

SYLVANIA

GENERAL TELEPHONE & ELECTRONICS

FACTORY PREPARED TECHNICAL SERVICE DATA

STEREO HI-FI
BULLETIN: S32-6



SERVICE PUBLICATIONS DEPARTMENT
Entertainment Products Division · Sylvania Electric Products Inc. · 700 Ellicott Street · Batavia, N. Y.

CIRCUIT DESCRIPTION

NOTE: Only the right channel will be described for simplicity since the left channel is identical.

The pre-driver and driver stages are DC coupled. The pre-driver (Q1) is a small signal silicon transistor; the driver (Q2) a drift-field germanium power type.

Fixed bias for Q1 (pre-driver) is provided by voltage divider resistors R6, R8. R4 and C4 are in a "bootstrap" connection with Q1. Since the AC swing at the emitter of Q1 follows the input signal, R4 is literally "bootstrapped" along with this signal, causing the effective value of R4 to be multiplied by the approximate beta of Q1. Q1 is used as a common emitter amplifier, directly driving Q2. The driver stage (Q2) provides no voltage gain but a large power gain to the power output stage via interstage coupling transformer T1.

Approximately 20 db of negative feedback from the final output stage is applied through C6 and R10 to the emitter of the pre-driver stage Q1. The use of negative feedback results in improved damping and reduced distortion of the audio signal.

The pre-driver stage (Q1) collector voltage provides the bias voltage for the driver stage, Q2. It can be seen that when the pre-driver collector voltage falls (high conduction) the base voltage of the driver also falls, thus driving this stage toward saturation. Therefore, under signal conditions, the driver may be driven from saturation to cut-off by the pre-driver stage.

Phase reversal necessary to drive the power output stage is obtained from the secondary windings of the driver transformer T1.

The final power output stage consists of a matched pair of DTG110 germanium transistors (Q3, Q5) and a matched pair of DTG110B germanium transistors (Q4, Q6) connected in a class B push-pull arrangement for high power gain and excellent linearity. A total of 200 Watts of EIA music power is taken from the collector-emitter busses of these matched transistor groups to drive the speaker systems directly. With a drive point potential on the collector-emitter buss nominally at 0 VDC, the signal swing is from near -45 VDC to near +45 VDC.

Emitter resistors R24 and R34 serve to compensate for differences between transistor parameters and the effects of ambient temperature variations. R16, R18, R20 and R22 form a biasing network for the power output transistors to keep their "no signal" condition slightly above cutoff to eliminate cross-over distortion.

Power transistors Q3 and Q5 are used in the common base mode and are directly driven by Q4 and Q6 collectors. Their purpose is to share the power supply voltage with the transformer driven transistors Q4 and Q6.

Capacitors C9 and C13 provide extra high frequency drive to Q3 and Q5 to maintain their power output at higher audio frequencies.

Note that all four DTG110 transistors are mounted on one extruded aluminum heat sink and that all four DTG110B transistors are mounted on the other.

Input AC power is applied to power transformer T3 and rectified in a solid state, full wave balanced bridge network. The secondary winding of the transformer has a grounded center tap in order to obtain both +45 volts and -45 volts from the rectified output. Note that the filter in the -45 volt line (C30) is mounted on a phenolic insulator to isolate the can from chassis ground.

When replacing power transistors, always observe the following precautions:

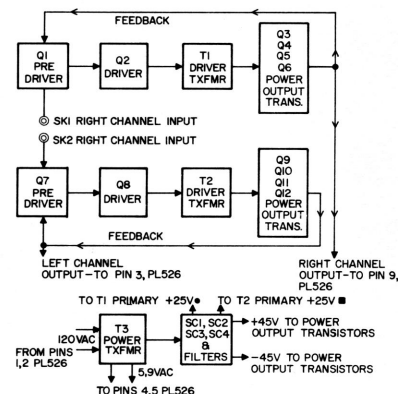
1. Use matched Beta, direct replacement types only.
2. Be sure to use silicon grease liberally on both sides of the mica insulators used under these transistors.
3. Be sure to snug down the power transistor to the heat sink evenly and firmly.
4. A momentary short across the output terminals of this amplifier will not damage the output stage. However, a prolonged shorted condition may cause serious damage to the amplifier.

