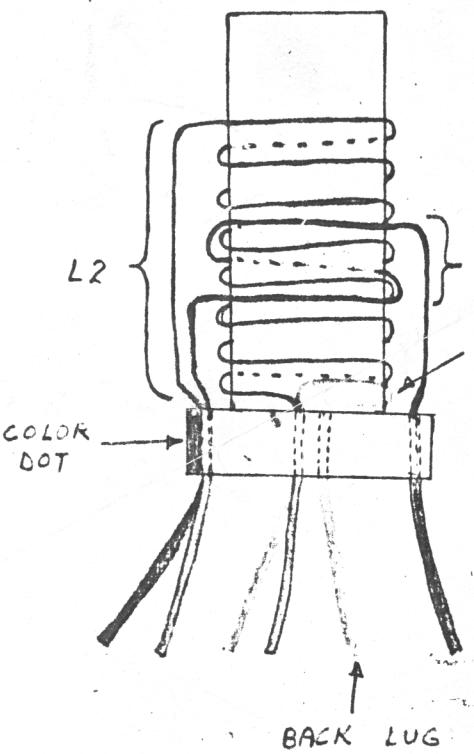


RECEIVERS						
	SCHEM ATICS		PARTS LOCATION		PARTS LISTS	WAVE FORMS/VOLTS
	DECODER	RF	DECODER	RF		
LOG I (64 - 65)						
LOG II (65-67)	B-503	B-505				
LOG III (68 - 70)	B-527	B-527				B-538
DIGI - GHOST (68)	B-515	B-515				
XL III (68)	B-527	B-527				V-B-540
PRO SERIES (69)	B-527	B-527				V-B-540
PRO SERIES (70 - 71)	B-540	B-540	B-629	B-629	PL-B-629	W-B-540 V-B-540
LOGICTROL (70)	B-540	B-540	B-673	B-673	PL-B-673	W-B-540 V-B-540
CHAMPION (70)	B-540	B-450	B-673	B-673	PL-B-673	W-B-540 V-B-540
LOGICTROL (71)	B-600	B-600	B-618	B-618	PL-B-618	W-B-600 V-B-600
CHAMPION (71)	B-600	B-600	B-618	B-618	PL-B-618	W-B-600 V-B-600
Hobby Lobby 3 4 5 6	B-600	B-600	B-618	B-618		
LRB 2 - 3 (71 - 73)	B-599	B-599	B-616	B-616	PL-B-616	V-B-599
CHAMPION (72)	B-645	B-644	B-636	B-637	PL-B-636 PL-B-637	W-B-664 V-B-644
SUPER PRO (72)	B-664	B-641	B-658	B-657	PL-B-658 PL-B-657	W-B-664 V-C-1021
CHAMPION (73)	B-664	B-644	B-658	B-637	PL-B-658 PL-B-637	W-B-664 V-B-644
SUPER PRO (73)	B-664	C-1021	B-658	B-657	PL-B-658 PL-B-657	W-B-664 V-C-1021
LRB 3 - 4 (74 - 75)	B-661	B-599	B-670	B-616	PL-B-670 PL-B-616	V-B-599
CHAMPION (74 - 75)	B-661	B-644	B-669	B-637	PL-B-669 PL-B-637	V-B-644
SUPER PRO (74 - 75)	B-661	C-1021	B-669	B-657	PL-B-669 PL-B-657	V-C-1021
LRB 3 - 5 (75)	B-661	B-599	B-670	B-616	PL-B-670 PL-B-616	V-B-599
RANGER (75)	B-661	B-644	B-669	B-637	PL-B-669 PL-B-637	V-B-644
LRB 3 - 5 (76 - 77)	B-684	B-599	B-686	B-616	PL-B-686 PL-B-616	V-B-599
RANGER (76 - 77)	B-684	B-644	B-685	B-687	PL-B-685 PL-B-631	V-B-644
CHAMPION (76 - 77)	B-684	B-644	B-685	B-637	PL-B-685 PL-B-637	V-B-637
SUPER PRO (76 - 77)	B-694	B-644 C-1021	B-685	B-637 B-657	PL-B-685 PL-B-687	V-B-694 V-C-1021
NIMBUS 4 (77)	B-600	B-600	B-618	B-618	PL-B-618	W-B-600 V-B-600

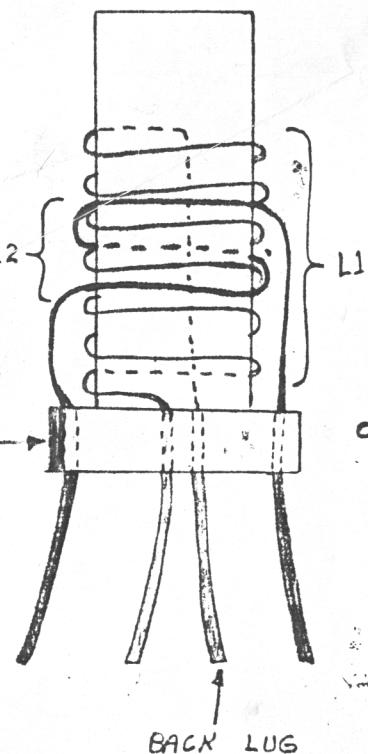
Red =Do not have

Green = Good copy

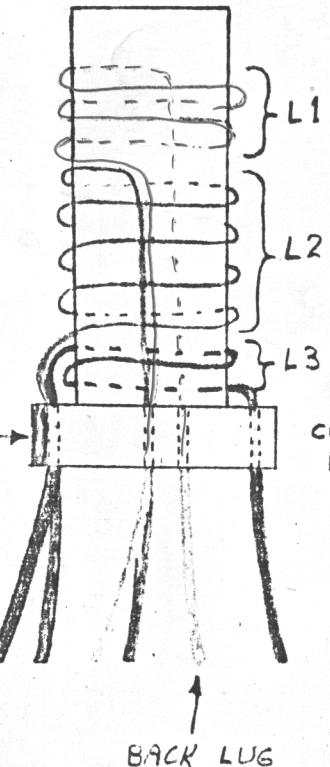
27 MHZ.
ANT. COIL



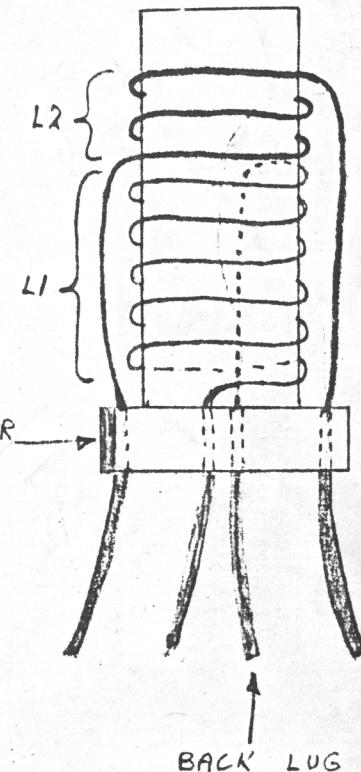
27 MHZ.
RF COIL



6 METER +
72 MHZ
ANT. COIL



6 METER +
72 MHZ.
RF COIL



PART NO.	COIL	L1	L2	L3	COLOR
A020	27 MHZ ANT.	1/2T#28	1 1/4T#28	2 1/2T#28	RED
A021	27 MHZ RF.	1 1/2T#28	1 1/2T#28	—	BLUE
A022	6 METER ANT.	7 1/2T#34	7 1/4T#28	1 1/2T#28	ORANGE
A023	6 METER RF.	8 1/2T#26	1 1/2T#26	—	BROWN
A024	72 MHZ ANT.	8 1/2T#34	7 1/4T#26	1 1/2T#26	YELLOW
A026	72 MHZ RF.	7 1/2T#26	1 1/2T#26	—	WHITE
A-030	72 MHZ RF.	8 1/2T#26	1 1/2T#26	—	GRN

HOBBY LOBBY COIL WINDING DATA

HOBBY LOBBY RECEIVER VOLTAGE STANDARDS

Nominal Values and Tolerances:

Receiver Battery:	4.8 +.3, -.4
Reg. (I.F. line):	3.3 +.17, -.17
AGC:	1.2 +.1, -.1
Q6: Collector	3.0 +.1, -.1
Q8: Collector	2.5 +.25, -.25
Q1,Q3 thru Q5:	Emitter .5 +.05, -.05
Q2 (72 mhz)	Emitter .1 +.05, -.02
Q2 (27 & 53 mhz)	Emitter 1.0 +.1, -.1

Receiver voltages (Transmitter OFF)

Q1	E	B	C
Q1	.55	1.22	3.3
Q2 (72)	.15	.7	3.2
Q3	.55	1.2	3.3
Q4	.55	1.22	3.29
Q5	.55	1.25	3.3
Q6	0	.58	3.05
Q7	2.43	3.05	4.8
Q8	0	.56	2.7

The nominal voltages may vary somewhat due to component tolerances and variations in the 3.3 volt regulated supply and the ABC voltage. The determining factor for adjusting voltages that are out of tolerance is whether the entire system works correctly or not, such as the range and operational checks. You may adjust the regulator voltages, AGC voltage, or emitter voltages that are out of tolerance though the receiver range and operation checks are at the minimum standards.

Typical Readings:

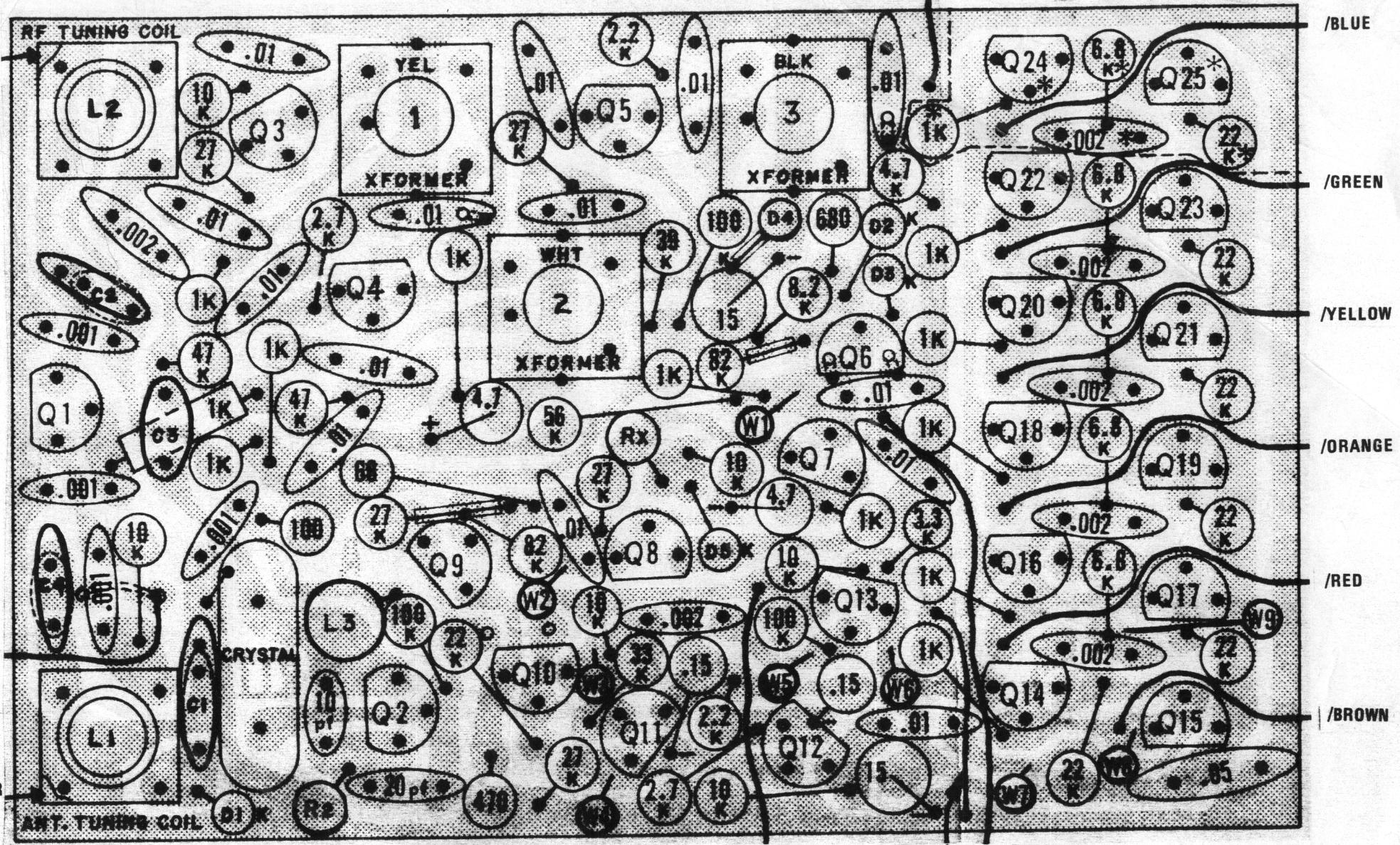
Reg. (I.F. line): 3.35
AGC: 1.25

Transistor gain chart:

27 mhz	R.F. Amp	Red	Q-037B
	Osc.	Violet	Q-029G
	Mixer	Orange	Q-037C
	J.F. Stages	Yellow or Green	Q-037D or Q-029E
53 mhz	R.F. Amp	Red or Orange	Q-037B or Q-037C
	Osc.	Gray	Q-029H
	Mixer	Orange or Yellow	Q-037C or Q-037D
	I.F. Stages	Yellow or Green	Q-037D or Q-029E
72 mhz	R.F. Amp	Orange or Yellow	Q-037C or Q-037D
	Osc.	White	Q-029I
	Mixer	Orange or Yellow	Q-037C or Q-037D
	I.F. Stages	Yellow or Green	Q-037D or Q-029E

Beta gain of transistors:

Q-029 E (Green)	50-59
Q-029 F (Blue)	60-69
Q-029 G (Violet)	70-79
Q-029 H (Gray)	80-89
Q-029 I (White)	90-99
Q-037 A (Brown)	10-19
Q-037 B (Red)	20-29
Q-037 C (Orange)	30-39
Q-037 D (Yellow)	40-49



27Mhz 53Mhz 72Mhz

D1, D3, & D5 - 1N4154
D2 - 1N60
D4 - 1N746A Zener
D3 1N2207 (selected 1N4154)
D5 1N2208 (selected 1N4154)
For 75Mhz C2 is 7.8 - 8.8pf

Rx - Variable 4.7K - 27K

Q1,2,3,4,5,6,7,8,9,10,14,16,18,20,22,24 NPN
Q11,12,13,15,17,19,21,23,25 PNP

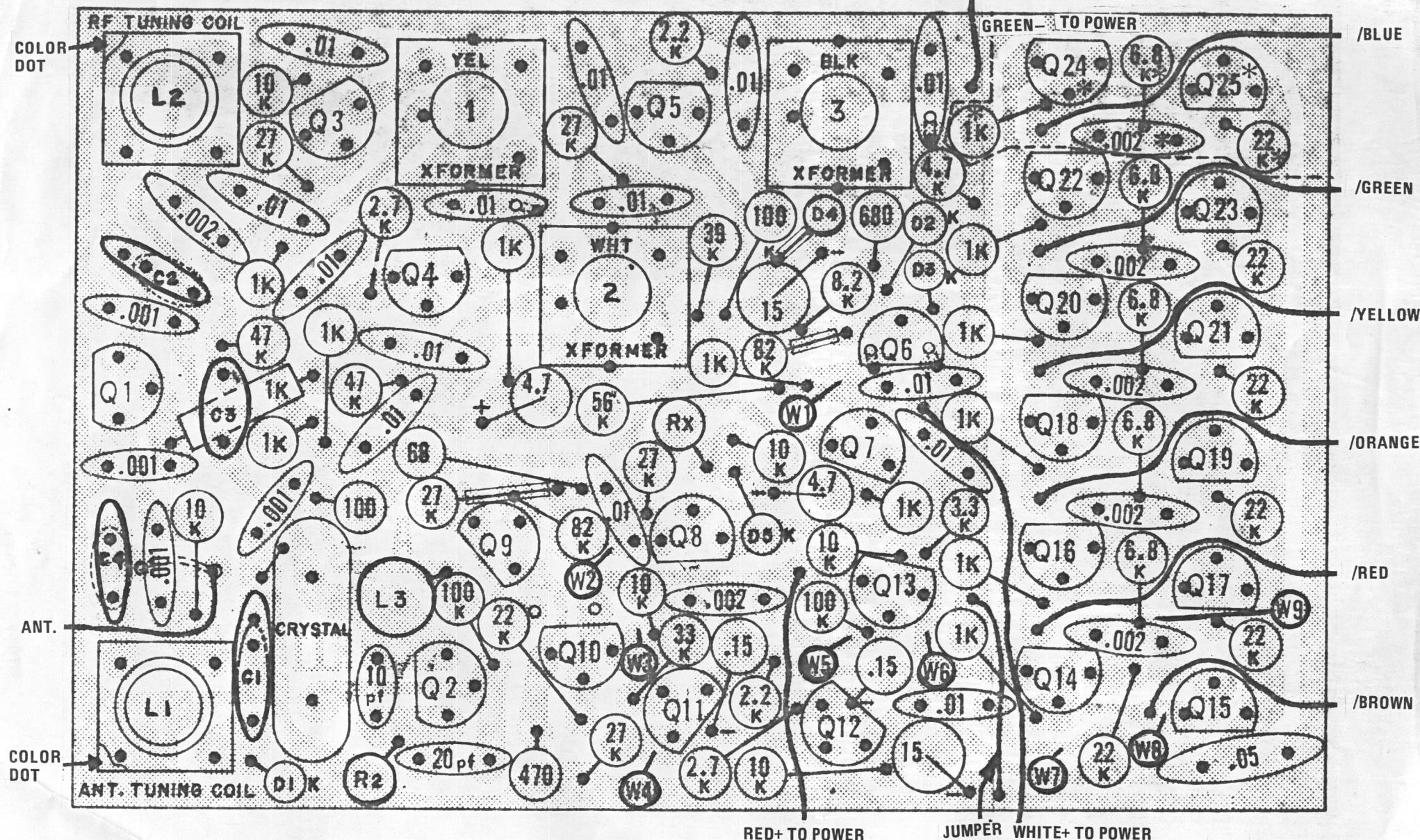
Q1,2,3,4,5 X32N4200, or 16G4200
Q6,7,8,10,14,18,20,22,24 X32B4079
Q11,12,13,15,17,19,21,23,25 X34A1165



Top View

EK 8-618

HOBBY LOBBY 3, 4, 5 & 6 RECEIVER



27Mhz 53Mhz 72Mhz

C1	33pf	22pf	12pf	D1, D3, & D5 - 1N4154
C2	33pf	20pf	10pf	D2 - 1N60
C3	10pf	6.8pf	1.0pf	D4 - 1N746A Zener
C4	10pf	X	X	D3 1N2207 (selected 1N4154)
R2	1.0K	1.0K	100	D5 1N2208 (selected 1N4154)
L1	red	orange	yellow	For 75Mhz C2 is 7.8 - 8.8pf
L2	blue	brown	green	
L3	10uh	4.7uh	.82uh	Rx - Variable 4.7K - 27K

Q1,2,3,4,5,6,7,8,9,10,14,16,18,20,22,24 NPN
Q11,12,13,15,17,19,21,23,25 PNP

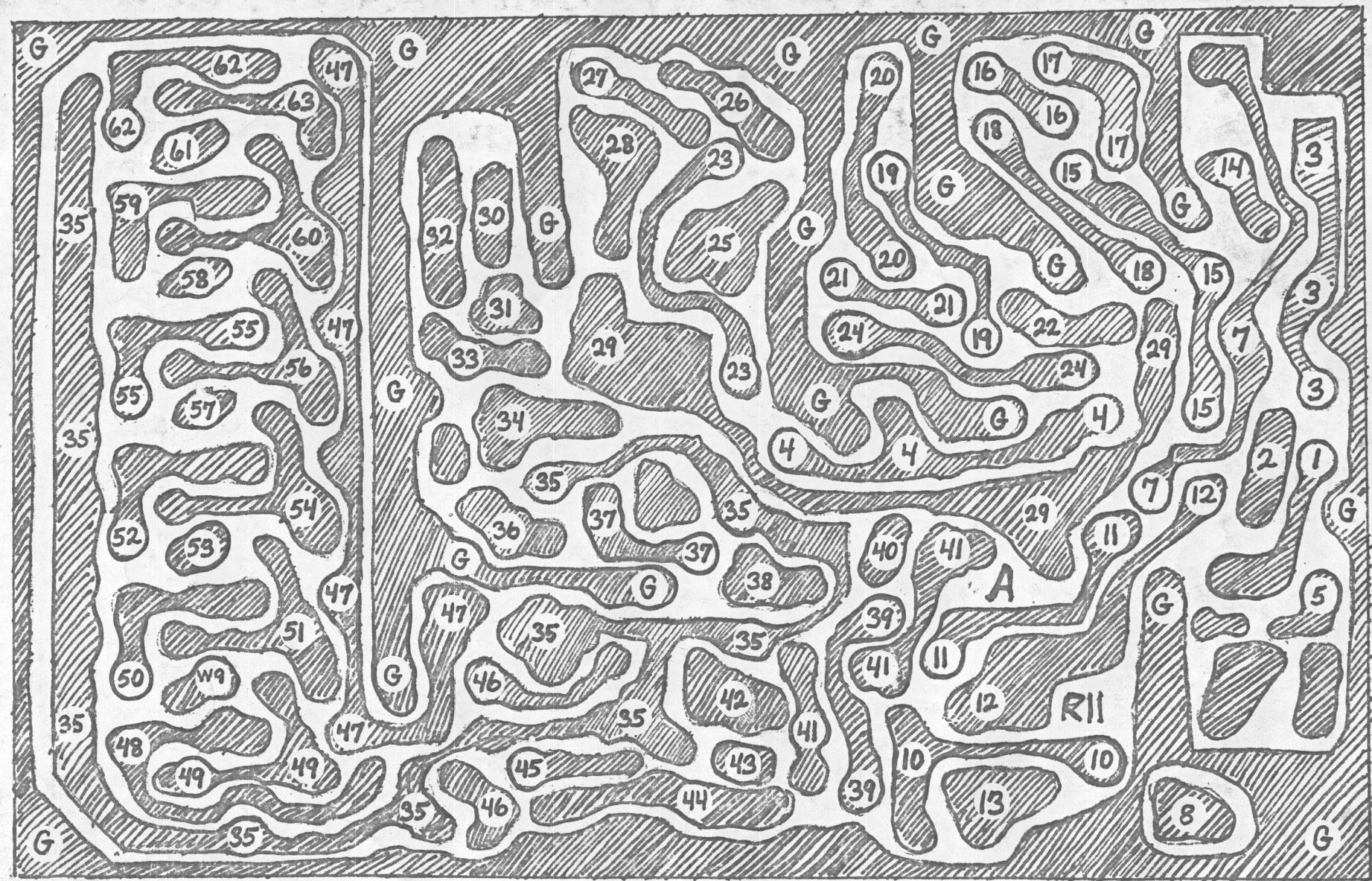
Q1,2,3,4,5 X32N4200, or 16G4200
Q6,7,8,10,14,18,20,22,24 X32B4079
Q11,12,13,15,17,19,21,23,25 X34A1165

