REALISTIC®

Service Manual

21-1504

CB 40-CHANNEL TRANSCEIVER

TRC-410

Catalog Number : 21-1504

CUSTOM MANUFACTURED FOR RADIO SHACK TC A DIVISION OF TANDY CORPORATION

CONTENTS

1. SPECIFICATIONS

GENERAL SPECIFICATIONS

Description

Transmitter ..... Crystal controlled PLL synthesizer, amplitude modulation
Receiver ..... Crystal controlled double conversion, superheterodyne system
Communicating frequencies ..... All 40 CB channels (26.965 to 27.405 MHz)
Voltage operation ..... 12 — 16 V DC
(positive or negative ground vehicles)
Temperature and Humidity range ..... −30°C to +60°C and 10% to 90%
Transmitter/Receiver switching ..... Electronic

STANDARD TEST CONDITIONS

Battery supply voltage ..... 13.8 V DC
Modulation ..... 1000 Hz, 30%
Receiver output power ..... 500 mW at external SP.
Receiver output impedance ..... 8 ohms, non-inductive
Ant. load impedance of transmitter ..... 50 ohms, non-inductive
Ambient conditions
temperature ..... 17 to 23°C
humidity ..... 40 to 70%

TRANSMITTER SPECIFICATIONS

Description	Nominal	Limit
RF power output	4.0 watts (max.)	3.6-4.4 watts
Emission	8A3	
Modulation capabilities	+90%, −95%	
AMC Range at 1 kHz	40 dB	> 30dB
Frequency accuracy	0.002%	0.005%
Spurious radiation & Harmonic signal radiation ratio from fundamental	−65 dB	−60 dB
Current consumption unmodulated	1050 mA	1400 mA
Current consumption 80% modulated	1600 mA	1950 mA
Envelope distortion	10% max. 1000 Hz, 50% mod.	
Hum and Noise level	40 dB min. below max. mod.	
Stability against variation of antenna impedance	Satisfactory when dummy antenna is varied from 40 ohms to 200 ohms.	

RECEIVER SPECIFICATIONS

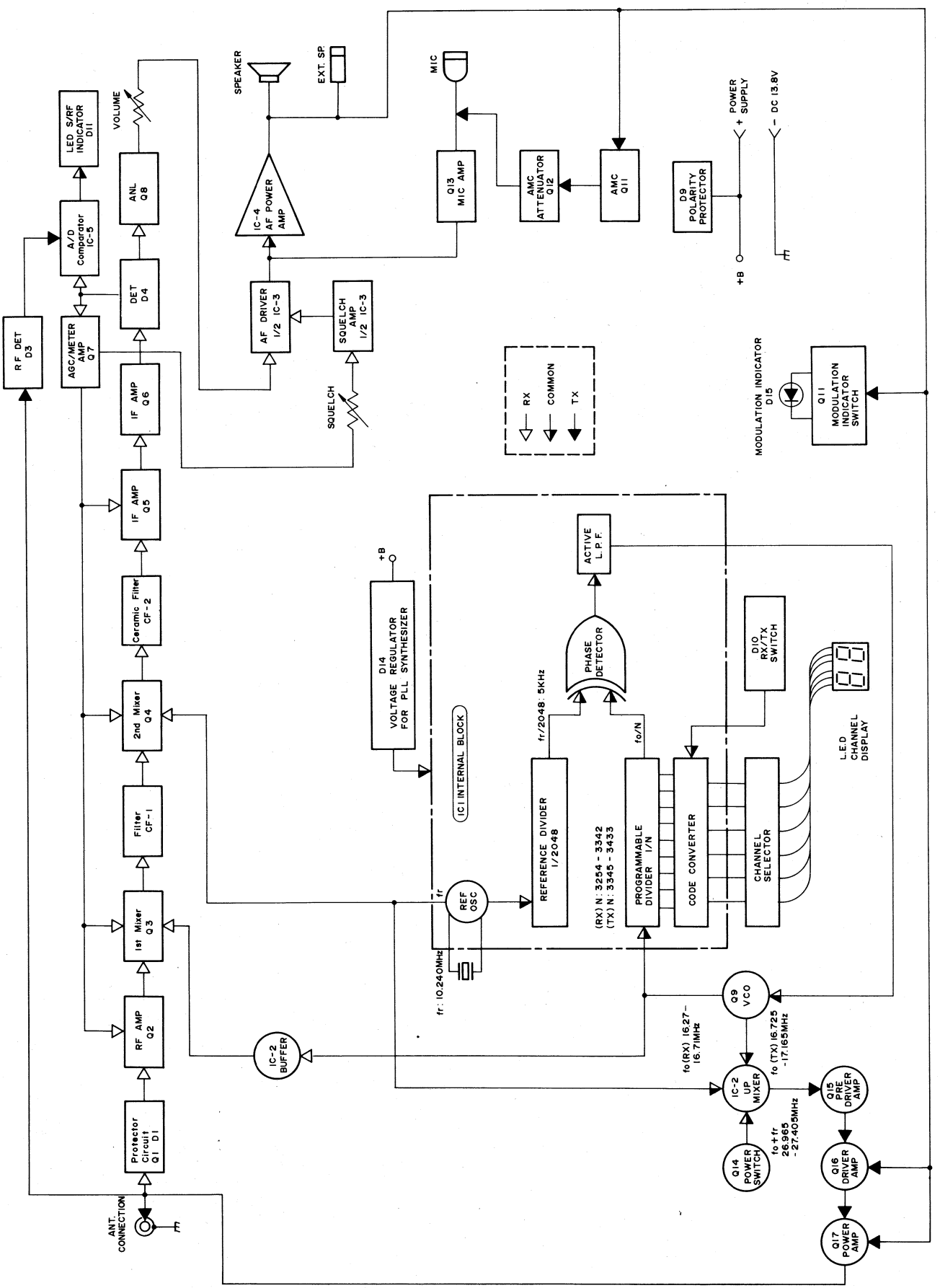
Description	Nominal	Limit
Intermediate frequency		
1st IF	10.695 MHz	
2nd IF	455 kHz	
Sensitivity for 500 mW output	0.25 μV	0.5 μV
Sensitivity at 10 dB S + N/N	0.6 μV	1.2 μV
Adjacent channel rejection	60 dB	56 dB
Image rejection (1st IF/2nd IF)	45 dB	35 dB
IF rejection ratio (1st IF/2nd IF)	70 dB	60 dB
Signal-to-Noise ratio		
at 1 mV input	40 dB	34 dB
Distortion at 1 mV input,		
50% mod. (500 mW out)	3%	6%
AGC Figure of merit at 50 mV input	90 dB	70 dB
Power output at 500 μV Input		
Undistorted (10% THD)	3.5 W	3.0 W
Maximum	6.0 W	4.0 W
Electrical fidelity compared to 1000 Hz		
450 Hz	−5 dB	−6±3 dB
2500 Hz	−5 dB	−6±3 dB
Cross modulation	50 dB	45 dB
Squelch	Adjustable from 0.6 μV to 1 mV	
Current consumption (no signal)	190 mA	280 mA
"S" meter sensitivity to light 4th LED	10 μV	5 — 20 μV

OTHER ITEMS

Fuse	2 Amp.
General power requirement	12 — 16 V DC
Dimensions	(H) 1-18/32"(40mm) × (W) 4-30/32"(125mm) × (D) 8-5/32"(207mm)
Weight	2 lb 2 oz. (1 kg)

NOTE: Nominal Specs represent the design specs; all units should be able to approximate these — some will exceed and some may drop slightly below these specs. Limit specs represent the absolute worst condition which still might be considered acceptable; in no case should a unit perform to less than within any Limit spec.

