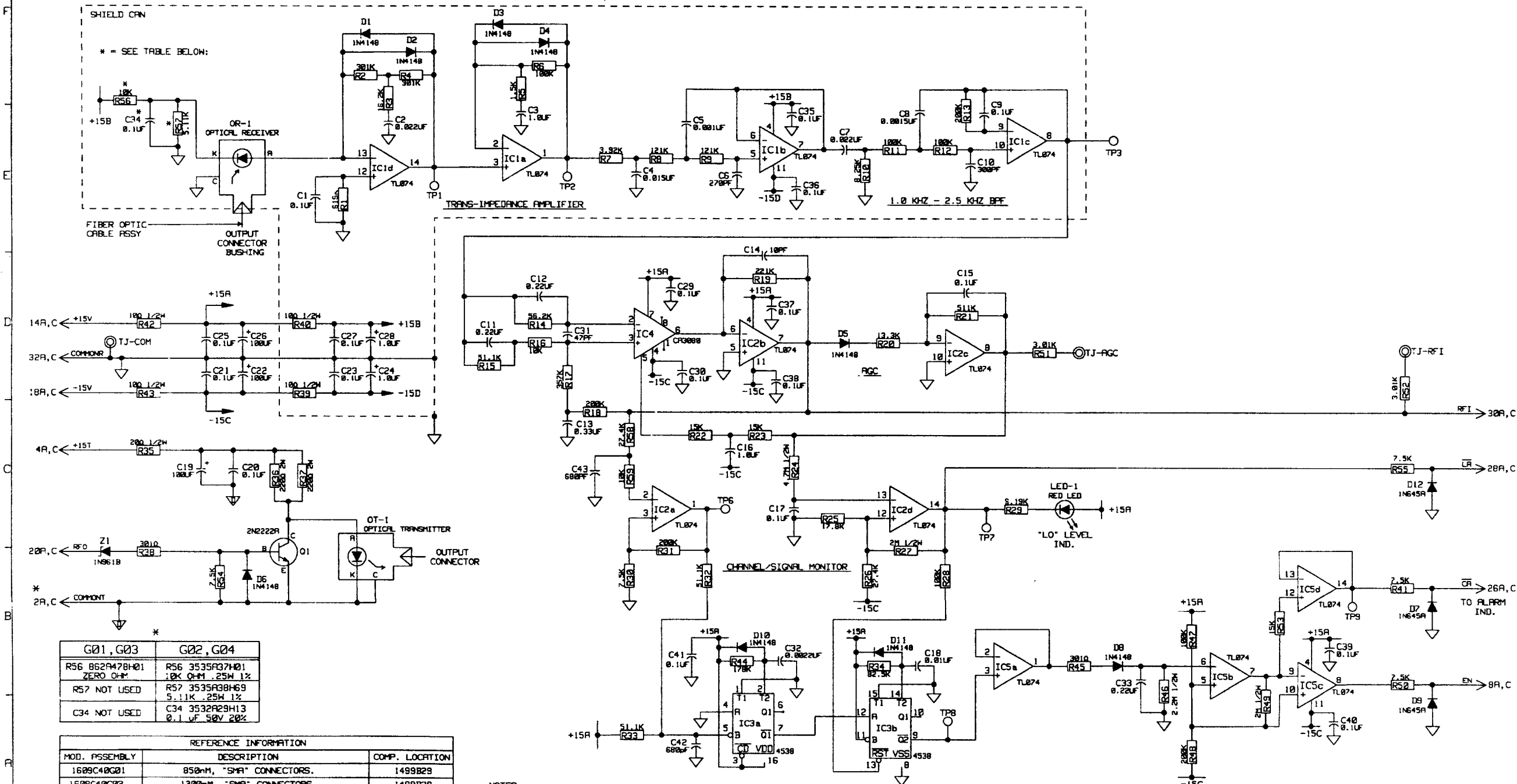
D1	3508R22H01	RED LED (FRT MOUNT)
D2	3508R22H01	RED LED (FRT MOUNT)
D3	3508R22H01	RED LED (FRT MOUNT)
D4	3508R22H04	RED LED (TOP MOUNT)
D6	836R928H01	1N4148 DIODE
D7	837R692H03	1N6458 DIODE
D8	837R692H03	1N6458 DIODE
D9	836R928H01	1N4148 DIODE
D10	836R928H01	1N4148 DIODE
D11	836R928H01	1N4148 DIODE
D12	836R928H01	1N4148 DIODE
D13	836R928H01	1N4148 DIODE
D14	836R928H01	1N4148 DIODE
D15	836R928H01	1N4148 DIODE
D16	836R928H01	1N4148 DIODE
D17	836R928H01	1N4148 DIODE
D18	836R928H01	1N4148 DIODE
D19	836R928H01	1N4148 DIODE
D20	836R928H01	1N4148 DIODE
D21	836R928H01	1N4148 DIODE
D22	836R928H01	1N4148 DIODE
D23	836R928H01	1N4148 DIODE
D24	836R928H01	1N4148 DIODE
D25	836R928H01	1N4148 DIODE
D26	836R928H01	1N4148 DIODE
D27	836R928H01	1N4148 DIODE

INT OKT

IC01	3528R90H02	TL0721J DUAL OP AMP
IC02	3528R90H01	TL0741J QUAD OP AMP
IC03	3528R90H01	TL0741J QUAD OP AMP
IC04	3534R29H02	RC1156 QUAD OP-AMP
IC05	3533R21H01	CR0000S OP TRANSCOND AMP
IC06	3536R27H02	MC14569 PROGRAMMABLE CONTR.
IC07	9642R70H01	PX0-1000 PROG. CRYSTAL OSC.
IC08	3527R69H01	MC14538 BFL DUAL MONO MULTIVIB
IC09	3527R69H06	MC14013 DUAL D-FLIP FLOP
IC10	3536R27H02	MC14569 PROGRAMMABLE CONTR.
IC11	3527R69H01	MC14538 BFL DUAL MONO MULTIVIB
IC12	3534R29H02	RC1156 QUAD OP-AMP
IC13	3528R90H01	TL0741J QUAD OP AMP
IC14	3528R90H01	TL0741J QUAD OP AMP
IC15	3527R69H06	MC14066 BFL QUAD BILATERAL SW
IC16	3527R69H02	MC14011 QUAD NAND GATE
IC17	3528R90H01	TL0741J QUAD OP AMP
IC18	3534R39H01	5V REGULATOR

R79	3532R30H01	100K, .25W, 1% METAL FILM
R80	3535R38H05	7.5K, .25W, 1% METAL FILM
R81	3535R39H77	619 OHM, .25W, 1% METAL FILM
R82	3532R30H19	154K, .25W, 1% METAL FILM
R83	3535R37H66	37.4K, .25W, 1% METAL FILM
R84	3535R38H21	1.62K, .25W, 1% METAL FILM
R85	3532R30H19	154K, .25W, 1% METAL FILM
R86	3535R37H30	20K, .25W, 1% METAL FILM
R87	3532R30H48	305K, .25W, 1% METAL FILM
R88	3532R30H25	178K, .25W, 1% METAL FILM
R89	3535R41H50	1.10M, .25W, 5% METAL FILM
R90	3532R30H01	100K, .25W, 1% METAL FILM
R91	3535R37H01	10K, .25W, 1% METAL FILM
R92	3535R37H22	16.5K, .25W, 1% METAL FILM
R93	3535R37H05	75K, .25W, 1% METAL FILM
R94	3535R37H76	60.4K, .25W, 1% METAL FILM
R95	3535R37H04	73.2K, .25W, 1% METAL FILM
R96	3535R38H82	8.87K, .25W, 1% METAL FILM
R97	3535R38H47	3.01K, .25W, 1% METAL FILM
R98	3532R30H08	118K, .25W, 1% METAL FILM
R99	3535R37H46	29.4K, .25W, 1% METAL FILM
R100	3535R37H40	25.5K, .25W, 1% METAL FILM
R101	3535R38H68	4.99K, .25W, 1% METAL FILM
R102	3535R39H47	301 OHM, .25W, 1% METAL FILM
R103	3535R37H30	20K, .25W, 1% METAL FILM
R104	3535R37H01	10K, .25W, 1% METAL FILM
R105	3535R39H47	301 OHM, .25W, 1% METAL FILM
R106	3535R41H56	2M, .25W, 5% METAL FILM
R107	3535R37H69	51.1K, .25W, 1% METAL FILM
R108	3535R37H32	21K, .25W, 1% METAL FILM
R109	3535R37H30	20K, .25W, 1% METAL FILM
R110	3535R37H30	20K, .25W, 1% METAL FILM
R111	3535R38H85	7.5K, .25W, 1% METAL FILM
R112	3535R37H01	10K, .25W, 1% METAL FILM
R113	3535R37H43	27.4K, .25W, 1% METAL FILM
R114	3535R37H30	20K, .25W, 1% METAL FILM
R115	3535R37H69	51.1K, .25W, 1% METAL FILM
R116	3535R41H65	4.7M, .25W, 5% METAL FILM
R117	3532R30H09	121K, .25W, 1% METAL FILM
R118	3532R30H08	118K, .25W, 1% METAL FILM
R119	3535R37H46	29.4K, .25W, 1% METAL FILM
R120	3535R39H47	301 OHM, .25W, 1% METAL FILM
R121	3535R39H47	301 OHM, .25W, 1% METAL FILM
R122	3535R38H85	7.5K, .25W, 1% METAL FILM
R123	3535R41H50	1.1M, .25W, 5% METAL FILM
R124	3535R37H01	10K, .25W, 1% METAL FILM
R125	3535R37H01	10K, .25W, 1% METAL FILM
R126	3535R37H72	54.9K, .25W, 1% METAL FILM
R127	3535R38H85	7.5K, .25W, 1% METAL FILM
R128	3535R41H53	1.5M, .25W, 5% METAL FILM
R129	3532R30H00	200K, .25W, 1% METAL FILM
R130	3532R30H01	100K, .25W, 1% METAL FILM
R131	3535R37H01	10K, .25W, 1% METAL FILM
R132	3535R38H47	3.01K, .25W, 1% METAL FILM
R133	3532R30H01	100K, .25W, 1% METAL FILM
R134	3535R41H56	2M, .25W, 5% METAL FILM
R135	3532R30H01	100K, .25W, 1% METAL FILM
R136	3535R39H18	150 OHM, .25W, 1% METAL FILM
R137	3532R30H01	100K, .25W, 1% METAL FILM
R138	3532R30H01	100K, .25W, 1% METAL FILM
R139	3535R38H50	3.92K, .25W, 1% METAL FILM
R140	3532R30H09	121K, .25W, 1% METAL FILM
R141	187R290H03	2.7 OHM, .5W, 5% CARBON
R142	187R290H03	2.7 OHM, .5W, 5% CARBON
R143	187R290H03	2.7 OHM, .5W, 5% CARBON
R144	187R290H03	2.7 OHM, .5W, 5% CARBON
R145	3535R39H77	619 OHM, .25W, 1% METAL FILM
R146	3535R37H30	20K, .25W, 1% METAL FILM

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G01, G03	G02, G04
R56 862A478H01 ZERO OHM	R56 3535A37H01 10K OHM .25W 1%
R57 NOT USED	R57 3535A38H69 5.11K .25W 1%
C34 NOT USED	C34 3532A29H13 0.1 uF 50V 20%

REFERENCE INFORMATION		
MOD. ASSEMBLY	DESCRIPTION	COMP. LOCATION
1609C40G01	850nm, "SMA" CONNECTORS.	1499B29
1609C40G02	1300nm, "SMA" CONNECTORS.	1499B29
1609C40G03	850nm, "ST" CONNECTORS.	1499B29
1609C40G04	1300nm, "ST" CONNECTORS.	1499B29

NOTES:
ALL RESISTORS ARE 1/4W UNLESS OTHERWISE SPECIFIED.

1710551

CAPACITORS			
COMPLOC	DESCRIPTION	STYLE	GROUP
C1	.1 MFD 100V +- 5% MET-POLY CARB	3534A68H08	ALL
C2	.022 MFD 100V +- 2% MET-POLY CARB	3533A53H01	ALL
C3	1.0UF 50V +- 5% MET-POLY CARB	3534A68H11	ALL
C4	.015 MFD 200V +- 2% MET-POLY CARB	3534A68H05	ALL
C6	.001 MFD 200V +- 1% MET-POLY CARB	3534A68H01	ALL
C8	270 PF 500V, +- 2% MICA	782A757H12	ALL
C7	.022 MFD 100V +- 2% MET-POLY CARB	3533A53H01	ALL
C8	.0015 MFD, 600V +- 2% MET-POLY CARB	3533A53H08	ALL
C9	.1 MFD 100V +- 5% MET-POLY CARB	3534A68H08	ALL
C10	300 PF, 500V, +- 2% MICA	187A584H09	ALL
C11	.22 MFD, 100V, +- 5% MET-POLY CARB	3534A68H10	ALL
C12	.22 MFD, 100V, +- 5% MET-POLY CARB	3534A68H10	ALL
C13	.33UF 50V, +- 5% MET-POLY CARB	863A168H16	ALL
C14	10 PF, 500V, +- 5% MICA	763A209H03	ALL
C15	.1 MFD 100V +- 5% MET-POLY CARB	3534A68H08	ALL
C16	1.0UF 50V +- 5% MET-POLY CARB	3534A68H11	ALL
C17	.1 MFD 100V +- 5% MET-POLY CARB	3534A68H08	ALL
C18	.01MFD, 200V +- 2% MET-POLY CARB	3533A53H02	ALL
C19	100 MFD, 35V, +- 20% TANTALUM	880A363H01	ALL
C20	.1 MFD 100V +- 5% MET-POLY CARB	3534A68H08	ALL
C21	.1 MFD 100V +- 5% MET-POLY CARB	3534A68H08	ALL
C22	100 MFD, 35V, +- 20% TANTALUM	880A363H01	ALL
C23	.1 MFD 100V +- 5% MET-POLY CARB	3534A68H08	ALL
C24	1MFD 35V 10% TANTALUM	837A241H15	ALL
C25	.1 MFD 100V +- 5% MET-POLY CARB	3534A68H08	ALL
C26	100 MFD, 35V, +- 20% TANTALUM	880A363H01	ALL
C27	.1 MFD 100V +- 5% MET-POLY CARB	3534A68H08	ALL
C28	1MFD 35V 10% TANTALUM	837A241H15	ALL
C29	.1 MFD 100V +- 5% MET-POLY CARB	3534A68H08	ALL
C30	.1 MFD 100V +- 5% MET-POLY CARB	3534A68H08	ALL
C31	47 PF 500V, +- 2% MICA	763A209H17	ALL
C32	.0022 UF 2% 400V, MET. POLYCARB	3533A53H05	ALL
C33	.22 MFD, 100V, +- 5% MET-POLY CARB	3534A68H10	ALL
C34	.1MFD 50V 20% CERAMIC	3532A29H13	G02
C35	.1MFD 50V 20% CERAMIC	3532A29H13	ALL
C36	.1MFD 50V 20% CERAMIC	3532A29H13	ALL
C37	.1MFD 50V 20% CERAMIC	3532A29H13	ALL
C38	.1MFD 50V 20% CERAMIC	3532A29H13	ALL
C39	.1MFD 50V 20% CERAMIC	3532A29H13	ALL
C40	.1MFD 50V 20% CERAMIC	3532A29H13	ALL
C41	.1MFD 50V 20% CERAMIC	3532A29H13	ALL
C42	680pF 300V ± 2% DIPPED MICA	3532A31H57	ALL
C43	680pF 300V ± 2% DIPPED MICA	3532A31H57	ALL