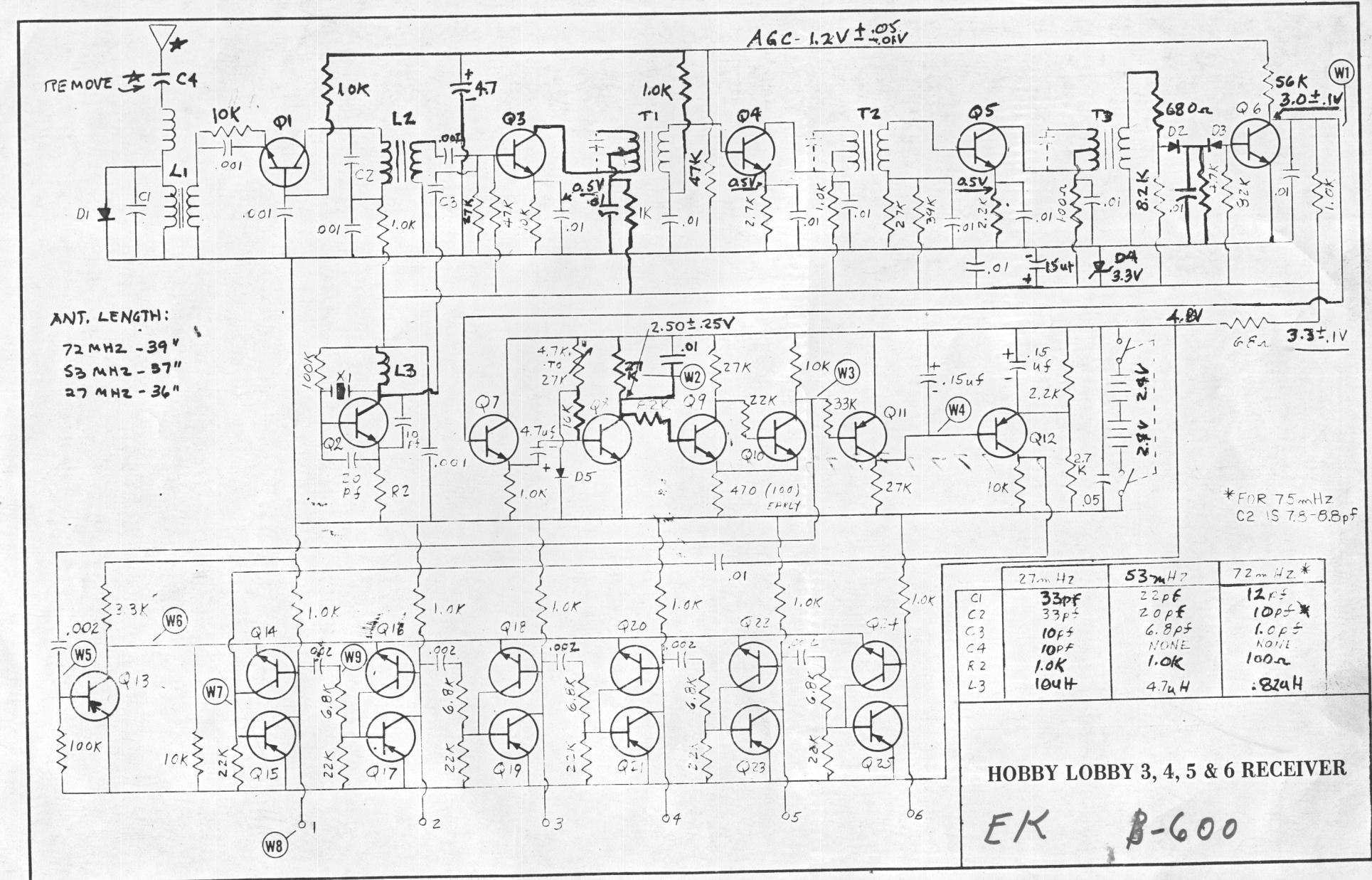


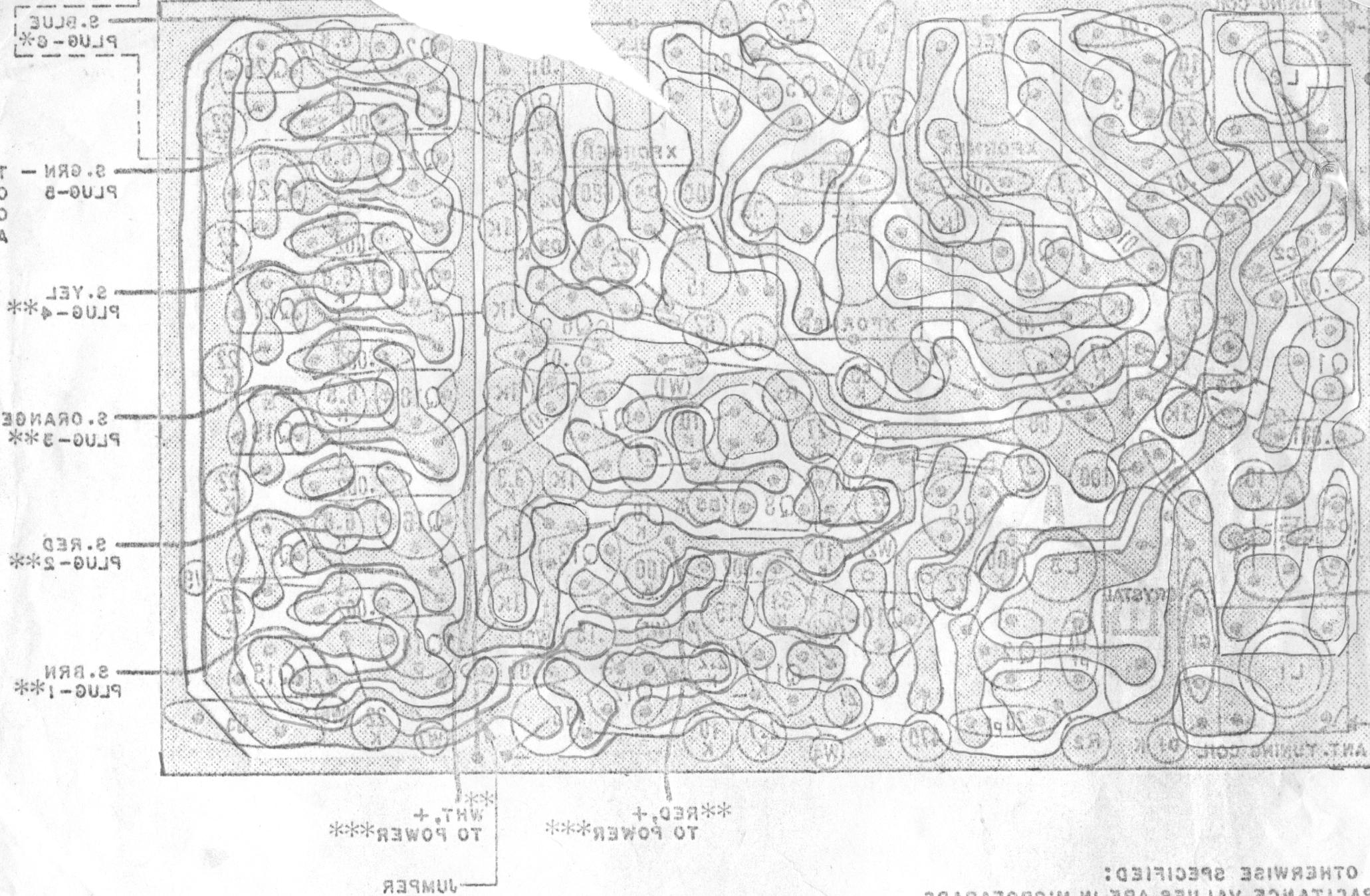
Top View

EK B-618

HOBBY LOBBY 3, 4, 5 & 6 RECEIVER





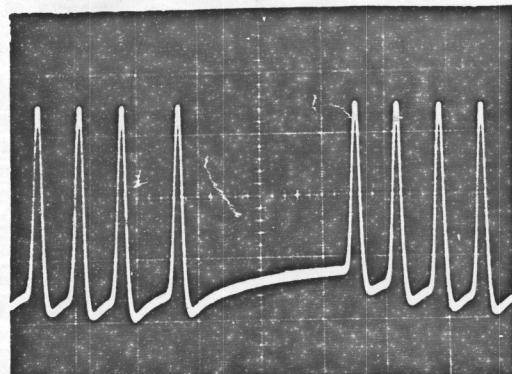


	SEE DME	12MHz	23MHz	33MHz	SOpt	10bt	C5	C1	33bt	SOpt	10bt	S.BRN -	PLUG-1**	PLUG-5**	PLUG-3**	PLUG-4**	PLUG-8 CC AL	S.GRN -	S.BLUE
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

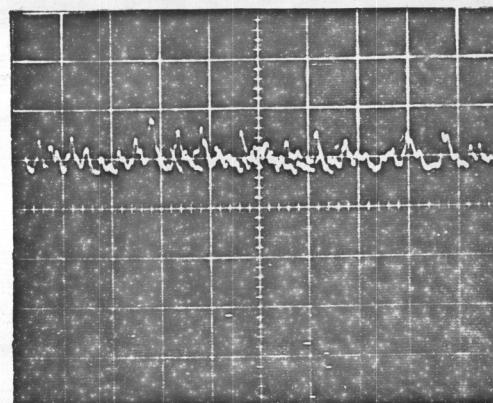
DIS, Q13, Q15, Q12, Q13, Q12, Q15, Q14, Q18, Q18, Q50, Q55, Q54 ARE X525403 (Q-Q52).
DIS, Q13, Q15, Q12, Q13, Q12, Q15, Q14, Q18, Q18, Q50, Q55, Q54 ARE X525403 (Q-Q52).
DISLOCATORS: Q1, Q5, Q9, Q4, Q8 ARE X525403 (Q-Q53) OR 1E64500 (Q-Q19).
CAPACITANCE VALUES ARE IN MICROFARADS.
DISTANCE VALUES ARE IN OHMS.

2 OTHERWISE SPECIFIED.

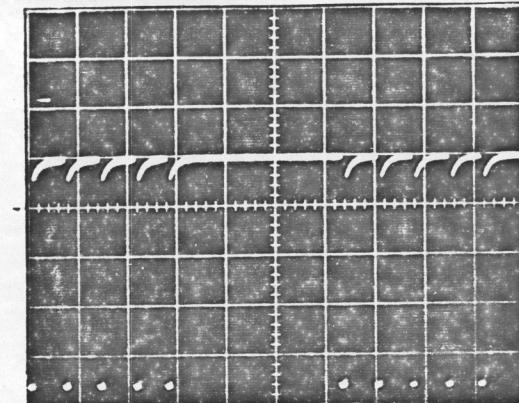
HOBBY LOBBY RECEIVER WAVEFORMS



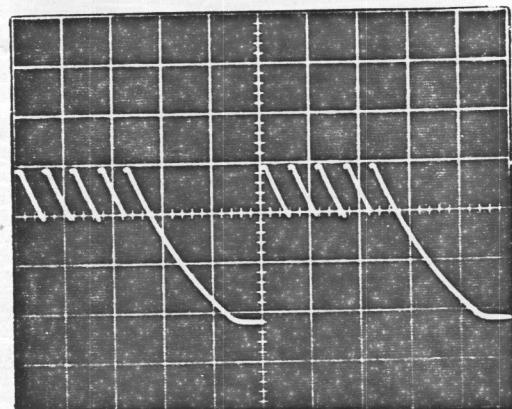
W1 1V/CM 2MS/CM 0V
Collector of Q6 Collector with strong signal.



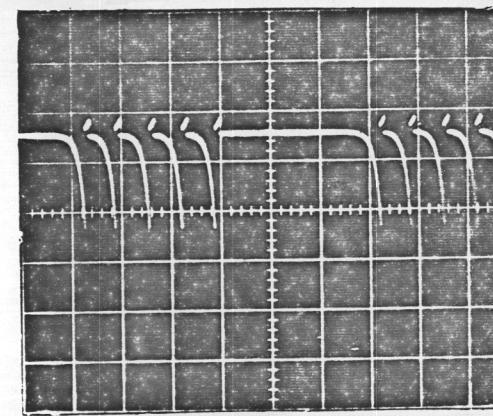
W2 1V/CM 2MS/CM 0V
Collector of Q8 Pulse Amp. with no signal.



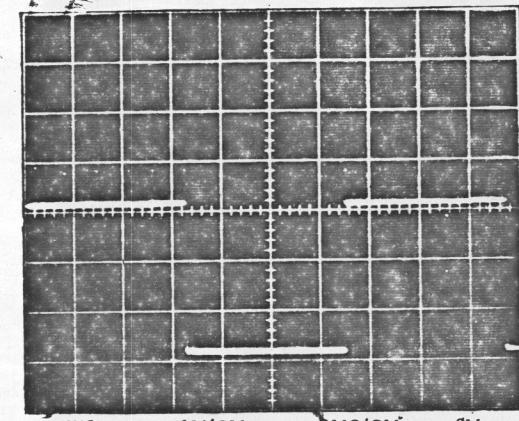
W3 1V/CM 1MS/CM 0V
Collector of Q10 - Schmitt trigger output with signal.



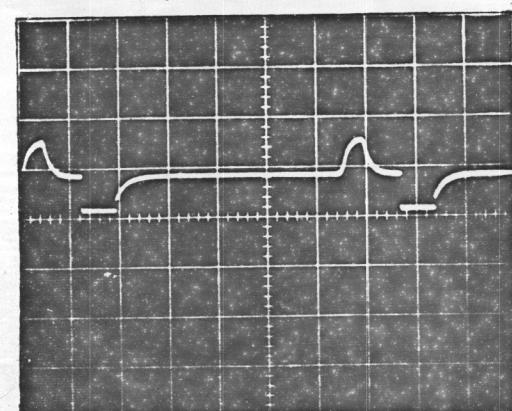
W4 1V/CM 2MS/CM 0V
Collector of Q11 - Input to reset circuit.



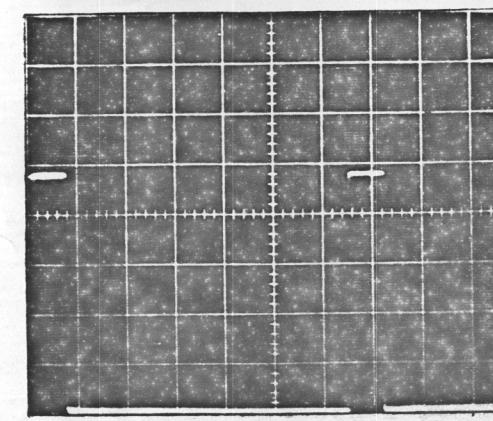
W5 2V/CM 2MS/CM 0V
Base of Q13 - Shift pulse generator input signal.



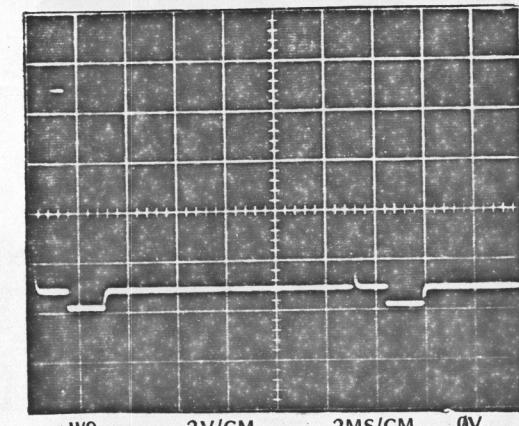
W6 1V/CM 2MS/CM 0V
Collector of Q13 - SCS shift line.



W7 1V/CM 2MS/CM 0V
Q14 & Q15, 1st SCS pair - reset signal from Q-12



W8 1V/CM 2MS/CM 0V
Q14 & Q15, 1st SCS pair - Typical output signal



W9 2V/CM 2MS/CM 0V
SCS shift pulse through .002 coupling cap.

HOBBY LOBBY RECEIVER ALIGNMENT PROCEDURE

In checking out receivers, the gain of the receivers (range) is determined by gains of various transistors and the current through each of the gain amplifiers. The range is the overall multiplication of the incoming signal, which is $\frac{1}{2}$ to 1 u volt, to a useable signal at the pulse amplifier of from 3 to 4 volts (a gain of 3 to 8 million). It is impossible to determine the exact gain before assembly of the various transistors, resistors and capacitors by preselection. The gain is determined by specifying that the assemblies have an excess gain over what is considered to be a minimum. Ultimately some receivers may not range check and, to prevent frequent occurrence of this, the technician is required to determine on the scope what a reasonable range should be. Only by experience can a technician learn what a proper sensitivity receiver looks and acts like.

The receiver amplifier and decoder section is designed to give solid operation to a detected signal level of .05 volt peak to peak. The position of the cover on the can attenuator when the minimum signal as above (.05v p-p) will indicate the sensitivity. This is what the technician must determine for each location and each frequency.

An examination of the noise level at the pulse amplifier with the transmitter off (OFF) is one additional way of support the sensitivity determination.

Make sure the receiver is working properly and that all connections are properly made and no solder bridges or open lands exist. Voltage levels should be checked against the standard and any low or high values correct by prescribed methods.

Once all voltages are within specifications, the receiver can be tuned. RF and IF transformers should be peaked for maximum sensitivity using the matching transmitter. This is done with a signal level of no more than .5v peak to peak at the detector. This is done to tune the receiver to a point where the gain amplifiers are not affected by the AGC and at a signal level at which a small change in amplitude can easily be observed.

Check the operation of the receiver over the signal level range of open can attenuator to the point where the signal level drops below .05v p-p. The position of the cover on the attenuator will determine the decision that the proper gain (range) and sensitivity is obtained.

The receiver when coils are sealed can be put back in the case and then normally range checked. Thirty steps or 75 feet or what is determined is the proper range check for the particular location which is established as the criteria.

ADJUSTING RECEIVER GAIN

There are several factors that establish the current level of the various gain amplifiers and therefore the amplification contributed to each stage by the overall sensitivity:

Resistor tolerance, Incorrect resistor assembly, Incorrect capacitors in bypass application, AGC voltage level, Detector transistor collector voltage, Beta (gain) of the transistors, Incorrect labelling of transistor gains, Power supply, i.e. freshly charged or discharged battery, Zener voltage level.

As you can see there are many variables and the technician must check each receiver to see that the proper components are used and voltage and current levels are maintained at the prescribed standards. The technician can increase or decrease the gain of the transistors (except the oscillator) by one gain division to correct overall problems with gain and range check. Here are some hints for trouble shooting receivers with gain problems:

Emitter voltage of Q1 low: (1) AGC low, raise by decreasing the value of the AGC resistor, look for option Q4 or Q5. (2) Gain of Q1 low, increase by one gain division.

Emitter voltage of Q3 out of specifications: (1) bias resistor tolerance too great. (2) wrong resistor? (3) gain of Q3 (low or high) replace Q3 with lower or higher gain xstr.

The Oscillator output is injected into the receiver through a small value capacitor into the base of Q3. This raises the emitter current and therefore the voltage at the emitter of Q3 by from 10 to 15%. If the emitter voltage of Q3 is low therefore, the oscillator may not be working or the injection capacitor may not be connected.

Emitter voltage of Q4 or Q5 low: (1) Gain of transistors low...replace by higher gain. (2) Q1 open (3) AGC low, change resistor as mentioned before.

Emitter voltage of Q6 low: (1) bias resistors tolerance too great. (2) wrong resistors, wrong value of emitter resistor. (3) Q6 gains too low, replace.

Collector voltage of Q6 too low: (1) Q6 bad, (2) Diode D2 or D3 wrong type. (3) Bias resistor too low in value. (4) Q6 is of the type incorrectly furnished by GE and the factory used to change the value of the 82K resistor to 120K to 150K. (5) wrong value of collector resistor. (6) power supply low.

Collector voltage of Q6 too high: (1) Q7 open or bad (2) bias resistor too high in value (3) wrong value of collector resistor (4) power supply high...zener diode open or burned out.

Collector voltage of Q8 out of tolerance: Bad transistor Q9 or (1) Rx not adjusted to correct level (2) D4 wrong type or bad (3) collector resistor wrong value. (4) leaky 4.7mf capacitor attached to collector of Q6 or capacitor in backwards, positive side should be on collector of Q6.

AFTER TUNING THE RECEIVER TO THE MATCHING TRANSMITTER PROCEED AS FOLLOWS:

Place receiver in one of the range test dummy planes: attach servos and arrange antenna as per standard.

Remove antenna from transmitter. Turn on receiver and transmitter and check that all controls are working at close range. Back off, holding transmitter with both hands and from 45 degrees to vertical until controls become jittery. It is best to operate one control, usually elevator while backing off.

Continue to back off until the control that is being used is lost. Come back toward the receiver until control is regained.

Back off again until control is lost again; this should be at the same point where the control was lost previously. This locates the range point and should exceed the minimum established. Different bands have different ranges.

Come back towards the receiver, control should be regained in about one step. If a considerable distance is required to recapture control, it may indicate an oscillating receiver.

If receiver and transmitter pass the minimum range requirements, turn off both receiver and transmitter. Units are now ready for shipment.

Always check for range before shipping, and definitely after any work is done on either receiver or transmitter.

EK CUSTOMER SERVICE BULLETIN

DATE: JANUARY 27, 1975
 SUBJECT: Transistor Gain Selection
 TO: All EK Customer Service Centers

Use the following chart for selecting transistors (Q-029 and Q-037) for receiver gain in RF and IF amplifier and oscillator stages.

<u>Freq. Band</u>	<u>Use</u>	<u>Color</u>	<u>Part. No.</u>
27mHz	R.F. Amp.	Red	Q-037B
	Loc. Oscillator	Violet	Q-029G
	Mixer	Orange	Q-037C
	I.F. Stages	Yellow or Green	Q-037D
53mHz	R.F. Amp.	Red or Orange	Q-037B
	Loc. Oscillator	Gray	Q-029H
	Mixer	Orange or Yellow	Q-037C
	I.F. Stages	Yellow or Green	Q-037D
72mHz	R.F. Amp.	Orange or Yellow	Q-037C
	Loc. Oscillator	White	Q-029I
	Mixer	Orange or Yellow	Q-037C
	I.F. Stages	Yellow or Green	Q-037D
Super Pro (Dual Conversion)	R.F. Amp.	Orange or Yellow	Q-037D
	Loc. Oscillator	Blue	Q-029F
11.155mHz			

Thank you,

Mike McCall
 Asst. Service Manager
 EK Products, Inc.

MM/ss

CUSTOMER SERVICE CENTER BULLETIN

DATE: December 14, 1973

SUBJECT: Proper grounding of receivers during bench checkout.

TO: All EK Warranty and Associate Customer Service Centers.

To bench check any EK receiver using an oscilloscope for testing, proper grounding must be obtained. This is accomplished by inserting a choke between ground of the receiver and ground of the oscilloscope.

For all 27 mHz use a 10 uhy choke, EK part number L-001. For all 53 mHz and 72 mHz use a .33 uhy choke, EK part number L9005.

Solder an ITT pin on one end of the choke, which will plug into receiver plug block on servo plug. The other end is attached to the oscilloscope by use of an alligator clip.

The choke will provide RF isolation between scope and receiver for proper tuning and alignment.

On 1971 Champions and similar systems with servo amplifier in receiver, it may be necessary to insert choke in 5th channel plug on solder to ground land of receiver. This is because of the diodes that are installed between the ground land of servo amplifier and ground wire to servo feedback pot.

Service Manager,
EK PRODUCTS, INC.

DDD/pac

4-21-72

CHECK OUT - RECEIVERS

In checking out receivers, the gain of the receivers (range) is determined by gains of the various transistors and the current through each of the gain amplifiers.

The range is the overall multiplication of the incoming signal, which is 1/2 to 1 u volt, to a useable signal at the pulse amplifier of from 3 to 4 volts (a gain of 3 to 8 million.) It is impossible to determine the exact gain before assembly of the various transistors, resistors and capacitors by preselection. The gain is determined by specifying that the assemblies have an excess of gain over what we consider to be a minimum. Ultimately some receivers may not range check and, to prevent frequent occurrence of this, the technician is required to determine on the scope what a reasonable range should be. Only by experience can a technician learn what a proper sensitivity receiver looks and acts like.

Our receiver amplifier and decoder section is designed to give solid operation down to a detected signal level of .05v peak to peak. The position of the covers on the can attenuator when the minimum signal as above (.05v p-p) will indicate the sensitivity. This is what the technician must determine for each location and each frequency.

An examination of the noise level at the pulse amplifier with the transmitter not turned on is one additional way of supporting the sensitivity determination.

The first step in checking a receiver is to make sure the receiver works, and that all connectors are properly made and that no solder bridges or open lands exist. Voltage levels should be checked against the standard and any low or high values corrected by methods prescribable and acceptable to EK Products and R. L. Elliott.

Once all voltages are within specifications, the receiver should be tuned. RF and IF transformers should be peaked for maximum sensitivity using a standard transmitter with plug in crystals. This should be done with a signal level of no more than .5v-peak to peak at the detector. This is done to tune the receiver at a point where the gain amplifiers are not effected by the AGC and at a signal level at which a small change in amplitude can easily be observed.

Check the operation of the receiver over the signal level range of open can to where the signal level drops below .05v p-p. The position of the cover as previously mentioned, will determine the judgement that the proper gain (range) and sensitivity has been achieved.

A receiver should be checked as above before the receiver is coated with RF lacquer. Remove all tuning slugs from the RF coils and cover the RF and IF slug openings before applying the RF lacquer. The slugs should be replaced after the coating has been dried for a minimum of 24 hours.

Now tune the receiver to the companion transmitter, repeating the voltage and current checks as outlined in the previous paragraphs.

After all tuning has been peaked, seal the slugs with beeswax (only beeswax) do not substitute. Put the receiver in a case and make sure it is identified as mating with the transmitter to which it was tuned. This set should not be separated from this point on. They must be shipped together.

The receiver and transmitter can now be range checked at some location not interferred with by the factory or other CB or RF emission. Once a location is chosen it should be used for all future range checks.

Thirty steps or 75 feet should be a minimum range before we ship to the customer. R/C de Mexico should not ship anything less than 32 steps on all frequencies. A maximum is 55 steps. Do not ship when over 55 steps.

All sets that do not pass range check, must be returned to a technician and the range must be increased or decreased, and the problem reasonably determined to prevent future out-of-specification range checks. These sets cannot be shipped until they have been rechecked for range and pass.

HOBBY LOBBY RECEIVER VOLTAGE STANDARDS

Nominal Values and Tolerances:

Receiver Battery:	4.8 +.3, -.4
Reg. (I.F. line):	3.3 +.17, -.17
AGC:	1.2 +.1, -.1
Q6: Collector	3.0 +.1, -.1
Q8: Collector	2.5 +.25, -.25
Q1, Q3 thru Q5:	Emitter .5 +.05, -.05
Q2 (72 mhz)	Emitter .1 +.05, -.02
Q2 (27 & 53 mhz)	Emitter 1.0 +.1, -.1

Receiver voltages (Transmitter OFF)

	E	B	C
Q1	.55	1.22	3.3
Q2 (72)	.15	.7	3.2
Q3	.55	1.2	3.3
Q4	.55	1.22	3.29
Q5	.55	1.25	3.3
Q6	0	.58	3.05
Q7	2.43	3.05	4.8
Q8	0	.56	2.7

The nominal voltages may vary somewhat due to component tolerances and variations in the 3.3 volt regulated supply and the ABC voltage. The determining factor for adjusting voltages that are out of tolerance is whether the entire system works correctly or not, such as the range and operational checks. You may adjust the regulator voltages, AGC voltage, or emitter voltages that are out of tolerance though the receiver range and operation checks are at the minimum standards.