#14 or #16 "Zip cord" is excellent for making up long extension speaker cables.

TECHNICAL INFORMATION

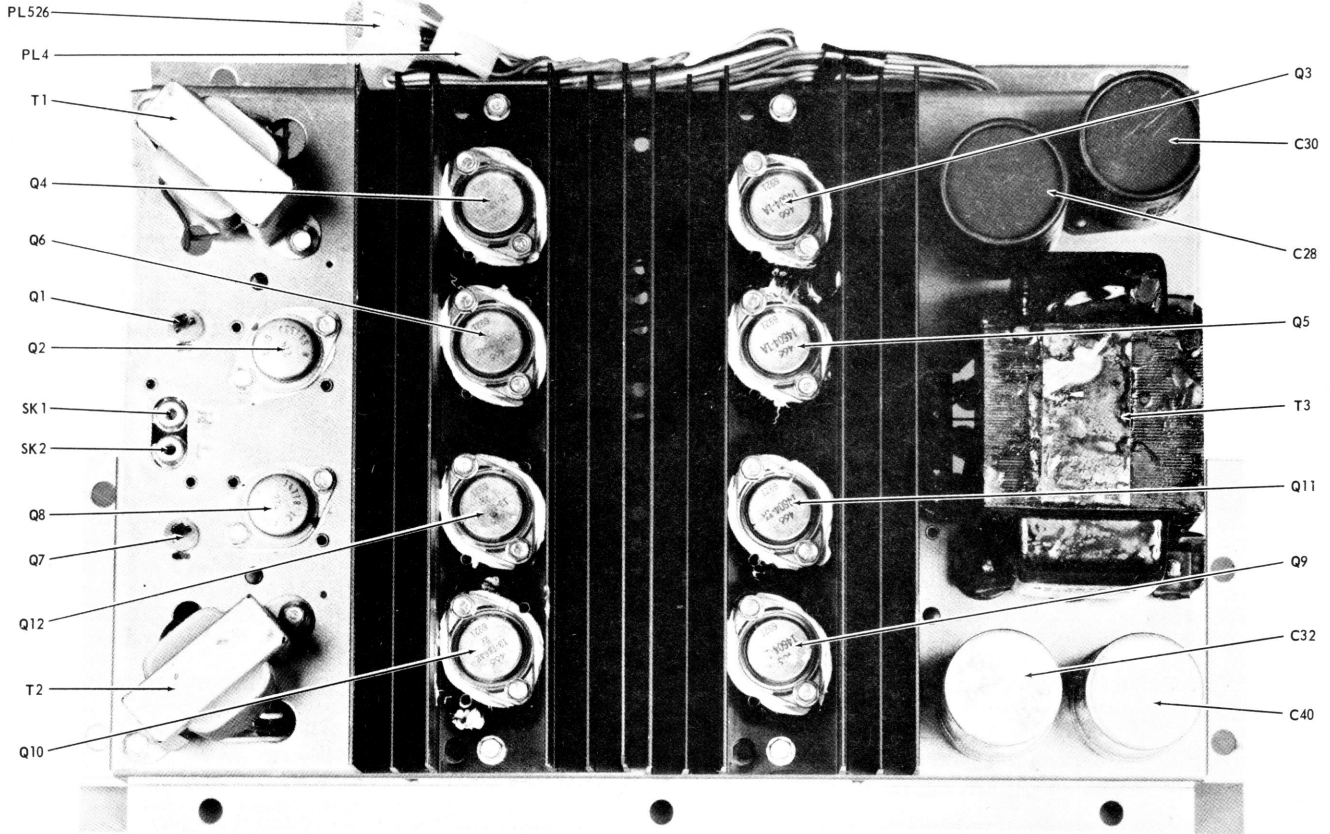
Sensitivity:	1.5 volts for 60 watts, each channel.
Frequency Response:	8 Hertz to 55kHz \pm 3db.
Cont. Sine Wave Pwr:	100 watts total at less than 0.7% T.H.D.
EIA Music Power:	200 watts total.
IHF Music Power:	160 watts total into 8 ohm load at less than 0.7% total harmonic distortion.
IM Distortion:	Less than 0.5% for 50 watts - each chan.
Peak Music Power $\frac{1}{2}$:	Less than 0.5% for 320 watts total.
Power Response:	15 Hz to 20 kHz (Half Power Points)
Hum and Noise:	85db below 80 watts.
Load Impedance:	8 ohms.
Damping Factor:	20