DIODES			
COMPLOC	DESCRIPTION	STYLE	GROUP
LED1	RED LED (EDGE MOUNT) 550-0408	3508A22H01	ALL
D1	1N4148	836A928H06	ALL
D2	1N4148	836A928H06	ALL
D3	1N4148	836A928H06	ALL
D4	1N4148	836A928H06	ALL
D5	1N4148	836A928H06	ALL
D6	1N4148	836A928H06	ALL
D7	1N645A	837A692H03	ALL
D8	1N4148	836A928H06	ALL
D9	1N645A	837A692H03	ALL
D10	1N4148	836A928H06	ALL
D11	1N4148	836A928H06	ALL
D12	1N645A	837A692H03	ALL

INT CKTS			
COMPLOC	DESCRIPTION	STYLE	GROUP
IC1	TL074 IJ QUAD OP AMP	3528A90H01	ALL
IC2	TL074 IJ QUAD OP AMP	3528A90H01	ALL
IC3	MC14538BAL DUAL PREC MONO MULTVIB	3527A09H01	ALL
IC4	CA3080AS OP TRANSCOND AMP	3533A21H01	ALL
IC5	TL074 IJ QUAD OP AMP	3528A90H01	ALL

RESISTORS			
COMP LOC	DESCRIPTION	STYLE	GROUP
R1	619K .25W 1% METAL FILM	3532A38H77	ALL
R2	301K .25W 1% METAL FILM	3532A38H47	ALL
R3	18.2K .25W 1% METAL FILM	3535A37H21	ALL
R4	301K .25W 1% METAL FILM	3532A38H47	ALL
R5	1.50K .25W 1% METAL FILM	3535A38H18	ALL
R6	100K .25W 1% METAL FILM	3532A38H01	ALL
R7	3.92K .25W 1% METAL FILM	3535A38H58	ALL
R8	121K .25W 1% METAL FILM	3532A38H09	ALL
R9	121K .25W 1% METAL FILM	3532A38H09	ALL
R10	8.25K .25W 1% METAL FILM	3536A38H89	ALL
R11	100K .25W 1% METAL FILM	3532A38H01	ALL
R12	100K .25W 1% METAL FILM	3532A38H01	ALL
R13	200K .25W 1% METAL FILM	3532A38H30	ALL
R14	56.2K .25W 1% METAL FILM	3535A37H73	ALL
R15	61.1K .25W 1% METAL FILM	3535A37H69	ALL
R16	10K .25W 1% METAL FILM	3535A37H01	ALL
R17	357K .25W 1% METAL FILM	3532A38H54	ALL
R18	200K .25W 1% METAL FILM	3532A38H30	ALL
R19	221K .25W 1% METAL FILM	3532A38H34	ALL
R20	13.3K .25W 1% METAL FILM	3535A37H13	ALL
R21	511K .25W 1% METAL FILM	3532A38H69	ALL
R22	15K .25W 1% METAL FILM	3535A37H18	ALL
R23	15K .25W 1% METAL FILM	3535A37H18	ALL
R24	4.7M .25W, 5% CARBON FILM	3535A41H65	ALL
R25	17.8K .25W 1% METAL FILM	3535A37H25	ALL
R26	27.4K .25W 1% METAL FILM	3535A37H43	ALL
R27	2MEG .25W 1% METAL FILM	3532A38H30	ALL
R28	100K .25W 1% METAL FILM	3532A38H01	ALL
R29	6.19K .25W 1% METAL FILM	3535A38H77	ALL
R30	7.50K .25W 1% METAL FILM	3535A38H85	ALL
R31	200K .25W 1% METAL FILM	3532A38H30	ALL
R32	51.1K .25W 1% METAL FILM	3535A37H69	ALL
R33	51.1K .25W 1% METAL FILM	3535A37H69	ALL
R34	82.5K .25W 1% METAL FILM	3535A37H89	ALL
R35	20-OHM .5W 5% FIXED COMP	187A290H08	ALL
R36	220-OHM .2W 5% MOLDED COMP	185A207H11	ALL
R37	220-OHM .2W 5% MOLDED COMP	185A207H11	ALL
R38	301 OHM .25W 1% METAL FLIM	3535A39H47	ALL
R39	10-OHM .5W 5% FIXED COMP	187A290H01	ALL
R40	10-OHM .5W 5% FIXED COMP	187A290H01	ALL
R41	7.50K .25W 1% METAL FILM	3535A38H85	ALL
R42	10-OHM .5W 5% FIXED COMP	187A290H01	ALL
R43	10-OHM .5W 5% FIXED COMP	187A290H01	ALL
R44	178K .25W 1% METAL FILM	3532A38H25	ALL
R45	301 OHM .25W 1% METAL FLIM	3535A39H47	ALL
R46	2.2M-OHM .25W, 5% C.F.	3535A41H57	ALL
R47	100K .25W 1% METAL FILM	3532A38H01	ALL
R48	200K .25W 1% METAL FILM	3532A38H30	ALL
R49	2MEG .25W 1% METAL FILM	3532A38H30	ALL
R50	7.50K .25W 1% METAL FILM	3535A38H85	ALL
R51	3.01K .25W 1% METAL FILM	3535A38H47	ALL
R52	3.01K .25W 1% METAL FILM	3535A38H47	ALL
R53	15K .25W 1% METAL FILM	3535A37H18	ALL
R54	7.50K .25W 1% METAL FILM	3535A38H85	ALL
R55	7.50K .25W 1% METAL FILM	3535A38H85	ALL
R56	10K .25W 1% METAL FILM	3535A37H01	G02
R57	5.11K .25W 1% METAL FILM	3535A38H69	G02
R58	0 OHM	862A478H01	G01
R59	27.4K .25W 1% METAL FILM	3535A37H43	ALL
	10K .25W 1% METAL FILM	3535A37H01	ALL

TRANSISTORS			
COMP LOC	DESCRIPTION	STYLE	GROUP
Q1	2N2222A NPN	762A572H15	ALL

ZENERS			
COMP LOC	DESCRIPTION	STYLE	GROUP
Z1	1N961B 10V 5% 400MW	186A797H07	ALL

OPTICAL COMPONENTS			
COMP LOC	DESCRIPTION	STYLE	GROUP
ORI	HFD 3843-002 HONEYWELL DETECTOR	9644A71H02	G01
OTI	HFE 4807-013 HONEYWELL EMITTER	9644A71H01	G01
ORI	LYTEL SMA DETECTOR 0658-001	9647A37H06	G02
OTI	LYTEL SMA EMITTER 0655-000	9647A37H05	G02
ORI	HFD 3854-007 HONEYWELL DETECTOR	9644A71H06	G03
OTI	HFE 4834-014 HONEYWELL EMITTER	9644A71H05	G03
ORI	LYTEL ST DETECTOR 0673-001	9647A37H03	G04
OTI	LYTEL ST EMITTER 0670-000	9647A37H07	G04
	BUSHING (SMA)	9644A70H02	G01, 2
	BUSHING (ST)	9644A70H03	G03, 4
	FIBER OPTIC CABLE 9" SMA 100/140	1604C71G01	G01, 2
	FIBER OPTIC CABLE 9" ST 100/140	1604C71G14	G03, 4

DRAWING ROUTING CODE	A	P	V	F	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
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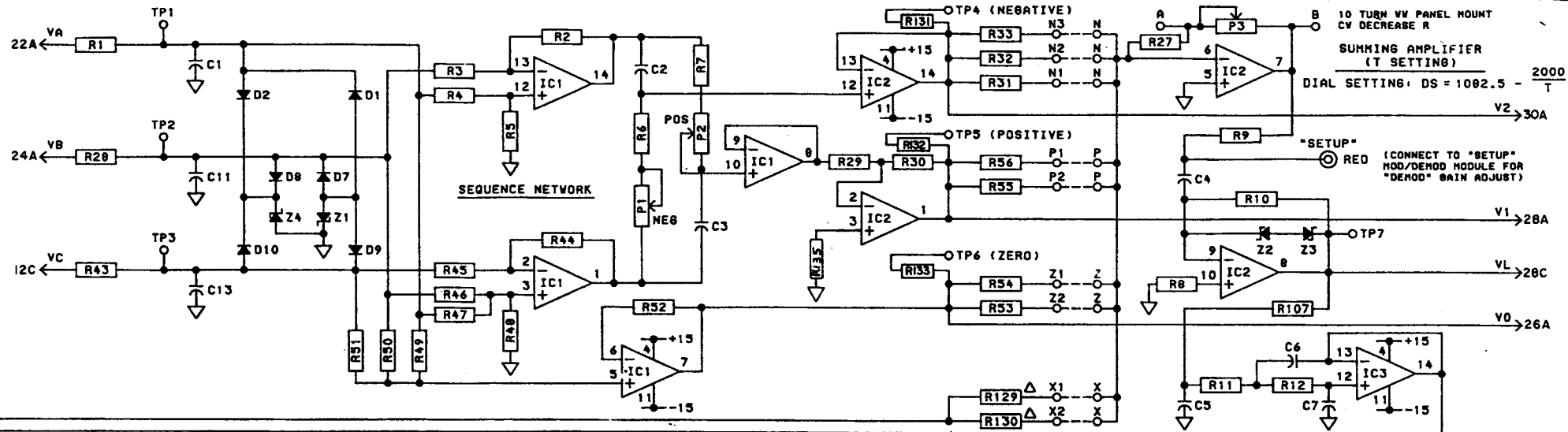
11 10 9 8 7 6 5 4 3 2 1

CT-RATED AMP(5A OR 1A)RMS = .354V RMS

REF: 5A CT'S - S#1581C70601
1A CT'S - S#1581C70802

Δ - 25 Ω 0.1% 3V
FOR 1 AMP CT'S

CURRENT TRANSFORMER
PACKAGE



CAPACITOR	STYLE
C01	.1 MFD 100V +-5% MET-POLY CARB 3534A68H08
C02	.022 MFD 100V +-2% MET-POLY CARB 3533AE3H01
C03	.01 MFD 200V +-2% MET-POLY CARB 3533AE3H02
C04	1.0 MFD 50V +-5% MET-POLY CARB 3534A68H11
C05	.1 MFD 50V +-2% MET-POLY CARB 3533AE3H03
C06	.047 MFD 100V +-5% MET-POLY CARB 3534A68H07
C07	.01 MFD 200V +-2% MET-POLY CARB 3533AE3H02
C08	.01 MFD 200V +-2% MET-POLY CARB 3533AE3H02
C09	.01 MFD 200V +-2% MET-POLY CARB 3533AE3H02
C10	.22 MFD 100V 5% MET-POLY CARB 3534A68H10
C11	.1 MFD 100V +-5% MET-POLY CARB 3534A68H08
C12	.012 MFD 200V +-5% MET-POLY CARB 3534A68H04
C13	.1 MFD 100V +-5% MET-POLY CARB 3534A68H08
C14	.04 MFD 200V +-2% MET-POLY CARB 3533AE3H02
C15	.0048 MFD 200V +-2% MET-POLY CARB 3533AE3H06
C16	.047 MFD 100V +-5% MET-POLY CARB 3534A68H07
C17	.1 MFD 100V +-5% MET-POLY CARB 3534A68H08
C18	.1 MFD 50V +-2% MET-POLY CARB 3533AE3H03
C19	.15 MFD 100V +-5% MET-POLY CARB 3534A68H07
C20	10 MFD 35V +-5% TANTALUM 862A630H12
C21	.1 MFD 100V +-5% MET-POLY CARB 3534A68H08
C22	510 PF 500V +-2% MICA 841A844H19
C23	.1 MFD 50V +-2% MET-POLY CARB 3533AE3H03
C24	.1 MFD 50V +-2% MET-POLY CARB 3533AE3H03
C25	.1 MFD 100V +-5% MET-POLY CARB 3534A68H08
C26	.0047 MFD 200V +-5% NYLAR 3582A68H09
C27	10 MFD 35V +-5% TANTALUM 862A630H12
C28	1.0 MFD 100V +-20% CERAMIC CP-1002WLB9
C29	.005MFD 100V +-20% CERAMIC 184A663H02
C30	1000PF 1000V +-10% 762A860H02
C31	1000PF 500V +-5% DURA MICA C2R000372A

DIODE	STYLE
D01	1N4145A 225V 837A692H03
D02	1N4145A 225V 837A692H03
D03	1N4148 75V 834A928H06
D04	1N4148 75V 834A928H06
D05	1N4148 75V 834A928H06
D06	1N4148 75V 834A928H06
D07	1N4145A 225V 837A692H03
D08	1N4145A 225V 837A692H03
D09	1N4145A 225V 837A692H03
D10	1N4145A 225V 837A692H03
D11	1N4148 75V 834A928H06
D12	1N4148 75V 834A928H06
D13	1N4148 75V 834A928H06
D14	1N4148 75V 834A928H06
D15	1N4145A 225V 837A692H03
D16	1N4145A 225V 837A692H03
D17	1N4148A 75V 834A928H06
D18	1N4148A 75V 834A928H06
D19	1N4148A 75V 834A928H06
D20	1N4145A 225V 837A692H03
D21	1N4148 75V 834A928H06
D22	1N4148 75V 834A928H06

DIAL	STYLE
DIAL	DIGITAL DIAL 3509A12H03

INT CKT	STYLE
IC01	TL0741J QUAD OP AMP 3528A90H01
IC02	TL0741J QUAD OP AMP 3528A90H01
IC03	TL0741J QUAD OP AMP 3528A90H01
IC04	TL0741J QUAD OP AMP 3528A90H01
IC05	TL0741J QUAD OP AMP 3528A90H01
IC06	TL0741J QUAD OP AMP 3528A90H01
IC07	MC14066BAL QUAD BILATERAL SWITCH 3527A09H06
IC08	MC14081BAL QUAD 2-INPUT NOR 3533A17H01
IC09	MC14538BAL DUAL PREC MONO MULTIVIB 3527A09H01
IC10	MC14081BAL QUAD 2-INPUT NOR 3533A17H01
IC11	MC14071BAL QUAD 2-INPUT OR 3537A15H04

DIODE	STYLE
LED-1	RED LED (EDGE MOUNT) 3508A22H01

POT	STYLE
P01	100K 3/4W 10% TRIMPOT 3527A30H07
P02	100K 3/4W 10% TRIMPOT 3527A30H07
P03	100K 2W 10% TURN SX PREC POT 3509A13H04
P04	100K 3/4W 10% TRIMPOT 3527A30H07
P05	1K 3/4W 10% TRIMPOT 3527A30H07