Typical Readings:

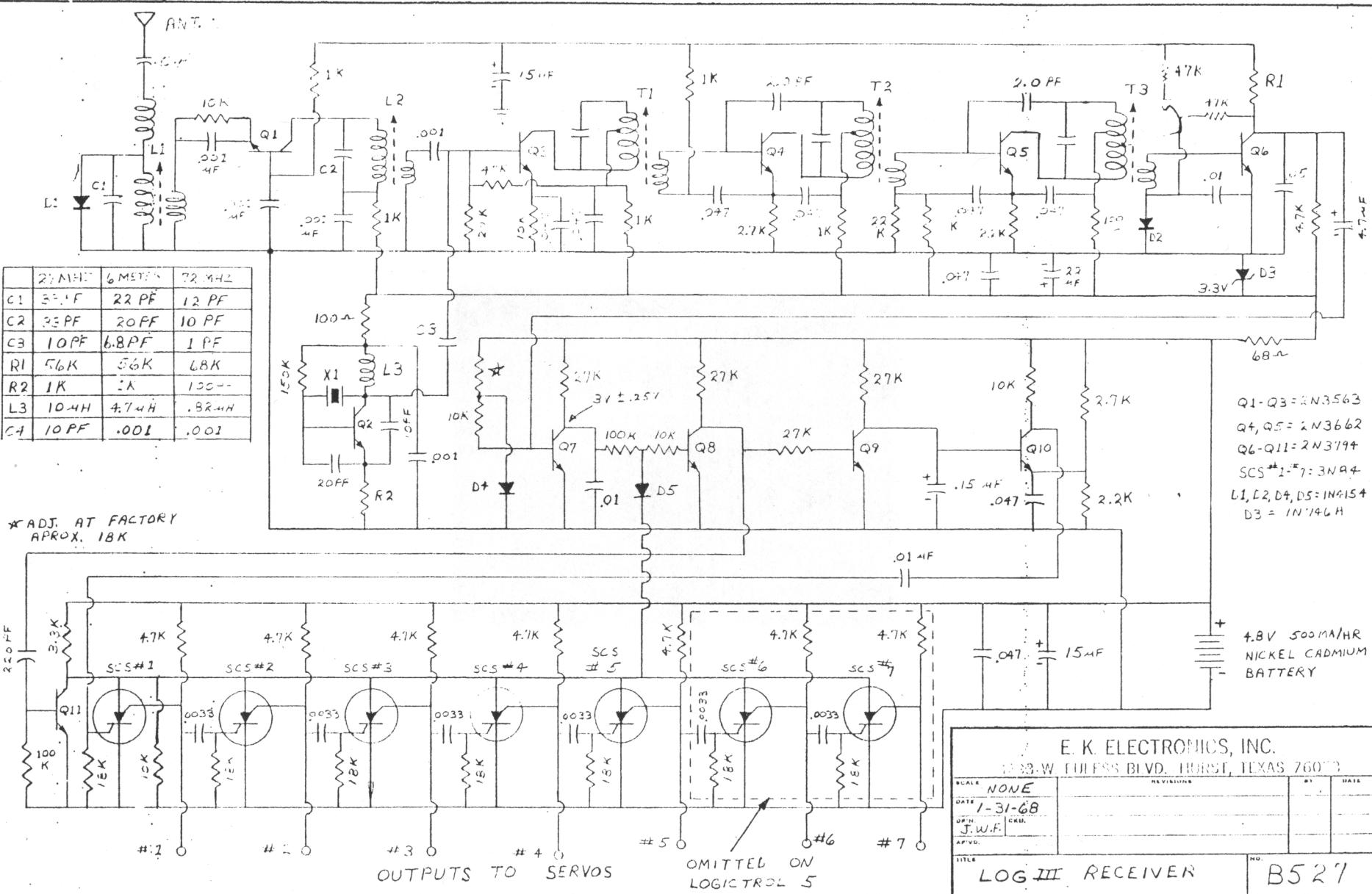
Reg. (I.F. line): 3.35
AGC: 1.25

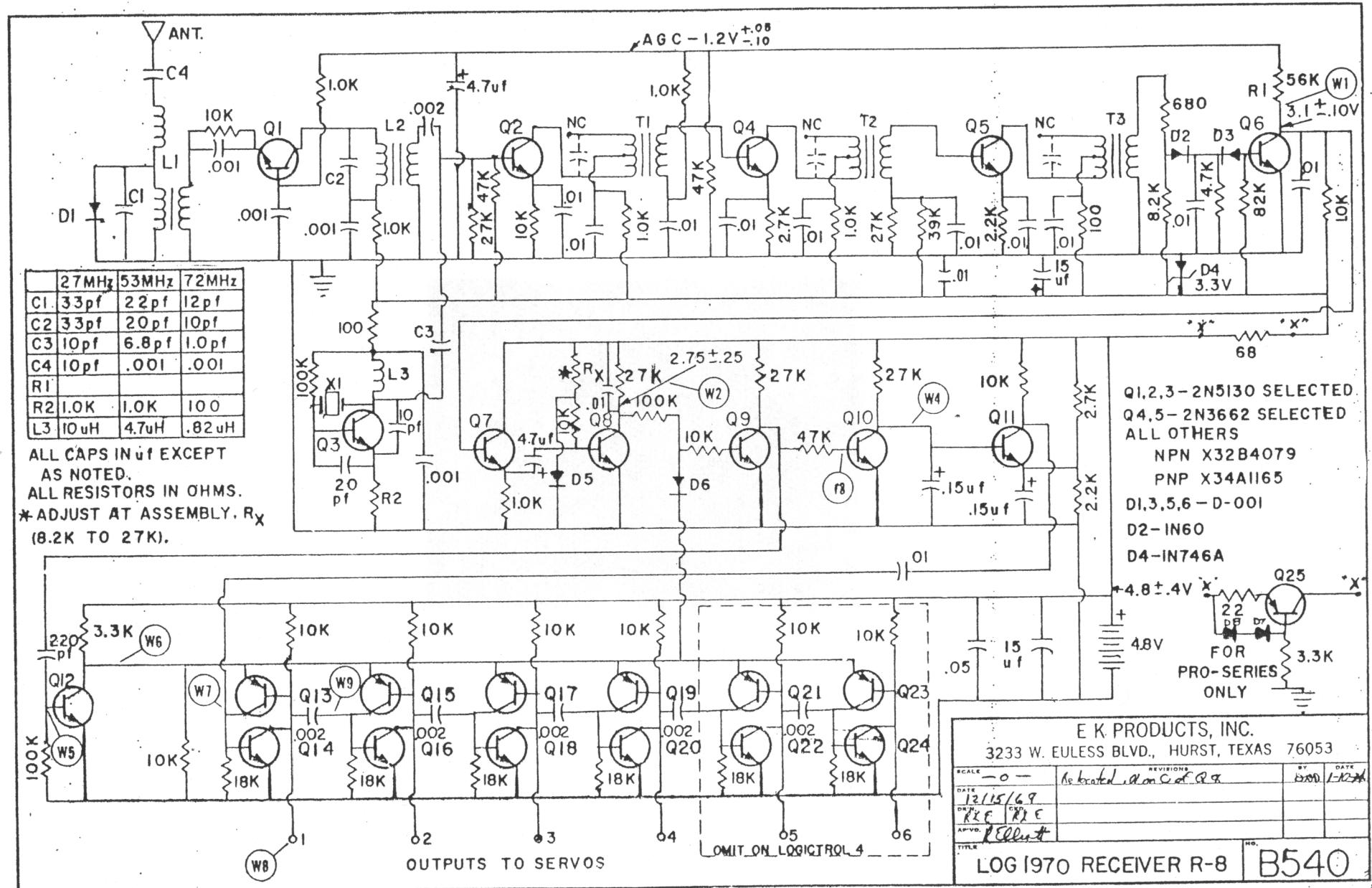
Transistor gain chart:

27 mhz	R.F. Amp	Red	Q-037B
	Osc.	Violet	Q-029G
	Mixer	Orange	Q-037C
	J.F. Stages	Yellow or Green	Q-037D
53 mhz	R.F. Amp	Red or Orange	Q-037B
	Osc.	Gray	Q-037C
	Mixer	Orange	Q-029H
	I.F. Stages	Yellow	Q-037C
		Yellow or Green	Q-037D
72 mhz	R.F. Amp	Orange or Yellow	Q-037C
	Osc.	White	Q-029I
	Mixer	Orange	Q-037C
	I.F. Stages	Yellow	Q-037D
		Yellow or Green	Q-037D

Beta gain of transistors:

Q-029 E (Green)	50-59
Q-029 F (Blue)	60-69
Q-029 G (Violet)	70-79
Q-029 H (Gray)	80-89
Q-029 I (White)	90-99
Q-037 A (Brown)	10-19
Q-037 B (Red)	20-29
Q-037 C (Orange)	30-39
Q-037 D (Yellow)	40-49





V-B-540

VOLTAGE MEASUREMENTS

LOG III, PRO-SERIES, 1969-70 LOGICTROL AND CHAMPION RECEIVERS

REFERENCE DRAWINGS B-527, B-540, and B-629

Nominal Values and Tolerances:

	Collector	Emitter
Batt: 4.8 $\pm .3$	Q6 3.0 $\pm .1$	Q1, Q2, Q4, and Q5 .5 $\pm .05$
Reg: 3.3 $\pm .17$	Q8 2.75 $\pm .25$	Q3 (Log III Q2) 72mHz .1 $\pm .02$
AGC 1.2 $\pm .05$		27 and 53 mHz 1.0 $\pm .1$

Typical Readings:

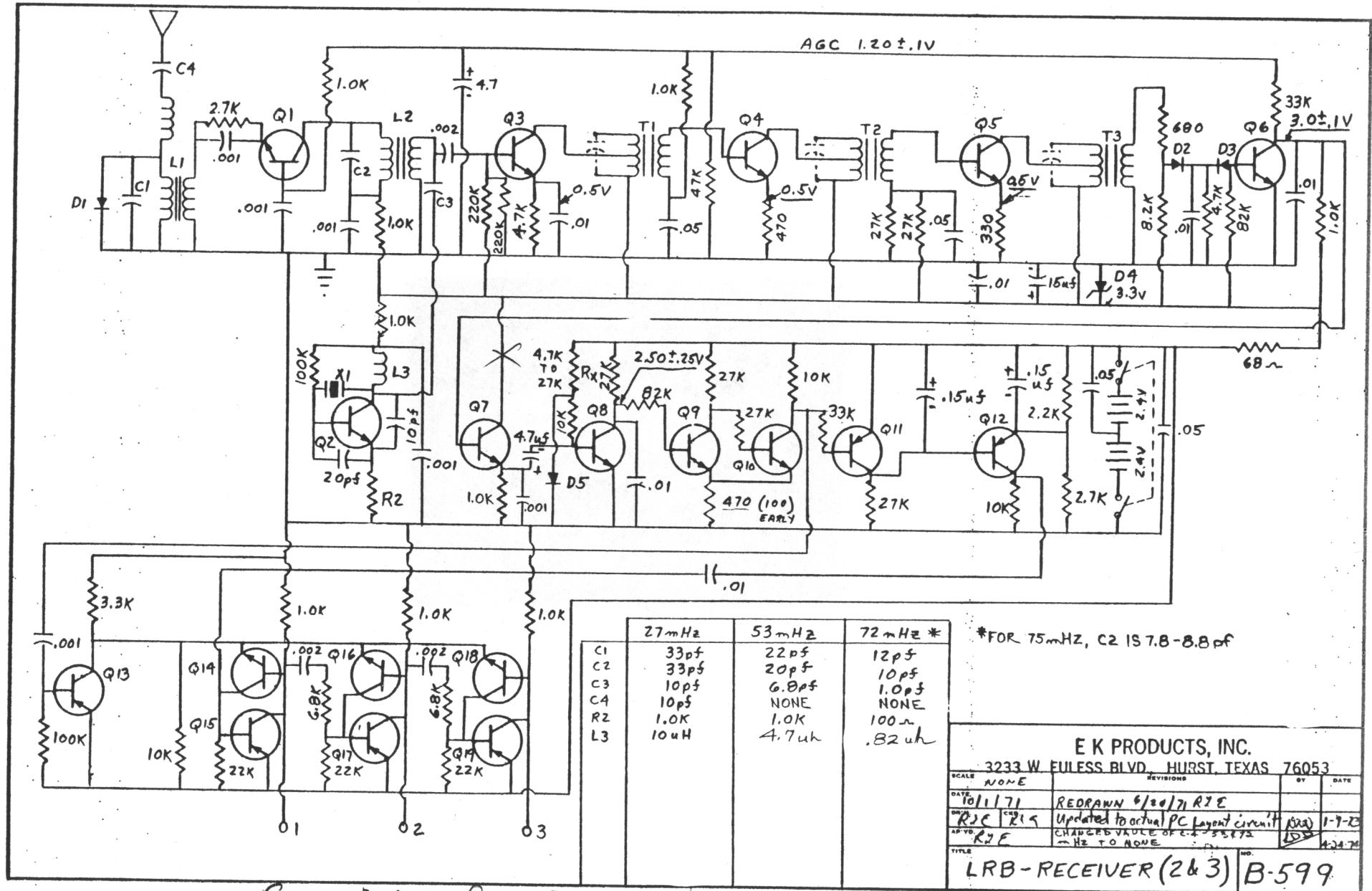
Reg: 3.3

AGC 1.18

Transmitter Off

	E	B	C
Q1	.52	1.15	3.25
Q2	.55	1.2	3.25
Q3 (72mHz)	.18	.8	3.1
Q4	.5	1.15	3.1
Q5	.5	1.15	3.25
Q6	0	.53	3.0
Q7	2.4	3.0	4.8
Q8	0	.5	2.75

The nominal voltages may vary somewhat due to component tolerances and variations in the 3.3 volt regulated supply and the AGC voltage. The determining factor for adjusting voltages that are out of tolerance is whether the entire system works correctly or not, such as the range and operational checks. You may adjust the regulator voltages, AGC voltage, or emitter voltages that are out of tolerance though the receiver range and operation checks are at the minimum standards.



See B-600 for Q7
wiring changes?

VOLTAGE MEASUREMENTS

1971 - LRB RECEIVER

REFERENCE DRAWINGS B-599 and B-616

Nominal Values and Tolerances

Batt: $4.8 \pm .4$
 Reg: $3.3 \pm .17$
 AGC $1.2 \pm .05$

Typical Readings:
 Reg: 3.2
 AGC 1.2

COLLECTOR

Q6 $3.0 \pm .1$
 Q8 $2.5 \pm .25$

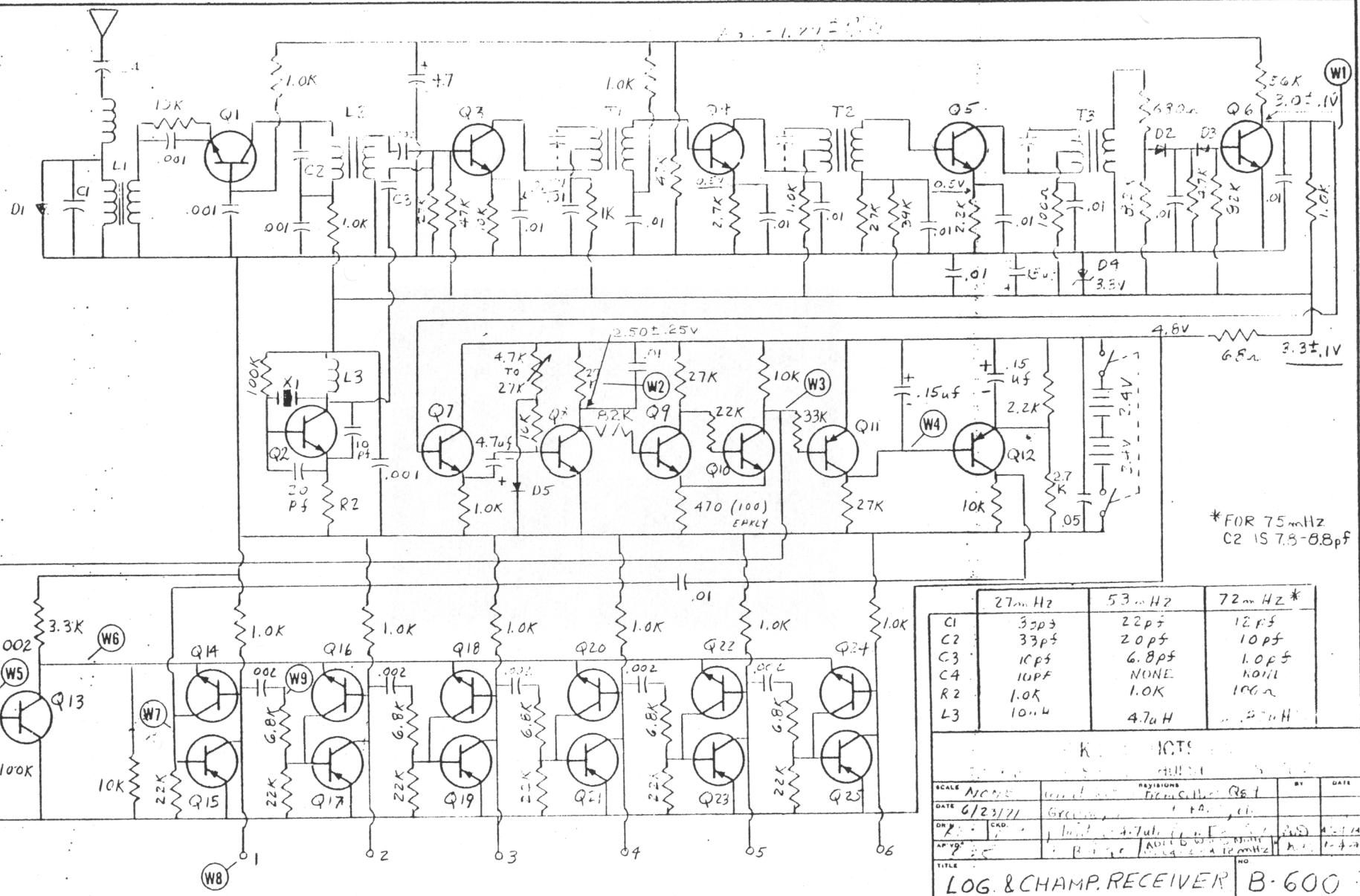
EMITTER

Q1, Q3, Q4, and Q5 $.5 \pm .05$
 Q2 (72mHz) $.1 \pm .02$
 (27 and 53 .8 to 1.4)

Transmitter Off

	E	B	C
Q1	.52	1.4	3.0
Q2 (72mHz)	.15	.7	2.1
Q3	.52	1.1	3.2
Q4	.47	1.2	3.2
Q5	.46	1.2	3.2
Q6	0	.6	3.0
Q7	2.2	3.0	3.2
Q8	0	.54	2.25

The nominal voltages may vary somewhat due to component tolerances and variations in the 3.3 volt regulated supply and the AGC voltage. The determining factor for adjusting voltages that are out of tolerance is whether the entire system works correctly or not, such as the range and operational checks. You may adjust the regulator voltages, AGC voltage, or emitter voltages that are out of tolerance though the receiver range and operation checks are at the minimum standards.



V-B-600

VOLTAGE MEASUREMENTS

1971 LOGICTROL AND CHAMPION RECEIVER

REFERENCE DRAWINGS B-600 and B-618

Nominal Values and Tolerances:

	Collector	Emitter
Batt: 4.8 $\pm .3$	Q6 $3.0 \pm .1v$	Q1, Q3, Thru Q5 $.5 \pm .05$
Reg: $3.3 \pm .17$	Q8 $2.5 \pm .25$	Q2 (72 mHz $.1 \pm .05 - .02$) (27 and 53 mHz $1.0 \pm .1$)
AGC: $1.2 \pm .1$		

Typical Readings:

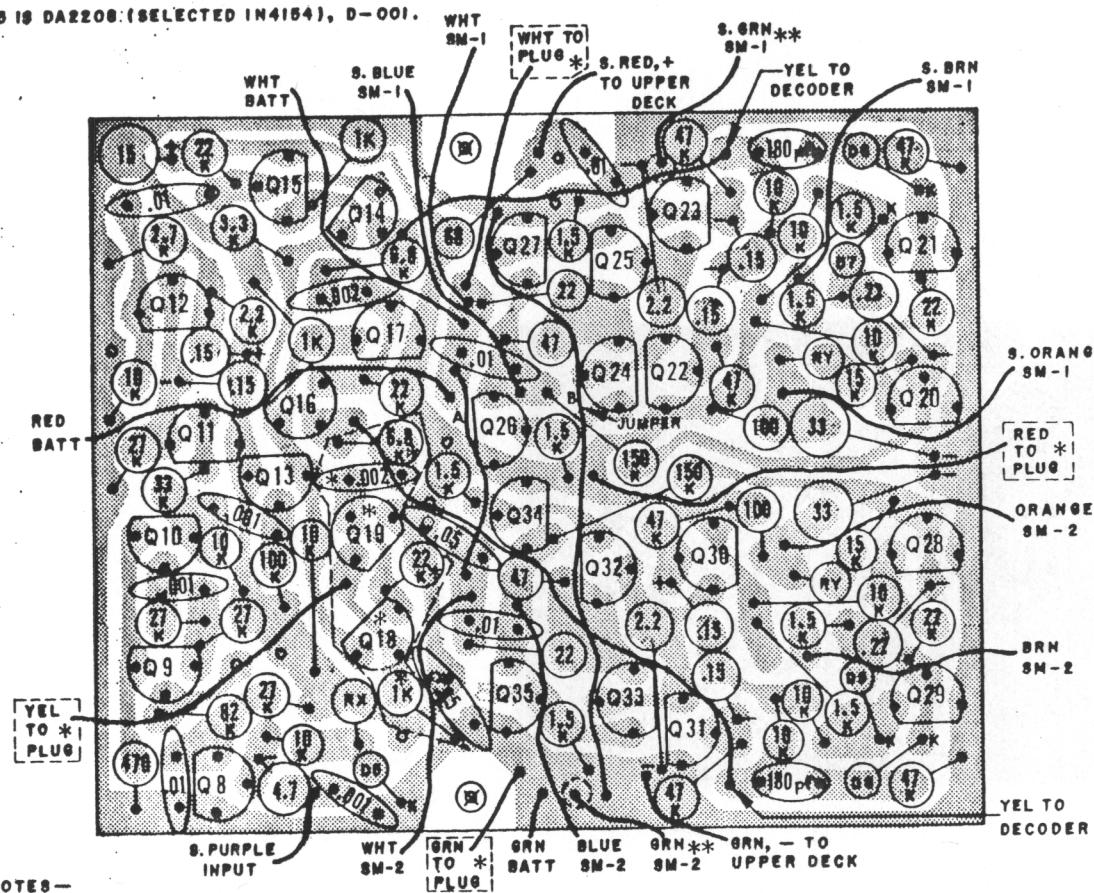
Reg: 3.35
AGC: 1.25

Transmitter Off

	E	B	C
Q1	.55	1.22	3.3
Q2 (72 mHz)	.15	.7	3.2
Q3	.55	1.2	3.3
Q4	.55	1.22	3.29
Q5	.55	1.25	3.3
Q6	0	.58	3.05
Q7	2.43	3.05	4.8
Q8	0	.56	2.7

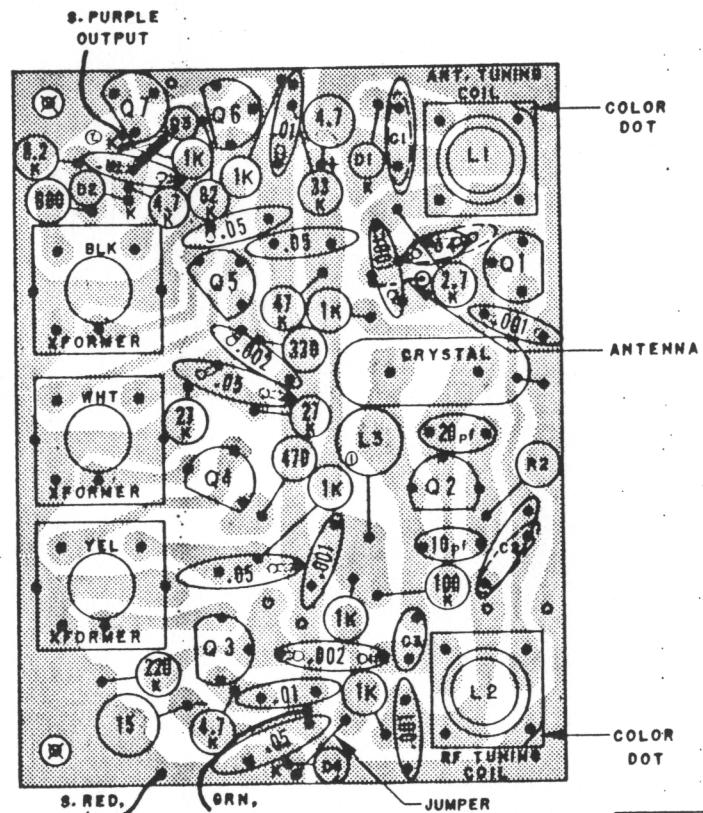
The nominal voltages may vary somewhat due to component tolerances and variations in the 3.3 volt regulated supply and the AGC voltage. The determining factor for adjusting voltages that are out of tolerance is whether the entire system works correctly or not, such as the range and operational checks. You may adjust the regulator voltages, AGC voltage or emitter voltages that are out of tolerance though the receiver range and operation checks are at the minimum standards.