2. BLOCK DIAGRAM



3. ALIGNMENT INSTRUCTIONS

A. PLL SECTION

1. Test Equipment Required

a. Frequency Counter
b. DC Power Supply (13.8 Volt, 2.5 Amp.)
c. DC Volt Meter (above 100 KΩ/V)

NOTE: Figure 1 provides test point and alignment location information.

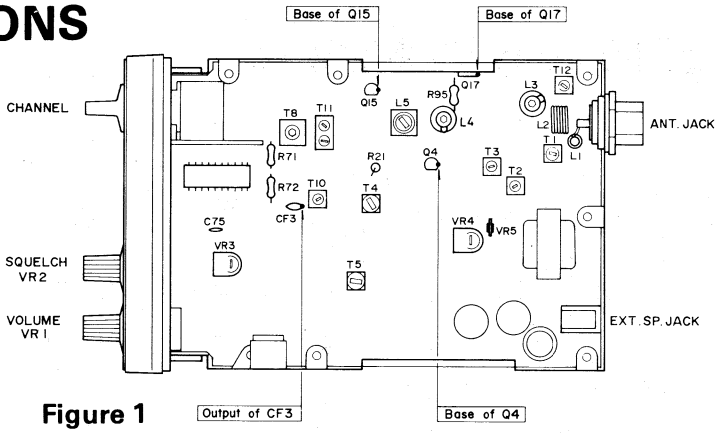


Figure 1

2. Alignment Procedure

STEP	OUTPUT INDICATOR CONNECTION	ADJUST	ADJUST FOR
1	MIC: Receive, POWER: "on", VOLUME: Optional, SQUELCH: Optional, Channel Selector: Optional.		
2	Connect Frequency Counter to output of CF-3 (Figure 2).	C75	If the frequency is not 10.240 MHz ± 400 Hz, change value of C75 (18-39 pF).
3	MIC: Transmit, Channel Selector: Channel 40.		
4	Connect DC Volt Meter to R71/R72 (Figure 3).	T8	Alignment of VCO Adjust for 6.0 Volt indication on DC Volt Meter.
5	MIC: Receive, Channel Selector: Channel 1.		
6	Same as step 5.	Check for indication on DC Volt Meter; must be 2.5-3.5 Volt. If DC Volt Meter does not indicate 2.5-3.5 Volt, readjust T8 (return to step 4).	

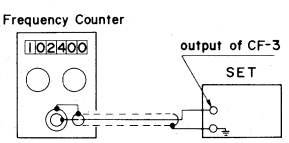


Figure 2

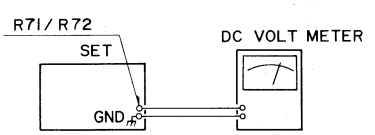


Figure 3

B. TRANSMITTER SECTION

1. Test Equipment Required

a. RF Output Power Meter
b. 50 Ohm Load (non-inductive)
c. RF Attenuator
d. Oscilloscope
e. Audio Generator
f. DC Power Supply (13.8 Volt, 2.5 Amp.)
g. Field Strength Meter (or Spectrum Analyzer)
h. Frequency Counter
i. Coupler

NOTE: Figure 1 provides test point and alignment location information.

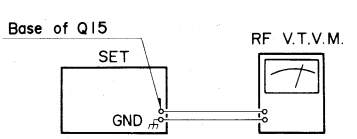


Figure 4

2. Alignment Procedure

STEP	SIGNAL SOURCE CONNECTION	OUTPUT INDICATOR CONNECTION	ADJUST	ADJUST FOR
1	Set Channel Selector to Channel 18.			
2	Disconnect R95 (or short base of Q17 to ground with 0.01 μF).			
3		Connect RF V.T.V.M. to base of Q15 (Figure 4).	T10	Alignment of Pre-driver Stage
4			T11	Adjust for maximum indication on RF V.T.V.M.

STEP	SIGNAL SOURCE CONNECTION	OUTPUT INDICATOR CONNECTION	ADJUST	ADJUST FOR
5	①Make sure that the level (at base of Q15) of Channel 1 and Channel 40 is above 450 mV on RF V.T.V.M. ②Make sure that the differential level (at base of Q15) of Channel 1 and Channel 40 is below 50 mV on RF V.T.V.M. If the differential level is above 50 mV and /or level is below 450 mV, repeat steps 3 and 4 as necessary to obtain maximum output.			
6	Re-connect R95 (or remove shorting capacitor). (Figure 5).			
7		Connect Dummy Load and Frequency Counter through Coupler to RF Power Meter. Connect RF Power Meter to EXT. ANT. Jack on Set. (Figure 6).	L5	Alignment of Driver and Final Stage
8			L4	Adjust for maximum indication on RF Power Meter.
9			L3	
10	Repeat steps 7 through 9 as necessary to obtain maximum output.			
11	Adjust the core of L5 up (1/4 turn).			
12		Connect Dummy Load and Frequency Counter through Coupler to RF Power Meter. Connect RF Power Meter to EXT. ANT. Jack on Set. (Figure 6).	Check that RF output power is 3.7 to 4.3W on all channels with no modulation. If it is not within the above range, go back to steps 3 through 10 and readjust. If still improper, change R95 value (0—15 ohms).	
13	Audio Generator (1 kHz) across C115 or to Microphone Connector, pin 4. (Figure 7) Adjust audio signal level to obtain 80-100% modulation level.	Connect Dummy Load and Oscilloscope through Coupler to RF Meter. Connect RF Meter to EXT. ANT. Jack on Set. (Figure 7).	Check scope pattern for proper modulation.	
14		Connect Dummy Load and Field Strength Meter through Coupler to RF Power Meter. Connect RF Power Meter to EXT. ANT. Jack on set. (Figure 8) Tune to 2nd harmonic Frequency (54.35 MHz) on Field Strength Meter. or Connect Spectrum Analyzer and RF Attenuator through RF Power Meter to EXT. ANT. Jack on Set. (Figure 9)	Check level of fundamental and 2nd harmonic frequency (54.35 MHz). Check suppression of 2nd harmonic frequency (54.35 MHz) compared to fundamental (must be better than —63 dB). Check all Channels and if necessary, make sure that is more than —63 dB on all channels with no modulation. If it is NG, adjust L2 and L1 (stretch or squeeze).	
15		Same as step 12.	Adjustment of Transmitter Frequency Make sure that the transmitter frequency is 27.175 MHz ± 600 Hz indication on Frequency Counter. Change crystal.	
16		Same as step 12.	VR5	Alignment of LED RF Meter Adjust so fourth LED lights at 3.5 watts of RF output power.