RESISTOR	STYLE
R001	300 OHM 2% 1/2W METAL GLAZE 629A531H19
R002	100K 1/8W 1% METAL FILM 3532A38H01
R003	301K 1/4W 1% METAL FILM 3534A73H01
R004	301K 1/4W 1% METAL FILM 3534A73H01
R005	100K 1/8W 1% METAL FILM 3532A38H01
R006	170K 1/8W 1% METAL FILM 3532A38H02
R007	1.5K 1/8W 1% METAL FILM 3532A38H01
R008	100K 1/8W 1% METAL FILM 3532A38H01
R009	100K 1/8W 1% METAL FILM 3532A38H01
R010	100K 1/8W 1% METAL FILM 3532A38H01
R011	75K 1% 1/8W METAL FILM 3536A37H05
R012	75K 1% 1/8W METAL FILM 3536A37H05
R013	100K 1/8W 1% METAL FILM 3532A38H01
R014	200K 1% 1/8W METAL FILM 3532A38H30
R015	200K 1% 1/8W METAL FILM 3532A38H30
R016	200K 1% 1/8W METAL FILM 3532A38H30
R017	200K 1% 1/8W METAL FILM 3532A38H30
R018	100K 1/8W 1% METAL FILM 3532A38H01
R019	100K 1/8W 1% METAL FILM 3532A38H01
R020	100K 1/8W 1% METAL FILM 3532A38H01
R021	200K 1% 1/8W METAL FILM 3532A38H30
R022	200K 1% 1/8W METAL FILM 3532A38H30
R023	200K 1% 1/8W METAL FILM 3532A38H30
R024	100K 1/8W 1% METAL FILM 3532A38H01
R025	200K 1/8W 1% METAL FILM 3532A38H30
R026	100K 102A 100K 1/8W 1% METAL FILM 3532A38H01
R027	8.25K 1/4W 1% METAL FILM 3535A38H09
R028	300 OHM 2% 1/2W METAL GLAZE 629A531H19
R029	100K 1/8W 1% METAL FILM 3532A38H01
R030	100K 1/8W 1% METAL FILM 3532A38H01
R031	4.32K 1/4W 1% METAL FILM 3535A38H02
R032	4.32K 1/4W 1% METAL FILM 3535A38H02
R033	4.99K 1/4W 1% METAL FILM 3535A38H09
R034	1K 1% 1/4W METAL FILM 848A819H48
R035	24.3K 1/8W 1% METAL FILM 3536A37H30
R036	100K 1/8W 1% METAL FILM 3532A38H01
R037	200K 1% 1/8W METAL FILM 3532A38H30
R038	2.0 MEG 5% 1/2W CARBON 187A29H30
R039	51.1K 1/8W 1% METAL FILM 3536A37H45
R040	61.9K 1/8W 1% METAL FILM 3536A37H77
R041	200K 1% 1/8W METAL FILM 3532A38H30
R042	61.9K 1/8W 1% METAL FILM 3536A37H77
R043	300 OHM 2% 1/2W METAL GLAZE 629A531H19
R044	200K 1% 1/8W METAL FILM 3532A38H30
R045	301K 1/4W 1% METAL FILM 3534A73H01
R046	301K 1/4W 1% METAL FILM 3534A73H01
R047	301K 1/4W 1% METAL FILM 3534A73H01
R048	100K 1/8W 1% METAL FILM 3532A38H01
R049	301K 1% 1/4W METAL FILM 3534A73H01
R050	301K 1% 1/4W METAL FILM 3534A73H01
R051	301K 1% 1/4W METAL FILM 3534A73H01
R052	100K 1/8W 1% METAL FILM 3532A38H01
R053	80K OHM 1/4W 1% METAL FILM 848A819H39
R054	412 OHM 1/4W 1% METAL FILM 848A819H11
R055	20K 1% 1/8W METAL FILM 3536A37H30
R056	10K 1/8W 1% METAL FILM 3536A37H01
R057	200K 1% 1/8W METAL FILM 3532A38H30
R058	200K 1% 1/8W METAL FILM 3532A38H30
R059	100K 1% 1/8W METAL FILM 3532A38H01
R060	200K 1% 1/8W METAL FILM 3532A38H30
R061	200K 1% 1/8W METAL FILM 3532A38H30
R062	150K 1% 1/8W METAL FILM 3532A38H10
R063	301K 1/8W 1% METAL FILM 3532A38H47
R064	150K 1% 1/8W METAL FILM 3532A38H10
R065	10K 1/8W 1% METAL FILM 3536A37H01
R066	15K 1/8W 1% METAL FILM 3536A37H10
R067	100 OHM 1% 1/8W METAL FILM 3536A39H01
R068	30.1K 1% 1/8W METAL FILM 3536A37H47
R069	162K 1% 1/8W METAL FILM 3532A38H21
R070	5.1K 1/4W 1% METAL FILM 3535A38H09
R071	2K 1% 1/8W METAL FILM 3536A38H30
R072	200K 1/8W 1% METAL FILM 3532A38H30
R073	100K 1/8W 1% METAL FILM 3532A38H01
R074	100K 1/8W 1% METAL FILM 3532A38H01
R075	150K 1% 1/8W METAL FILM 3532A38H10
R076	150K 1% 1/8W METAL FILM 3532A38H10
R077	100K 1/8W 1% METAL FILM 3532A38H01
R078	442K 1% 1/8W METAL FILM 3532A38H01
R079	442K 1% 1/8W METAL FILM 3532A38H01
R080	200K 1/8W 1% METAL FILM 3532A38H30
R081	100K 1% 1/8W METAL FILM 3532A38H01
R082	100K 1/8W 1% METAL FILM 3532A38H01
R083	100K 1% 1/8W METAL FILM 3532A38H10
R084	10K 1/8W 1% METAL FILM 3536A37H01
R085	15K 1/8W 1% METAL FILM 3536A37H01
R086	200K 1% 1/8W METAL FILM 3532A38H30
R087	200K 1% 1/8W METAL FILM 3532A38H30
R088	3.01K 1/4W 1% METAL FILM 848A819H94
R089	3.01K 1/4W 1% METAL FILM 848A819H94
R090	100K 1/8W 1% METAL FILM 3532A38H01
R091	200K 1/8W 1% METAL FILM 3532A38H30
R092	200K 1/8W 1% METAL FILM 3532A38H30
R093	100K 1/8W 1% METAL FILM 3532A38H01
R094	100K 1/8W 1% METAL FILM 3532A38H01
R095	200K 1% 1/8W METAL FILM 3532A38H30
R096	200K 1% 1/8W METAL FILM 3532A38H30
R097	200K 1% 1/8W METAL FILM 3532A38H30
R098	100K 1/8W 1% METAL FILM 3532A38H01
R099	100K 1/8W 1% METAL FILM 3532A38H01
R100	51.1K 1/8W 1% METAL FILM 3536A37H49

R101	200K 1/8W 1% METAL FILM 3532A38H30
R102	75K 1% 1/8W METAL FILM 3536A37H05
R103	200K 1% 1/8W METAL FILM 3532A38H30
R104	200K 1% 1/8W METAL FILM 3532A38H30
R105	140K 1% 1/8W METAL FILM 3532A38H15
R106	100K 1% 1/8W METAL FILM 3532A38H01
R107	9.09K 1% 1/8W METAL FILM 3536A38H03
R108	200K 1% 1/8W METAL FILM 3532A38H30
R109	16.2K 1/8W 1% METAL FILM 3536A37H21
R110	10K 1/8W 1% METAL FILM 3536A37H01
R111	10K 1/8W 1% METAL FILM 3536A37H01
R112	10K 1/8W 1% METAL FILM 3536A37H01
R113	10K 1/8W 1% METAL FILM 3536A37H01
R114	15K 1% METAL FILM 84158A78A9
R115	100K 1/8W 1% METAL FILM 3532A38H01
R116	3.01K 1% 1/8W METAL FILM 3536A38H47
R117	100K 1/8W 1% METAL FILM 3532A38H01
R118	3.01K 1% 1/8W METAL FILM 3536A38H47
R119	3.01K 1% 1/8W METAL FILM 3536A38H47
R120	3.01K 1% 1/8W METAL FILM 3536A38H47
R121	3.01K 1% 1/8W METAL FILM 3536A38H47
R122	10K 1/8W 1% METAL FILM 3536A37H01
R123	499 OHM 1/2W 1% METAL FILM 848A819H19
R124	7.5K 1/8W 1% METAL FILM 3536A38H05
R125	3.01K 1/8W 1% METAL FILM 3536A38H47

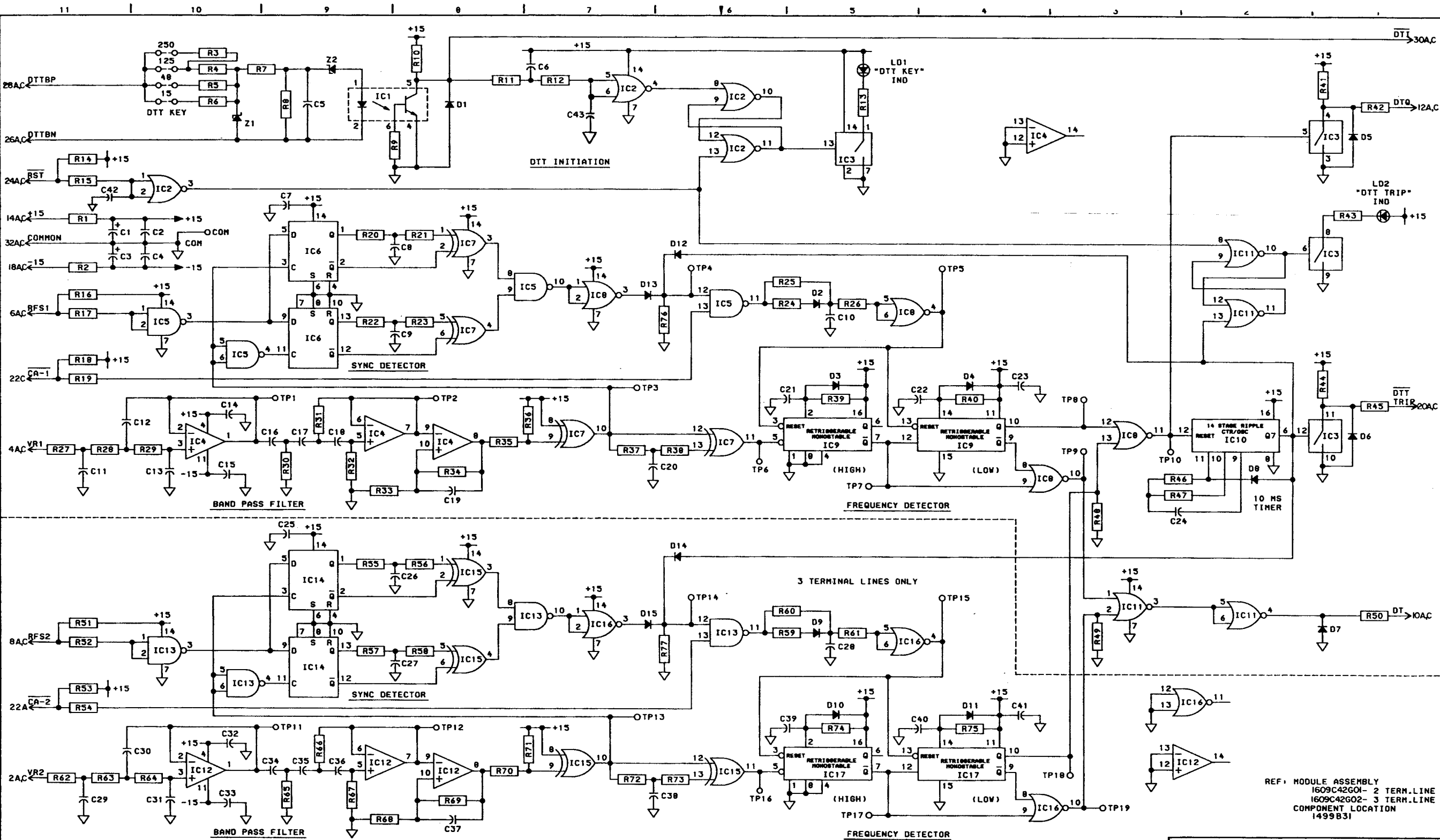
○-R036 49.9K 1/8W 1% METAL FILM 3535A37H68

ZENER	STYLE
Z01	1N759A 12V 5% 400 MW 837A693H01
Z02	1N961B 10V 5% 400 MW 186A777H07
Z03	1N961B 10V 5% 400 MW 186A777H07
Z04	1N759A 12V 5% 400 MW 837A693H01

LINK	STYLE
J(MM)	BLUE CLIP LINK 8832A54H01
N	BLUE CLIP LINK 8832A54H01
P	BLUE CLIP LINK 8832A54H01
S	BLUE CLIP LINK 8832A54H01
X	BLUE CLIP LINK 8832A54H01

* = FOR G01 AND G02
○ = FOR G03

R126	30.1K 1/4W 1% METAL FILM 3536A37H47
R127	30.1K 1/4W 1% METAL FILM 3536A37H47
R128	30.1K 1/4W 1% METAL FILM 3536A37H47
R129	412K 1/4W 1% METAL FILM 848A819H11
R130	808 OHM 1/4W 1% METAL FILM 848A819H39
R131	3.01K 1/4W 1% METAL FILM 3536A38H47
R132	3.01K 1/4W 1% METAL FILM 3536A38H47
R133	3.01K 1/4W 1% METAL FILM 3536A38H47
R134	10K 1/8W 1% METAL FILM 3535A37H01
R135	51.1K 1/8W 1% METAL FILM RMS112FQA9