D3 IS DA2207 (SELECTED IN4154), D-006.
D0 IS DA2208 (SELECTED IN4154), D-001.



**FOR 75MHz C2 IS
7.8 - 8.8pf

**ON LATER MODELS DIODE IN4154 IS ADDED
IN SERIES WITH S. GRN SM-1 & GRN SM-2,
POT WIRES, WITH CATHODE TO P.C. BOARD.



NOTES—

1. UNLESS OTHERWISE SPECIFIED:
ALL CAPACITANCE VALUES ARE IN MICROFARADS.
ALL RESISTANCE VALUES ARE IN OHMS.

2. TRANSISTORS: Q1 THRU Q5 ARE X32N4200 (Q-029).

Q6 THRU Q10, Q14, Q16, Q18, Q20, Q21, Q23, Q24, Q28, Q29, Q31, & Q32 ARE X32B4079 (Q-028). Q11, Q12, Q13, Q15, Q17, Q19, Q22, Q26, Q30, & Q33 ARE X34AII65 (Q-026). Q26 & Q34 ARE X34E1448 (Q-008). Q27 & Q35 ARE X32D4080 (Q-027).

3. DIODES: D1, D3, D5, D9 THRU D9 ARE IN4154. D2 IS IN60. D4 IS IN748A.

4. RX-VARIABLE: 4.7K TO 27K. RY—OPTIONAL VALUE: 10Ω TO 8.2K.

5. JUMPERS: A=WHT, B=GRN.

*THESE PARTS & WIRES
ARE NOT INCLUDED ON
2-CHANNEL RECEIVER

	27MHz	53MHz	72MHz
C1	33 pf	22 pf	12 pf
C2	33 pf	20 pf	10 pf
C3	10 pf	6.8 pf	1.0 pf
C4	10 pf	***	***
R2	1.0K	1.0K	100Ω
L1	RED	ORANGE	YELLOW
L2	BLUE	BROWN	GREEN
L3	10UH	4.7UH	.82UH

** ***
CONNECT A JUMPER WIRE BETWEEN LANDS IN
PLACE OF CAPACITOR C4, OR CONNECT ANTENNA
WIRE DIRECTLY TO ANTENNA COIL LAND.

SERIES
'71

E K PRODUCTS, INC.
3233 W. EULESS BLVD., HURST, TEXAS 76053.

SCALE	None	REVISIONS	BY	DATE
DATE	10/15/71	① Adk L.3	TAL	1/28/71
DR.	TAL	② CORRECTED PATCH COL. Q7		
TITLE	PARTS LOCATION — LRB RECEIVER (283)	B-616		

PARTS LIST FOR
NEXT ASSEMBLYLRB RECEIVER 2 AND 3 CHANNELS
RF BOARD

1971 - 1974

PL-

B-616

PART NUMBER	DESCRIPTION	27	52	12
A-020	Coil - Red Dot	1	0	0
A-021	Coil - Blue Dot	1	0	0
A-022	Coil - Orange Dot	0	1	0
A-023	Coil - Brown Dot	0	1	0
A-024	Coil - Yellow Dot	0	0	1
A-026	Coil - Green Dot	0	0	1
C-001	.05uf Capacitor	5	5	5
C-002	.001uf "	4	4	6
C-010	20pf "	1	2	1
C-011	33pf "	2	0	0
C-012	1.0pf "	0	0	1
C-017	.01uf "	3	3	3
C-019	6.8pf "	0	1	0
C-032	10pf "	3	1	2
C-033	15uf "	1	1	1
C-047	12pf "	0	0	1
C-051	22pf "	0	1	0
C-055	4.7uf "	1	1	1
C-064	.002uf "	1	1	1
D-001	DA 2208 Diode	1	1	1
D-002	1N60 "	1	1	1
D-005	3.3V Zener Diode 1N746-A	1	1	1
D-006	DA2207 Diode	1	1	1
L-001	Choke 10uh	1	0	0
L-008	Choke 4.7uh	0	1	0
L-011	Choke .82uh	0	0	1
Q-025	X32B4079	2	2	2
Q-029	X32N4200 Transistor	1	1	4
Q-037	X32N5647	4	4	4
R4-1010	100Ω Resistor	0	0	1
R4-1020	1K Ω "	7	7	6
R4-1040	100K Ω "	1	1	1
R42720	2.7K Ω "	2	1	1
R4-2730	27K Ω "	2	2	2
R4-2240	220K Ω "	1	1	1
R4-3310	330 Ω "	1	1	1
R4-3330	33K Ω "	1	1	1
R4-4710	470 Ω "	1	1	1
R4-4720	4.7 Ω "	1	2	2
R4-4730	47K Ω "	1	1	1
R4-6810	680 Ω "	1	1	1
R4-8220	8.2K Ω "	1	1	1
R4-8230	82K Ω "	1	1	1
T-006	Transformer I.F. White	1	1	1
T-007	Transformer I.F. Black	1	1	1
T-008	Transformer Mixer Yellow	1	1	1

PARTS LIST FOR
NEXT ASSEMBLY

LRB 2 AND 3 CHANNELS 1971 - 1974 LRB
RF BOARD

PL- B-616

PART NUMBER	DESCRIPTION	QUANTITY		
		27	53	72
W-000	WIRE - BLACK 37" ANT.	0	1	0
W-001	WIRE - BROWN LONG 36" ANT.	1	0	0
W-005	WIRE - GREEN LONG	1	1	1
W-006	WIRE - BLUE LONG 39" ANT.	0	0	1
W-092	WIRE - S. RED LONG	1	1	1
W-097	WIRE - S. PURPLE LONG	1	1	1
X-001A-E	CRYSTAL RX 27 mHz	1	0	0
X-003A-F	CRYSTAL RX 53 mHz	0	1	0
X-005A-G	CRYSTAL RX 72 mHz	0	0	1

PARTS LIST FOR LRB RECEIVER (2 and 3 CHANNELS) 71-73
NEXT ASSEMBLY DECODER BOARD

PL-

B-616

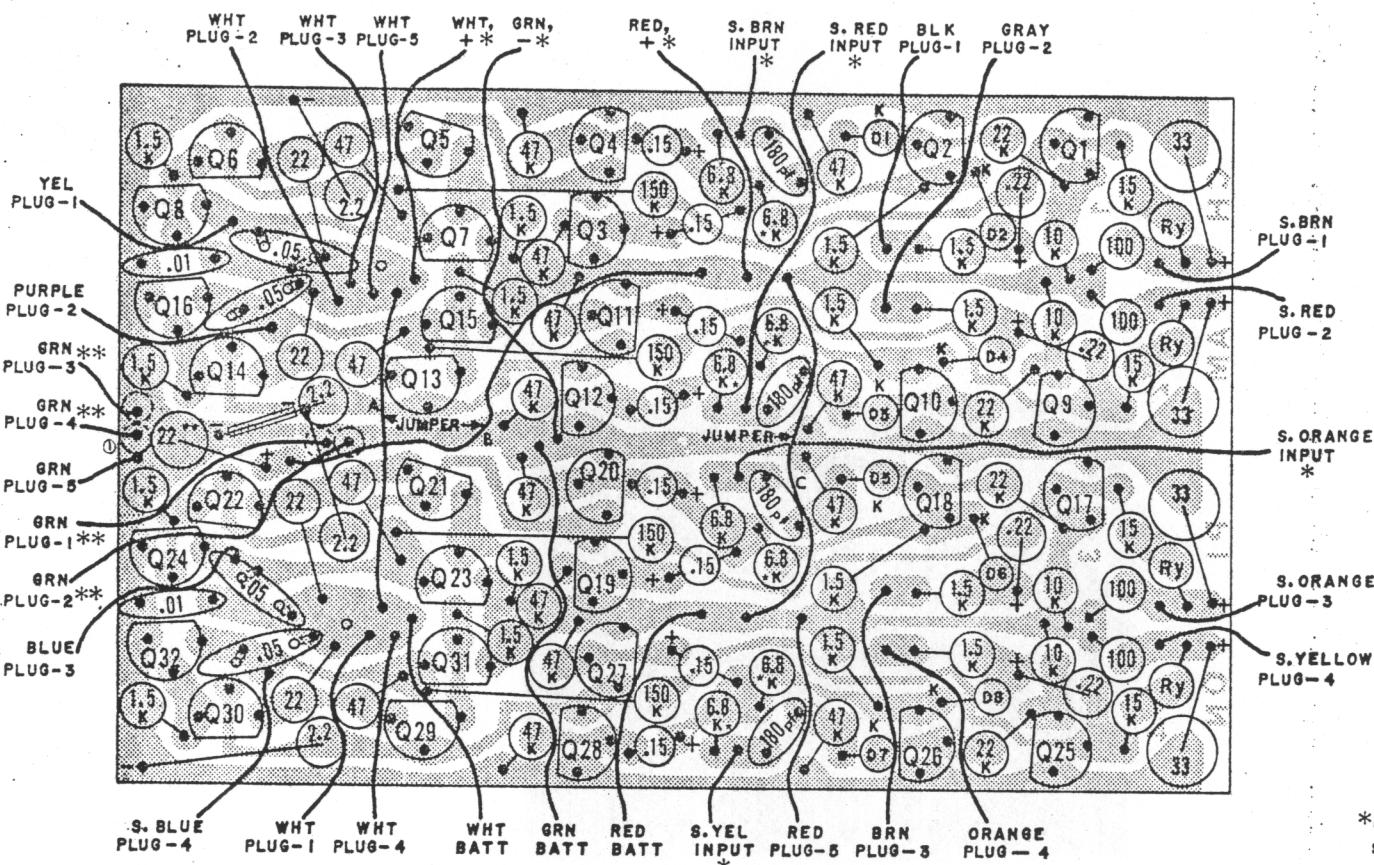
PART NUMBER	DESCRIPTION	QUANTITY		
		27	53	72
C-064	.002uf Capacitor	2	2	2
C-001	.05uf Capacitor	2	2	2
C-002	.001uf "	3	3	3
C-003	180pf "	2	2	2
C-004	2.2uf "	2	2	2
C-017	.01uf "	5	5	5
C-033	15uf "	1	1	1
*C-049	33uf "	2	2	2
C-052	.22uf "	2	2	2
C-055 /: 101	4.7uf "	1	1	1
C-057	.15uf "	6	6	6
D-001	DA 2208 Diode	6	6	6
D-006	DA 2207 Diode	1	1	1
E-016	3 pin insulator	1	1	1
E-018	Contact plug	7	7	7
E-025	4 pin insulator	1	1	1
E-027	Plug Cover - 3pin Blk.	1	1	1
E-041	Plug Cover - 4pin Red	1	1	1
Q-008	X34E1448 Transistor	2	2	2
Q-025	X32B4079	12	12	12
Q-026	X34A1165 "	10	10	10
Q-027	X32D4080 "	4	4	4
R4-1010	100Ω Resistor	2	2	2
R4-1020	1K Ω "	3	3	3
R4-1030	10K Ω "	6	6	6
R4-1040	100K Ω "	1	1	1
R4-1520	1.5KΩ "	8	8	8
R4-1530	15K Ω "	2	2	2
R4-2200	22Ω "	2	2	2
R4-2220	2.2k Ω "	1	1	1
R4-2230	22K Ω "	5	5	5
R4-2720	2.7K Ω "	1	1	1
R4-2730	27K Ω "	3	3	3
R4-3320	3.3k Ω "	1	1	1
R4-3330	33K Ω "	2	2	2
R4-4700	47Ω "	2	2	2
R4-4710	470Ω "	1	1	1
R4-4730	47K Ω "	6	6	6
R4-6800	68Ω "	1	1	1
R4-6820	6.8K "	2	2	2
R4-8230	82K "	1	1	1
R4-1540	150K "	2	2	2
RX	Variable Resistor 4.7K to 27K	1	1	1
RY	Optional Value 10Ω to 8.2K	2	2	2
W-001	Wire - Brown	1	1	1
W-002	Wire - Red	1	1	1
W-003	Wire - Orange	1	1	1

PARTS LIST FOR LRB RECEIVER (2 and 3 Channels) 71-73
NEXT ASSEMBLY Decoder Board

PL-

B-616

PART NUMBER	DESCRIPTION	QTY		
		27	53	72
W-004	Wire - Yellow	1	1	1
W-005	Wire - Green	1	1	1
W-006	Wire - Blue	1	1	1
W-090	Wire - S. Black	1	1	1
W-091	Wire - S. Brown	1	1	1
W-093	Wire - S. Orange	1	1	1
W-095	Wire - S. Green	1	1	1
W-096	Wire - S. Blue	1	1	1
PC-XXX	Printed Circuit Board			
*C-033	15uf Capacitor (on some versions)			



NOTES—

1. UNLESS OTHERWISE SPECIFIED:
ALL CAPACITANCE VALUES ARE IN MICROFARADS.
ALL RESISTANCE VALUES ARE IN OHMS.
2. TRANSISTORS: Q1, Q2, Q4, Q5, Q9, Q10, Q12, Q13, Q17, Q18, Q20, Q21, Q25, Q26, Q28, & Q29 ARE X32B4079 (Q-025). Q3, Q6, Q11, Q14, Q19, Q22, Q27, & Q30 ARE X34A1165 (Q-026). Q7, Q15, Q23, & Q31 ARE X34E1446 (Q-008). Q8, Q16, Q24, & Q32 ARE X32D4080 (Q-027).
3. DIODES: DI THRU D8 ARE ALL IN4154 (D-001).
4. Ry—OPTIONAL VALUE: 10Ω TO 8.2K.
5. JUMPERS: A=WHT, B=RED, C=RED.

① *OPTIONAL VALUE: 10K
**OPTIONAL VALUE: 15UF

① **ON LATER MODELS, DIODE
IN 4154 IS ADDED IN SERIES
WITH GRN PLUG 1, GRN PLUG
2, GRN PLUG 3, AND GRN
PLUG 4 WIRES, WITH
CATHODE TO P.C. BOARD.

SERIES
'71

E K PRODUCTS, INC.			
3233 W. EULESS BLVD., HURST, TEXAS 76053			
SCALE	REVISIONS	BY	DATE
NONE			
DATE 10/25/71	① Add diodes & optional value notes	TAL	12/29/71
DR N TAL			
AP V.O.			
TITLE	PARTS LOCATION	NO.	
CHAMPION AMP. DECK		B-617	

PARTS LIST FOR
NEXT ASSEMBLY

'71 CHAMPION AMP. DECK 4 AND 5 CHANNEL

PL-

B-617

PART NUMBER	DESCRIPTION	ALL
C-001	.05uf	4
C-003	180pf	4
C-004	2.2pf	4
C-017	.01uf	2
C-033	15uf	1
C-049	33uf	4
C-052	.22uf	4
D-001	1N4154 or DA2208	8
E-016	3 Pin plug insulator	1
E-018	Contact plug	23
E-020	5 Pin plug insulator	4
E-027	plug cover - 3pin blk	1
E-042	plug cover 5 pin red	4
PC-XXX	Servo Amp. Deck - Champion	1
Q-008	X34E1448 PNP Transistor	4
Q-025	X32B4079 NPN Transistor	15
Q-026	X34A1165 PNP Transistor	8
Q-027	X32D4080 NPN Transistor	4
R4-6820	6.8K Resistor	8
R4-1010	100Ω Resistor	4
R4-1030	10 K Resistor	4
R4-1520	1.5K Resistor	16
R4-1530	15K Resistor	4
R4-1540	150K Resistor	4
R4-2200	22Ω Resistor	4
R4-2230	22k Resistor	4
R4-4700	47Ω Resistor	4
R4-4730	47K Resistor	12
R4-	Optional value 10Ω to 8.2K	1
S-217	Harness Log 4P RCVR replacement	1
W-000	Wire - Black	1
W-001	Wire - Brown	1
W-002	Wire - Red	4
W-003	Wire - Orange	1
W-004	Wire - Yellow	1
W-005	Wire - Green	6
W-006	Wire - Blue	1
W-007	Wire - Purple	1
W-008	Wire - Grey	1
W-009	Wire - White	7
W-091	Wire - S. Brown	2
W-092	Wire - S: Red	2
W-093	Wire - S. Orange	2
W-096	Wire - S. Blue	2
W-094	Wire - S. Yellow	2
	5 Channels	
E-018	Contact plug	4

PARTS LIST FOR '71 CHAMPION AMP, DECK 4 AND 5 CHANNEL

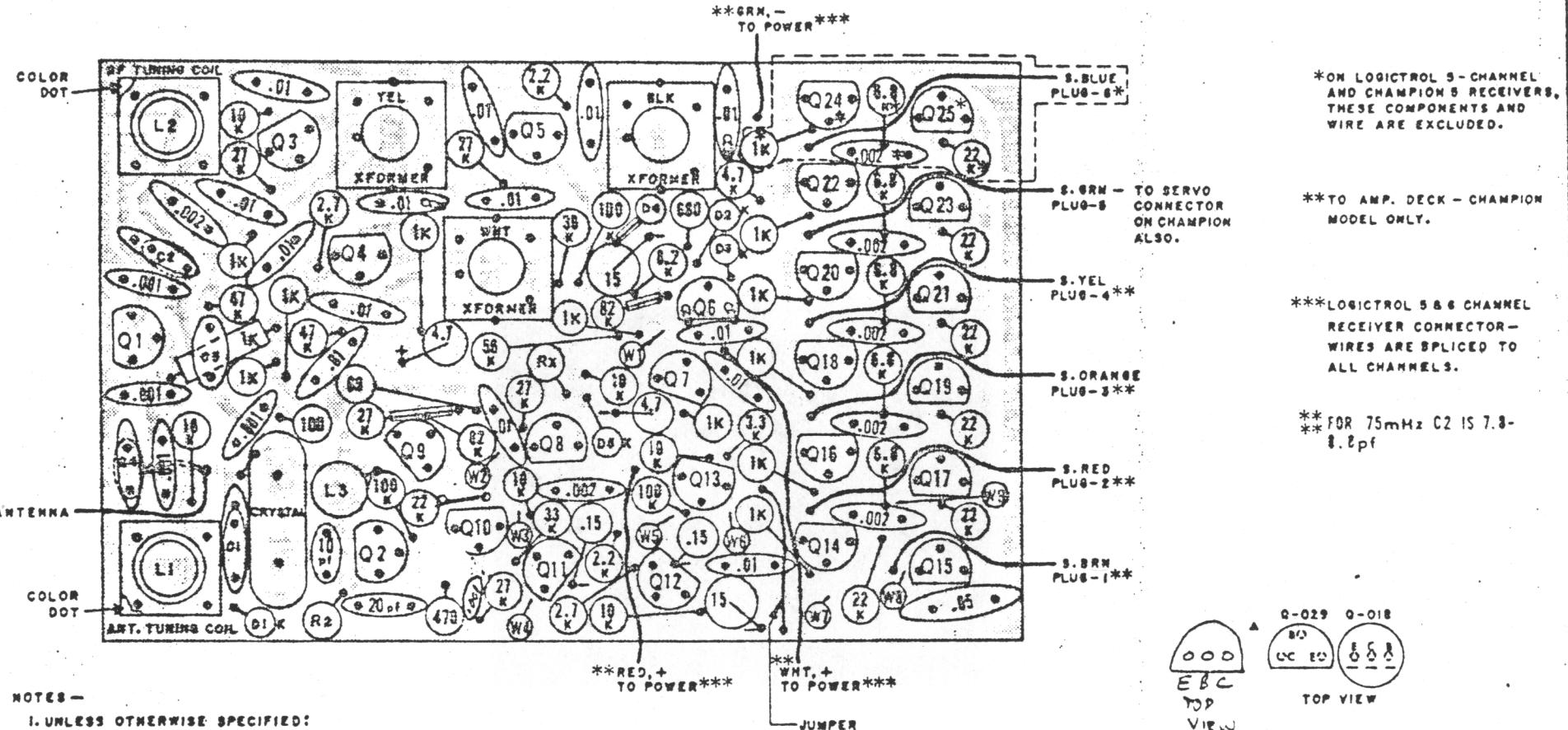
NEXT ASSEMBLY

PL-

B-617

60

PART NUMBER	DESCRIPTION	ALL
E-025	5 channel cont'd	1
E-041	4 Pin plug insulator	1
W-002	Plug cover 4 pin red	1
W-005	Wire - Red	1
W-009	Wire - Green	1
	Wire - White	1



NOTES—

1. UNLESS OTHERWISE SPECIFIED:
ALL CAPACITANCE VALUES ARE IN MICROFARADS.
ALL RESISTANCE VALUES ARE IN OHMS.

2. TRANSISTORS: Q1, Q2, Q3, Q4, & Q5 ARE X32M4200 (0-029), CR 16G4200 (0-018).
Q6, Q7, Q8, Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20, Q21, Q22, & Q24 ARE X32B4079 (0-025).

Q11, Q12, Q13, Q15, Q17, Q19, Q21, Q23, & Q25 ARE X32A1168 (0-026).
Q4 AND Q1/C ARE X32D4080.

3. DIODES: D1, D5, & D6 ARE IN4154 (D-001). D2 IS IN60 (D-002). D4 IS IN746A (D-005).
D3 IS DA2207 (SELECTED IN4154), D-006.

4. RX - VARIABLE: 4.7K TO 27K.

5. CONNECT A JUMPER WIRE BETWEEN LANDS IN PLACE
OF CAPACITOR C4, OR CONNECT ANTENNA WIRE
DIRECTLY TO ANTENNA COIL LAND.

	27mHz	53mHz	72mHz	**
C1	33 pf	22 pf	12 pf	
C2	33 pf	20 pf	10 pf	
C3	10 pf	6.8 pf	1.0 pf	
C4	10 pf	NOTE 5	NOTE 5	
R2	1.0K	1.0K	100A	
I1	RED	ORANGE	YELLOW	
L3	10uH	4.7uH	.82 uH	

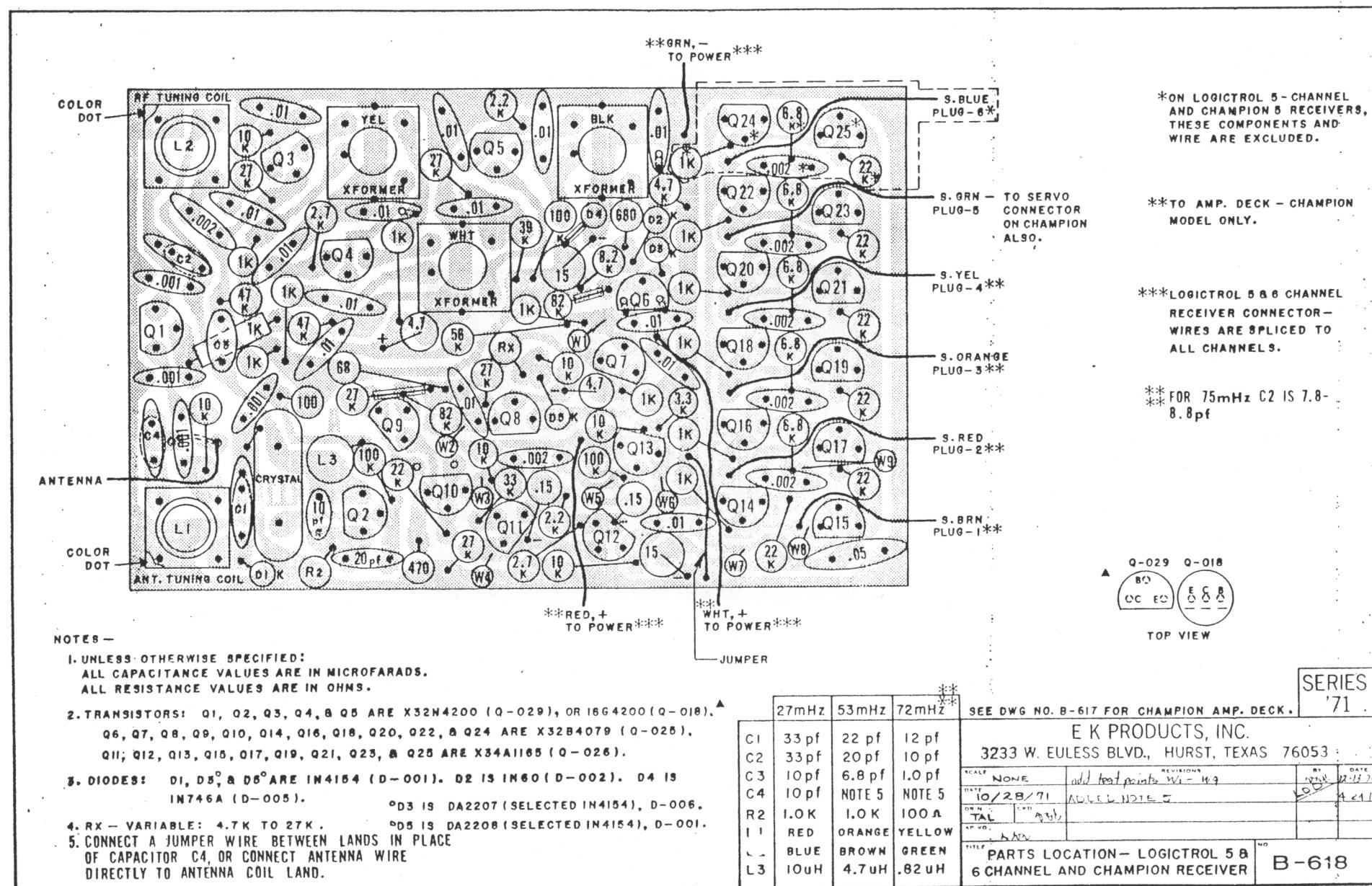
SEE DWG NO. B-617 FOR CHAMPION AMP. DECK.