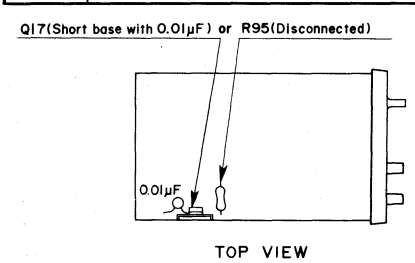


Figure 5

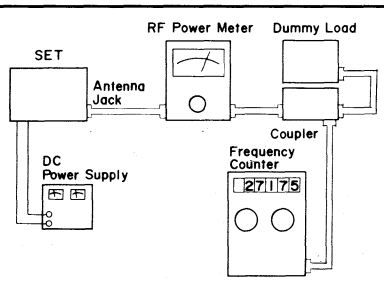


Figure 6

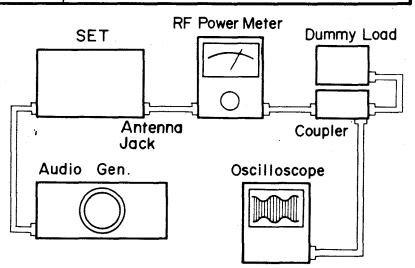


Figure 7

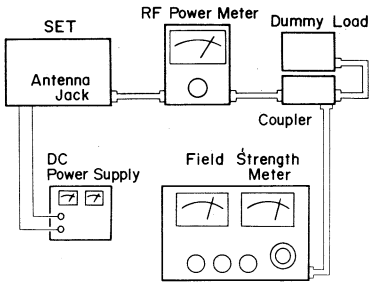


Figure 8

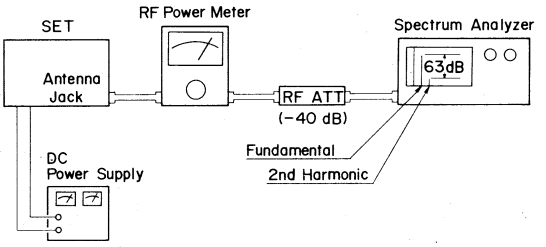


Figure 9

C. RECEIVER SECTION

1. Test Equipment Required

a. RF Signal Generator
b. V.T.V.M.
c. Distortion Meter

2. General Alignment Conditions

1. Signal input must be kept as low as possible, to avoid overload and clipping. (Use highest possible sensitivity of output indicator.)
2. Standard modulation is 1000 Hz at 30% amplitude.
3. A non-metallic alignment tool must be used for all adjustments.
4. Power supply adjusted for 13.8 V DC, 2A.

NOTE: Figure 1 provides alignment location information.

3. Alignment Procedure

STEP	SIGNAL SOURCE CONNECTION	OUTPUT INDICATOR CONNECTION	SET SIGNAL	ADJUST	ADJUST FOR
1	Set Channel Selector to Channel 18.				
2	Turn VR-2 (SQUELCH) fully counterclockwise.				
3	Turn VR-4 (VOLUME) fully clockwise.				
4	Connect RF Signal Generator (455 kHz, 30%) to base of Q4 through 0.01 μF Capacitor.	Connect V.T.V.M. across EXT. Speaker Jack with 8 Ω Dummy load. (Figure 10)	455 kHz, 1 kHz 30% Modulation. Adjust the output of RF Signal Generator to a minimum level, so the IF circuit is not saturated.	T4	Alignment of 2nd IF
5				T5	Adjust for maximum output.
6	Connect RF Signal Generator to Antenna Connector.	Connect V.T.V.M. and Distortion Meter across Ext. Speaker Jack with 8 Ω Dummy load. (Figure 11)	27.175 MHz 1 kHz, 30% Mod.	T1	Overall Adjustment
7				T2	Adjust for maximum indication on V.T.V.M. Reduce output from RF SG so that audio output remains about 500 mW (2 V).
8				T3	
9				T4	
10	Repeat steps 6 through 9 as necessary to obtain maximum output.				
11	Same as step 6	Same as step 6.	27.175 MHz 1 kHz, 80% Mod. Set Output of RF SG to 1 mV.	T5	Alignment of T5 Adjust for minimum indication on Distortion Meter.
12	Same as step 6	Same as step 6.	27.175 MHz 1 kHz, 30% Mod. Set output of RF SG to 0.316 μV.	R21	Adjustment of IF Gain Confirm 2V indication on V.T.V.M. If not 2V, change value of R21 (330—1K)
13	Same as step 6	Same as step 6.	27.175 MHz 1 kHz, 30% Mod. Set Output of RF SG to 1 mV.	VR3	Adjustment of SQUELCH Turn VR-2 (SQUELCH) fully clockwise. Adjust output "on".
14	Same as step 6	Same as step 6.	27.175 MHz 1 kHz, 30% Mod. Set Output of RF SG to 50 μV.	VR4	Adjustment of LED S-Meter Adjust so fourth LED on S/RF Meter lights.

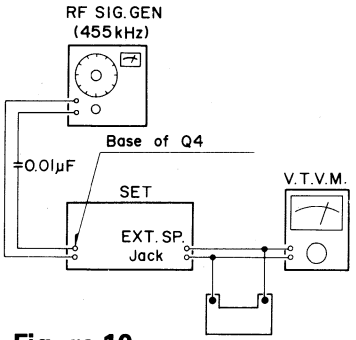


Figure 10

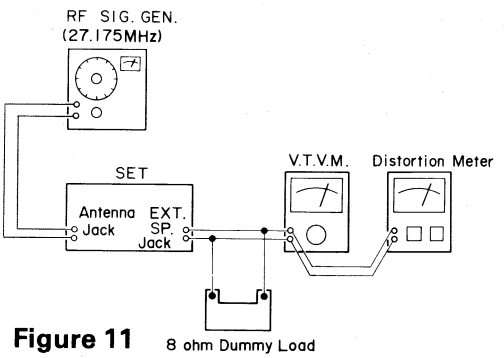


Figure 11

4. FREQUENCIES GENERATED AND MIXED TO OBTAIN EACH CHANNEL

RECEIVE

*VCO FREQUENCY = ((N/2048) × (REFERENCE FREQUENCY (10.240 MHz))

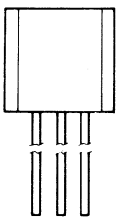
TRANSMIT

*VCO FREQUENCY = ((N/2048) × (REFERENCE FREQUENCY (10.240 MHz))

***TRANSMIT FREQUENCY = VCO FREQUENCY + (REFERENCE FREQUENCY (10.240 MHz))**

CHANNEL NUMBERS	BCD INPUT TO IC-1		RECEIVE		TRANSMIT		
	IC-1 PIN NUMBERS 8765	4321	N	VCO FREQUENCY (MHz)	N	VCO FREQUENCY (MHz)	TRANSMIT FREQUENCY (MHz)
1	0000	0001	3254	16.270	3345	16.725	26.965
2	0000	0010	3256	16.280	3347	16.735	26.975
3	0000	0011	3258	16.290	3347	16.745	26.985
4	0000	0100	3262	16.310	3353	16.765	27.005
5	0000	0101	3264	16.320	3355	16.775	27.015
6	0000	0110	3265	16.330	3357	16.785	27.025
7	0000	0111	3268	16.340	3359	16.795	27.035
8	0000	1000	3272	16.360	3363	16.815	27.055
9	0000	1001	3274	16.370	3365	16.825	27.065
10	0001	0000	3276	16.380	3367	16.835	27.075
11	0001	0001	3278	16.390	3369	16.845	27.085
12	0001	0010	3282	16.410	3373	16.865	27.015
13	0001	0011	3284	16.420	3375	16.875	27.115
14	0001	0100	3286	16.430	3377	16.885	27.125
15	0001	0101	3288	16.440	3379	16.895	27.135
16	0001	0110	3292	16.460	3383	16.915	27.155
17	0001	0111	3294	16.470	3385	16.925	27.165
18	0001	1000	3296	16.480	3387	16.935	27.175
19	0001	1001	3293	16.490	3389	16.945	27.185
20	0010	0000	3302	16.510	3393	16.965	27.205
21	0010	0001	3304	16.520	3355	16.975	27.215
22	0010	0010	3306	16.530	3397	16.985	27.225
23	0010	0011	3312	16.560	3403	17.015	27.255
24	0010	0100	3308	16.540	3399	16.995	27.235
25	0010	0101	3310	16.550	3401	17.005	27.245
26	0010	0110	3314	16.570	3405	17.025	27.265
27	0010	0111	3316	16.580	3407	17.035	27.275
28	0010	1000	3318	16.590	3409	17.045	27.285
29	0010	1001	3320	16.600	3411	17.055	27.295
30	0011	0000	3322	16.610	3413	17.065	27.305
31	0011	0001	3324	16.620	3415	17.075	27.315
32	0011	0010	3326	16.630	3417	17.085	27.325
33	0011	0011	3328	16.640	3419	17.095	27.335
34	0011	0100	3330	16.650	3421	17.105	27.345
35	0011	0101	3332	16.660	3423	17.115	27.355
36	0011	0110	3334	16.670	3425	17.125	27.365
37	0011	0111	3336	16.680	3427	17.135	27.375
38	0011	1000	3338	16.690	3429	17.145	27.385
39	0011	1001	3340	16.700	3431	17.155	27.395
40	0000	0000	3342	16.710	3433	17.165	27.405