1355D43

CAPACITOR			GROUPS *		DIODE			GROUPS *	
STYLE			1	2	STYLE			1	2
C01	10 MFD 35V +-5% TANTALUM	862A53H12	11		D001	RED LED (EDGE MOUNT)	3508A22H01	11	
C02	0.1 MFD 100V +-5% MET-POLYCARB	3534A68H08	11		D002	RED LED (EDGE MOUNT)	3508A22H01	11	
C03	10 MFD 35V +-5% TANTALUM	862A53H12	11		RESISTOR				
C04	0.1 MFD 100V +-5% MET-POLYCARB	3534A68H08	11		STYLE				
C05	0.047 MFD 100V +-5% MET-POLYCARB	3534A68H07	11		R01	2.7 OHM 1/2W 5% CARBON	187A29H31	11	
C06	0.022 MFD 100V +-2% MET-POLYCARB	3533A63H01	11		R02	2.7 OHM 1/2W 5% CARBON	187A29H31	11	
C07	0.1 MFD 50V +-20% CERAMIC	3532A29H13	11		R03	20K 2W 5% CARBON	185A207H58	11	
C08	0.015 MFD 200V +-2% MET-POLYCARB	3534A68H05	11		R04	20K 2W 5% CARBON	185A207H58	11	
C09	0.015 MFD 200V +-2% MET-POLYCARB	3534A68H05	11		R05	4.0K 2W 5% CARBON	185A207H47	11	
C10	0.022 MFD 100V +-2% MET-POLYCARB	3533A63H01	11		R06	430 OHM 1/2W 2% METAL GLAZE	429A531H23	11	
C11	4490PF 50V +-2% POLYSTY	3537A23H65	11		R07	430 OHM 1/2W 2% METAL GLAZE	429A531H23	11	
C12	5100 PF 500V +-2% NICA	187A584H05	11		R08	3.0K 1/2W 2% METAL GLAZE	80300H010	11	
C13	1500 PF 500V +-2% NICA	762A757H03	11		R09	750K 1/8W 1% METAL FILM	3532A38H05	11	
C14	0.1 MFD 50V +-20% CERAMIC	3532A29H13	11		R10	30.1K 1/8W 1% METAL FILM	3535A37H47	11	
C15	0.1 MFD 50V +-20% CERAMIC	3532A29H13	11		R11	51.1K 1/8W 1% METAL FILM	3535A37H49	11	
C16	6490PF 50V +-2% POLYSTY	3537A23H65	11		R12	10K 1/8W 1% METAL FILM	3535A37H01	11	
C17	3000 PF 500V +-2% NICA	3532A31H54	11		R13	51.1K 1/8W 1% METAL FILM	3535A37H49	11	
C18	3000 PF 500V +-2% NICA	3532A31H54	11		R14	51.1K 1/8W 1% METAL FILM	3535A37H49	11	
C19	20 PF 300V +-5% NICA	3532A31H47	11		R15	10K 1/8W 1% METAL FILM	3535A37H01	11	
C20	510 PF 500V +-2% NICA	861A846H10	11		R16	51.1K 1/8W 1% METAL FILM	3535A37H49	11	
C21	0.0066 MFD 200V +-2% MET-POLYCARB	3533A63H01	11		R17	10K 1/8W 1% METAL FILM	3535A37H01	11	
C22	0.015 MFD 200V +-2% MET-POLYCARB	3534A68H05	11		R18	51.1K 1/8W 1% METAL FILM	3535A37H49	11	
C23	0.1 MFD 50V +-20% CERAMIC	3532A29H13	11		R19	10K 1/8W 1% METAL FILM	3535A37H01	11	
C24	0.0001UF 200V +-5% MET-POLYCARB	3534A68H02	11		R20	100K 1/8W 1% METAL FILM	3532A38H01	11	
C25	0.1 MFD 50V +-20% CERAMIC	3532A29H13	11		R21	100K 1/8W 1% METAL FILM	3532A38H01	11	
C26	0.015 MFD 200V +-2% MET-POLYCARB	3534A68H05	11		R22	100K 1/8W 1% METAL FILM	3532A38H01	11	
C27	0.015 MFD 200V +-2% MET-POLYCARB	3534A68H05	11		R23	100K 1/8W 1% METAL FILM	3532A38H01	11	
C28	0.022 MFD 100V +-2% MET-POLYCARB	3533A63H01	11		R24	1K 1/8W 1% METAL FILM	3535A38H01	11	
C29	66,900 PF 50V +-2% POLYSTY	3537A23H65	11		R25	200K 1/8W 1% METAL FILM	3532A38H01	11	
C30	5100 PF 500V +-2% NICA	187A584H05	11		R26	10K 1/8W 1% METAL FILM	3535A37H41	11	
C31	1500 PF 500V +-2% NICA	762A757H03	11		R27	6.19K 1/8W 1% METAL FILM	3535A38H77	11	
C32	0.1 MFD 50V +-20% CERAMIC	3532A29H13	11		R28	150K 1/8W 1% METAL FILM	3532A38H10	11	
C33	0.1 MFD 50V +-20% CERAMIC	3532A29H13	11		R29	100K 1/8W 1% METAL FILM	3532A38H01	11	
C34	66,900 PF 50V +-2% POLYSTY	3537A23H65	11		R30	8.25K 1/8W 1% METAL FILM	3535A38H09	11	
C35	3000 PF 500V +-2% NICA	3532A31H54	11		R31	82.5K 1/8W 1% METAL FILM	3535A37H09	11	
C36	3000 PF 500V +-2% NICA	3532A31H47	11		R32	301K 1/8W 1% METAL FILM	3532A38H47	11	
C37	20 PF 300V +-5% NICA	861A846H10	11		R33	100K 1/8W 1% METAL FILM	3532A38H01	11	
C38	510 PF 500V +-2% NICA	3533A63H01	11		R34	257K 1/8W 1% METAL FILM	3532A38H45	11	
C39	0.0066 MFD 200V +-2% MET-POLYCARB	3533A63H01	11		R35	51.1K 1/8W 1% METAL FILM	3535A37H49	11	
C40	0.015 MFD 200V +-2% MET-POLYCARB	3534A68H05	11		R36	51.1K 1/8W 1% METAL FILM	3535A37H49	11	
C41	0.1 MFD 50V +-20% CERAMIC	3532A29H13	11		R37	51.1K 1/8W 1% METAL FILM	3535A37H49	11	
C42	.05MFD 100V +-20% CERAMIC	184A663H02	11		R38	51.1K 1/8W 1% METAL FILM	3535A37H49	11	
C43	.05MFD 100V +-20% CERAMIC	184A663H02	11		R39	100K 1/8W 1% METAL FILM	3532A38H01	11	
DIODE			STYLE		R40	121K 1/8W 1% METAL FILM	3532A38H09	11	
D01	1N4148 75V	836A928H06	11		R41	30.1K 1/8W 1% METAL FILM	3535A37H47	11	
D02	1N4148 75V	836A928H06	11		R42	511 OHM 1/8W 1% METAL FILM	3535A37H49	11	
D03	1N4148 75V	836A928H06	11		R43	3.01K 1/4W 1% METAL FILM	848A819H94	11	
D04	1N4148 75V	836A928H06	11		R44	30.1K 1/8W 1% METAL FILM	3535A37H47	11	
D05	1N4148 75V	836A928H06	11		R45	511 OHM 1/8W 1% METAL FILM	3535A37H49	11	
D06	1N4148 75V	836A928H06	11		R46	432K 1/8W 1% METAL FILM	3532A38H42	11	
D07	1N4148 75V	836A928H06	11		R47	43.2K 1/8W 1% METAL FILM	3535A37H42	11	
D08	1N4148 75V	836A928H06	11		R48	100K 1/8W 1% METAL FILM	3532A38H01	11	
D09	1N4148 75V	836A928H06	11		R49	100K 1/8W 1% METAL FILM	3532A38H01	11	
D10	1N4148 75V	836A928H06	11		R50	511 OHM 1/8W 1% METAL FILM	3535A37H49	11	
D11	1N4148 75V	836A928H06	11		R51	51.1K 1/8W 1% METAL FILM	3535A37H49	11	
D12	1N4148 75V	836A928H06	11		R52	10K 1/8W 1% METAL FILM	3535A37H01	11	
D13	1N4148 75V	836A928H06	11		R53	51.1K 1/8W 1% METAL FILM	3535A37H49	11	
D14	1N4148 75V	836A928H06	11		R54	10K 1/8W 1% METAL FILM	3535A37H01	11	
D15	1N4148 75V	836A928H06	11		R55	100K 1/8W 1% METAL FILM	3532A38H01	11	
INT CKT			STYLE		R56	100K 1/8W 1% METAL FILM	3532A38H01	11	
IC01	4N35 OPTICAL COUPLER	774B936H01	11		R57	100K 1/8W 1% METAL FILM	3532A38H01	11	
IC02	MC1401BAL QUAD 2-INPUT NOR	3533A17H01	11		R58	100K 1/8W 1% METAL FILM	3532A38H01	11	
IC03	MC1406BAL QUAD BILATERAL SWITCH	3527A09H06	11		R59	1K 1/8W 1% METAL FILM	3535A38H01	11	
IC04	TL0741Z QUAD OP AMP	3526A09H02	11		R60	200K 1/8W 1% METAL FILM	3532A38H01	11	
IC05	MC1401BAL QUAD 2-INPUT NAND	3527A09H06	11		R61	10K 1/8W 1% METAL FILM	3535A37H01	11	
IC06	MC1401BAL QUAD D FLIP FLOP	3527A26H04	11		R62	6.19K 1/8W 1% METAL FILM	3535A38H77	11	
IC07	MC1407BAL QUAD EXCLUSIVE OR	3527A26H01	11		R63	150K 1/8W 1% METAL FILM	3532A38H10	11	
IC08	MC1401BAL QUAD 2-INPUT NOR	3533A17H01	11		R64	100K 1/8W 1% METAL FILM	3532A38H01	11	
IC09	MC1453BAL QUAD PREC MONO MULTIVIB	3527A09H06	11		R65	8.25K 1/8W 1% METAL FILM	3535A38H09	11	
IC10	CD4060BF 81M BIPPLE CNTR/DIV/OSC	3527A09H05	11		R66	82.5K 1/8W 1% METAL FILM	3535A37H09	11	
IC11	MC1401BAL QUAD 2-INPUT NOR	3533A17H01	11		R67	30.1K 1/8W 1% METAL FILM	3532A38H47	11	
IC12	TL0741Z QUAD OP AMP	3526A09H02	11		R68	100K 1/8W 1% METAL FILM	3532A38H01	11	
IC13	MC1401BAL QUAD 2-INPUT NAND	3527A26H04	11		R69	207K 1/8W 1% METAL FILM	3532A38H48	11	
IC14	MC1401BAL QUAD D FLIP FLOP	3527A26H06	11		R70	51.1K 1/8W 1% METAL FILM	3535A37H49	11	
IC15	MC1407BAL QUAD EXCLUSIVE OR	3527A26H01	11		R71	51.1K 1/8W 1% METAL FILM	3535A37H49	11	
IC16	MC1401BAL QUAD 2-INPUT NOR	3533A17H01	11		R72	51.1K 1/8W 1% METAL FILM	3535A37H49	11	
IC17	MC1453BAL QUAD PREC MONO MULTIVIB	3527A09H01	11		R73	51.1K 1/8W 1% METAL FILM	3535A37H49	11	

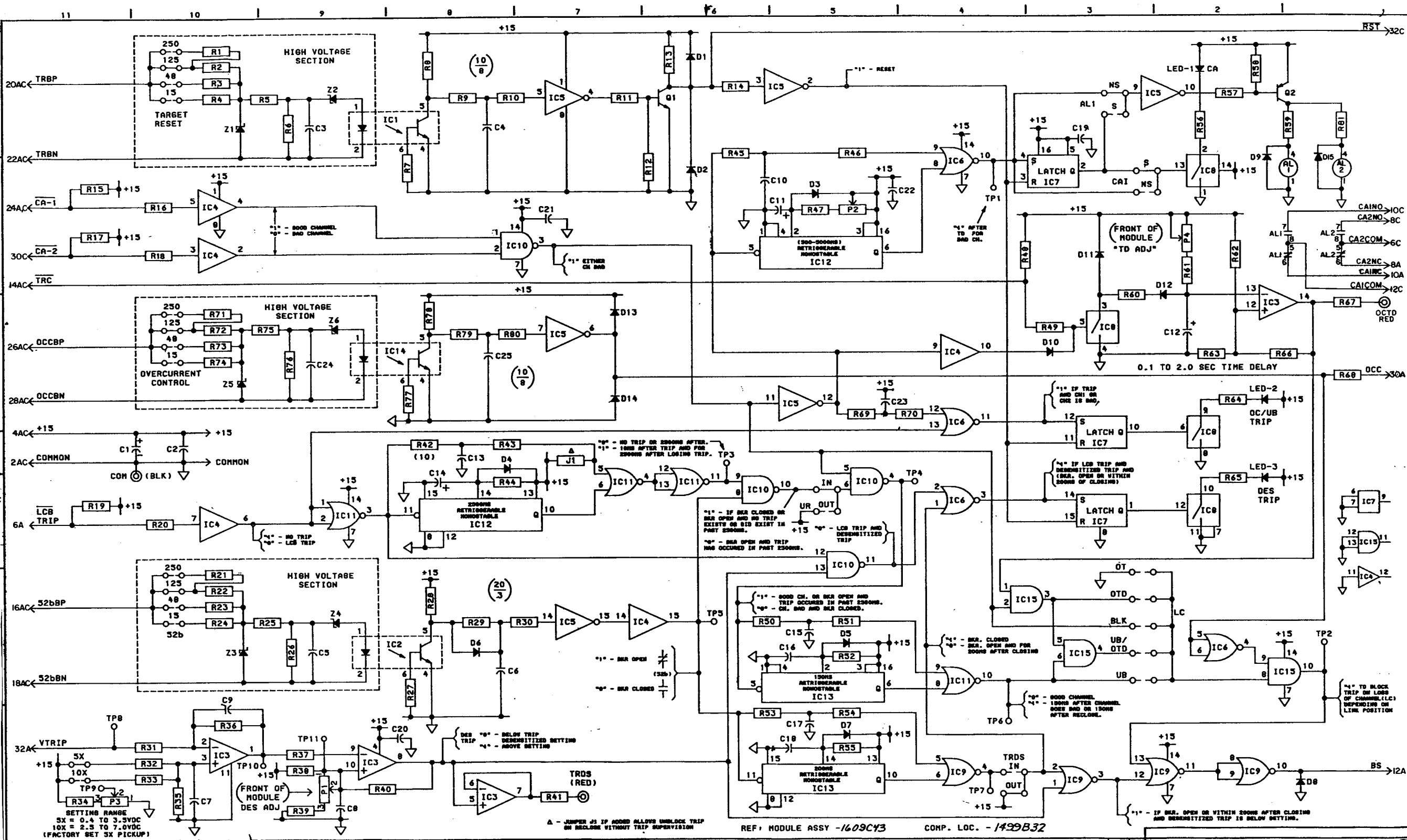
LINK
OTT KEY BLUE CLIP LINK 3532A54H01

ZENER			STYLE	
Z01	1N4747A 20V 1W 5%		849A487H01	11
Z02	1N752A 5.6V 400MW 5%		186A797H12	11

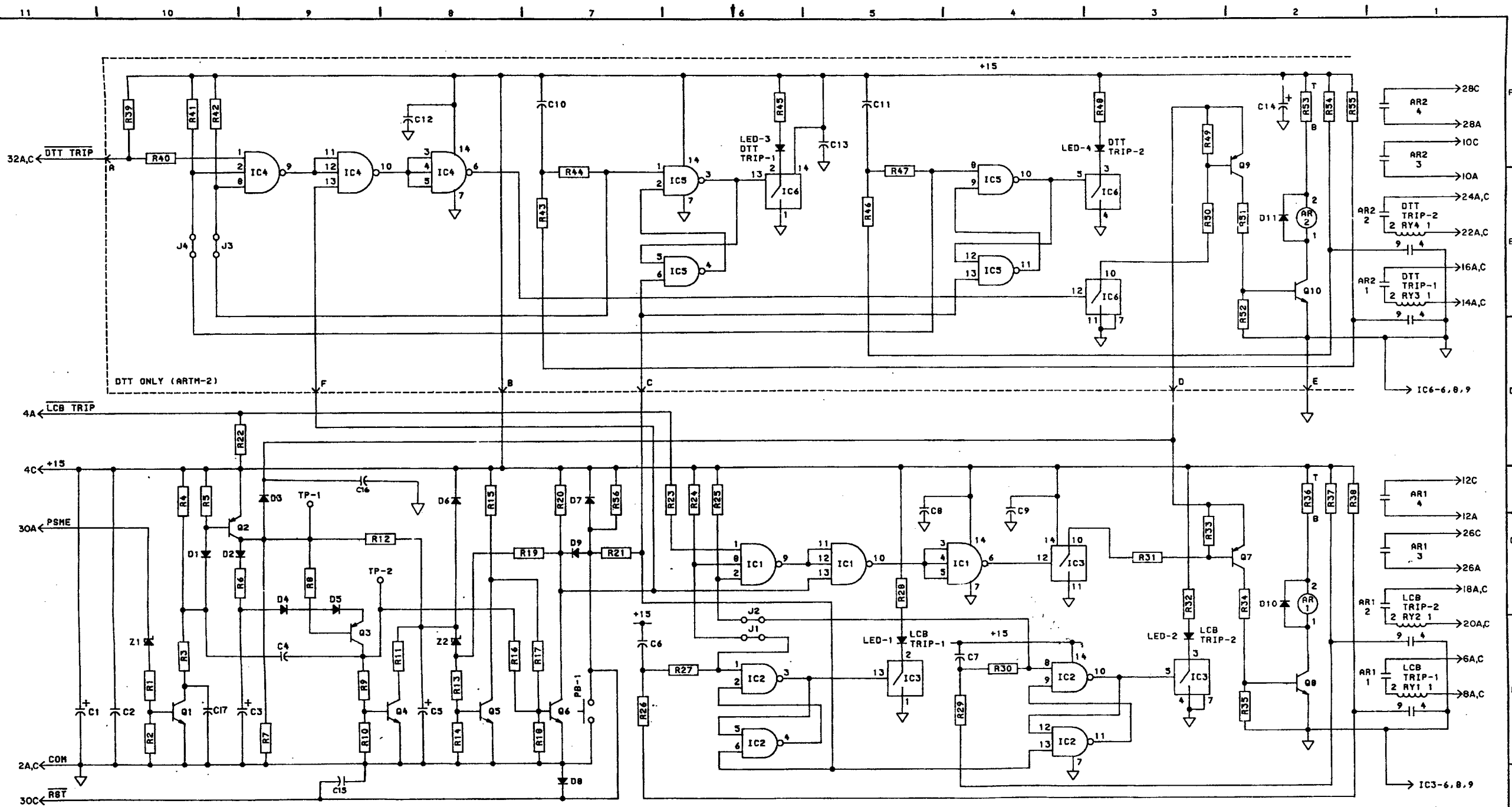
* GROUP 1 IS 2 TERMINAL LINES
GROUP 2 IS 3 TERMINAL LINES