E K PRODUCTS, INC.
3233 W. EULESS BLVD., HURST, TEXAS 76053

SCALE	1/16 INCH = 1 FT
DATE	10/28/71
USER	100A
TAL	PLT
PP	AMA

PARTS LOCATION - LOGICTROL 5 & 6 CHANNEL AND CHAMPION RECEIVER

B-618



PARTS LIST FOR
NEXT ASSEMBLYLOGICTROL 5 and 6 CHANNEL AND
CHAMPION RECEIVER CONT.....

PL-

B-618

PART NUMBER	DESCRIPTION	QUANTITY		
		27	53	72
A-024	COIL - YELLOW	0	0	1
A-030	COIL - GREEN	0	0	1
T-007	TRANSFORMER I.F. BLACK	1	1	1
T-008	TRANSFORMER MIXER YELLOW	1	1	1
T-006	TRANSFORMER - I.F. WHITE	1	1	1
X-001A - E	CRYSTAL	1	0	0
X-003A - F	CRYSTAL	0	1	0
X-005A - G	CRYSTAL	0	0	1
W-001	Wire - Brown (36" Antenna)	1	1	1
W-002	Wire - Red	1	1	1
W-006	Wire - Blue (39" Antenna)			1
W-005	Wire - Green	1	1	1
W-009	Wire - White	1	1	1
W-091	Wire - S. Brown	1	1	1
W-092	Wire - S. Red	1	1	1
W-093	Wire - S. Orange	1	1	1
W-094	Wire - S. Yellow	1	1	1
W-095	Wire - S. Green (Champion Servo Connector)	1	1	1
W-096	Wire - S. Blue	1	1	1

PART NUMBER	DESCRIPTION	QUANTITY		
		27	53	72
A-020	27 mHz Rcvr. Antenna Coil	1	-	-
A-021	27 mHz Rcvr. Antenna Coil	1	-	-
A-022	53 mHz Rcvr. Antenna Coil	-	1	-
A-023	53 mHz Rcvr. R.F. Coil	-	1	-
A-024	72 mHz Rcvr. Antenna Coil	-	-	1
A-026	72 mHz Rcvr. R.F. Coil	-	-	1
C-002	.001 uf ceramic disc. cap.	4	5	5
C-010	20 pf NPO ceramic disc cap.	1	2	1
C-011	33 pf NPO ceramic disc cap.	2	-	-
C-012	1.0 pf NPO ceramic disc cap.	-	-	1
C-017	.01 uf ceramic disc cap.	14	14	14
C-019	6.8 pf NPO ceramic disc cap.	-	1	-
C-032	10 pf NPO ceramic disc cap.	3	-	2
C-047	12 pf NPO ceramic disc cap.	-	-	1
C-051	22 pf NPO ceramic disc cap.	-	1	-
C-055	4.7 uf 6v Tantalum cap.	2	2	2
C-057	.15 uf 35v Tantalum cap.	2	2	2
C-059	220 pf ceramic disc cap.	1	1	1
C-064	.002 uf ceramic disc cap.	6	6	6
C-084	15 uf 10v ± 20% Tantalum cap.	2	2	2
D-001	1N4154 DA 2208	5	5	5
D-002	1N60	1	1	1
D-005	Zenier	1	1	1
D-006	1N4154 DA2207	1	1	1
E-018	Contact-plug-crimp type	23	23	23
E-021	Insulator-receiver plug block	1	1	1
L-001	10 uh choke	1	-	-
L-008	4.7 uh choke	-	1	-
L-011	.82 uh choke	-	-	1
PC-003	Pro-Series Recvr. Board (R-9)	1	1	1
Q-025	X32B4079	13	13	13
Q-026	X34A1165	7	7	7
Q-029	X32N4200	5	5	5
R4-1010	100 ohm.	2	2	3
R4-1020	1K	8	8	7
R4-1030	10K	12	12	12
R4-1040	100K	3	3	3
R4-1830	18K	6	6	6
R4-2200	22 ohm.	1	1	1
R4-2220	2.2K	2	2	2
R4-2720	2.7K	2	2	2
R4-2730	27K	5	5	5
R4-3320	3.3K	2	2	2
R4-3930	39K	1	1	1
R4-4720	4.7K	1	1	1
R4-4730	47K	3	3	3
R4	Rx Adjustable 8.2K to 27 K	1	1	1

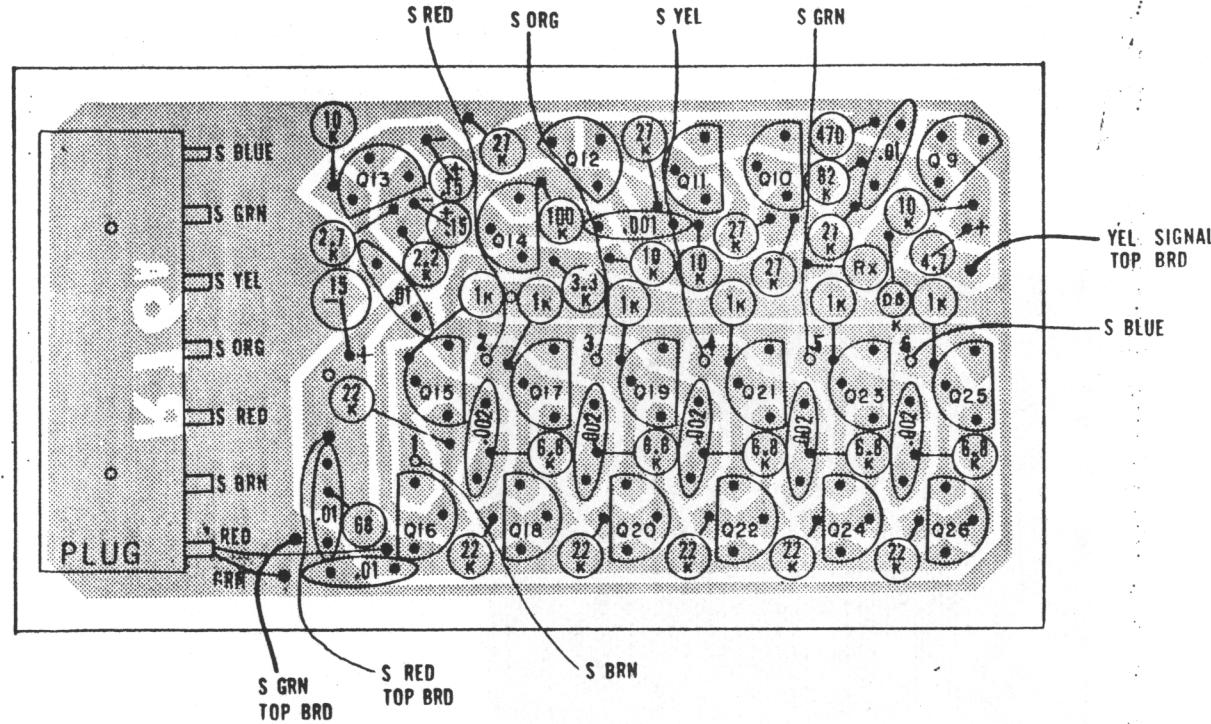
PARTS LIST FOR
NEXT ASSEMBLY

1970 - 1971 PRO SERIES RECEIVER (R-9) cont.

PL-

B-629

PART NUMBER	DESCRIPTION	QUANTITY		
		27	53	72
R4-5630	56K	1	1	1
R4-6810	680 ohm.	1	1	1
R4-8220	8.2K	1	1	1
R4-8230	82K	1	1	1
T-006	1st I.F. wht. - Transformer	1	1	1
T-007	2nd I.F. blk. - Transformer	1	1	1
T-008	Mixer Yel.-Transformer	1	1	1
W-001	PVC Stranded wire Brn.	1	1	1
X-001A-E	27 mHz crystal	1	-	-
X-003A-F	53 mHz crystal	-	1	-
X-005A-G	72 mHz crystal	-	-	1



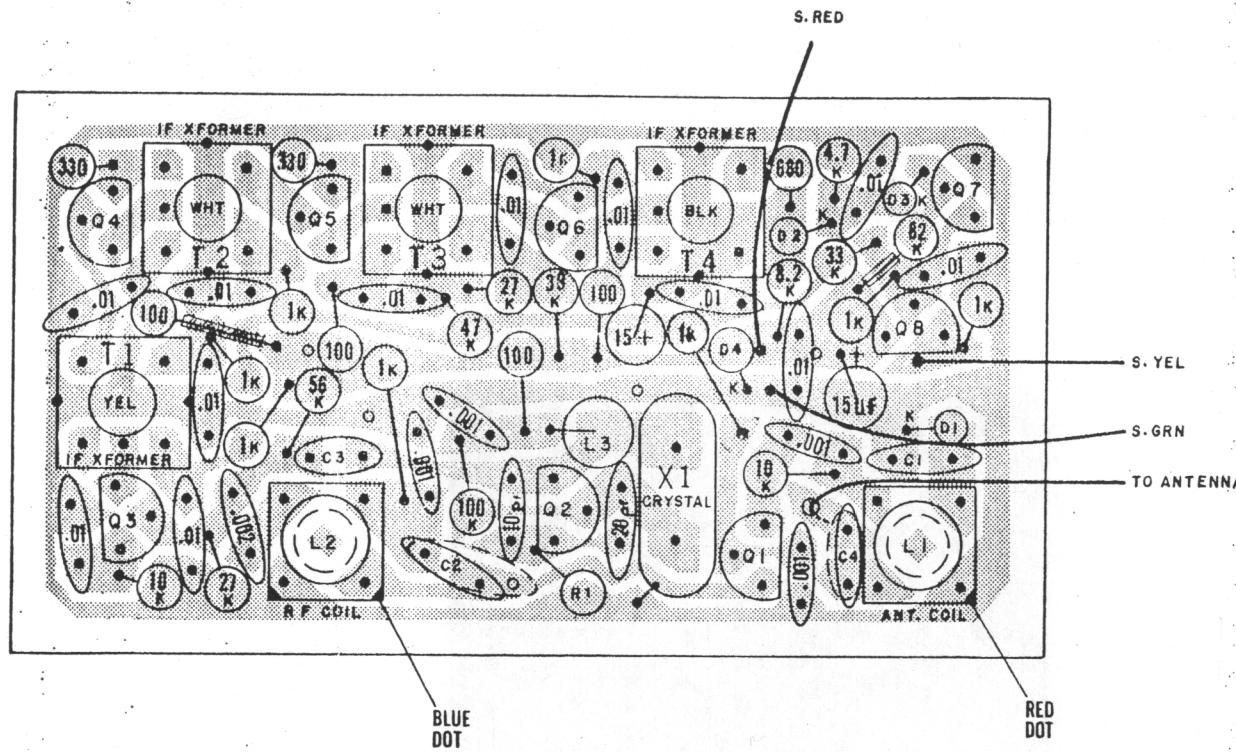
NOTES—

1. UNLESS OTHERWISE SPECIFIED:
ALL CAPACITANCE VALUES ARE IN MICROFARADS.
ALL RESISTANCE VALUES ARE IN OHMS.
2. TRANSISTORS: Q9, Q10, Q11, Q15, Q17, Q19, Q21, Q23, & Q25
ARE X32B4079 (Q-025). Q12, Q13, Q14, Q16, Q18, Q20,
Q22, Q24, & Q26 ARE X34A1165 (Q-026).
3. DIODES: D6 IS DA2207 (D-006).
4. RX - VARIABLE RESISTOR:

E K PRODUCTS, INC.		REVISIONS	
3233 W. EULESS BLVD., HURST, TEXAS 76053			
SCALE		BY	DATE
DATE	2-29-72	REV A	MAP
OR	9/1	CIR	11/1
AP NO			
TITLE		PARTS LOCATION: 1972 RECVR AMP & DECODER - 6 CHANNEL	NO
			B-636

ALL

PART NUMBER	DESCRIPTION	QTY
C-002	.001 Ceramic Disc. Cap.	1
C-017	.01 Ceramic Disc. Cap.	3
C-033 or C-084	.15uf Tant. Cap.	1
C-055	.4.7uf Tant. Cap.	1
C-057	.15uf Tant. Cap.	2
C-064	.002 Ceramic Disc. Cap	6
D-006	DA2207 Diode	1
E=018	ITT contact - plug	20
E-045	RCVR Plus block polarized	1
Q-025	32B 4079 GPNPN Transistor	9
Q-026	X34A1165 GP PNP Transistor	9
R4-1020	1000Ω±10% 1/4 or 1/8 Watt Carbon Comp Resistor	6
R4-1030	10KΩ - Ditto	4
R4-2220	2.2KΩ - Ditto	1
R4-2230	22KΩ - Ditto	7
R4-2720	2.7KΩ - Ditto	1
R4-2730	27KΩ - Ditto	3
R4-3330	33kΩ	1
R4-3320	3.3kΩ - Ditto	1
R4-4710	470Ω - Ditto	1
R4-6800	68Ω±10% 1/4 or 1/8 Watt Carbon Comp Resistor	1
R4-6820	6.8KΩ - Ditto	5
R4-8230	82KΩ - Ditto	1
W-002	Red 3" long	1
W-005	Green 3" Long	1
W-091	S-Brown 3" long	1
W-092	S-Red 3" long	1
W-093	S-Orange 3" long	1
W-094	S-Yellow 3" long	1
W-095	S-Green 3" long	1
W-096	S-Blue 3" long	1



NOTES -

1. UNLESS OTHERWISE SPECIFIED:
ALL CAPACITANCE VALUES ARE IN MICROFARADS.
ALL RESISTANCE VALUES ARE IN OHMS.
2. TRANSISTORS: Q1 THRU Q6 ARE X32N4200 (Q-029), OR
X32N5647 (Q-029). Q7 & Q8 ARE X32B4079 (Q-025).
3. DIODES: D1 IS DA2208 (D-001). D2 IS 1N60 (D-002).
D4 IS 3.3V ZENER (D-005). D3 IS DA2207 (D-006).
4. CONNECT A JUMPER WIRE BETWEEN LANDS IN PLACE OF
CAPACITOR C4 FOR 53 AND 72mHz, OR CONNECT
ANTENNA WIRE DIRECTLY TO ANTENNA COIL LAND.

	27mHz	53mHz	72mHz *	*FOR 75mHz C1 IS 10pf AND C2 IS 0.8pf		
C1	33 pf	22 pf	12 pf			
C2	33pf	20pf	10pf			
C3	10pf	6.8 pf	1.0 pf			
C4	10 pf	NOTE 4	NOTE 4			
R1	1.0 K	1.0 K	100 Ω			
L3	10uH	4.7uH	.82 uH			
X1						

E K PRODUCTS, INC.
3233 W. EULESS BLVD., HURST, TEXAS 76053

SCALE	—	REVISIONS	BY	DATE
DATE	Z-27-74	Preliminary	N/A	Map 4-20-74
DR. NO.	1	REV. NO.	4	4-24-74
AP. NO.	1	LINE NO.	4	Rev. 11-11-74
TITLE	PARTS LOCATION: 41F - RF RECEIVER - 1972			
NO.	B-637			

PARTS LIST FOR
NEXT ASSEMBLY41F - RF Receiver - 1972 Champion
Compiled From PI-B-637 And Part List RC de Mexico

PL-

B-637

PART NUMBER	DESCRIPTION	QUANTITY		
		27	53	72
A-020	L1 - Antenna Coil 27 mHz	1	-	-
A-034	L2- Rf Coil 27mHz	1	-	-
A-022	L1 - Antenna Coil 53 mHz	-	1	-
A-035	L2-RF Coil mHz	-	1	-
A-024	L1-Antenna Coil 72mHz	-	-	1
A-036	L2-RF Coil 72 mHz	-	-	1
C-002	.001 uf Ceramic Disc. Cap	4	5	5
C-010	20pf - NPO Ceramic Disc Cap	1	2	1
C-011	33pf - NPO Ceramic Disc. Cap	2	-	-
C-012	1.0pf Ceramic Cap	-	-	1
C-017	.01 pf Ceramic Cap	12	12	12
C-019	6.8pf NPO Ceramic Disc Cap	-	1	-
C-032	10pf - MPO Ceramic Disc Cap	2	1	1
C-033	15uf - 6v- Tant. Elec. Cap	2	2	2
C-047	12pf - NPO Ceramic Disc. Cap	-	-	1
C-051	22pf - NPO Ceramic Disc. Cap	-	1	-
C-064	.002 uf Ceramic Disc. Cap	1	1	1
D-001	DA 2208 Diode	1	1	1
D-002	In60 Diode	-	-	1
D-005	3.3v Zener Diode	1	1	1
D-006	DA 2207 Diode	1	1	1
D-011	.82uf Choke	-	-	1
E-017	Contact Socket	3	3	3
E-048	Socket Retainer - Female	1	1	1
L-001	L3-10uh-Choke	1	-	-
L-008	L3-4.7uh Choke	-	1	-
L-011	L3-.82uf Choke	-	1	1
Q-025	32B4079 GP NPN Transistor	2	2	2
Q-029	32N4200	1	1	1
Q-037	Color selected for each frequency and socket use. X32n5647	3	3	3
R4-1010	100Ω ± 10% 1/4w or 1/8w Carbon Comp Resistor	4	4	5
R4-1020	1000Ω "	9	9	8
R4-1030	10K Ω "	2	2	2
R4-2230	22K OHM Resistor	1	1	1
R4-2730	27K Ω "	2	2	2
R4-3330	33K Ω "	1	1	1
R4-3930	39K Ω "	1	1	1
R4-3310	330 Ω "	2	2	2
R4-4720	4.7Ω "	1	1	1
R4-4730	47KΩ "	1	1	1
R4-5630	56K OHM Resistor	1	1	1
R4-6810	680Ω "	1	1	1
R4-8220	8.2K Ω "	1	1	1
R4-1040	100K Ω "	1	1	1
R4-8230	82K Ω "	1	1	1

PARTS LIST FOR
NEXT ASSEMBLY

4IF - RF Receiver - 1972 Champion
Compiled from PL-B-637 and Part List Rx De Mexico

PL-

B-637

PART NUMBER	DESCRIPTION	QUANTITY		
		27	53	72
T-008	Yellow - Mixer Transformer	1	1	1
T-006	White - 1st and 2nd IF	2	2	2
T-007	Black - 3rd IF	1	1	1
W-000	Ant. Wire 37" Black (53mHz)	-	1	-
W-001	Ant. Wire 36" Brown	1	-	-
W-006	Ant. Wire 39" Blue	-	-	1
X-001 A-E	27mHz Crystal (Per requirement)	1	-	-
X-003 A-F	53Mhz Crystal (Per requirement)	-	1	-
X-005 A-G	72mHz Crystal (Per requirement)	-	-	1
RM-024	Plastic Tubing 105/20	1	1	1
RM-026	Plastic Tubing 105/8	1	1	1

VOLTAGE MEASUREMENTS

1972 - SUPER PRO DUAL CONVERSION RECEIVER

REFERENCE DRAWINGS B-641, B-657, and C-1021

Nominal Values and Tolerances

	Collector	Emitter
Batt: $4.8 \pm .4$	$Q9\ 3.0 \pm .1$	$Q1\ .35 \text{ to } .6$
Reg: $3.3 \pm .17$		$Q2\ (72\text{mHz}\ .1 \pm .05)$ $(53\text{mHz}\ .8 \text{ to } 1.4)$
AGC $1.2 \pm .1$		$Q3\ .35 \text{ to } .55$ $Q5\ .75 \text{ to } 1.15$

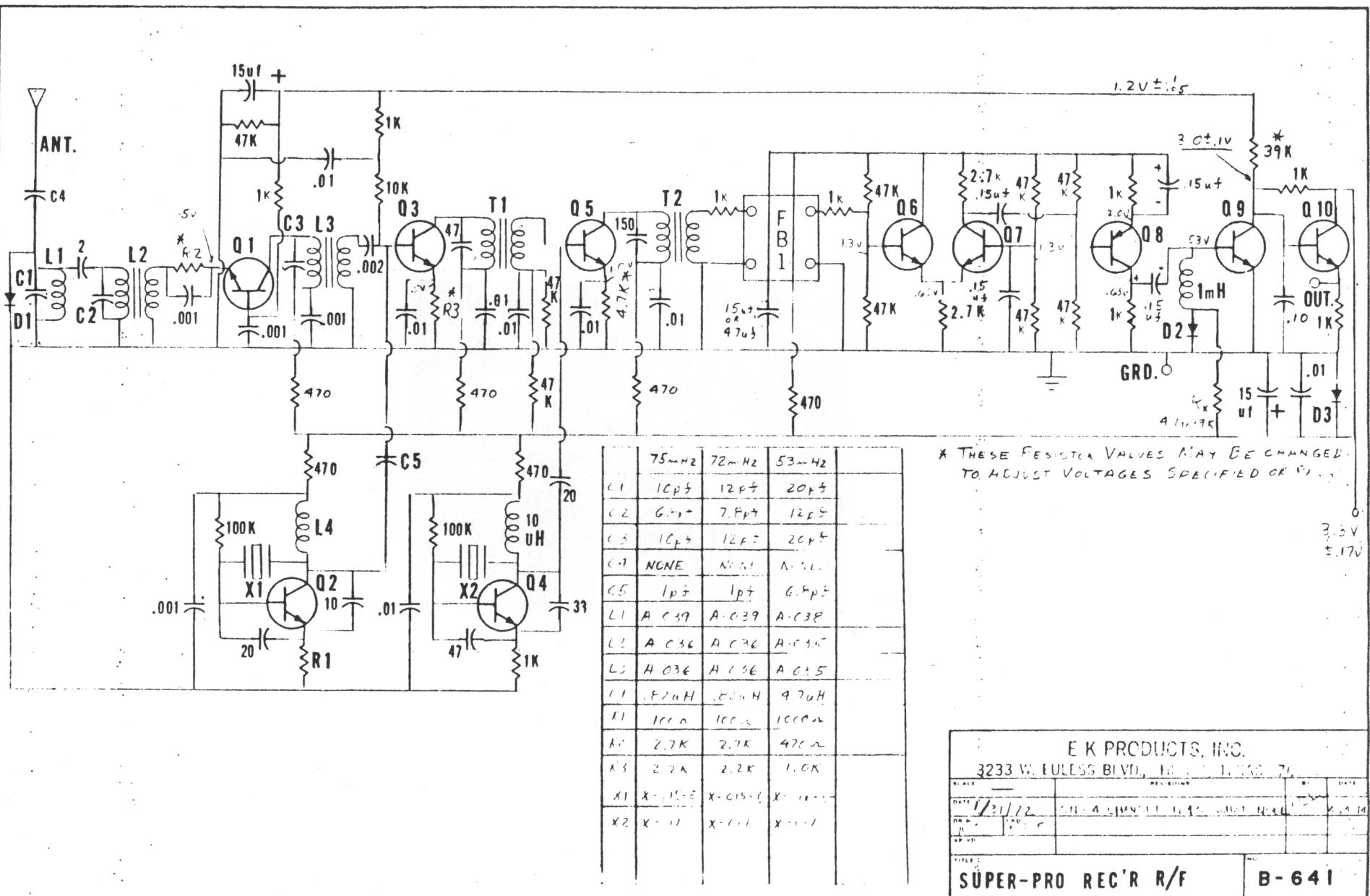
Typical Readings

Reg: 3.25
AGC 1.2 (V11)

Transmitter Off

	E	B	C
Q1	.54 (V1)	1.24	3.1
Q2	.15	.68	3.1
Q3	.55 (V2)	1.19	3.1
Q4	.5	.6	2.9
Q5	1.0 (V3)	1.5	3.1
Q6	.6	1.32 (V4)	2.75
Q7	.6 (V5)	1.34 (V6)	2.5
Q8	.77 (V8)	1.48	2.1 (V7)
Q9	0	.58 (V9)	3.0 (V10)
Q10	2.45	3.0	3.25

The nominal voltages may vary somewhat due to component tolerances and variations in the 3.3 volt regulated supply and the AGC voltage. The determining factor for adjusting voltages that are out of tolerance is whether the entire system works correctly or not, such as the range operational checks. You may adjust the regulator voltages, AGC voltage, or emitter voltages that are out of tolerance though the receiver range and operation checks are at the minimum standards.