BLOCK DIAGRAM

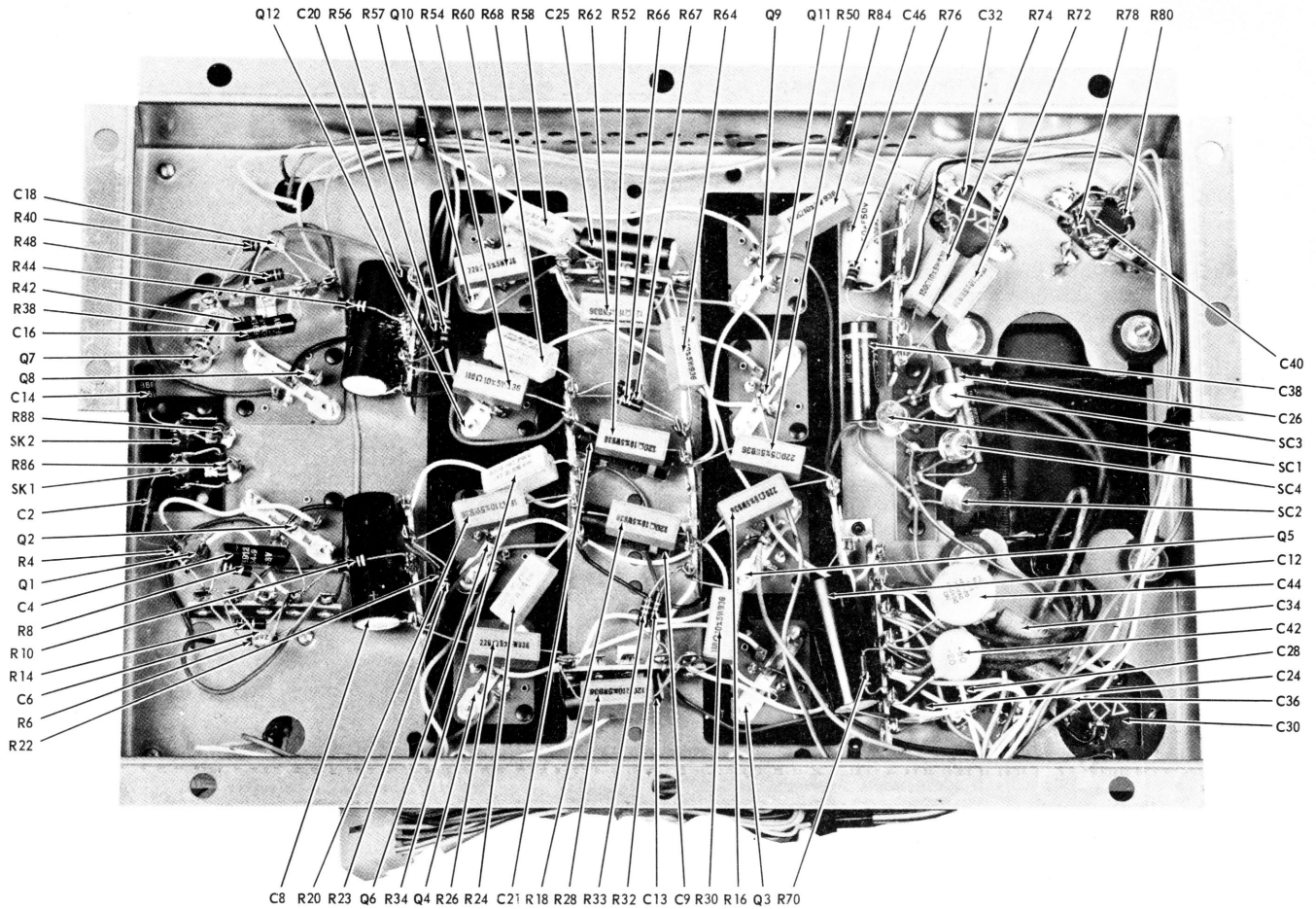


IMPORTANT: Always use genuine Sylvania replacement parts & tubes.

TOP PARTS



BOTTOM PARTS



REPLACEMENT PARTS LIST

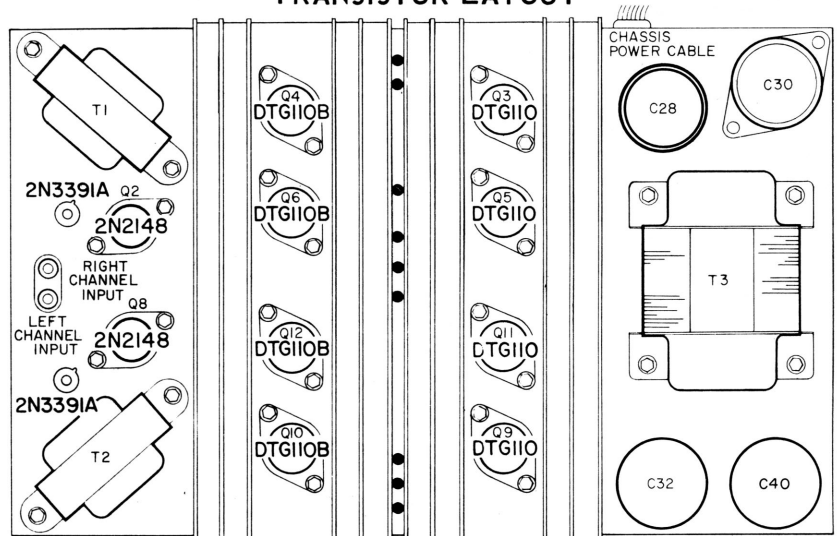
SCHMATIC CODING	SERVICE PART NO.	DESCRIPTION
CAPACITORS		
C2	41-98888-1	2/25 VNP Electrolytic
C4	41-10004-9	20/3V Electrolytic
C6		330 PF
C8	41-14594-6	250/30V Electrolytic
C9		.15
C12	41-14594-6	250/30V Electrolytic
C13		.15
C14	41-98888-1	2/25 VNP Electrolytic
C16	41-10004-9	20/3V Electrolytic
C18		330 PF
C20	41-14594-6	250/30V Electrolytic
C21		.15
C24	41-14594-6	250/30V Electrolytic
C25		.15
C26		.22/200V
C28	41-14772-1	1500/30V Electrolytic
C30	41-14772-1	1500/30V Electrolytic
C32	41-18163-1	1000 x 1000/35V Dual Electrolytic
C34		.047/100V
C36		.047/100V
C38		.22/100V
C40	41-22027-1	500 x 500 x 200V Electrolytic
C42	43-98665-1	.005/150VAC
C44	43-98665-1	.005/150VAC
C46	41-23765-27	250/50V Electrolytic
	86-61830-1	Insulator - C30 Mounting

RESISTORS - All 1/2 Watt, Carbon, 10% unless specified.