DRAWING ROUTING CODE	A	P	V	F	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
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FIG. 1
SCHEMATIC RELAY
PART NAME
PART TYPE
PART DESCRIPTION
SUB



CAPACITOR			RESISTOR			ZENER		
		STYLE						
C01	10 MFD 35V +-5% TANTALUM	862F630H12	R01	20K 2W +-5% CARBON	185F207H58	Z01	1N4747A 20V 1W 5%	849F487H01
C02	.1 MFD 100V +-5% MET-POLY CRRB	3534F68H08	R02	20K 2W +-5% CARBON	185F207H58	Z02	1N752A 5.6V 400MW 5%	186F797H12
C03	.1 MFD 100V +-5% MET-POLY CRRB	3534F68H08	R03	6.8K 2W +-5% CARBON	185F207H47	Z03	1N4747A 20V 1W 5%	849F487H01
C04	.22 MFD 100V +-5% MET-POLY CRRB	3534F68H10	R04	430 OHM 1/2W +-2% METAL GLAZE	629F531H23	Z04	1N752A 5.6V 400MW 5%	186F797H12
C05	1.0 MFD 50V +-5% MET-POLY CRRB	3534F68H11	R05	430 OHM 1/2W +-2% METAL GLAZE	629F531H23	Z05	1N4747A 20V 1W 5%	849F487H01
C06	.33 MFD 50V +-5% MET-POLY CRRB	863F166H16	R06	3.0K 1/2W +-2% METAL GLAZE	R03001G1E6	Z06	1N752A 5.6V 400MW 5%	186F797H12
C07	.1 MFD 100V +-5% MET-POLY CRRB	3534F68H08	R07	1 MEG 1/4W 1% METAL FILM	3532F39H01			
C08	.1 MFD 100V +-5% MET-POLY CRRB	3534F68H08	R08	25.7K 1/8W 1% METAL FILM	3535F37H42			
C09	.001 MFD 200V +-5% MET-POLY CRRB	3534F68H02	R09	45.3K 1/8W 1% METAL FILM	3535F37H42			
C10	150 PF 500V +-2% MLCR	861F846H25	R10	10K 1/8W 1% METAL FILM	3535F37H41			
C11	6.8 MFD 35V +-5% TANTALUM	184F661H21	R11	4.99K 1/8W 1% METAL FILM	3535F38H58			
			R12	2K 1% 1/8W METAL FILM	3535F38H30			
			R13	15K 1/8W 1% METAL FILM	3535F37H18			
			R14	10K 1/8W 1% METAL FILM	3535F37H41			
			R15	51.1K 1/8W 1% METAL FILM	3535F37H49			
			R16	10K 1/8W 1% METAL FILM	3535F37H41			
			R17	51.1K 1/8W 1% METAL FILM	3535F37H49			
			R18	10K 1/8W 1% METAL FILM	3535F37H41			
			R19	51.1K 1/8W 1% METAL FILM	3535F37H49			
			R20	10K 1/8W 1% METAL FILM	3535F37H41			
			R21	20K 2W +-5% CARBON	185F207H58			
			R22	20K 2W +-5% CARBON	185F207H58			
			R23	6.8K 2W +-5% CARBON	185F207H47			
			R24	430 OHM 1/2W +-2% METAL GLAZE	629F531H23			
			R25	430 OHM 1/2W +-2% METAL GLAZE	629F531H23			
			R26	3.0K 1/2W +-2% METAL GLAZE	R03001G1E6			
			R27	1 MEG 1/4W 1% METAL FILM	3532F39H01			
			R28	15K 1/8W 1% METAL FILM	3535F37H18			
			R29	57.6K 1% 1/8W METAL FILM	3535F37H42			
			R30	10K 1/8W 1% METAL FILM	3535F37H41			
			R31	10K 1/8W 1% METAL FILM	3535F37H41			
			R32	34.8K 1/8W 1% METAL FILM	3535F37H53			
			R33	17.4K 1% 1/8W METAL FILM	3535F37H24			
			R34	30.1K 1% 1/8W METAL FILM	3535F37H47			
			R35	10K 1% 1/8W METAL FILM	3535F37H41			
			R36	24.9K 1% 1/8W METAL FILM	3535F37H49			
			R37	10K 1/8W 1% METAL FILM	3535F37H41			
			R38	8.25K 1% 1/8W METAL FILM	3535F38H49			
			R39	2.43K 1% 1/8W METAL FILM	3535F38H36			
			R40	221K 1% 1/8W METAL FILM	3532F38H34			
			R41	3.01K 1% 1/8W METAL FILM	3535F38H47			
			R42	100K 1/8W 1% METAL FILM	3532F38H01			
			R43	10K 1W 1/8W METAL FILM	3535F37H41			
			R44	365K 1/8W 1% METAL FILM	3532F38H55			
			R45	100K 1/8W 1% METAL FILM	3535F38H01			
			R46	10K 1/8W 1% METAL FILM	3535F37H41			
			R47	10K 1/8W 1% METAL FILM	3535F37H41			
			R48	51.1K 1/8W 1% METAL FILM	3535F37H53			
			R49	10K 1/8W 1% METAL FILM	3535F37H41			
			R50	100K 1/8W 1% METAL FILM	3532F38H01			
			R51	10K 1/8W 1% METAL FILM	3535F37H41			
			R52	150K 1/8W 1% METAL FILM	3532F38H18			
			R53	100K 1/8W 1% METAL FILM	3532F38H01			
			R54	10K 1/8W 1% METAL FILM	3535F37H41			
			R55	200K 1/8W 1% METAL FILM	3532F38H30			
			R56	3.01K 1% 1/4W METAL FILM	848F819H84			
			R57	4.99K 1/4W METAL FILM	3535F38H47			
			R58	2K 1% 1/4W METAL FILM	3535F38H30			
			R59	150 OHM 1/4W 1% METAL FILM	R011500F021			
			R60	2K 1/8W 1% METAL FILM	3535F38H30			
			R61	9.09K 1/8W 1% METAL FILM	3535F38H53			
			R62	200K 1/8W 1% METAL FILM	3532F38H08			
			R63	200K 1/8W 1% METAL FILM	3532F38H08			
			R64	3.01K 1% 1/4W METAL FILM	848F819H84			
			R65	3.01K 1% 1/4W METAL FILM	848F819H84			
			R66	100K 1/8W 1% METAL FILM	3532F38H01			
			R67	3.01K 1% 1/8W METAL FILM	3535F38H47			
			R68	1K 1/8W 1% METAL FILM	3535F38H01			
			R69	51.1K 1/8W 1% METAL FILM	3535F37H53			
			R70	10K 1/8W 1% METAL FILM	3535F37H41			
			R71	20K 2W +-5% CARBON	185F207H58			
			R72	20K 2W +-5% CARBON	185F207H58			
			R73	6.8K 2W +-5% CARBON	185F207H47			
			R74	430 OHM 1/2W +-2% METAL GLAZE	629F531H23			
			R75	430 OHM 1/2W +-2% METAL GLAZE	629F531H23			
			R76	3.0K 1/2W +-2% METAL GLAZE	R03001G1E6			
			R77	1 MEG 1/4W 1% METAL FILM	3532F39H01			
			R78	15K 1/8W 1% METAL FILM	3535F37H18			
			R79	51.1K 1/8W 1% METAL FILM	3535F37H49			
			R80	10K 1/8W 1% METAL FILM	3535F37H41			
			R81	150 OHM 1/4W 1% METAL FILM	3535F39H18			
RELAY			LINK					
RL01	AROMAT TYPE STE-1 FORM C	1484B33H01	TR	BLUE CLIP LINK		3532F54H01		
RL02	AROMAT TYPE STE-1 FORM C	1484B33H01	OC	BLUE CLIP LINK		3532F54H01		
			525	BLUE CLIP LINK		3532F54H01		
			5X/10X	BLUE CLIP LINK		3532F54H01		
			TR05	BLUE CLIP LINK		3532F54H01		
			LC	BLUE CLIP LINK		3532F54H01		
			CR1	BLUE CLIP LINK		3532F54H01		
			RL1	BLUE CLIP LINK		3532F54H01		
			UR	BLUE CLIP LINK		3532F54H01		
DIODE								
		STYLE						
D01	1N645A 225V	837F692H03						
D02	1N645A 225V	837F692H03						
D03	1N4148 75V	836F828H06						
D04	1N4148 75V	836F828H06						
D05	1N4148 75V	836F828H06						
D06	1N4148 75V	836F828H06						
D07	1N4148 75V	836F828H06						
D08	1N4148 75V	836F828H06						
D09	1N645A 225V	837F692H03						
D10	1N4148 75V	836F828H06						
D11	1N4148 75V	836F828H06						
D12	1N4148 75V	836F828H06						
D13	1N645A 225V	837F692H03						
D14	1N645A 225V	837F692H03						
D15	1N645A 225V	837F692H03						
INT CKT								
		STYLE						
IC01	4N05 OPTICAL COUPLER	774B936H01						
IC02	4N05 OPTICAL COUPLER	774B936H01						
IC03	1L07411 QUAD OP AMP	3527F09H07						
IC04	MC140508AL HEX BUFFER	3527F09H04						
IC05	MC140498AL HEX INV/BUFFER	3527F09H05						
IC06	MC140018AL QUAD 2-INPUT NOR	3533A17H01						
IC07	MC140438AL QUAD NOR RS LATCH	3527F09H07						
IC08	MC140658AL QUAD BILATERAL SWITCH	3527F09H06						
IC09	MC140018AL QUAD 2-INPUT NOR	3533A17H01						
IC10	MC140118AL QUAD 2-INPUT NAND	3527F09H02						
IC11	MC140018AL QUAD 2-INPUT NOR	3533A17H01						
IC12	MC145388AL DUAL PREC MONO MULTIVIB	3527F09H01						
IC13	MC145388AL DUAL PREC MONO MULTIVIB	3527F09H01						
IC14	4N05 OPTICAL COUPLER	774B936H01						
IC15	MC140018AL QUAD 2-INPUT AND	3533A15H05						
LED								
		STYLE						
LED 1	RED LED (EDGE MOUNT)	3508F22H01						
LED 2	RED LED (EDGE MOUNT)	3508F22H01						
LED 3	RED LED (EDGE MOUNT)	3508F22H01						
POT								
		STYLE						
P01	20K 3/4W +-10% TRIMPOT	3527F30H04						
P02	1 MEG 3/4W +-10% TRIMPOT	3527F30H11						
P03	20K 3/4W +-10% TRIMPOT	3527F30H04						
P04	250K 3/4W 10% TRIMPOT	3527F30H18						
TRANSISTOR								
		STYLE						
Q01	2N2222A, NPN	762F672H15						
Q02	2N2907A, PNP	762F672H17						



REF: MODULE ASSEMBLY - 1609C44G01 - ARTH-1
 1609C44G02 - ARTH-2
 1581C27801 - ARTH-2 SUB-ASSEMBLY
 COMPONENT LOC. - 1499B49 - ARTH-1
 1484B32 - ARTH-2

LCB RELAY - AR TRIP MODULE
 ARTH-1 - SINGLE TRIP
 ARTH-2 - DOUBLE TRIP

NOTE: J1, J2, J3, J4 PROVIDE SEAL-IN OF TRIP
 AR'S WHEN 2.0 AMPs DC IS FLOWING THROUGH
 THE RESPECTIVE TRIP CONTACTS.