5. TRANSISTOR LEAD IDENTIFICATION AND IC INTERNAL CONNECTION



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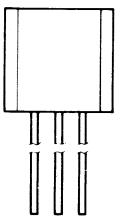

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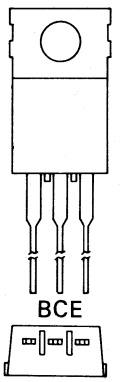

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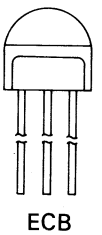

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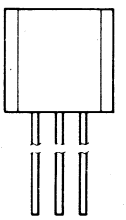

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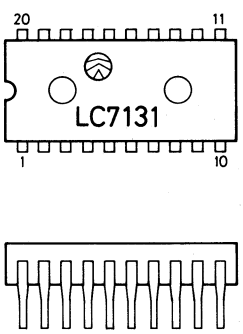
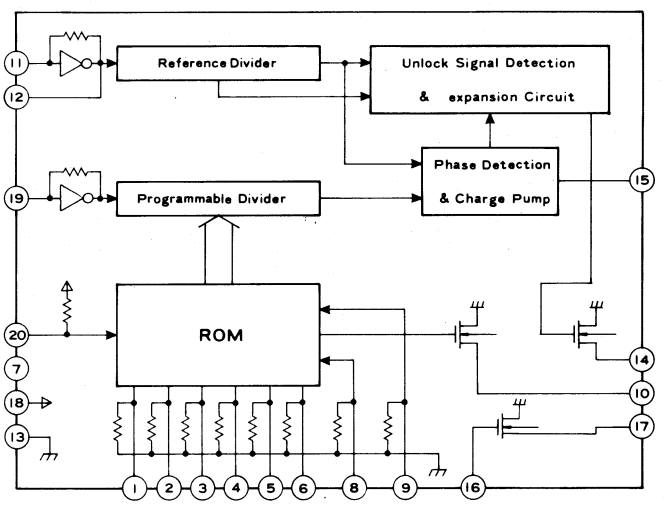
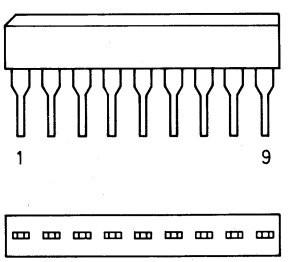
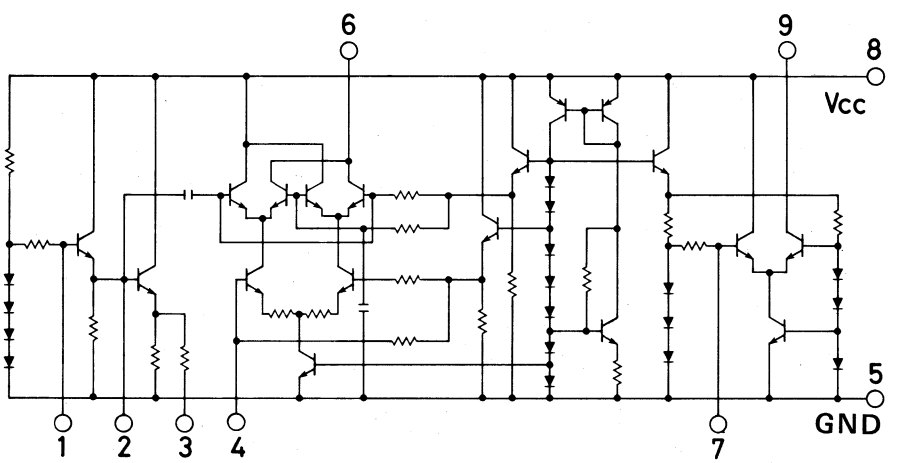
IC-LC7131





IC-2 TA7310P





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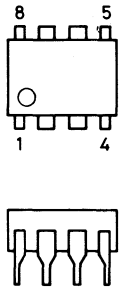

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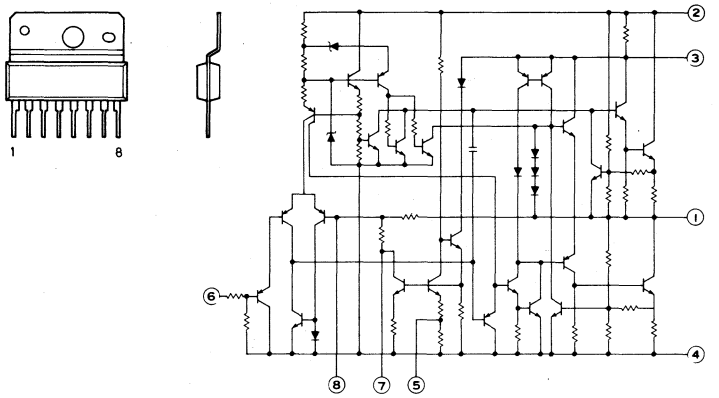
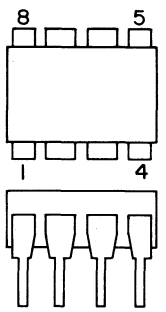
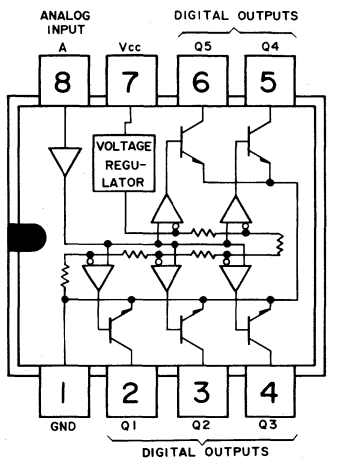