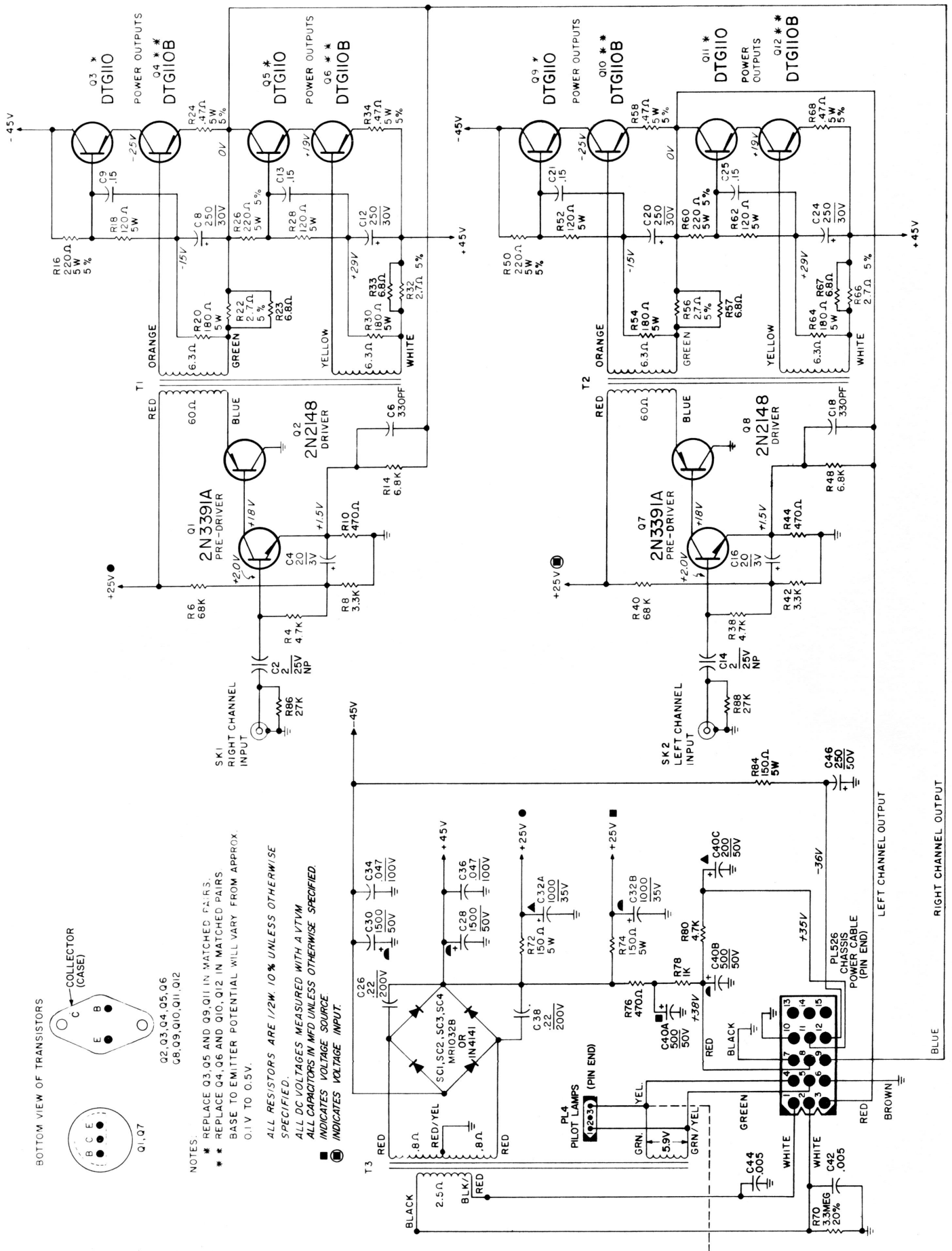
R4		4.7K
R6		68K
R8		3.3K
R10		470
R14		6.8K
R16	187-0092	220, 5W - 5%
R18	187-0068	120, 5W
R20	36-62454-55	180, 5W
R22		2.7 ohm, 5%
R23		6.8 ohm
R24	36-18482-9	.47 ohm, 5W - 5%
R26	187-0092	220, 5W
R28	187-0068	120, 5W
R20	36-62454-55	180, 5W
R32		2.7 ohm, 5%
R33		6.8 ohm
R34	36-18482-9	.47 ohm, 5W - 5%
R38		4.7K
R40		68K
R42		3.3K
R44		470
R48		6.8K
R50	187-0092	220, 5W - 5%
R52	187-0068	120, 5W
R54	36-62454-55	180, 5W
R56		2.7 ohm, 5%
R57		6.8 ohm
R58	36-18482-9	.47 ohm, 5W - 5%
R60	187-0092	220, 5%
R62	187-0068	120, 5W
R64	36-62454-55	180, 5W
R66		2.7 ohm, 5%
R67		6.8 ohm
R68	36-18482-9	.47 ohm, 5W - 5%
R70		3.3 meg, 20%
R72	36-62454-53	150, 5W
R74	36-62454-53	150, 5W
R76		470
R78		1K
R80		4.7K
R84	36-62454-53	150, 5W
R86		27K
R88		27K