V-B-644

VOLTAGE MEASUREMENTS

1972 - CHAMPION RECEIVER

REFERENCE DRAWINGS B-637, B-644

Nominal Values and Tolerances

	Collector	Emitter
Batt: $4.8 \pm .4^3$	$Q7 \ 3.0 \pm .1$	$Q1, Q3, \text{ and } Q6 \ .5 \pm .05$
Reg: $3.3 \pm .17$		$Q4 \text{ and } Q5 \ .4 \pm .05$
AGC: $1.2 \pm .05^1$		$Q2 \ (72\text{mHz} \ .1 + .05 - .02)$ $(27 \text{ and } 53 \text{ mHz} \ .8 \text{ to } 1.4)$

Typical Readings

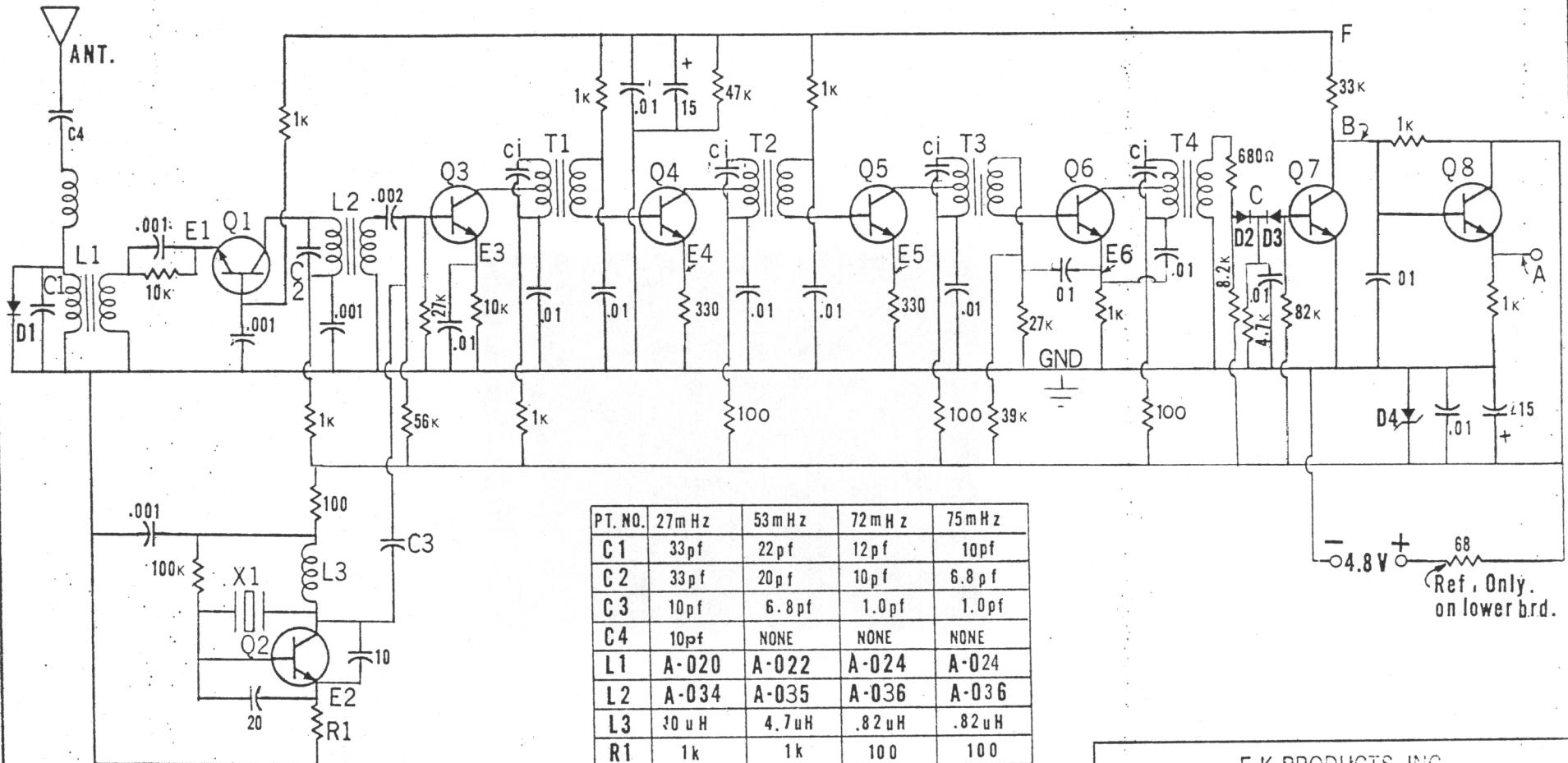
Reg: 3.35

AGC: 1.18

Transmitter Off

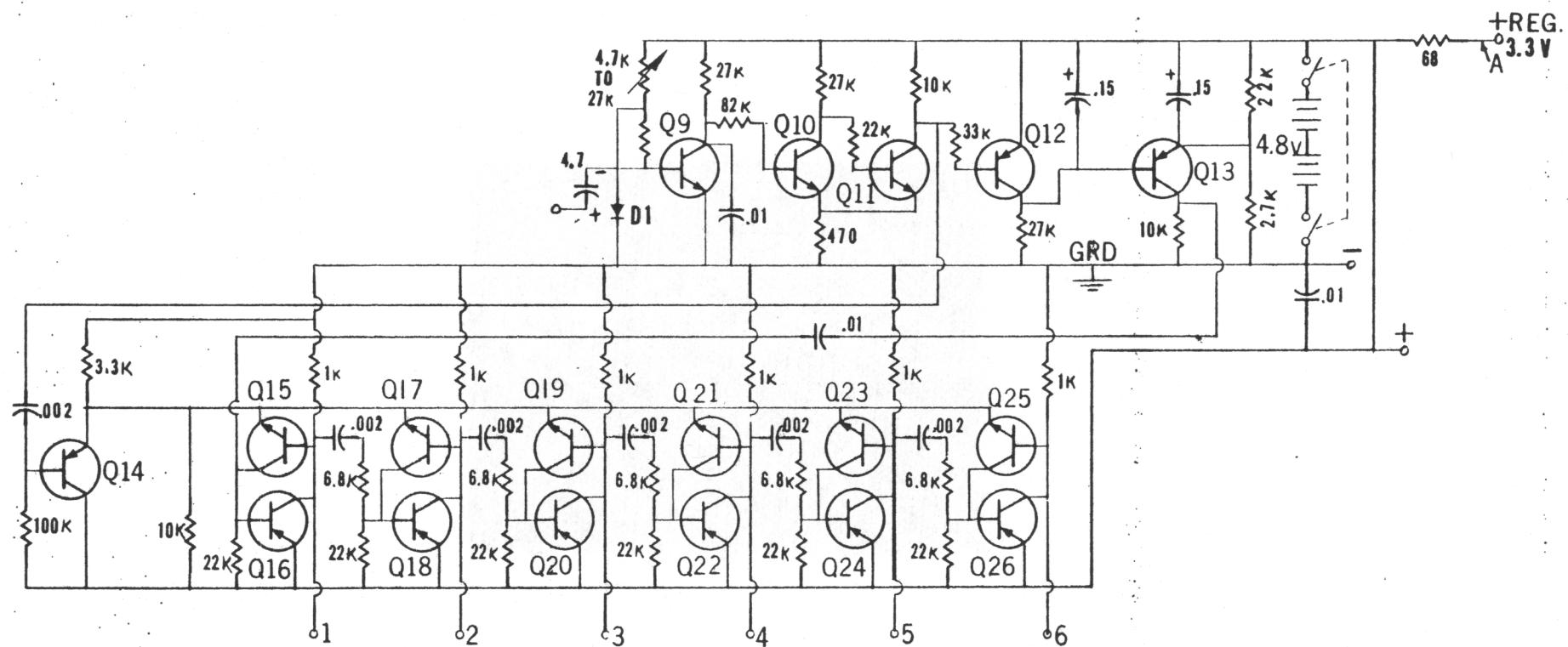
	E	B	C
Q1	.52	1.18	3.28
Q2 (72mHz)	.17	.8	3.18
Q3	.56	1.04	3.25
Q4	.42	1.16	3.2
Q5	.42	1.16	3.2
Q6	.55	1.24	3.3
Q7	0	.56	3.05

The nominal voltages may vary somewhat due to component tolerances and variations in the 3.3 volt regulated supply and the AGC voltage. The determining factor for adjusting voltages that are out of tolerance is whether the entire system works correctly or not, such as the range and operational checks. You may adjust the regulator voltages, AGC voltage, or emitter voltages that are out of tolerance through the receiver range and operation checks are at the minimum standards.

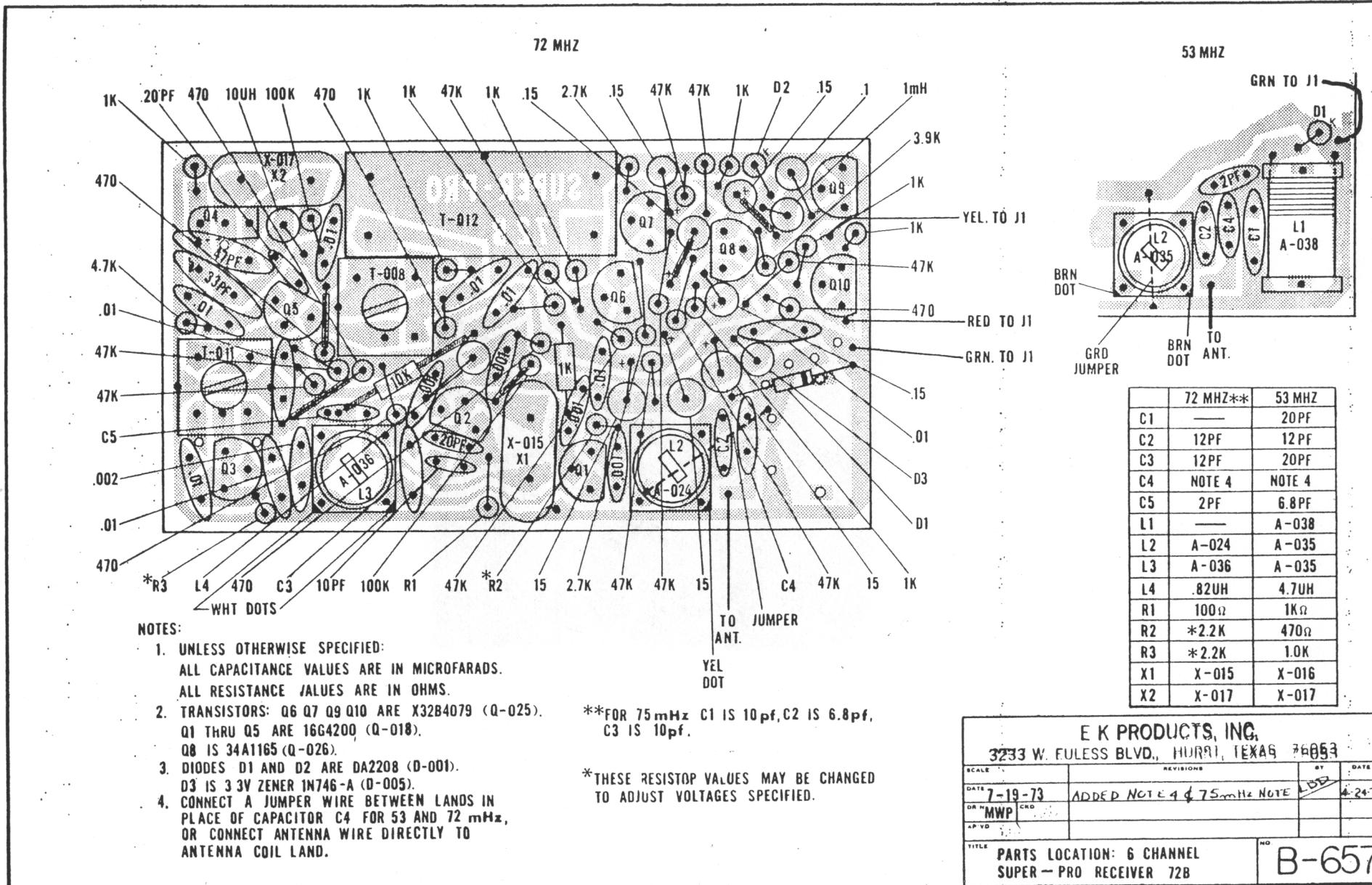


PT. NO.	27m Hz	53m Hz	72m Hz	75m Hz
C1	33pf	22pf	12pf	10pf
C2	33pf	20pf	10pf	6.8 pf
C3	10pf	6.8 pf	1.0pf	1.0pf
C4	10pf	NONE	NONE	NONE
L1	A-020	A-022	A-024	A-024
L2	A-034	A-035	A-036	A-036
L3	.30 uH	.4.7uH	.82uH	.82uH
R1	1k	1k	100	100
Q1	ORG/RED	ORG/YEL	YEL/ORG	YEL/ORG
Q2	WHT/GREY VIOLET	GREY/WHT.	WHITE	WHITE
Q3	ORG/RED	YELLOW	YELLOW	YELLOW
Q4	BLU/GRN	BLU/GRN	BLU/GRN	BLU/GRN
Q5	"	"	"	"
Q6	"	"	"	"

E K PRODUCTS, INC.
3233 W. FULESS BLVD., DALLAS, TEXAS 75201
SCALE — 0 — REVISIONS BY DATE
DATE 2-29-72 DRAWN BY J. HAN-EE TO NONE
APPROVED BY R. E. DATE
TITLE RF-CHAMP. REC'R 72 NO. B 644



E K PRODUCTS, INC.	
3238 W. EULESS BLVD., HURST, TEXAS 76053	
SCALE:	REVISIONS
DATE 2-29-72	BY
SPR 72 CPS 72	DATE
AP-VO R-72	
TITLE: DECODER DRIVER PET	
NO. B645	



PARTS LIST FOR
NEXT ASSEMBLY6 CHANNEL SUPER- PRO 1972 -
RECEIVER 72B RF BOARD

PL-

B-657

PART NUMBER	DESCRIPTION	72	53
A-024	Coil - 72 mHz	1	0
A-035	Coil - 53 mHz	0	2
A-036	Coil - 72 mHz - RF-4IF	1	0
A-038	Coil - 53 mHz	0	1
C-002	.001uf	5	4
C-010	20PF	2	4
C-011	33 PF	1	1
C-017	.01 uf	9	9
C-032	10 PF	1	1
C-039	.1uf 6V	1	1
C-047	12 PF	2	1
C-048	47 PF	0	1
C-061	3.9uf	0	1
C-064	.002uf	1	1
C-065	2 PF	1	1
C-073	6.8 PF	0	1
C-088	15 UF 6v	3	3
C-091	.15 uf 35v	4	4
D-001	DA2208 Diode	1	1
D-005	3.3v Zenier Diode	1	1
D-006	DA2207 Diode	1	3
E-017	Contact Socket	3	3
E-048	Socket Retainer Female	1	1
L-008	Choke 4.7 UH	0	0
L-013	Choke .82 UH	1	0
L-015	Choke 10 UH	1	1
L-016	Choke 1000 UHY Minature 102592	1	1
Q-025	Transistor X32B4079	4	4
Q-026	Transistor 34A3165	1	1
Q-029	Transistor X32N4200	2	2
Q-037	Transistor X32N5647	3	3
R10-1010	Resistor 100 OHM	1	1
R10-1020	Resistor 1K OHM	9	11
R10-1030	Resistor 10K OHM	1	1
R10-1040	Resistor 100k OHM	2	1
R10-2220	Resistor 2.2K OHM	2	0
R10-2720	Resistor 2.7K OHM	2	2
R10-3920	Resistor 3.9K OHM	1	1
R10-4710	Resistor 470 OHM	6	7
R10-4720	Resistor 4.7K ohm	1	1
R10-4730	Resistor 47K OHM	10	10
T-008	Transformer - Mixer Yellow	1	1
T-011	Transformer if can orange	1	1
T-012	Filter Block - CFM - 455 - D	1	1
W-000	Wire - Black 37" Antenna	0	1
W-002	Wire - Red	0	1

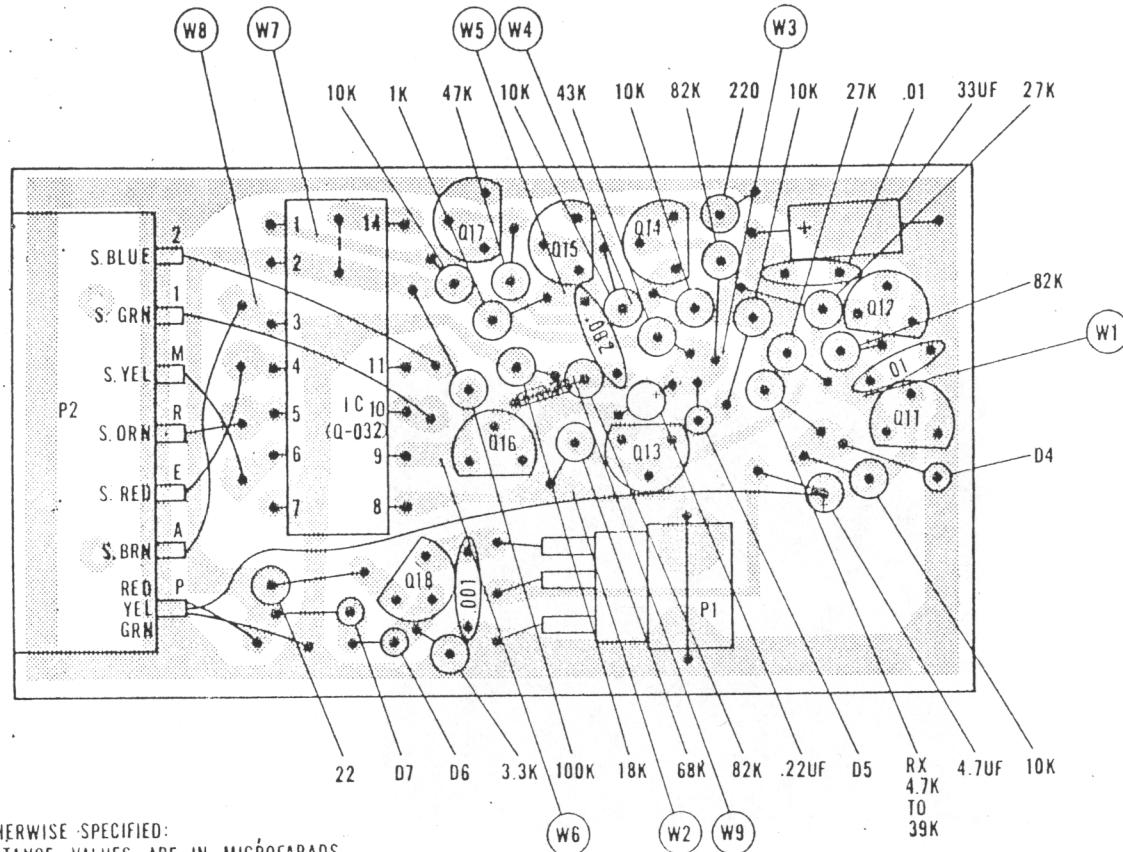
PARTS LIST FOR
NEXT ASSEMBLY

6 CHANNEL SUPER-PRO 1972 - -----
RECEIVER 72B RF BOARD

PL-

B-657

PART NUMBER	DESCRIPTION	72	53
W-004	Wire - Yellow	1	1
W-005	Wire - Green	1	1
W-006	Wire - Blue 39" Antenna	1	0
X-015A-G	72 mHz Receiver Crystal	1	0
X-016A-F	53 mHz Receiver Crystal	0	1
X-017	11.155 mHz Crystal	1	1
PC-XXX	Printed Circuit Board	1	1



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
ALL CAPACITANCE VALUES ARE IN MICROFARADS.
ALL RESISTANCE VALUES ARE IN OHMS.
2. TRANSISTORS: Q11 THRU Q18 ARE X32B4079 (Q-025).
3. DIODES: D4 THRU D7 ARE DA2208 (D-001). ALL CATHODES ARE DOWN AGAINST PC BOARD.

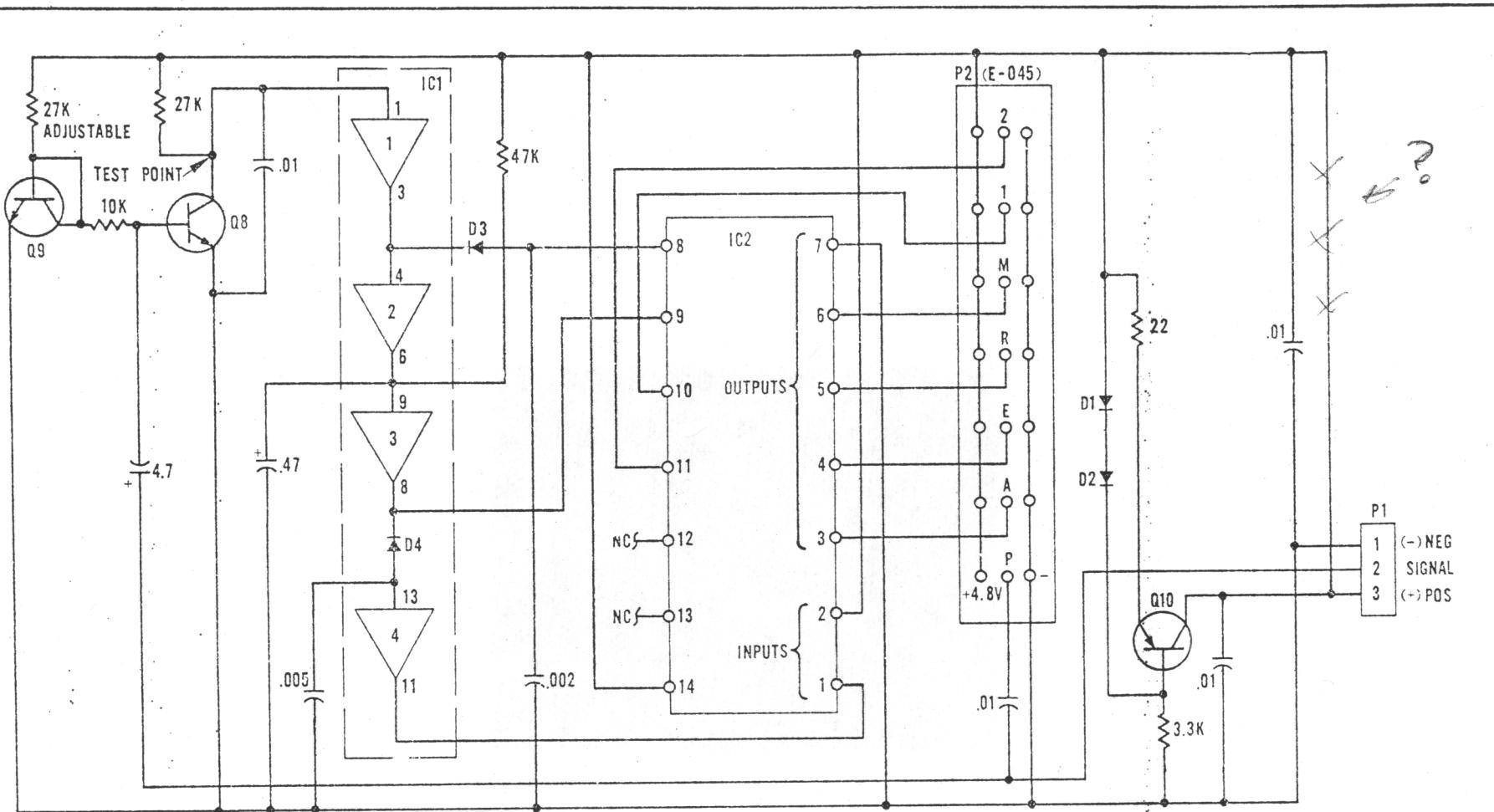
EK PRODUCTS, INC.			
3233 W. FULESS BLVD., HOUSTON, TEXAS 76053			
SCALE	REVIEWS	BY	DATE
DATE 7-24-73			
DRW "MWP" CAD APVU J-2A			
PARTS LOCATION: 6 CH IC DECODER FOR SUPER-PRO AND CHAMP RECEIVERS			NO. B-658

PARTS LIST FOR
NEXT ASSEMBLYPARTS LIST 6 CHANNEL IC DECODER
FOR SUPER PRO AND CHAMPION RECEIVERS

PL-

B-658

PART NUMBER	DESCRIPTION	HC	2IC	version
C-085/103	.47uf Tant		1	
C-002	.001uf	1	0	
C-017	.01uf	2	3	
C-037	.005uf Cer. Disc.		1	
C-049	33uf 6v	1		
C-055/101	4.7uf 6v	1		
C-064	.002	1	1	
C-083	.22uf 35v	1		
D-001	DA2208 Diode	4	4	
E-018	Contact Pins plug	24	24	
E-045	RCVR plug block polarized	1	1	
E-046	Plug Base and wire guide		1	
E-047	Pin Retainer Plastic	1	1	
Q-025	Transistor X32B4079	8	2	
Q-026	X34A1165 Trans.	1	1	
Q-032	Integrated Circuit DM86L 70N	1	1	
Q-040	74-L03N I.C.	1	1	
R4-1020	Resistor 1k OHM			
R4-1030	Resistor 10K OHM			
R4-1040	Resistor 100K OHM			
R4-1830	Resistor 18K OHM			
R4-2200	Resistor 22 OHM			
R4-2210	Resistor 220 OHM			
R4-2730	Resistor 27K OHM			
R4-3320	Resistor 3.3K OHM			
R4-4330	Resistor 43K OHM			
R4-4730	Resistor 47K OHM		2	
R4-6830	Resistor 68K OHM			
R4-8230	Resistor 82K OHM			
PC-XXX	Printed Circuit Board			
W-002	Wire - Red			
W-004	Wire - Yellow			
W-005	Wire - Green			
W-091	Wire - S Brown			
W-092	Wire - S. Red			
W-093	Wire - S. Orange			
W-094	Wire S. Yellow			
W-095	Wire - S. Green			
W-096	Wire - S. Blue			
 7 CHANNEL				
E-018	Contact - plug	3	3	
E-047	Pin retainer - male	1	1	
E-046	Plug base and wire guide	1	1	
W-002	Wire - Red	1	1	
W-005	Wire - Green	1	1	
W-091	Wire - S. Brown	1	1	