IC-5 TL-489





6. TROUBLESHOOTING

SYMPTOM	CAUSE/REMEDY
A) UNIT WILL NOT TURN ON.	1. Defective power switch S3: Replace. 2. Fuse blown: Replace. 3. Broken DC power cable: Replace. 4. Poor solder connection or other open connection in circuit: Repair or replace. 5. Defective IC-1: Replace.
B) NO RECEIVE SOUND.	1. Defective external Speaker jack: Repair or replace. 2. Poor contact on microphone connector: Repair as required. 3. Defective push switch on microphone: Repair or replace MIC. 4. Defective internal Speaker: Replace Speaker. 5. Defective D4, VR3, VR2, IC-3 or semiconductor in RX circuit: Replace the defective component(s). 6. Defective VR-1: Replace.
C) NO NOISE	1. Defective Q7: Replace. 2. Measure transistor & IC voltages in all audio states and receiver section. Compare with voltages noted on the IC & TRANSISTOR VOLTAGE CHART. 3. Improper local oscillator adjustment: Readjust. 4. Defective SQUELCH Circuit (IC-3, VR2, VR3): Replace the defective component(s).
D) NO TRANSMISSION	1. Defective microphone: Repair or replace microphone. 2. Defective push switch on microphone: Repair or replace. 3. Improper adjustment of carrier oscillator or local oscillator: Readjust. 4. If you have checked all channels and obtain no RF output, check V.C.O. and/or signal trace through transmitter circuit. 5. Defective Antenna connector: Repair or replace. 6. Defective L1: Repair or replace. 7. Defective Q14 (E-C short): Replace.
E) NO MODULATION	1. Defective microphone: Repair or replace microphone. 2. Poor audio output/Defective modulator: Repair or replace defective component(s). 3. Inoperative microphone amplifier (Q13, IC-4): Replace component(s). 4. Defective microphone connector: Repair or replace. 5. Defective AMC circuit (Q11, D7, Q12): Replace component(s).
F) NO SQUELCH	1. Defective Q7, IC-3 circuit: Replace component(s). 2. Improper adjustment of VR-3: Readjust.
G) LED METER DOES NOT OPERATE BUT CB OPERATES NORMALLY	1. Defective LED (D11-1 — D11-5): Replace. 2. Defective IC-5: Replace. 3. Defective D3, VR-5: Replace.
H) MODULATION INDICATOR DOES NOT LIGHT	1. Defective D15, Q10: Replace. 2. Check Modulation: Refer E) NO MODULATION.

7. TRANSISTOR AND IC VOLTAGE CHART

TRANSISTOR VOLTAGE CHART

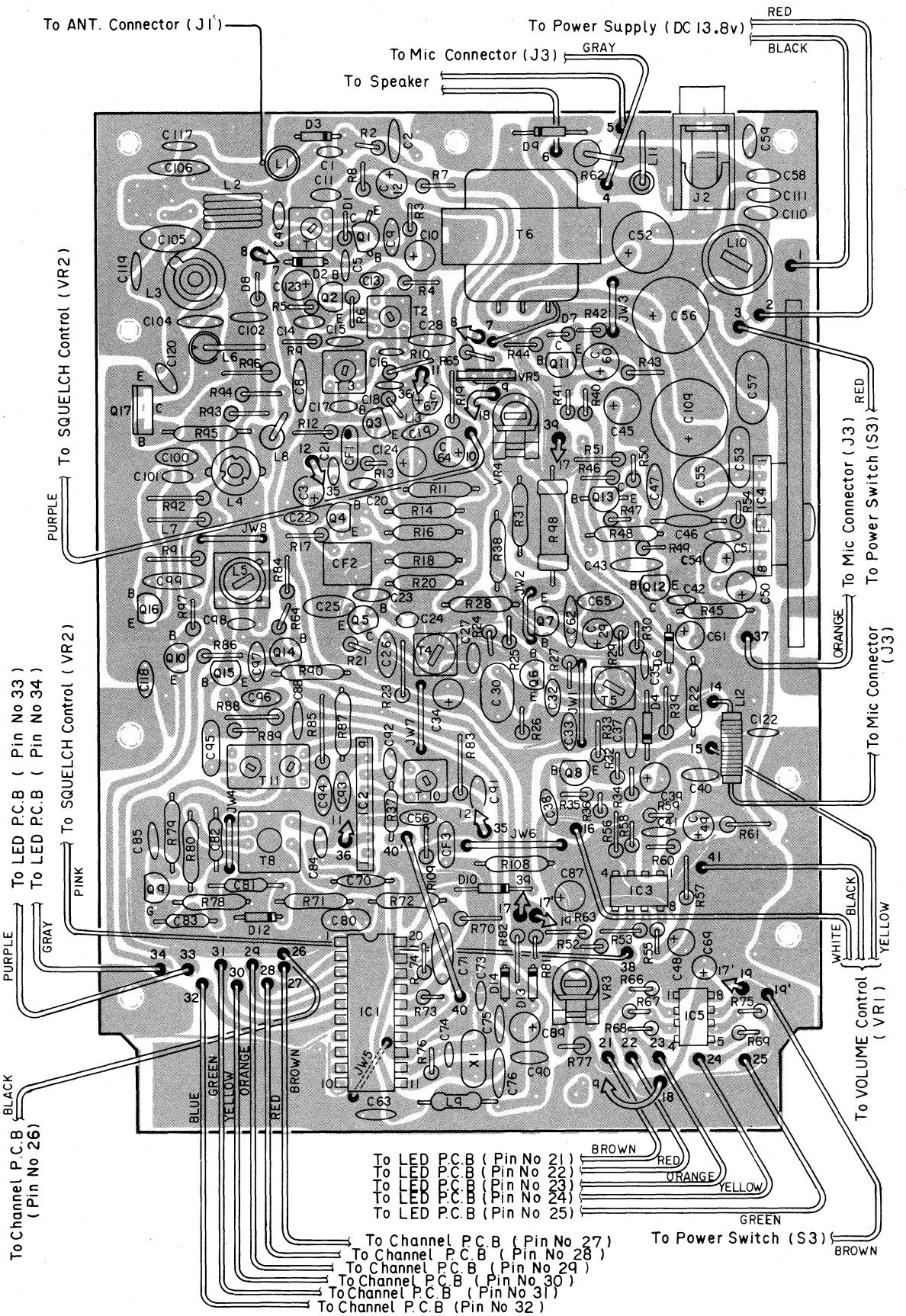
TRANSISTOR NUMBER	EMITTER (SOURCE)		COLLECTOR (DRAIN)		BASE (GATE)	
	RECEIVE	TRANSMIT	RECEIVE	TRANSMIT	RECEIVE	TRANSMIT
Q1	2.0	1.3	2.0	1.3	8.0	0.6
Q2	0.7	0	7.5	0	1.1	0.4
Q3	0.5	0	8.1	0	1.2	0.4
Q4	0.7	0	6.4	0	1.1	0.4
Q5	0.8	0	9.0	0	1.4	0.4
Q6	1.5	0	8.1	0	2.1	0
Q7	0	0	7.9	0.5	0.5	0
Q8	0.1	0	0.1	0.4	0.5	0.5
Q9	8.1	8.0	0.5	0.5	0	0
Q10	2.8	11.6	0	0	13.0	11.0
Q11	3.6	3.6	0.7	0	4.3	4.3
Q12	0	0	0	0	0.7	0
Q13	0.6	0.6	3.5	3.3	1.2	1.2
Q14	13.7	13.5	1.2	13.5	13.3	12.8
Q15	9.4	2.4	13.7	13.8	3.5	2.6
Q16	0	0	13.3	13.8	0	0
Q17	−0.3	0	13.3	13.8	0	0