SCHMATIC CODING	SERVICE PART NO.	DESCRIPTION
TRANSFORMERS		
T1	56-18973-1	Driver - Right Channel
T2	56-18973-1	Driver - Left Channel
T3	55-14766-1	Power
DIODES		
SC1	IN 4141	Rectifier
SC2	IN 4141	Rectifier
SC3	IN 4141	Rectifier
SC4	IN 4141	Rectifier
TRANSISTORS		
Q1	13-18365-1	Predriver - 2N3391A
Q2	13-14778-1	Driver - 2N2148
Q3	13-14604-1	Power Output - DTG110
Q4	13-18642-1	- DTG110B
Q5	13-14604-1	- DTG110
Q6	13-18642-1	- DTG110B
Q3,Q4,Q5,Q6 are a matched set.		
Q7	13-18365-1	Predriver - 2N3391A
Q8	13-14778-1	Driver - 2N2148
Q9	13-14604-1	Power Output - DTG110
Q10	13-18642-1	- DTG110B
Q11	13-14604-1	- DTG110
Q12	13-18642-1	- DTG110B
Q9,Q10,Q11,Q12 are a matched set.		
	86-14608-1	Insulator, Mica - Power Transistor
	72-14734-2	Socket - Q1,Q7
	72-14607-1	- Q2,Q3,Q4,Q5,Q6,Q8,Q9, Q10,Q11,Q12
MISCELLANEOUS PARTS		
PL4	73-10302-31	Plug - Pilot Lamps (3 pin)
PL526	73-10302-46	Connector - Power Cable (15 pin)
	73-26772-1	Pins for PL526
SK1	73-98079-2	Socket - Phono (Right Chan. Input)
SK2	73-98079-2	- Phono (Left Chan. Input)
	72-14734-2	- Transistor (Q1 & Q7)
	72-14607-1	- Transistor (Q2,Q3,Q4,Q5, Q6,Q8,Q9,Q10, Q11,Q12)
	86-61830-1	Insulator - C30 Mounting
	86-14608-1	Mica Insulator - Power Transistor

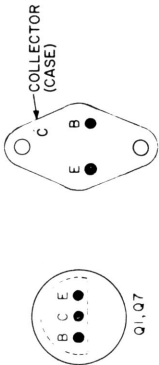
TRANSISTOR LAYOUT



SCHEMATIC DIAGRAM (S32-6)



BOTTOM VIEW OF TRANSISTORS



- NOTES:
- * REPLACE Q3, Q5 AND Q9, Q11 IN MATCHED PAIRS.
 - ** REPLACE Q4, Q6 AND Q10, Q12 IN MATCHED PAIRS
 - BASE TO EMITTER POTENTIAL WILL VARY FROM APPROX. 0.1V TO 0.5V.
 - ALL RESISTORS ARE 1/2W. 10% UNLESS OTHERWISE SPECIFIED.
 - ALL DC VOLTAGES MEASURED WITH A VTVM
 - ALL CAPACITORS IN MFD UNLESS OTHERWISE SPECIFIED.
 - INDICATES VOLTAGE INPUT.
 - INDICATES VOLTAGE INPUT.