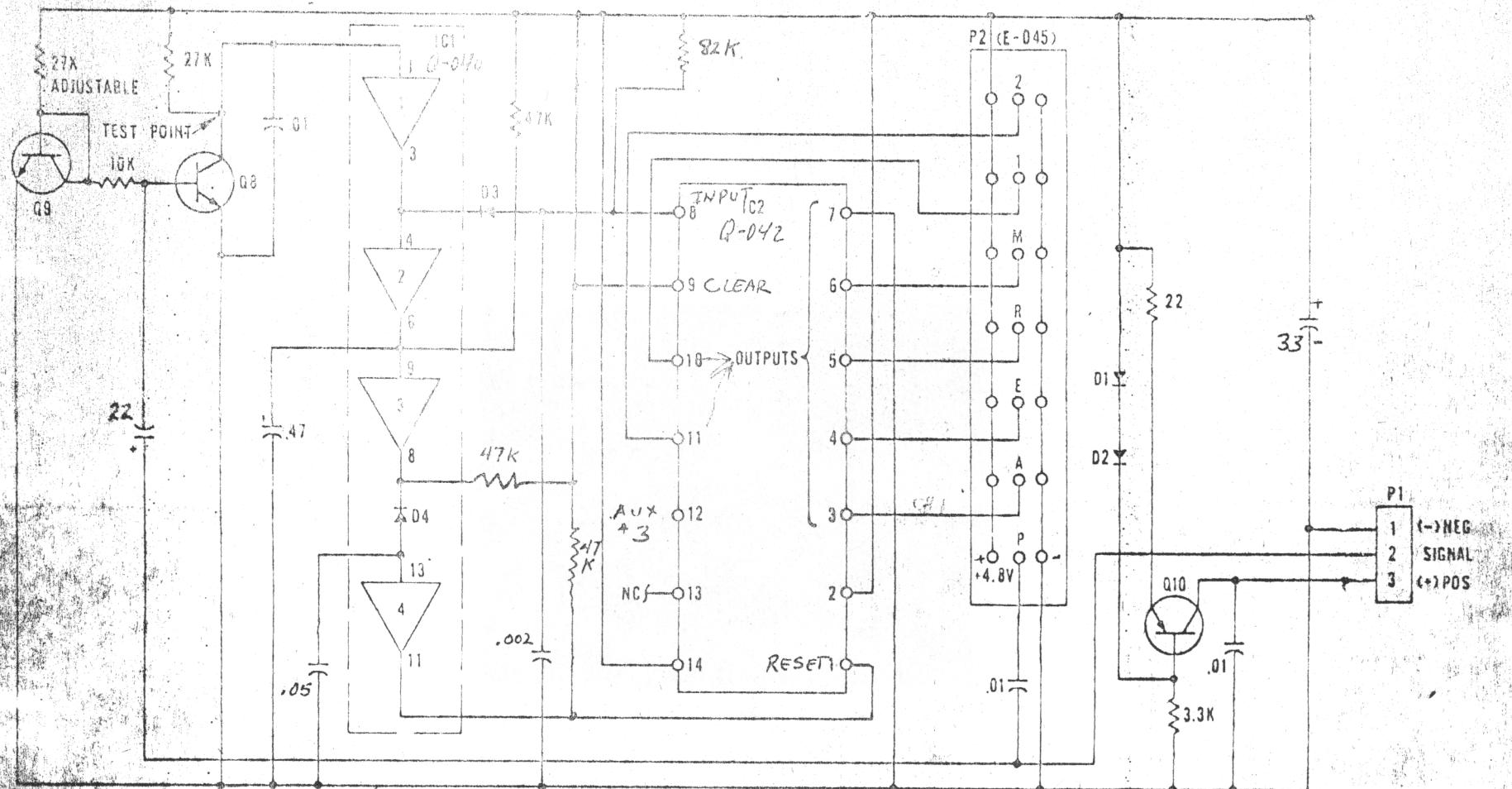


NOTES:

1. UNLESS OTHERWISE SPECIFIED:
ALL CAPACITANCE VALUES ARE IN MICROFARADS.
ALL RESISTANCE VALUES ARE IN OHMS.
2. TRANSISTORS: Q8 AND Q9 ARE X32B4079 (Q-025), Q10 IS 34A1165 (Q-026).
3. DIODES: D1 THRU D4 ARE DA2208 (D-001).

E. K. PRODUCE, INC.		3233 W. FORTRESS BLVD., FORTRESS, TEXAS 76051	
SCALE	NONE	REVISIONS	B1 DATE
DATE	8-3-73	Addition of 27K to Collector of Q8	
DR NO	MWP	CKD	127
AP NO		CHANGL	121
TITLE		CIRCUIT DIAGRAM: 6 CHANNEL 2 I.C. DECODER	
		NO B-661	

SCHEMATIC FOR 1976 DECODER
(RANGER, CHAMPION, SUPER, CHAMPIONSHIP)

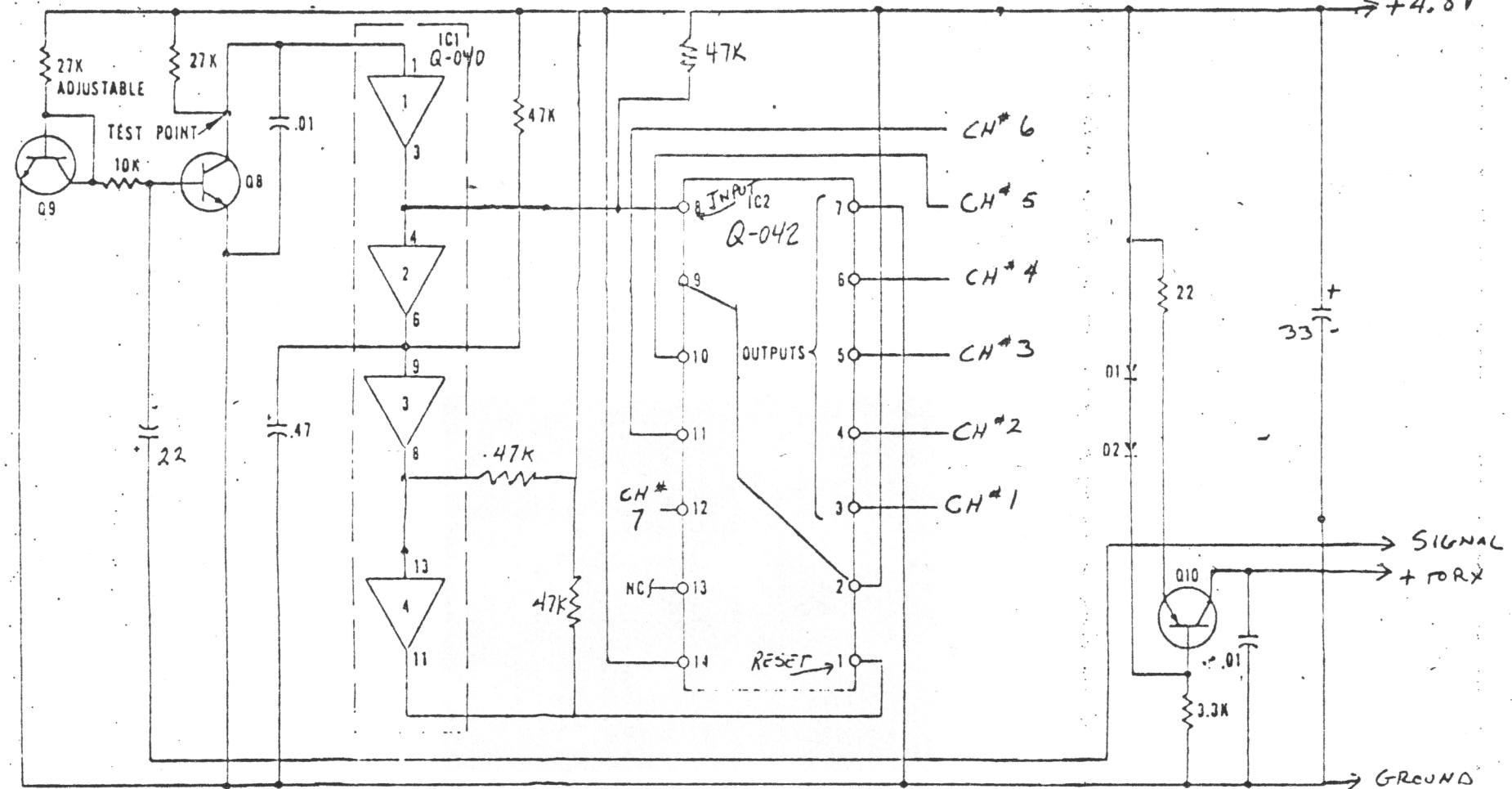


NOTES:

1. UNLESS OTHERWISE SPECIFIED:
ALL CAPACITANCE VALUES ARE IN MICROFARADS.
ALL RESISTANCE VALUES ARE IN OHMS.
2. TRANSISTORS: Q8 AND Q9 ARE X32B4079 (Q-025), Q10 IS 3A1165 (Q-026).
3. DIODES: D1 THRU D4 ARE DA2208 (D-001).
4. IC1 IS Q-040 (DM74L03N)
5. IC2 IS Q-042 (MM74C164N)

E. K. FEDCO., INC.	
1233 W. ENDICOTT BLVD., LUBBOCK, TEXAS 76051	
SCALE	NONE
DATE	8-3-73
REV.	addition of 27K to collector of Q10
MWP	100%
AP NO	144-1
TITLE: CIRCUIT DIAGRAM: 6 CHANNEL 2 I.C. DECODER	
B661 A	

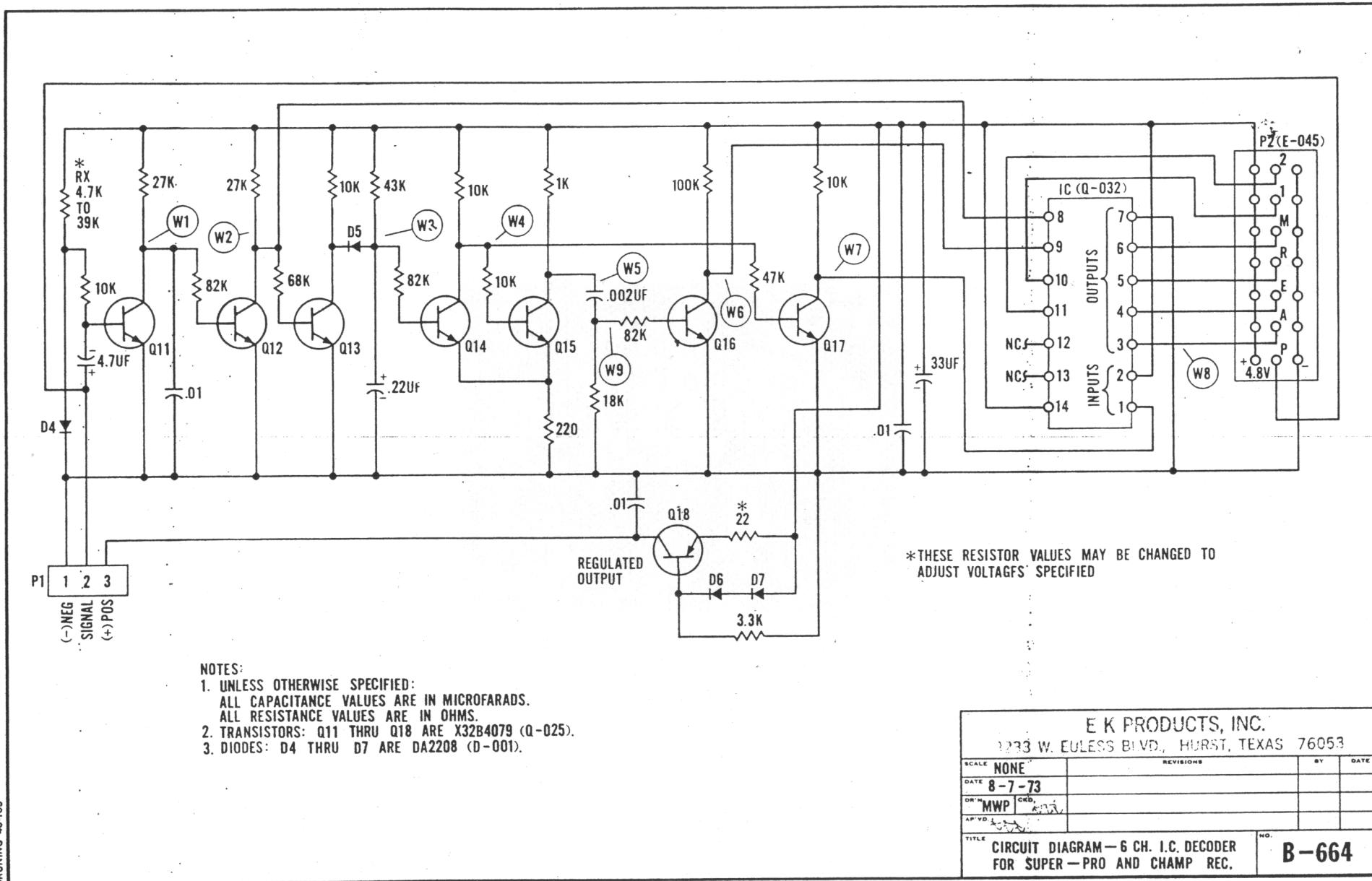
PARTS LOC B669, B670.



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
ALL CAPACITANCE VALUES ARE IN MICROFARADS.
ALL RESISTANCE VALUES ARE IN OHMS.
2. TRANSISTORS: Q8 AND Q9 ARE X3284079 (Q-025), Q10 IS 34A1165 (Q-026).
3. DIODES: D1 THRU D4 ARE DA2208 (0-001).
4. IC1 IS Q-040 (MM74L03N)
5. IC2 IS Q-042 (MM74C164N)

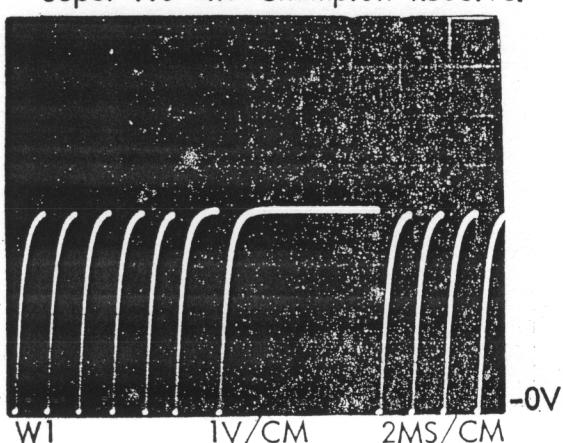
E. K. FORD, INC.	
1233 W. FULLERTON BLVD., SUITE 1, TEXAS 76051	
SEARCH	MATERIAL NUMBER
NONE	
8-3-73	REVERSE AT 21K IN COLLECTOR OF Q8
MWP	21K
CIRCUIT DIAGRAM: 6 CHANNEL 2 I.C. DECODER	
B661B	



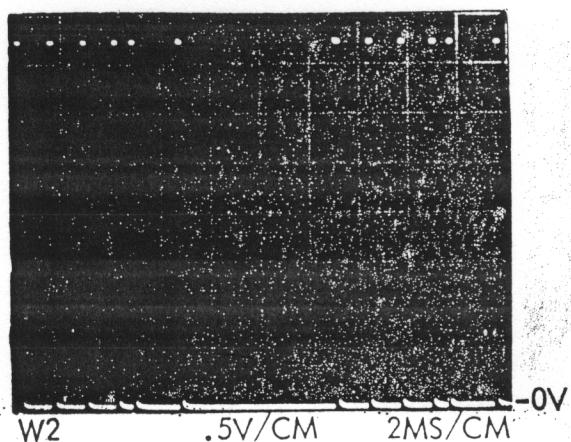
W-B-664
WAVE FORMS

6 Channel I.C. Decoder for 1972-73
Super Pro and Champion Receiver

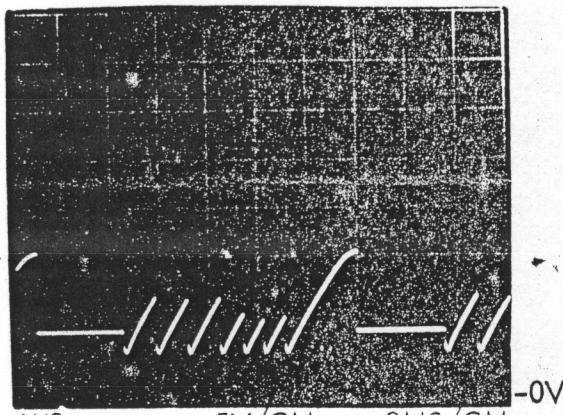
REFERENCE DRAWINGS B-658 & 664



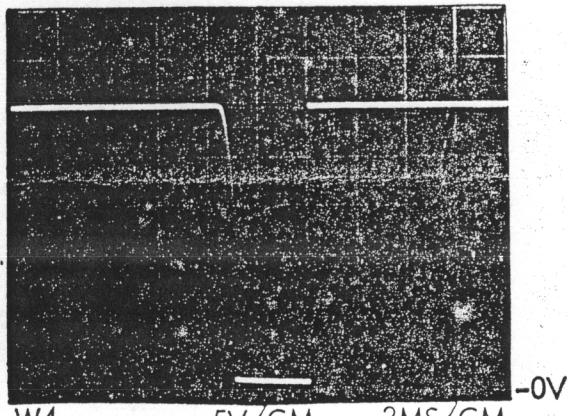
Collector of Q-11 - Pulse Amp.
with strong signal.



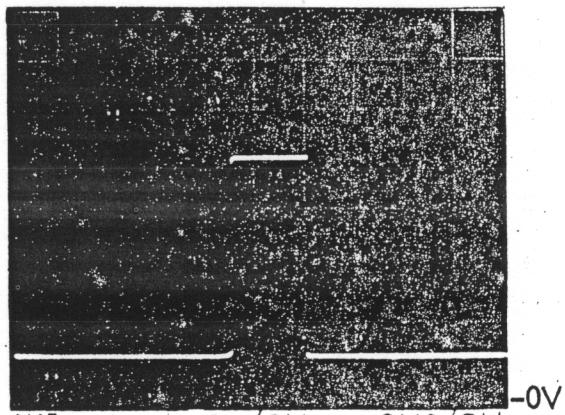
Collector of Q-12 - Clock pulse
to shift register.



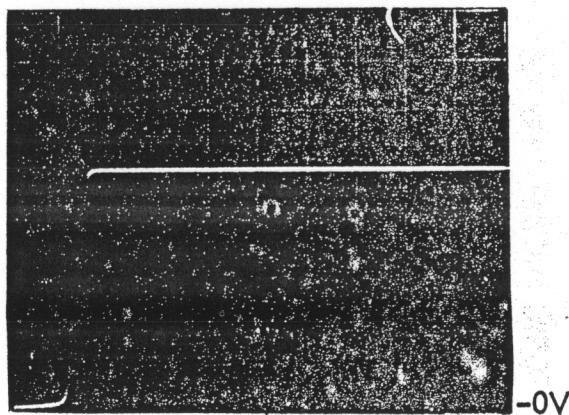
Anode of D-5 - Input to Schmitt
trigger.



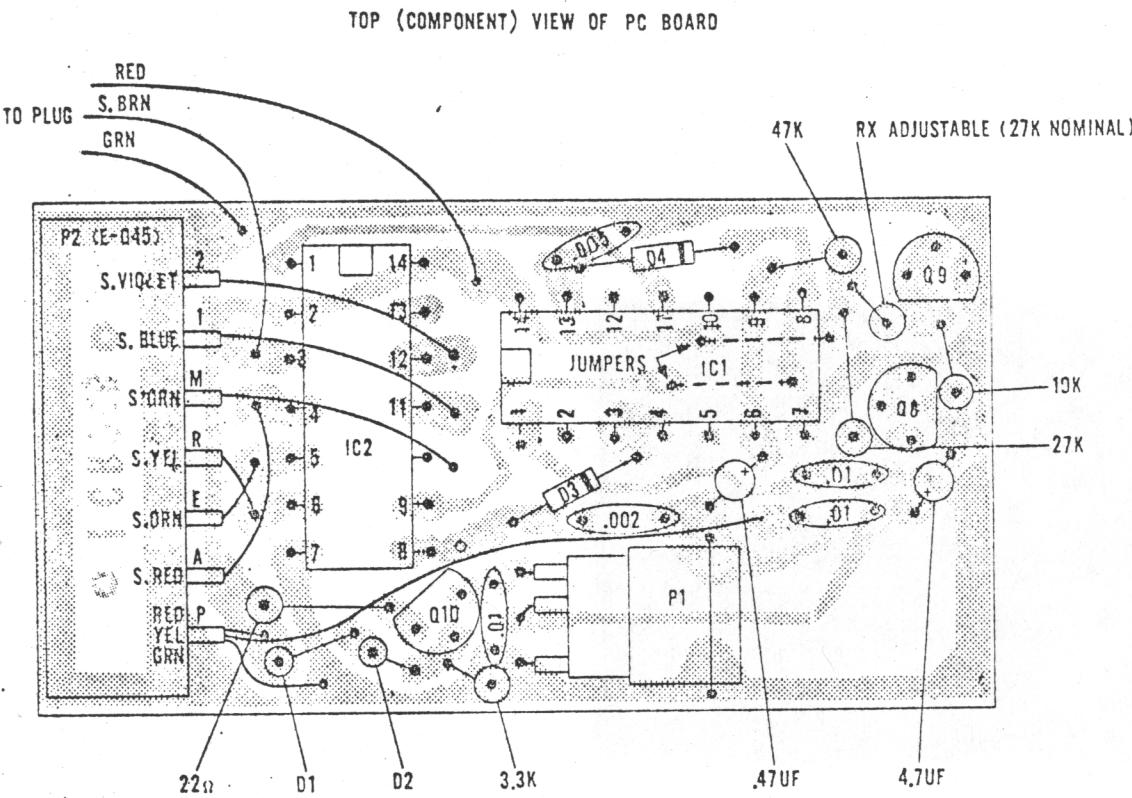
Collector of Q-14 - signal to
inverter Q17.



Collector of Q-15 - Schmitt Trigger
output.



Collector of Q-16 - Clear input wave-
form to shift register.



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
ALL CAPACITANCE VALUES ARE IN MICROFARADS.
ALL RESISTANCE VALUES ARE IN OHMS.
2. TRANSISTORS: Q8 AND Q9 ARE X32B4079 (Q-025), Q10 IS 34A1165 (Q-026).
3. DIODES: D1 THRU D4 ARE DA2208 (D-001).
4. THE CATHODE END IS UP ON D1 AND D2.