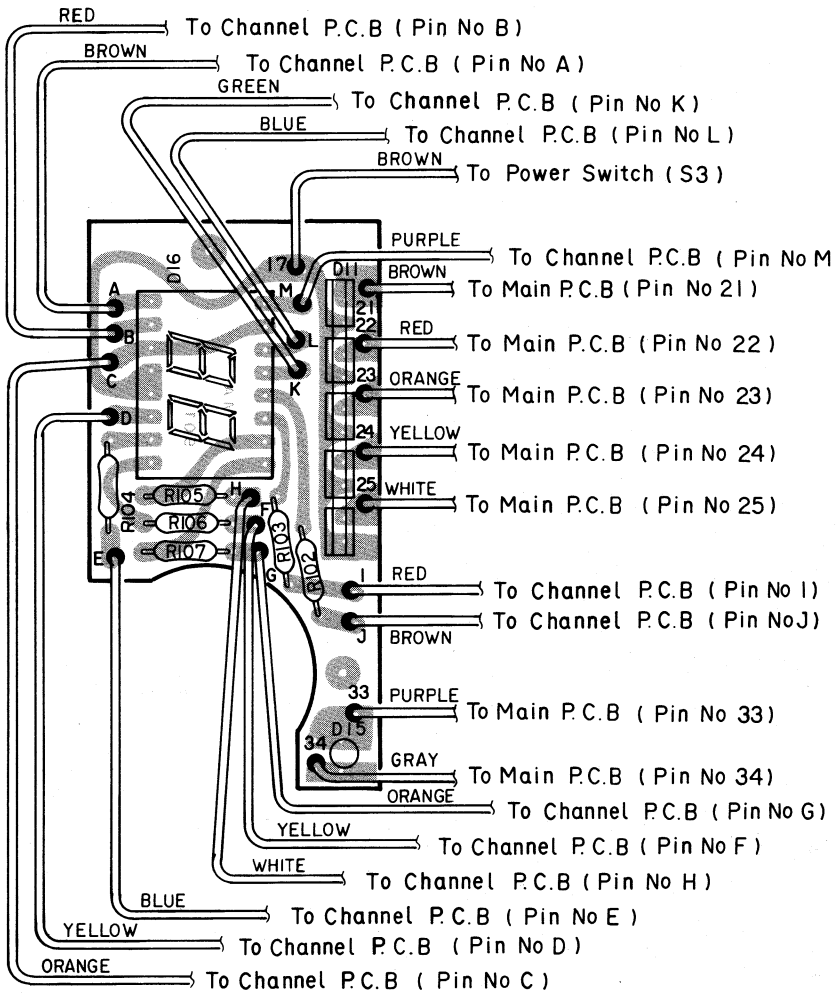
NOTE: All voltage values are indicated in volts with no signal measured with V.T.V.M. PLL in locked condition. Channel is 19.

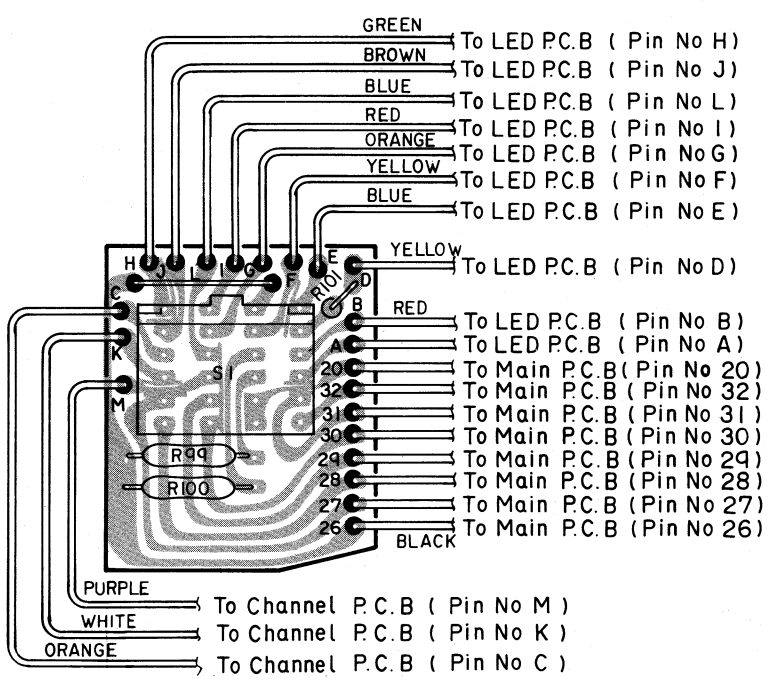
IC VOLTAGE CHART

IC-1 LC7131	PIN NO.	1	2	3	4	5	6	7	8	9	10
	RECEIVE	6.4	0	0	6.4	0	0	0	0	0	0
	TRANSMIT	6.4	0	0	6.4	6.4	0	0	0	0	0
	PIN NO.	11	12	13	14	15	16	17	18	19	20
	RECEIVE	3.2	3.1	0	2.0	1.5	1.5	3.5	6.4	2.8	6.3
	TRANSMIT	3.2	3.1	0	1.4	1.4	0	5.1	6.4	2.8	0.7
IC-2 KIA7310	PIN NO.	1	2	3	4	5	6	7	8	9	
	RECEIVE	2.6	1.9	1.2	1.6	0	1.2	2.0	7.2	1.2	
	TRANSMIT	2.5	1.9	1.3	2.4	0	13.2	1.9	8.2	13.2	
IC-3 NJM4558 Squelch (on/off)	PIN NO.	1	2	3	4	5	6	7	8		
	RECEIVE	1.3/4.4	1.3/4.4	1.0/4.4	0/0	1.4/1.4	2.7/0	1.3/7.8	8.5/8.5		
	TRANSMIT	4.4	4.4	4.4	0	1.4	0	7.9	8.5		
IC-4 MB3712HM	PIN NO.	1	2	3	4	5	6	7	8		
	RECEIVE	6.8	13.7	13.0	0	0	0	0.6	0.6		
	TRANSMIT	6.8	13.6	12.9	0	0	0	0.6	0.6		
IC-5 TL489C	PIN NO.	1	2	3	4	5	6	7	8		
	RECEIVE	0	12.3	12.3	12.2	12.3	12.2	13.7	0		
	TRANSMIT ON	0	0	0	0	0	12.1	13.6	0.9		
	(LED / RF/S METER) OFF	0	1.5	12.1	12.1	12.1	12.1	13.5	0		