1355D45

1609C44G03

ITEM	PART NAME	DESCRIPTION	STYLE
AR-1	RELAY	1.6 OHM COIL, 10W, 4A	408C845G44
C1	CAPACITOR	100 MFD, 35V, +-20% TANTALUM	880A363H01
C2	CAPACITOR	.1 MFD 100V +-5% MET-POLY CARB	3534A68H06
C3	CAPACITOR	.47 MFD, 35V, +-20% TANTALUM	188A342H24
C4	CAPACITOR	.47 MFD, 35V, +-10% MTLAR	188A669H01
C5	CAPACITOR	100 MFD, 35V, +-20% TANTALUM	880A363H01
C6	CAPACITOR	.033 MFD, 100V, +-5% MET-POLY CARB	3534A68H06
C7	CAPACITOR	.033 MFD, 100V, +-5% MET-POLY CARB	3534A68H06
C8	CAPACITOR	.1 MFD 100V +-5% MET-POLY CARB	3534A68H06
C9	CAPACITOR	.1 MFD 100V +-5% MET-POLY CARB	3534A68H06
C15	CAPACITOR	.033 MFD 100V, +-5% MET-POLY CARB	3534A68H06
C16	CAPACITOR	.033 MFD 100V, +-5% MET-POLY CARB	3534A68H06
C17	CAPACITOR	220PF 500V +-5% DIPPED MICA	3532A31H01
D1	DIODE	1N645A	837A692H03
D2	DIODE	1N645A	837A692H03
D3	DIODE	1N645A	188A342H24
D4	DIODE	1N645A	837A692H03
D5	DIODE	1N645A	837A692H03
D6	DIODE	1N645A	837A692H03
D7	DIODE	1N645A	837A692H03
D8	DIODE	1N645A	837A692H03
D9	DIODE	1N645A	837A692H03
D10	DIODE	1N535B	188A342H24
IC1	INT CKT	MC14023BAL TRIPLE 3 INPUT NAND	3527A26H03
IC2	INT CKT	MC14011BAL QUAD-2 INPUT NAND	3527A09H02
IC3	INT CKT	MC14066BAL QUAD BILATERAL SWITCH	3527A09H06
J1	JUMPER	0 OHM	862A478H01
J2	JUMPER	0 OHM	862A478H01
LED-1	DIODE	RED LED (EDGE MOUNT)	3508A22H01
LED-2	DIODE	RED LED (EDGE MOUNT)	3508A22H01
PB-1	SWITCH	PUSHBUTTON	1444C63H01
Q1	TRANSISTOR	2N2222A, NPN	762A672H15
Q2	TRANSISTOR	2N2907A PNP	762A672H17
Q3	TRANSISTOR	2N2907A PNP	762A672H17
Q4	TRANSISTOR	2N2222A, NPN	762A672H15
Q5	TRANSISTOR	2N2222A, NPN	762A672H15
Q6	TRANSISTOR	2N2222A, NPN	762A672H15
Q7	TRANSISTOR	2N2907A PNP	762A672H17
Q8	TRANSISTOR	D44VH10 NPN	3532A45H09
R1	RESISTOR	1K, 1% 1/4W METAL FILM	848A819H48
R2	RESISTOR	10K 1/4W 1% METAL FILM	848A820H45
R3	RESISTOR	3.01K 1%, 1/4W METAL FILM	848A819H49
R4	RESISTOR	51.1K 1/4W 1% METAL FILM	848A821H14
R5	RESISTOR	10K 1/4W 1% METAL FILM	848A820H45
R6	RESISTOR	100-OHM 1% 1/4W METAL FILM	848A818H51
R7	RESISTOR	20K 1% 1/4W METAL FILM	848A820H74
R8	RESISTOR	20K 1% 1/4W METAL FILM	848A820H74
R9	RESISTOR	1K, 1% 1/4W METAL FILM	848A819H48
R10	RESISTOR	20K 1% 1/4W METAL FILM	848A820H74
R11	RESISTOR	10 OHM, 1/2W, +-5% CARBON	187A290H01
R12	RESISTOR	30.1K 1% 1/4W METAL FILM	848A820H91
R13	RESISTOR	1K, 1% 1/4W METAL FILM	848A819H48
R14	RESISTOR	20K 1% 1/4W METAL FILM	848A820H74
R15	RESISTOR	10K 1/4W 1% METAL FILM	848A820H45
R16	RESISTOR	10K 1/4W 1% METAL FILM	848A820H45
R17	RESISTOR	10K 1/4W 1% METAL FILM	848A820H45
R18	RESISTOR	20K 1% 1/4W METAL FILM	848A820H74
R19	RESISTOR	100K 1/4W 1% METAL FILM	848A821H42
R20	RESISTOR	10K 1/4W 1% METAL FILM	848A820H45
R21	RESISTOR	10K 1/4W 1% METAL FILM	848A820H45
R22	RESISTOR	51.1K 1/4W 1% METAL FILM	848A821H14
R23	RESISTOR	10K 1/4W 1% METAL FILM	848A820H45
R24	RESISTOR	511K 1/4W 1% METAL FILM	848A822H11
R25	RESISTOR	511K 1/4W 1% METAL FILM	848A822H11
R26	RESISTOR	51.1K 1/4W 1% METAL FILM	848A821H14
R27	RESISTOR	10K 1/4W 1% METAL FILM	848A820H45
R28	RESISTOR	3.01K 1%, 1/4W METAL FILM	848A819H49
R29	RESISTOR	51.1K 1/4W 1% METAL FILM	848A821H14
R30	RESISTOR	10K 1/4W 1% METAL FILM	848A820H45
R31	RESISTOR	3.01K 1%, 1/4W METAL FILM	848A819H49
R32	RESISTOR	3.01K 1%, 1/4W METAL FILM	848A819H49
R33	RESISTOR	5.62K, 1/4W, 1% METAL FILM	848A820H21
R34	RESISTOR	330 OHMS, +-5% 3W, WIREWOUND	762A679H02
R35	RESISTOR	1K, 1% 1/4W METAL FILM	848A819H48
R36	RESISTOR	22.4-OHM 25W +-5% WIREWOUND	0401297H41
R37	RESISTOR	15K 1/4W 1% METAL FILM	848A820H62
R38	RESISTOR	15K 1/4W 1% METAL FILM	848A820H62
R39	RESISTOR	5.62K, 1/4W, 1% METAL FILM	848A820H21
RY-1	REED RELAY	.5 AMP DC PICKUP, FORM A	1442C62G01
RY-2	REED RELAY	.5 AMP DC PICKUP, FORM A	1442C62G01
Z1	ZENER	1N5235B 6.8V 5% 500 MW	862A288H07
Z2	ZENER	1N560B 9.1V 5% 400 MW	186A797H10

158IC27G01

ITEM	PART NAME	DESCRIPTION	STYLE
AR2	AR UNIT	1.6 OHM COIL, 10W, 4A	408C845G44
C10	CAPACITOR	.033 MFD, 100V, +-5% MET-POLY CARB	3534A68H06
C11	CAPACITOR	.033 MFD, 100V, +-5% MET-POLY CARB	3534A68H06
C12	CAPACITOR	.1 MFD 100V +-5% MET-POLY CARB	3534A68H06
C13	CAPACITOR	.1 MFD 100V +-5% MET-POLY CARB	3534A68H06
C14	CAPACITOR	100 MFD, 35V, +-20% TANTALUM	880A363H01
D11	DIODE	1N4818	188A342H06
IC4	INT CKT	MC14023BAL TRIPLE 3 INPUT NAND	3527A26H03
IC5	INT CKT	MC14011BAL QUAD-2 INPUT NAND	3527A09H02
IC6	INT CKT	MC14066BAL QUAD BILATERAL SWITCH	3527A09H06
J03	JUMPER	0 OHM	862A478H01
J04	JUMPER	0 OHM	862A478H01
LED3	DIODE	RED LED (EDGE MOUNT)	3508A22H01
LED4	DIODE	RED LED (EDGE MOUNT)	3508A22H01
Q9	TRANSISTOR	2N2907A PNP	762A672H17
Q10	TRANSISTOR	D44VH10 NPN	3532A45H09
R39	RESISTOR	51.1K 1/4W 1% METAL FILM	848A821H14
R40	RESISTOR	10K 1/4W 1% METAL FILM	848A820H45
R41	RESISTOR	511K 1/4W 1% METAL FILM	848A822H11
R42	RESISTOR	511K 1/4W 1% METAL FILM	848A822H11
R43	RESISTOR	51.1K 1/4W 1% METAL FILM	848A821H14
R44	RESISTOR	10K 1/4W 1% METAL FILM	848A820H45
R45	RESISTOR	3.01K 1%, 1/4W METAL FILM	848A819H49
R46	RESISTOR	51.1K 1/4W 1% METAL FILM	848A821H14
R47	RESISTOR	10K 1/4W 1% METAL FILM	848A820H45
R48	RESISTOR	3.01K 1%, 1/4W METAL FILM	848A819H49
R49	RESISTOR	5.62K, 1/4W, 1% METAL FILM	848A820H21
R50	RESISTOR	3.01K 1%, 1/4W METAL FILM	848A819H49
R51	RESISTOR	330 OHMS, +-5% 3 WATTS, WIRE WOUND	762A679H02
R52	RESISTOR	1K, 1% 1/4W METAL FILM	848A819H48
R53	RESISTOR	22.4-OHM 25W +-5% WIREWOUND	0401297H41
R54	RESISTOR	15K 1/4W 1% METAL FILM	848A820H62
R55	RESISTOR	15K 1/4W 1% METAL FILM	848A820H62
RY3	REED RELAY	.5 AMP DC PICKUP, FORM A	1442C62G01
RY4	REED RELAY	.5 AMP DC PICKUP, FORM A	1442C62G01