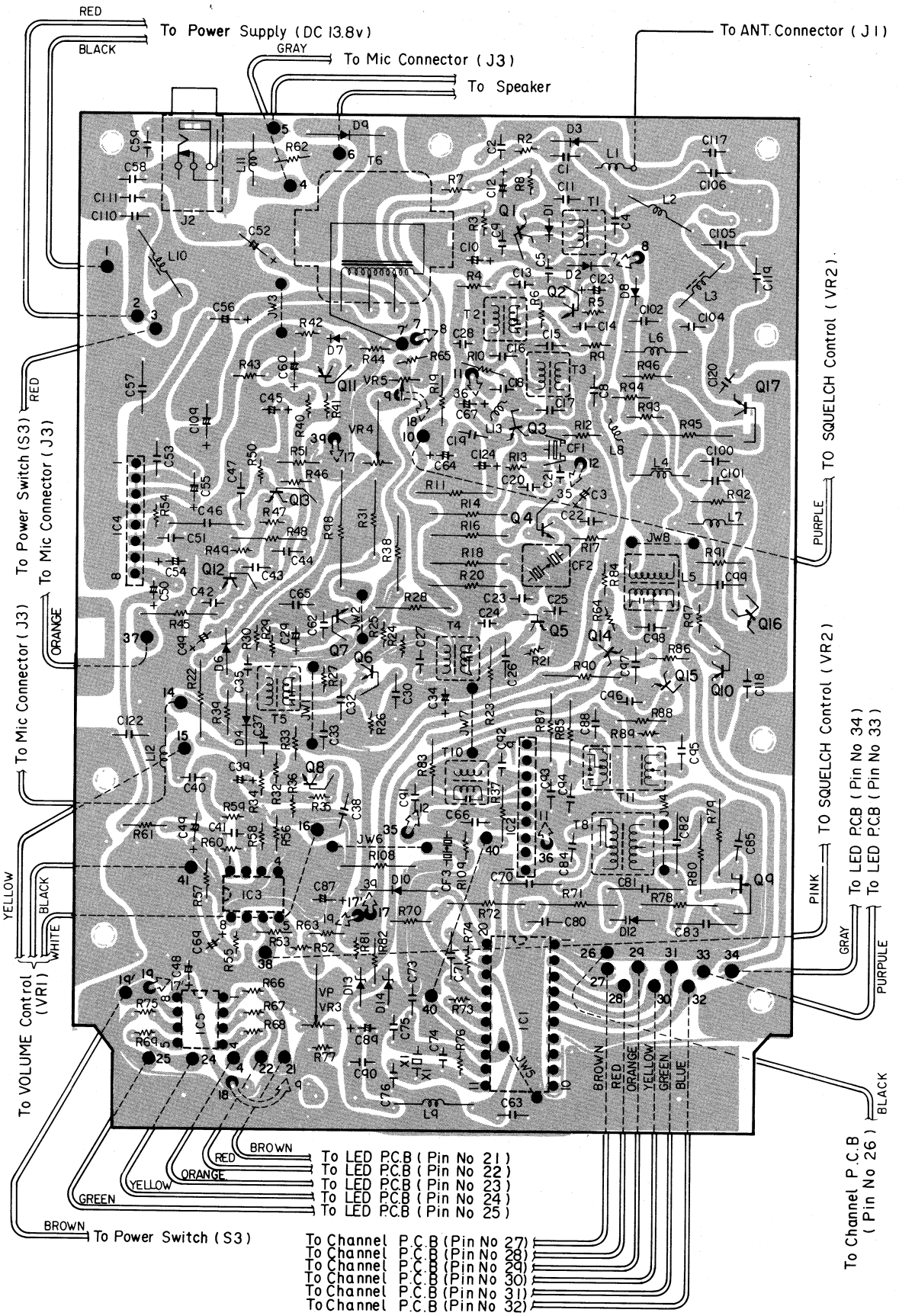
8. PRINTED CIRCUIT BOARD (TOP VIEW)

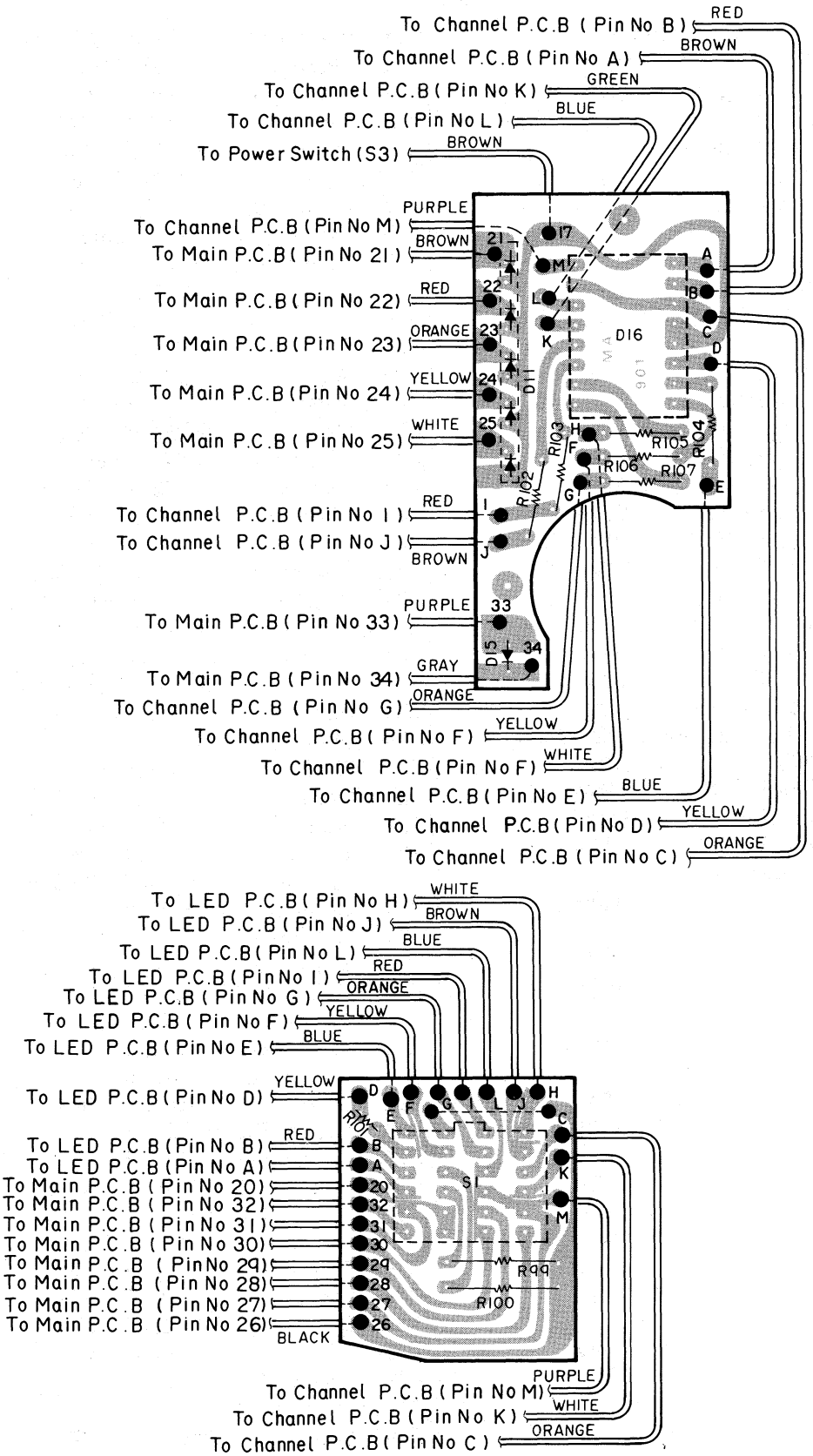



RED
To Channel P.C.B (Pin No B)
BROWN
To Channel P.C.B (Pin No A)
GREEN
To Channel P.C.B (Pin No K)
BLUE
To Channel P.C.B (Pin No L)
BROWN
To Power Switch (S3)
PURPLE
To Channel P.C.B (Pin No M)
BROWN
To Main P.C.B (Pin No 21)
RED
To Main P.C.B (Pin No 22)
ORANGE
To Main P.C.B (Pin No 23)
YELLOW
To Main P.C.B (Pin No 24)
WHITE
To Main P.C.B (Pin No 25)
RED
To Channel P.C.B (Pin No I)
To Channel P.C.B (Pin NoJ)
BROWN
PURPLE
To Main P.C.B (Pin No 33)
GRAY
To Main P.C.B (Pin No 34)
ORANGE
To Channel P.C.B (Pin No G)
YELLOW
To Channel P.C.B (Pin No F)
WHITE
To Channel P.C.B (Pin No H)
BLUE
To Channel P.C.B (Pin No E)
YELLOW
To Channel P.C.B (Pin No D)
ORANGE
To Channel P.C.B (Pin No C)
D16
D11
D15
R104
R105
R106
R107
R103
R102
A
B
C
D
E
F
G
H
I
J
K
L
M
17
21
22
23
24
25
33
34