DRAWING
ROUTING
CODE

A P V F 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47

PART NAME APPR TYPE PART DESCRIPTION SUB

SCHEMATIC RELAY AR TRIP MODULE 2

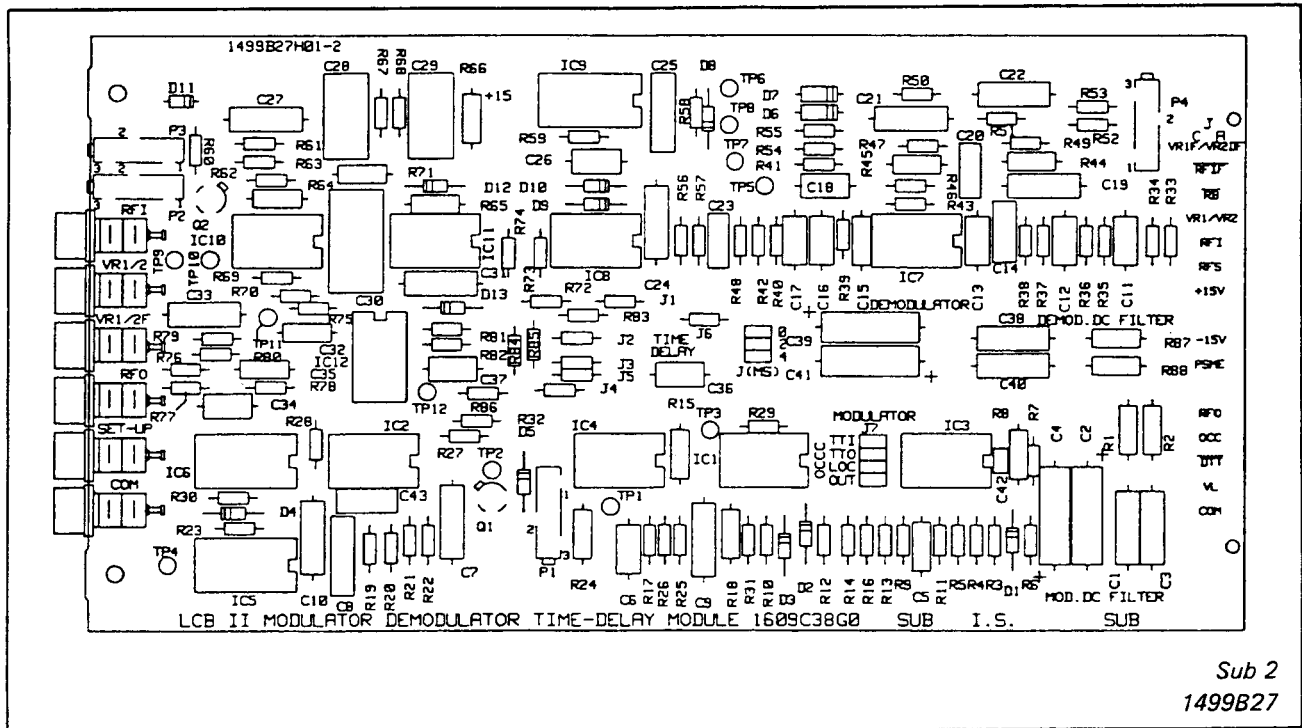


Fig. 9. MD/DTD Component Location

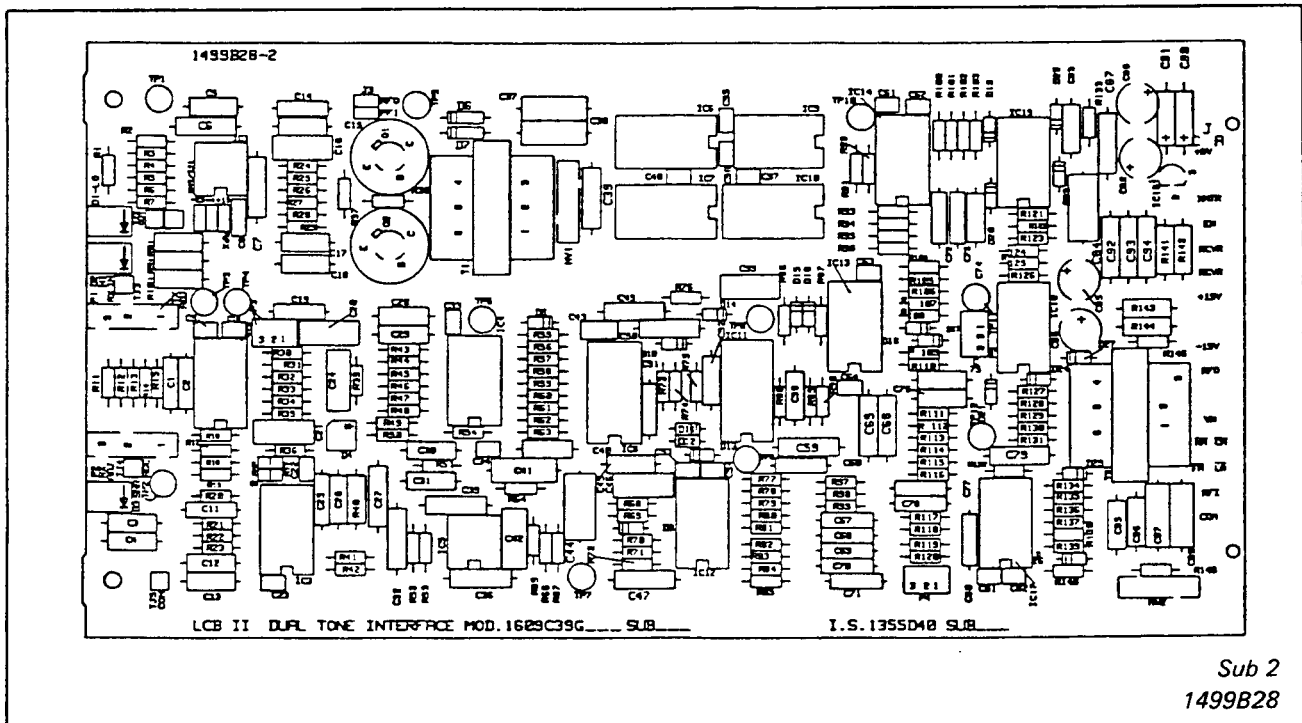


Fig. 10. IFDT Component Location

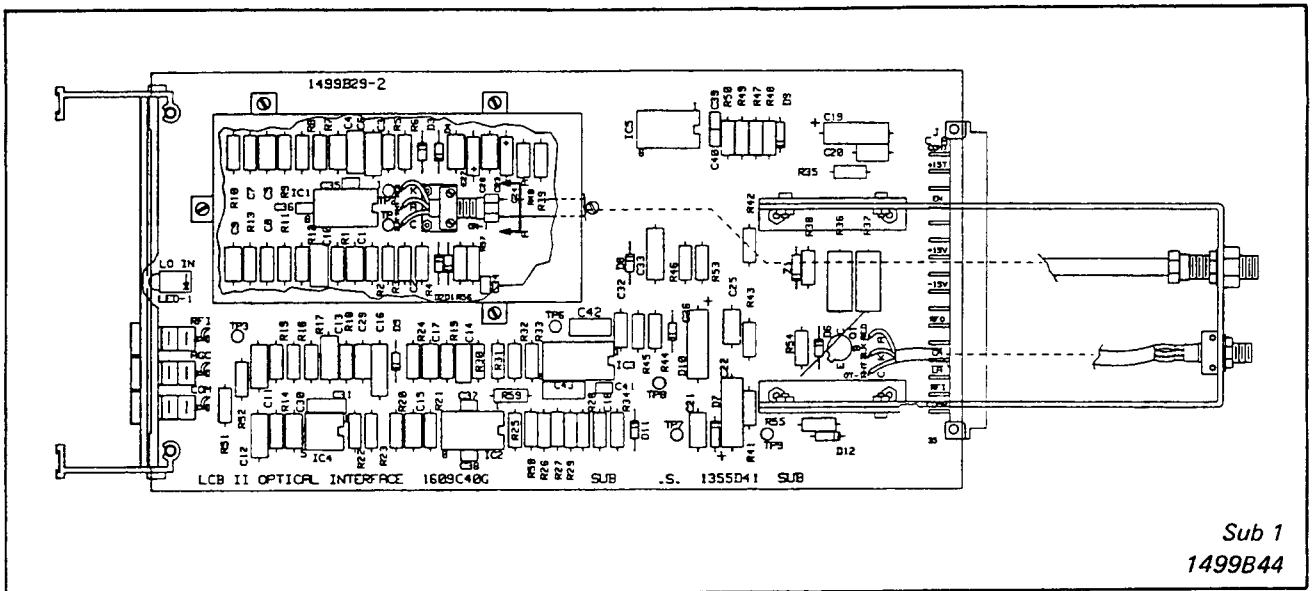


Fig. 11. IFO Component Location

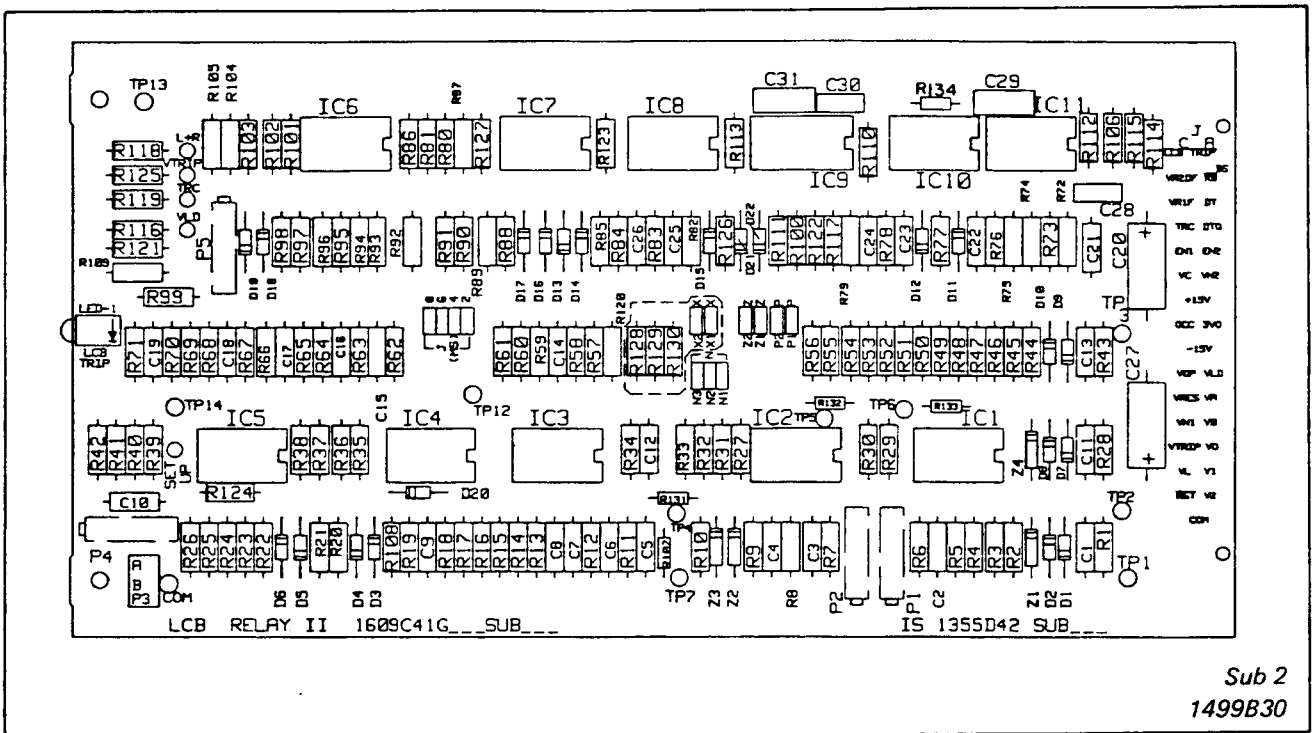


Fig. 12. Relay Component Location

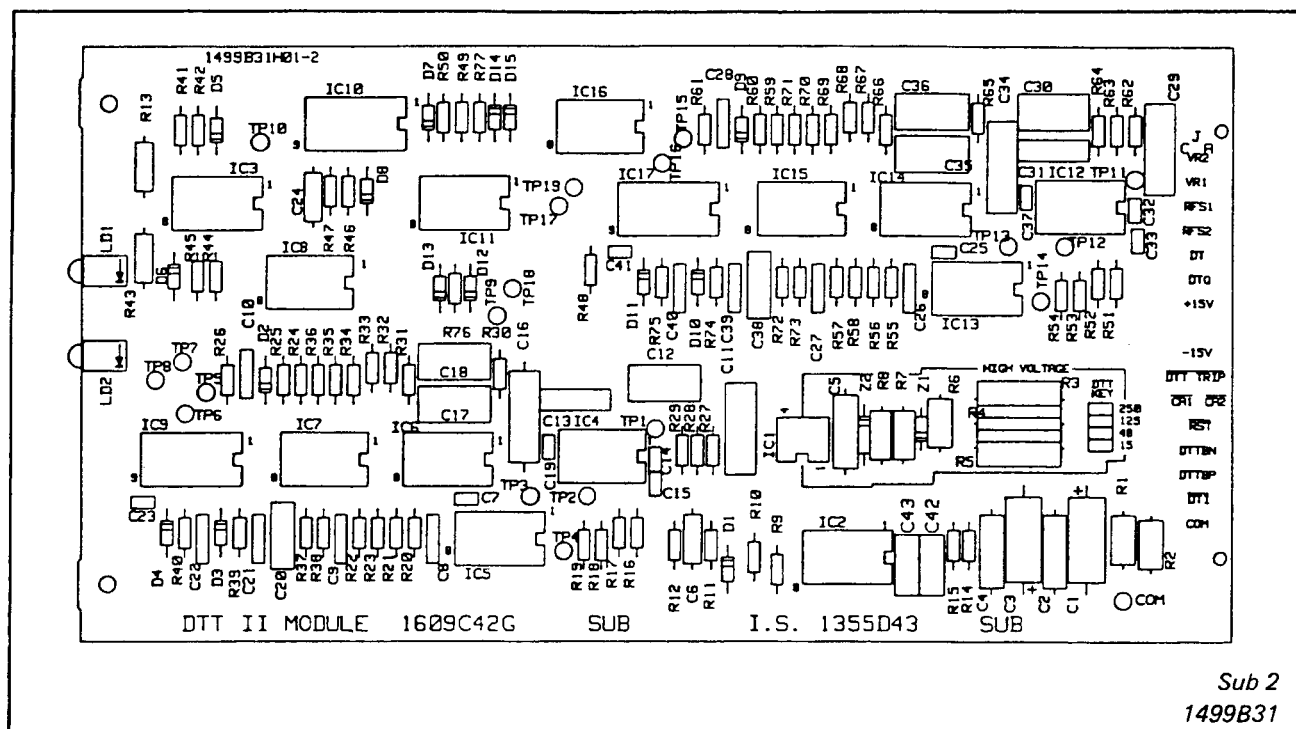


Fig. 13. DTT Component Location

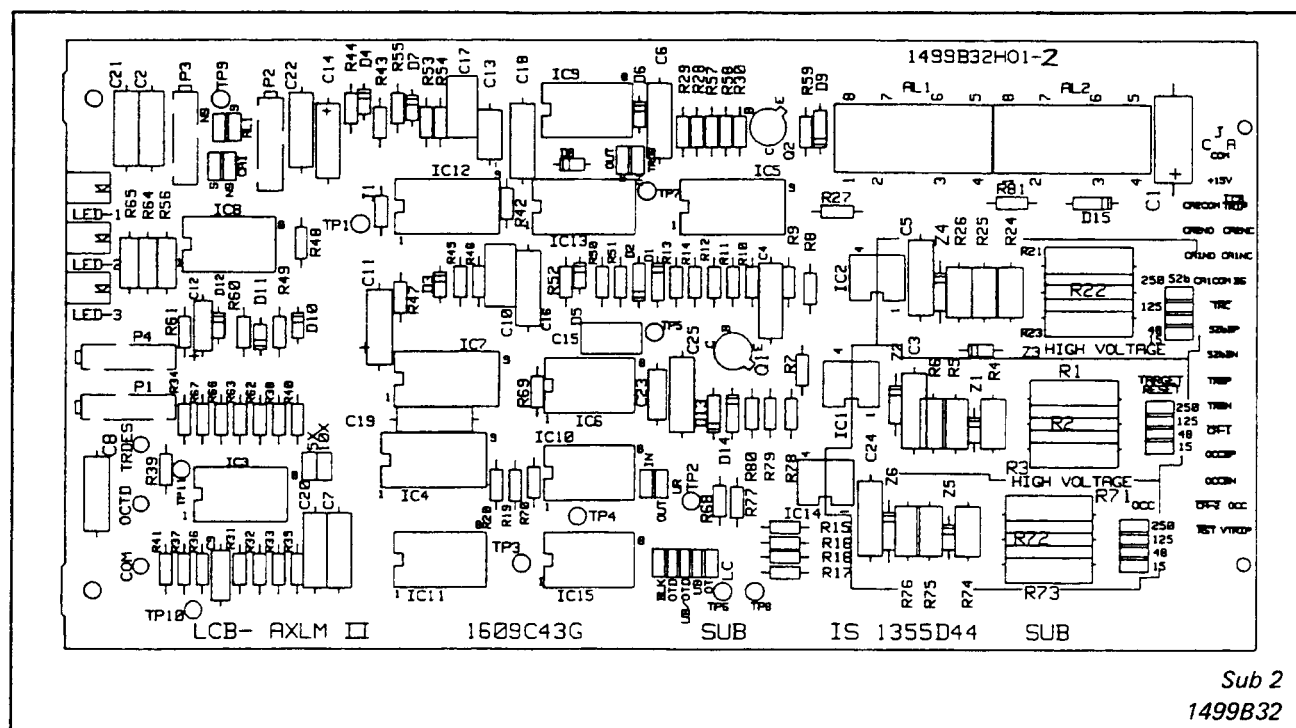


Fig. 14. AXLM Component Location

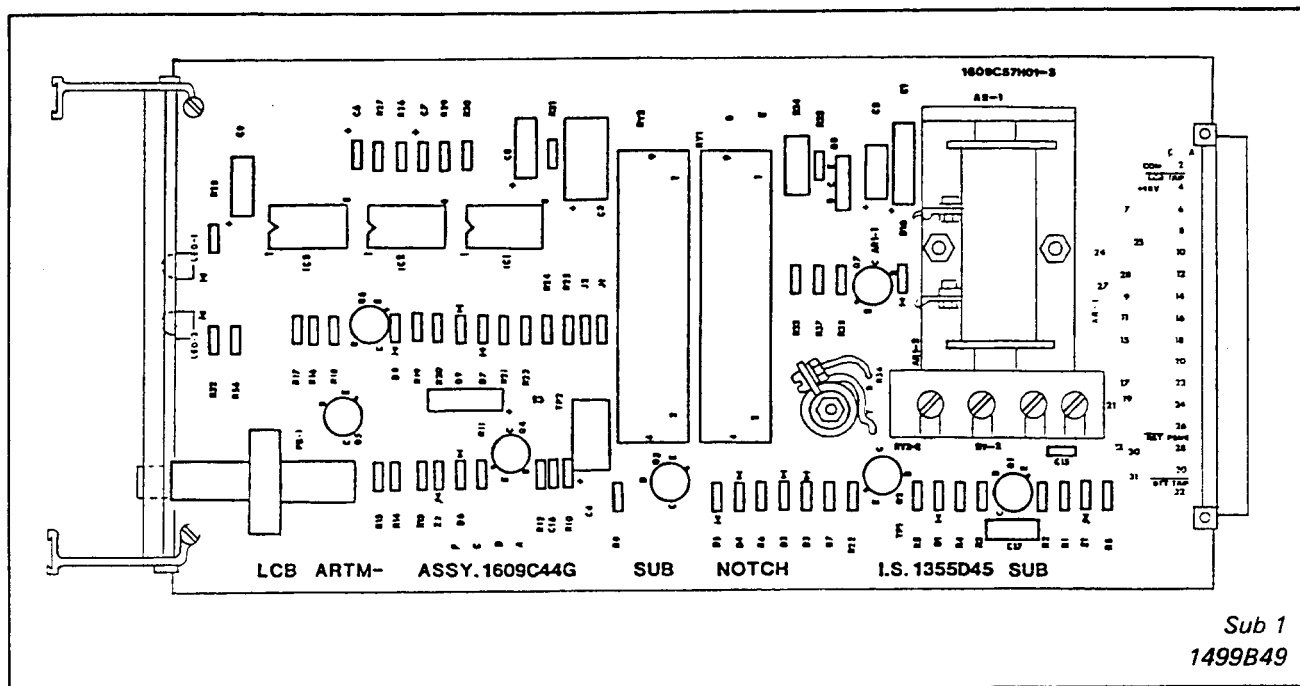


Fig. 15. ARTM-1 Component Locations

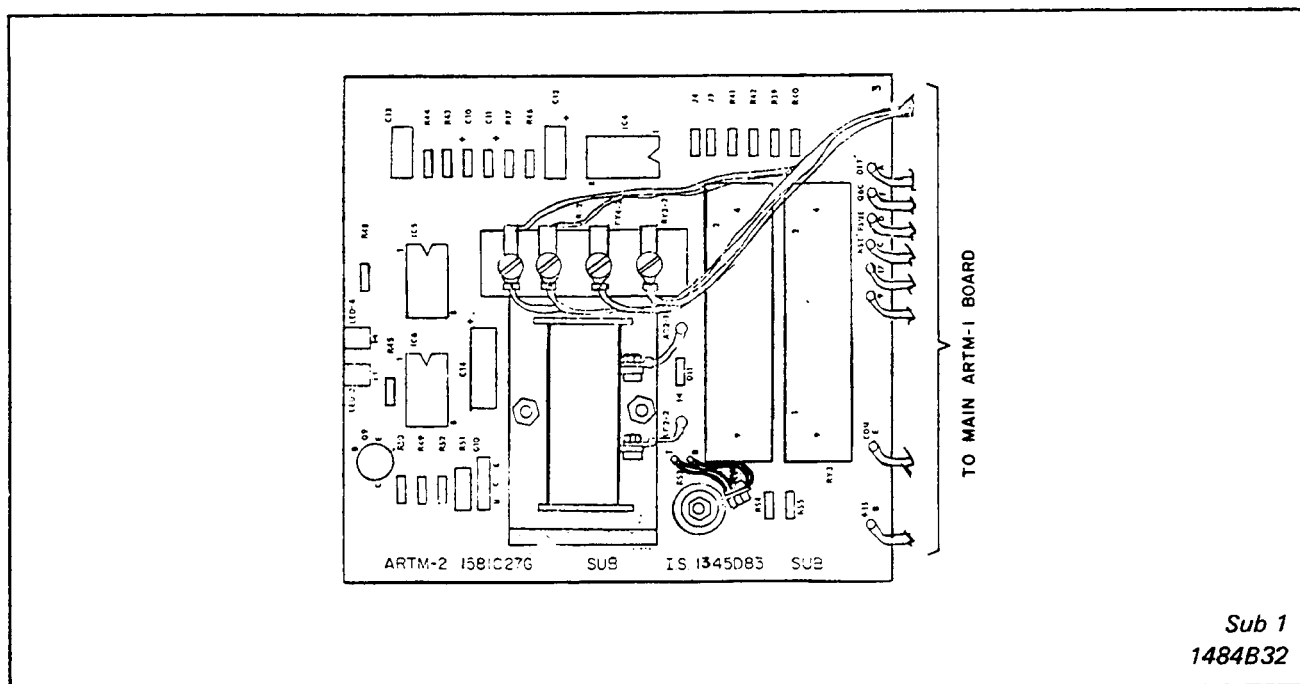


Fig. 16. ARTM-2 Subassembly Component Location



TYPE LCB II RELAY MODULES (With DIN Connectors)

Effective: April 1990

The purpose of this addendum is to add the following statements:

Page 1:

MODULE APPLICATION/DESCRIPTION; ALS - Analog Logic Power Supply. The last sentence of the paragraph incorrectly refers to I.L. 41-830.12. This sentence should state: This module is covered by I.L. 41-830.11.