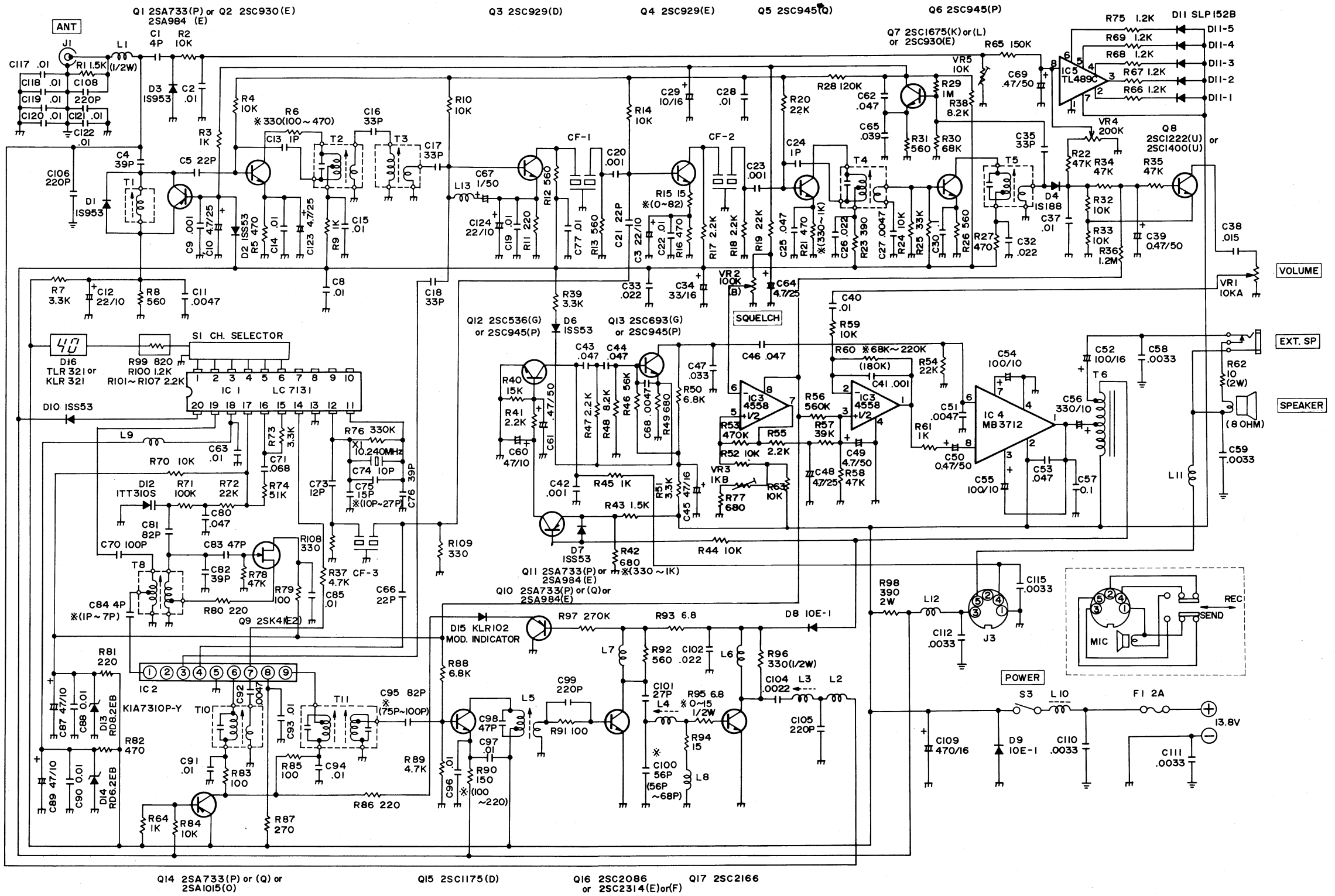

GREEN
To LED P.C.B (Pin No H)
BROWN
To LED P.C.B (Pin No J)
BLUE
To LED P.C.B (Pin No L)
RED
To LED P.C.B (Pin No I)
ORANGE
To LED P.C.B (Pin No G)
YELLOW
To LED P.C.B (Pin No F)
BLUE
To LED P.C.B (Pin No E)
YELLOW
To LED P.C.B (Pin No D)
RED
To LED P.C.B (Pin No B)
To LED P.C.B (Pin No A)
To Main P.C.B(Pin No 20)
To Main P.C.B (Pin No 32)
To Main P.C.B (Pin No 31)
To Main P.C.B (Pin No 30)
To Main P.C.B (Pin No 29)
To Main P.C.B (Pin No 28)
To Main P.C.B (Pin No 27)
To Main P.C.B (Pin No 26)
BLACK
PURPLE
To Channel P.C.B (Pin No M)
WHITE
To Channel P.C.B (Pin No K)
ORANGE
To Channel P.C.B (Pin No C)
R101
R99
R100
S1
A
B
C
D
E
F
G
H
I
J
K
L
M
20
32
31
30
29
28
27
26

9. PRINTED CIRCUIT BOARD (BOTTOM VIEW)




To Channel P.C.B (Pin No B)
RED
To Channel P.C.B (Pin No A)
BROWN
To Channel P.C.B (Pin No K)
GREEN
To Channel P.C.B (Pin No L)
BLUE
To Power Switch (S3)
BROWN
To Channel P.C.B (Pin No M)
PURPLE
To Main P.C.B (Pin No 21)
BROWN
To Main P.C.B (Pin No 22)
RED
To Main P.C.B (Pin No 23)
ORANGE
To Main P.C.B (Pin No 24)
YELLOW
To Main P.C.B (Pin No 25)
WHITE
To Channel P.C.B (Pin No I)
RED
To Channel P.C.B (Pin No J)
BROWN
To Main P.C.B (Pin No 33)
PURPLE
To Main P.C.B (Pin No 34)
GRAY
To Channel P.C.B (Pin No G)
ORANGE
To Channel P.C.B (Pin No F)
YELLOW
To Channel P.C.B (Pin No F)
WHITE
To Channel P.C.B (Pin No E)
BLUE
To Channel P.C.B (Pin No D)
YELLOW
To Channel P.C.B (Pin No C)
ORANGE
D16
R103
R104
R105
R106
R107
R102
D11
D15
To LED P.C.B (Pin No H)
WHITE
To LED P.C.B (Pin No J)
BROWN
To LED P.C.B (Pin No L)
BLUE
To LED P.C.B (Pin No I)
RED
To LED P.C.B (Pin No G)
ORANGE
To LED P.C.B (Pin No F)
YELLOW
To LED P.C.B (Pin No E)
BLUE
To LED P.C.B (Pin No D)
YELLOW
To LED P.C.B (Pin No B)
RED
To LED P.C.B (Pin No A)
To Main P.C.B (Pin No 20)
To Main P.C.B (Pin No 32)
To Main P.C.B (Pin No 31)
To Main P.C.B (Pin No 30)
To Main P.C.B (Pin No 29)
To Main P.C.B (Pin No 28)
To Main P.C.B (Pin No 27)
To Main P.C.B (Pin No 26)
BLACK
R99
R100
To Channel P.C.B (Pin No M)
PURPLE
To Channel P.C.B (Pin No K)
WHITE
To Channel P.C.B (Pin No C)
ORANGE

12. SCHEMATIC DIAGRAM



NOTE (1) ALL RESISTANCE VALUES ARE INDICATED IN "OHM" ($K=10^3$ OHM, $M=10^6$ OHM)

(2) ALL CAPACITANCE VALUES ARE INDICATED IN "μF" ($P=10^{-6}\mu F$)

(3) ※ MAY VARY FROM UNIT TO UNIT FOR BEST PERFORMANCE.

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