Page 2:

- IFO - OPTICAL INTERFACE

The High Output Transmitter contains a Fiber Optic Edge Emitting LED mounted on the IFO-II module. The LED assembly has a "PIGTAIL" with the ST Connector mating with the bulkhead connector mounted on a bracket.

Page 3:

- MODULE REFERENCE INFORMATION

IFO-II High Power Module

Style 1609C96G01 (1300 nm, ST, High Power)

Internal Schematic 1355D70

Component Location 1500B02

Chassis Location P OS F (Channel 1)

POS E (Channel 2)

- ATTACHMENTS

a. Internal Schematics

<u>Figure</u>	<u>Module</u>	<u>Drawing</u>
17	IFO-II	1355D70

b. Component Location

<u>Figure</u>	<u>Module</u>	<u>Drawing</u>
18	IFO-II	1609C96

All possible contingencies which may arise during installation, operation or maintenance, and all details and variations of this equipment do not purport to be covered by these instructions. If further information is desired by purchaser regarding this particular installation, operation of maintenance of this equipment, the local ABB Power T&D Company Inc. representative should be contacted.

02095581

COMP LOC	CAPACITORS DESCRIPTION	STYLE
C01	.1 MFD 100V +5% MET-POLY CARB	3534F68H08
C02	.022 MFD 100V +2% MET-POLY CARB	3533F53H01
C03	1.0 MFD 50V +5% MET-POLY CARB	3534F68H11
C04	.015 MFD 200V +2% MET-POLY CARB	3534F68H05
C05	.001 MFD 200V +1% MET-POLY CARB	3534F68H01
C06	270 PF 500V +2% MICA	762A757H12
C07	.022 MFD 100V +2% MET-POLY CARB	3533F53H01
C08	.0015 MFD 600V +2% MET-POLY CARB	3533F53H08
C09	.1 MFD 100V +5% MET-POLY CARB	3534F68H08
C10	300 PF 500V +2% MICA	187A584H09
C11	.22 MFD 100V +5% MET-POLY CARB	3534F68H10
C12	.22 MFD 100V +5% MET-POLY CARB	3534F68H10
C13	.33 MFD 50V +5% MET-POLY CARB	863A166H16
C14	10 PF 500V +5% MICA	763A209H03
C15	.1 MFD 100V +5% MET-POLY CARB	3534F68H08
C16	1.0 MFD 50V +5% MET-POLY CARB	3534F68H11
C17	.1 MFD 100V +5% MET-POLY CARB	3534F68H08
C18	.01 MFD 200V +2% MET-POLY CARB	3533F53H02
C19	100 MFD 35V +20% TANTALUM	880A363H01
C20	.1 MFD 100V +5% MET-POLY CARB	3534F68H08
C21	.1 MFD 100V +5% MET-POLY CARB	3534F68H08
C22	100 MFD 35V +20% TANTALUM	880A363H01
C23	.1 MFD 100V +5% MET-POLY CARB	3534F68H08
C24	1 MFD 35V 10% TANTALUM	837A241H15
C25	.1 MFD 100V +5% MET-POLY CARB	3534F68H08
C26	100 MFD 35V +20% TANTALUM	880A363H01
C27	.1 MFD 100V +5% MET-POLY CARB	3534F68H08
C28	1 MFD 35V 10% TANTALUM	837A241H15
C29	.1 MFD 100V +5% MET-POLY CARB	3534F68H08
C30	.1 MFD 100V +5% MET-POLY CARB	3534F68H08
C31	47 PF 500V +2% MICA	763A209H17
C32	.0022 MFD 400V 2% MET-POLY CARB	3533F53H05
C33	.22 MFD 100V +5% MET-POLY CARB	3534F68H10
C34	.1 MFD 50V 20% CERAMIC	3532A29H13
C35	.1 MFD 50V 20% CERAMIC	3532A29H13
C36	.1 MFD 50V 20% CERAMIC	3532A29H13
C37	.1 MFD 50V 20% CERAMIC	3532A29H13
C38	.1 MFD 50V 20% CERAMIC	3532A29H13
C39	.1 MFD 50V 20% CERAMIC	3532A29H13
C40	.1 MFD 50V 20% CERAMIC	3532A29H13
C41	.1 MFD 50V 20% CERAMIC	3532A29H13
C42	680 PF 300V +2% DIPPED MICA	3532A31H57
C43	680 PF 300V +2% DIPPED MICA	3532A31H57

COMP LOC	DIODE-LEDS DESCRIPTION	STYLE
LED1	RED LED (EDGE MOUNT) 550-0406	3508A22H01
D1	1N4148	836A928H06
D2	1N4148	836A928H06
D3	1N4148	836A928H06
D4	1N4148	836A928H06
D5	1N4148	836A928H06
D6	1N4148	836A928H06
D7	1N645A	837A692H03
D8	1N4148	836A928H06
D9	1N645A	837A692H03
D10	1N4148	836A928H06
D11	1N4148	836A928H06
D12	1N645A	837A692H03

COMP LOC	DESCRIPTION	STYLE
OR1	LYTEL ST PIN PHOTO DIODE 0673-001	9647A37H08
OT1	LASERTRON QLED 13005H-501	9647A35H04

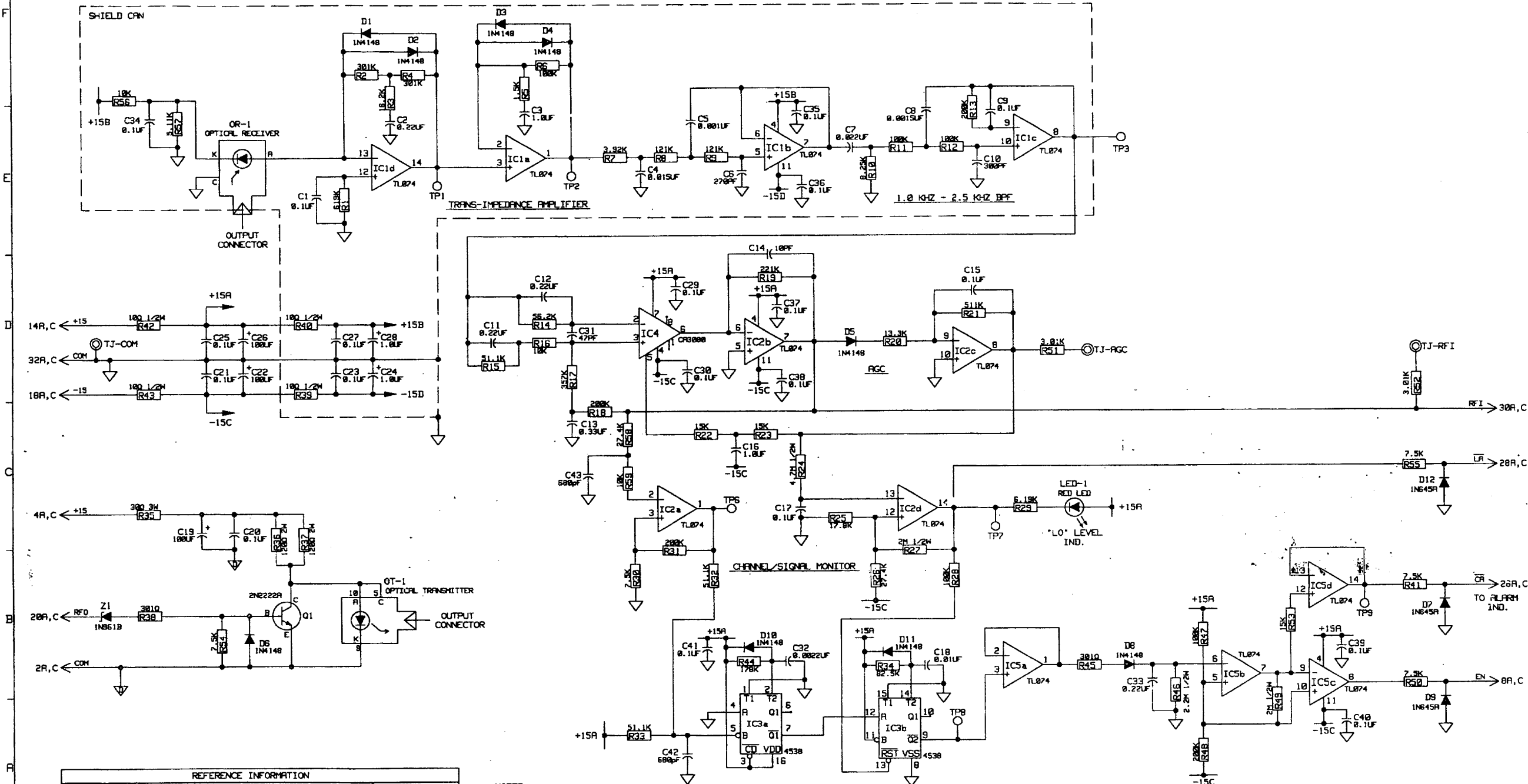
COMP LOC	INT CKTS DESCRIPTION	STYLE
IC1	TL074IJ QUAD OP AMP	3528A90H01
IC2	TL074IJ QUAD OP AMP	3528A90H01
IC3	MC145383AL DUAL PREC MONO MULTIVIB	3527A09H01
IC4	CA3080AS OP TRANSCOND AMP	3533A21H01
IC5	TL074IJ QUAD OP AMP	3528A90H01

COMP LOC	RESISTORS DESCRIPTION	STYLE
R1	619K .25W 1% METAL FILM	3532A38H77
R2	301K .25W 1% METAL FILM	3532A38H47
R3	16.2K .25W 1% METAL FILM	3535A37H21
R4	301K .25W 1% METAL FILM	3532A38H47
R5	1.50K .25W 1% METAL FILM	3535A38H18
R6	100K .25W 1% METAL FILM	3532A38H01
R7	3.92K .25W 1% METAL FILM	3535A38H58
R8	121K .25W 1% METAL FILM	3532A38H09
R9	121K .25W 1% METAL FILM	3532A38H09
R10	8.25K .25W 1% METAL FILM	3535A38H89
R11	100K .25W 1% METAL FILM	3532A38H01
R12	100K .25W 1% METAL FILM	3532A38H01
R13	200K .25W 1% METAL FILM	3532A38H30
R14	56.2K .25W 1% METAL FILM	3535A37H73
R15	51.1K .25W 1% METAL FILM	3535A37H69
R16	10K .25W 1% METAL FILM	3535A37H01
R17	357K .25W 1% METAL FILM	3532A38H54
R18	200K .25W 1% METAL FILM	3532A38H30
R19	221K .25W 1% METAL FILM	3532A38H34
R20	13.3K .25W 1% METAL FILM	3535A37H13
R21	511K .25W 1% METAL FILM	3532A38H69
R22	15K .25W 1% METAL FILM	3535A37H18
R23	15K .25W 1% METAL FILM	3535A37H18
R24	4.7M .25W 5% CARBON FILM	3535A41H65
R25	17.8K .25W 1% METAL FILM	3535A37H25
R26	27.4K .25W 1% METAL FILM	3535A37H43
R27	2M .25W 1% METAL FILM	3532A39H30
R28	100K .25W 1% METAL FILM	3532A38H01
R29	6.19K .25W 1% METAL FILM	3535A38H77
R30	7.50K .25W 1% METAL FILM	3535A38H85
R31	200K .25W 1% METAL FILM	3532A38H30
R32	51.1K .25W 1% METAL FILM	3535A37H69
R33	51.1K .25W 1% METAL FILM	3535A37H69
R34	82.5K .25W 1% METAL FILM	3535A37H89
R35	30 OHM 3W 1% WIRE WOUND	763A126H34
R36	120 OHM 2W 5% MOLDED COMP	185A207H05
R37	120 OHM 2W 5% MOLDED COMP	185A207H05
R38	301 OHM .25W 1% METAL FILM	3535A39H47
R39	10 OHM .5W 5% FIXED COMP	187A290H01
R40	10 OHM .5W 5% FIXED COMP	187A290H01
R41	7.50K .25W 1% METAL FILM	3535A38H85
R42	10 OHM .5W 5% FIXED COMP	187A290H01
R43	10 OHM .5W 5% FIXED COMP	187A290H01
R44	178K .25W 1% METAL FILM	3532A38H25
R45	301 OHM .25W 1% METAL FILM	3535A39H47
R46	2.2M OHM .25W 5% CARBON FILM	3535A41H67
R47	100K .25W 1% METAL FILM	3532A38H01
R48	200K .25W 1% METAL FILM	3532A38H30
R49	2M .25W 1% METAL FILM	3532A39H30
R50	7.50K .25W 1% METAL FILM	3535A38H85
R51	3.01K .25W 1% METAL FILM	3535A38H47
R52	3.01K .25W 1% METAL FILM	3535A38H47
R53	15K .25W 1% METAL FILM	3535A37H18
R54	7.50K .25W 1% METAL FILM	3535A38H85
R55	7.50K .25W 1% METAL FILM	3535A38H85
R56	10K .25W 1% METAL FILM	3535A37H01
R57	5.11K .25W 1% METAL FILM	3535A38H69
R58	27.4K .25W 1% METAL FILM	3535A37H43
R59	10K .25W 1% METAL FILM	3535A37H01

COMP LOC	TRANSISTORS DESCRIPTION	STYLE
Q1	2N2222A NPN 40V 0.8A 0.4W	762A672H15

COMP LOC	ZENERS DESCRIPTION	STYLE
Z1	1N561B 10V 5% 400MW	186A797H07

0209551



REFERENCE INFORMATION		
MOD. ASSEMBLY	DESCRIPTION	COMP. LOCATION
1609C9601	1300nm, HIGH POWER LED, "ST" CONNECTORS.	1500B02

NOTES:

ALL RESISTORS ARE 1/4W UNLESS OTHERWISE SPECIFIED.

PART NAME	APP'D. TYPE	PART DESCRIPTION	SUB
SCHEMATIC	RELAY	IFO II MOD. - LCB II	1