IC1 (Q-40 74-L03N)

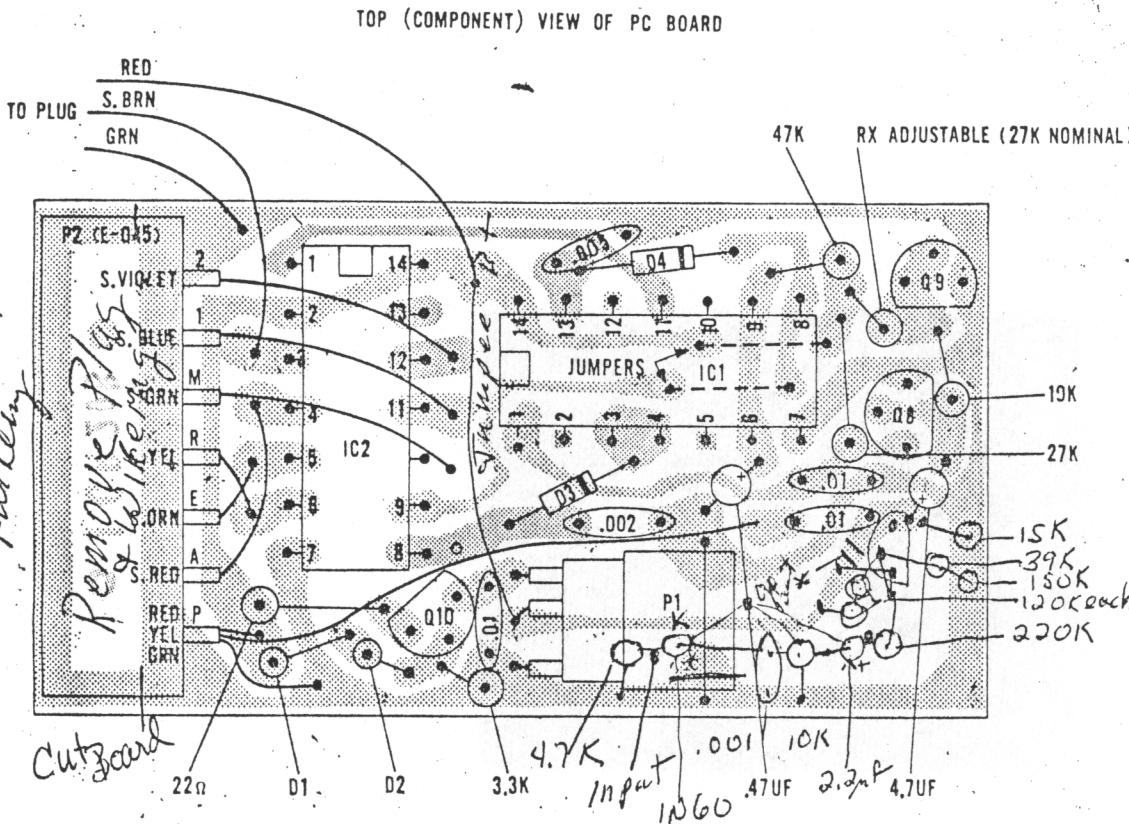
- 1 SIGNAL INPUT
- 2 NC
- 3 OUTPUT GATE 1 (CLOCK SIGNAL)
- 4 OUTPUT GATE 1 INPUT GATE 2
- 5 NC
- 6 OUTPUT GATE 2 (RESET TIME DELAY)
- 7 GROUND (-)
- 8 OUTPUT GATE 3 (RESET OR CLEAR SIGNAL)
- 9 INPUT TO RESET AMP
- 10 NC
- 11 OUTPUT GATE 4 (SERIAL INPUT)
- 12 NC
- 13 INPUT TO SERIAL SIGNAL AMP
- 14 VCC + 4.8V

IC2 (Q-032 DM86L70N)

- 1 SERIAL INPUT
- 2 VCC + 4.8V (INPUT TO +)
- 3 OUTPUT CHANNEL 1
- 4 OUTPUT CHANNEL 2
- 5 OUTPUT CHANNEL 3
- 6 OUTPUT CHANNEL 4
- 7 GROUND (-)
- 8 CLOCK INPUT
- 9 CLEAR INPUT
- 10 OUTPUT CHANNEL 5
- 11 OUTPUT CHANNEL 6
- 12 OUTPUT CHANNEL 7
- 13 NC
- 14 VCC + 4.8V

E.K. PRODUCTS, INC.	
3233 W. CULLESS BLVD., HURST, TEXAS 76053	
SCALE	4 TO 1
DATE	10-9-73
DRAWN BY	MWP
APR'D BY	VPA
PARTS LOCATION: 7 CHANNEL 2 I.C. DECODER	
NO. B-669	

*Remove Plug Block
X-Y Keying*



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
ALL CAPACITANCE VALUES ARE IN MICROFARADS.
ALL RESISTANCE VALUES ARE IN OHMS.
2. TRANSISTORS: Q8 AND Q9 ARE X32B4079 (Q-025), Q10 IS 34A1165 (Q-026).
3. DIODES: D1 THRU D4 ARE DA2208 (D-001).
4. THE CATHODE END IS UP ON D1 AND D2.

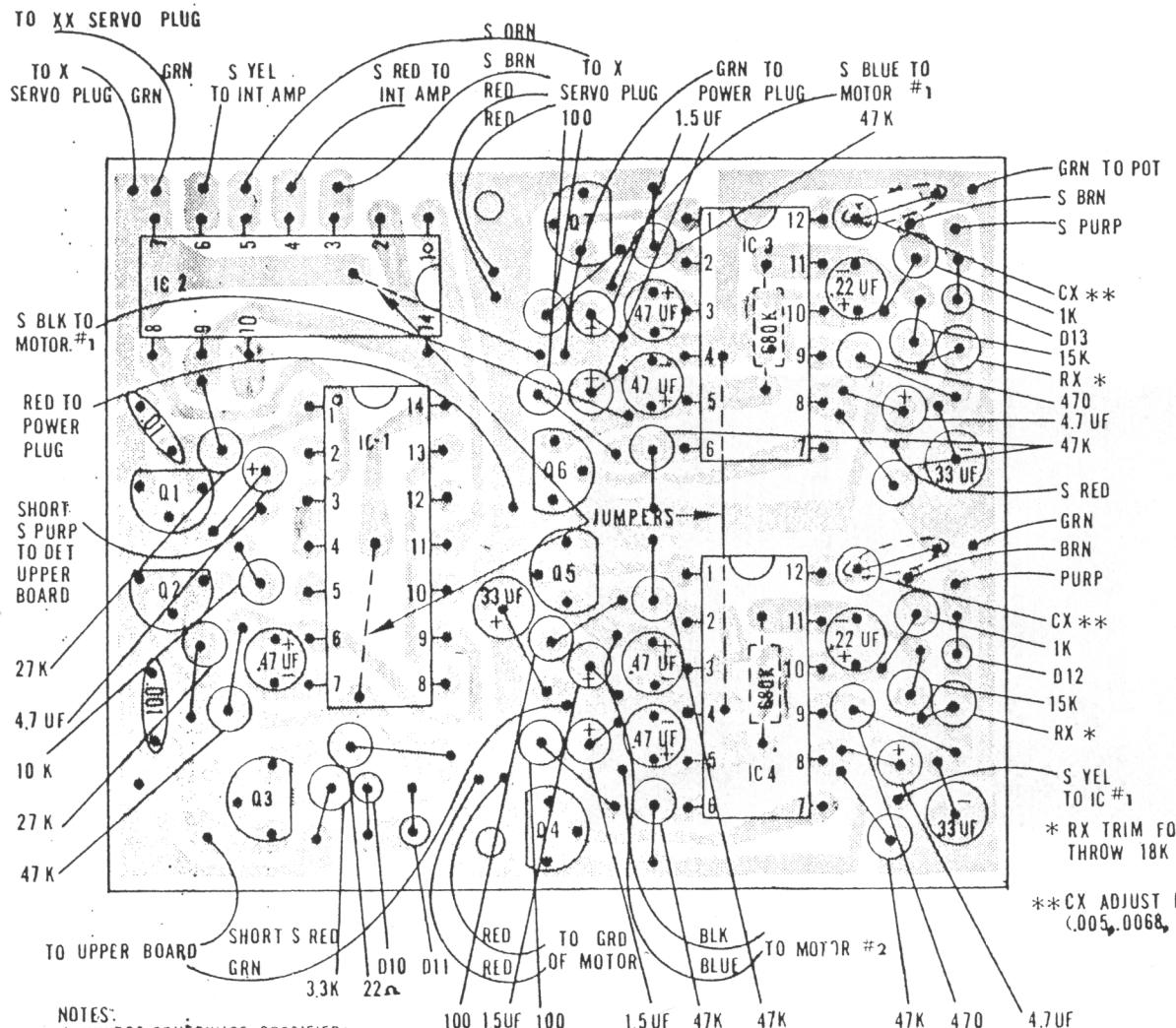
SCALE	4 TO 1	REVISIONS	REV	DATE
DATE	10-9-73	CHANGED Q10 ON NOTE 2		127
ORIGIN	MWP	X		
AP. NO.	WPA			
TITLE		PARTS LOCATION: 7 CHANNEL 2 I.C. DECODER		
		B - 669		

PARTS LIST FOR
NEXT ASSEMBLY1974 Champion and Super Pro
7 Channel 2 I.C. Decoder

PL-

B-669

PART NUMBER	DESCRIPTION	27	53	72
C-017	.01 uf Capacitor		3	
C-037	.005 uf capacitor		1	
C-053	.47 uf capacitor		1	
C-055	4.7uf Capacitor		1	
C-064	.002 uf capacitor		1	
D-001	DA-2208 Diode		4	
E-018	Contact Plug		24	
E-045	RCVR Plug Block Polarized (P2)		1	
E-047	Pin Retainer -Male (P1)		1	
Q-025	Transistor X32B4079 (Q8, Q9)		2	
Q-026	Transistor 34A1165		1	
Q-032	Integrated Circuit DM86L70N (IC2)		1	
Q-040	Integrated Circuit DM74L03N (IC1)		1	
R4-1030	10K OHM Resistor		1	
R4-2200	22 OHM Resistor		1	
R4-2730	27K OHM Resistor		1	
R4-3320	3.3K OHM Resistor		1	
R4-4730	47K OHM Resistor		1	
R4	RX adjustable resistor (27K nominal)		1	
W-002	Wire - Red		2	
W-004	Wire - Yellow		1	
W-005	Wire - Green		2	
W-091	S. Brown - Wire		1	
W-092	Wire - S. Red		1	
W-093	Wire - S. Orange		1	
W-094	Wire - S. Yellow		1	
W-095	Wire - S. Green		1	
W-096	Wire - S. Blue		1	
W-097	Wire - S. Violet		1	



IC1

- 1 SIGNAL INPUT
- 2 NC
- 3 OUTPUT GATE 1 (CLOCK SIGNAL)
- 4 OUTPUT GATE 1 INPUT GATE 2
- 5 NC
- 6 OUTPUT GATE 2 (RESET TIME DELAY)
- 7 GROUND (-)
- 8 OUTPUT GATE 3 (RESET)
- 9 INPUT TO RESET AMP
- 10 NC
- 11 OUTPUT GATE 4 (SERIAL INPUT)
- 12 NC
- 13 INPUT TO SERIAL SIGNAL AMP
- 14 VCC +4.8V

IC2

- 1 SERIAL INPUT
- 2 VCC + 4.8V (INPUT TO +)
- 3 OUTPUT CHANNEL 1
- 4 OUTPUT CHANNEL 2
- 5 OUTPUT CHANNEL 3
- 6 OUTPUT CHANNEL 4
- 7 GROUND (-)
- 8 CLOCK INPUT
- 9 VCC + 4.8V
- 10 NC
- 11 NC
- 12 NC
- 13 NC
- 14 VCC + 4.8V

* RX TRIM FOR PROPER
 THROW 18K NOMINAL IC 3 AND IC 4 SEE DRAWING A126

**CX ADJUST FOR PROPER DEAD ZONE
 (.005,.0068,.0082)

E K ELECTRONICS, INC.			
3233 W. ENDERBEE DR., SUITE 1, TEXAS 76053			
SCALE	REVISED	BY	10-10
NONE			
DATE	11-30-73		
INSTRUMENT	LSD	AVL	
APPROVED	N/A		
PARTS LOCATION: LRB 4 AND 5 CHANNEL DECODER AMP DECK			
B 670			

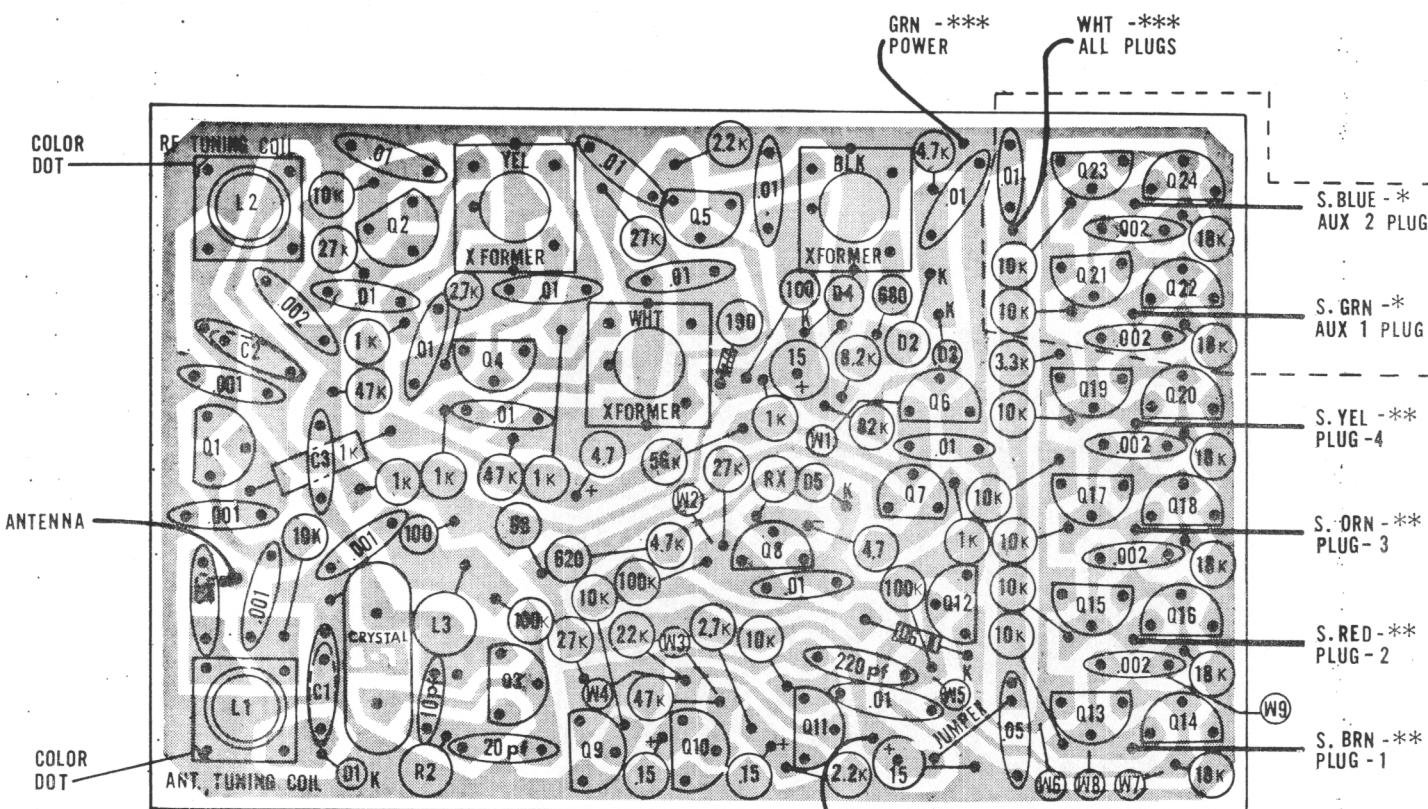
PARTS LIST FOR
NEXT ASSEMBLY

1974 - LRB 4 and 5 Channel
Decoder Amp Deck

PL-

B-670

PART NUMBER	DESCRIPTION	QTY	
		ALL	-
C-002	.001uf capacitor	1	
C-017	.01 UF Capacitor	1	
C-027	47uf Capacitor	2	
C-049	33uf Capacitor	3	
C-052	.22uf Capacitor	2	
C-053	.47 uf Capacitor	3	
C-055	4.7 uf Capacitor	3	
C-092	1.5uf Capacitor	4	
D-001	DA 2208 Diode	4	
Q-008	X34E1448 Transistor	4	
Q-025	X32B4079 Transistor	2	
Q-026	X34A1165 Transistor	1	
Q-030	Integrated Circuit SN 21919 (3 and 4)	2	
Q-032	Integrated Circuit DM86L70N (2)	1	
Q-040	Integrated Circuit DM74L03N (1)	1	
R4-1010	100 OHM	4	
R4-1020	1K OHM	2	
R4-1030	10K OHM	1	
R4-1530	15K OHM	2	
R4-2200	22 OHM	1	
R4-3320	3.3K OHM	1	
R4-4710	470 OHM	2	
R4-4730	47K OHM	6	
R4-6840	680K OHM	2	
W-000	Wire - Black	1	
W-001	Wire - Brown	1	
W-002	Wire - Red	5	
W-005	Wire - Green	6	
W-006	Wire - Blue	1	
W-007	Wire - Purple	1	
W-090	Wire - S. Black	1	
W-091	Wire - S. Brown	2	
W-093	Wire - S. Orange	1	
W-094	Wire - S. Yellow	2	
W-095	Wire - S. Blue	1	
W-097	Wire - S. Purple	2	
CX	Adjust For proper Dead zone (.005, .0068, .0082)	2	
RX	Trim for proper Throw 18K Nominal	2	
R4-2730	27K OHM	2	



*ON LOGICTROL 4-CHANNEL
AND CHAMPION 4 RECEIVERS
THESE COMPONENTS AND
WIRES ARE EXCLUDED.

**TO AMP DECK - CHAMPION
MODEL ONLY.

***LOGICTROL 4 AND 6 CHANNEL
RECEIVER CONNECTOR
WIRES ARE SPLICED TO
ALL CHANNELS.

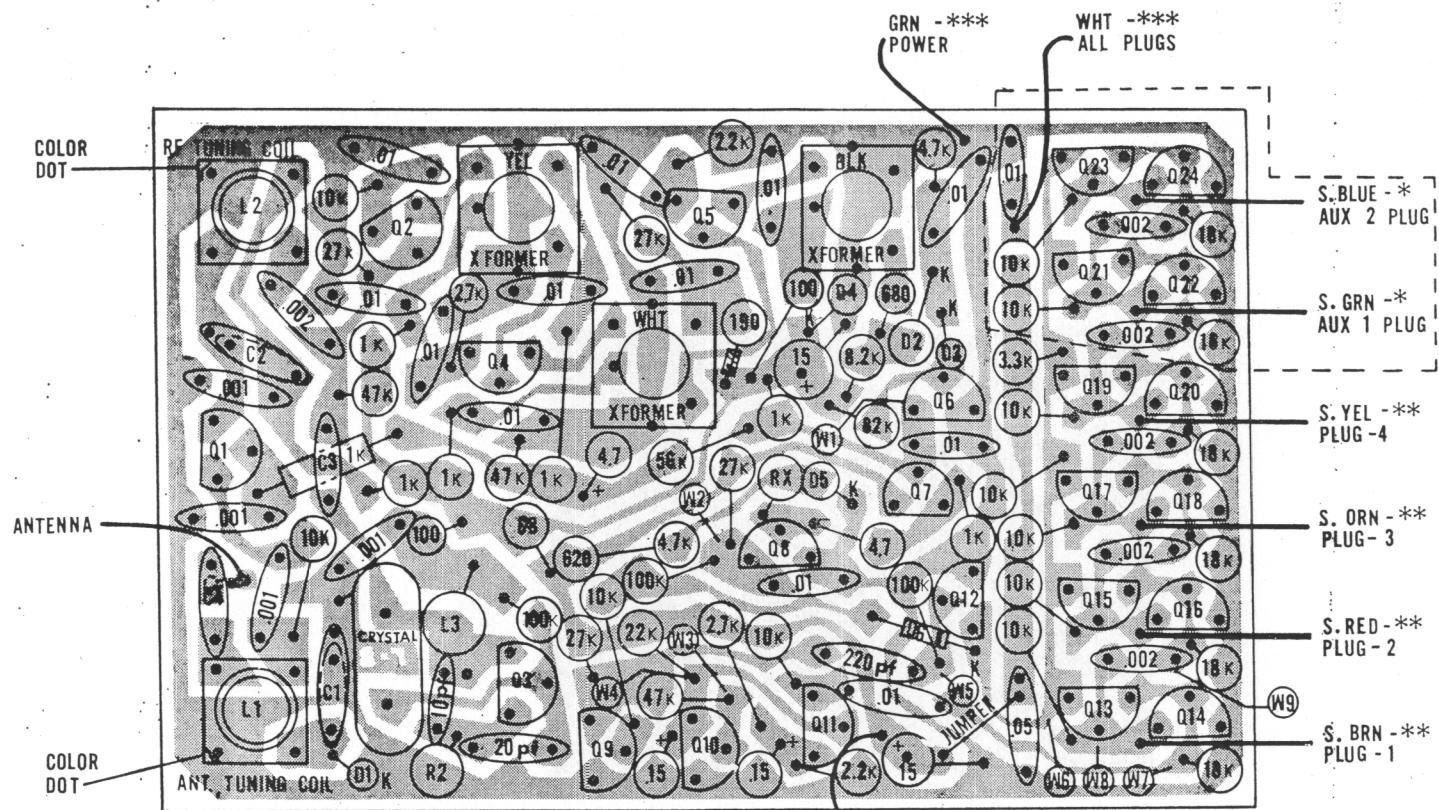
NOTES:

1. UNLESS OTHERWISE SPECIFIED:
ALL CAPACITANCE VALUES ARE IN MICROFARADS.
ALL RESISTANCE VALUES ARE IN OHMS.
2. TRANSISTORS: Q1-Q5 ARE X32N4200 (Q-029).
Q6-Q12, Q14, Q16, Q18, Q20, Q22, Q24, ARE X32B4079 (Q025).
Q13, Q15, Q17, Q19, Q21, Q23, ARE X34A1165 (Q026).
3. DIODES: D1, D3, D5, D6 ARE DA2208 (D001).
D2 IS IN60 (D002).
D4 IS IN746-A (D005).
4. RX: VARIABLE- 4.7k TO 27k.

**RED -
POWER***

REF. DWG. B-540

	27 MHZ	53 MHZ	72 MHZ		E K PRODUCTS, INC.
C1	.33 pf	22 pf	12 pf		2233 W. LEE L. BLD, AUSTIN, TEXAS 78053
C2	33 pf	20 pf	10 pf	SCALE	REVISIONS
C3	10 pf	6.8 pf	1.0 pf	DATE	BY
C4	10 pf	.001uf	.001uf	2-5-74	DATE
L3	10 uH	4.7 uH	.82 uH	DR. BD	CKD
R2	1 k	1 k	100 Ω	AP. VD	
				TITLE	PARTS LOCATION: 70 LOG. AND CHAMP.
					4-6 CHANNEL RECEIVER (R-8)
					B-673



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
ALL CAPACITANCE VALUES ARE IN MICROFARADS.
ALL RESISTANCE VALUES ARE IN OHMS.
2. TRANSISTORS: Q1-Q5 ARE X32M4200 (Q-029).
Q6-Q12, Q14, Q16, Q18, Q20, Q22, Q24, ARE X32B4079 (Q-025).
Q13, Q15, Q17, Q19, Q21, Q23, ARE X34A1165 (Q-026).
3. DIODES: D1, D3, D5, D6 ARE DA2208 (D001).
D2 IS IN60 (D002).
D4 IS IN746-A (D005).
4. RX: VARIABLE- 4.7K TO 27K.

**RED -
POWER***

REF. DWG. B-540

	27 MHZ	53 MHZ	72 MHZ	
C1	.33 pf	.22 pf	.12 pf	
C2	.33 pf	.20 pf	.10 pf	
C3	.10 pf	.6.8 pf	.1.0 pf	
C4	.10 pf	.001 uf	.001 uf	
L3	.10 uH	.4.7 uH	.82 uH	
R2	1 k	1 k	100 Ω	

SCALE: NONE REVISIONS: BY DATE
 DATE: 2-5-74
 DR: SD CKD: A-1A
 AP: WD J-1A
 TITLE: PARTS LOCATION: 70 LOG. AND CHAMP.
 4-6 CHANNEL RECEIVER (R-8)

B-673

* ON LOGICTROL 4-CHANNEL
AND CHAMPION 4 RECEIVERS
THESE COMPONENTS AND
WIRES ARE EXCLUDED.

**TO AMP DECK - CHAMPION
MODEL ONLY.

***LOGICTROL 4 AND 6 CHANNEL
RECEIVER CONNECTOR -
WIRES ARE SPLICED TO
ALL CHANNELS.

PARTS LIST FOR
NEXT ASSEMBLY1970 LOGICTROL AND CHAMPION
4 - 6 CHANNEL RECEIVER

PL-

B-673

PART NUMBER	DESCRIPTION	27	22	2
A-020	Antenna Coil - Receiver	1	0	0
A-021	Receiver R.F. Coil	1	0	0
A-022	Receiver Antenna Coil	0	1	0
A-023	Receiver R.F. Coil	0	1	0
A-024	Receiver Antenna Coil	0	0	1
A-026	Receiver R.F. Coil	0	0	1
C-001	.05 uf Ceramic Disc Capacitor	1	1	1
C-002	.001 uf Ceramic Disc Capacitor	4	5	5
C-010	20 pf NPO Ceramic Disc Capacitor	1	2	1
C-011	33 pf NPO Ceramic Disc Capacitor	2	0	0
C-012	1 pf NPO Ceramic Disc Capacitor	0	0	1
C-017	.01 uf Ceramic Disc Capacitor	13	13	13
C-019	6.8 pf NPO Ceramic Disc Capacitor	0	1	0
C-032	10 pf NPO Ceramic Disc Capacitor	3	1	2
C-047	12 pf NPO Ceramic Disc Capacitor	0	0	1
C-051	22 pf NPO Ceramic Disc Capacitor	0	1	0
C-055	4.7 uf 6 V Tantalum Capacitor	2	2	2
C-057	.15 uf 35V Tantalum Capacitor	2	2	2
C-059	220 pf Ceramic Disc Capacitor	1	1	1
C-064	.002 uf Ceramic Disc Capacitor	6	6	6
C-084	15 uf 10 V ± 20% Tantalum Capacitor	2	2	2
D-001	1N4154-DA 2208 Diode	4	4	4
D-002	1N60 Diode	1	1	1
D-005	1N746-A Zener Diode	1	1	1
L-001	10 uh Choke	1	0	0
L-008	4.7 uh Choke	0	1	0
L-011	.82 uh Choke	0	0	1
Q-025	X32B4079 Transistor	13	13	13
Q-026	X34A1165 "	6	6	6
Q-029	X32N4200 "	5	5	5
R4-1010	100 OHM Resistor	2	2	3
R4-1020	1K " "	8	8	7
R4-1030	10K " "	11	11	11
R4-1040	100K " "	3	3	3
R4-1830	18K " "	6	6	6
R4-2220	2.2K " "	2	2	2
R4-2230	22K " "	1	1	1
R4-2720	2.7K " "	2	2	2
R4-2730	27K " "	4	4	4
R4-3320	3.3K " "	1	1	1
R4-4720	4.7K " "	2	2	2
R4-4730	47K " "	3	3	3
R4-5630	56K " "	1	1	1
R4-6215	620 " "	1	1	1
R4-6800	68 " "	1	1	1
R4-6810	680 " "	1	1	1

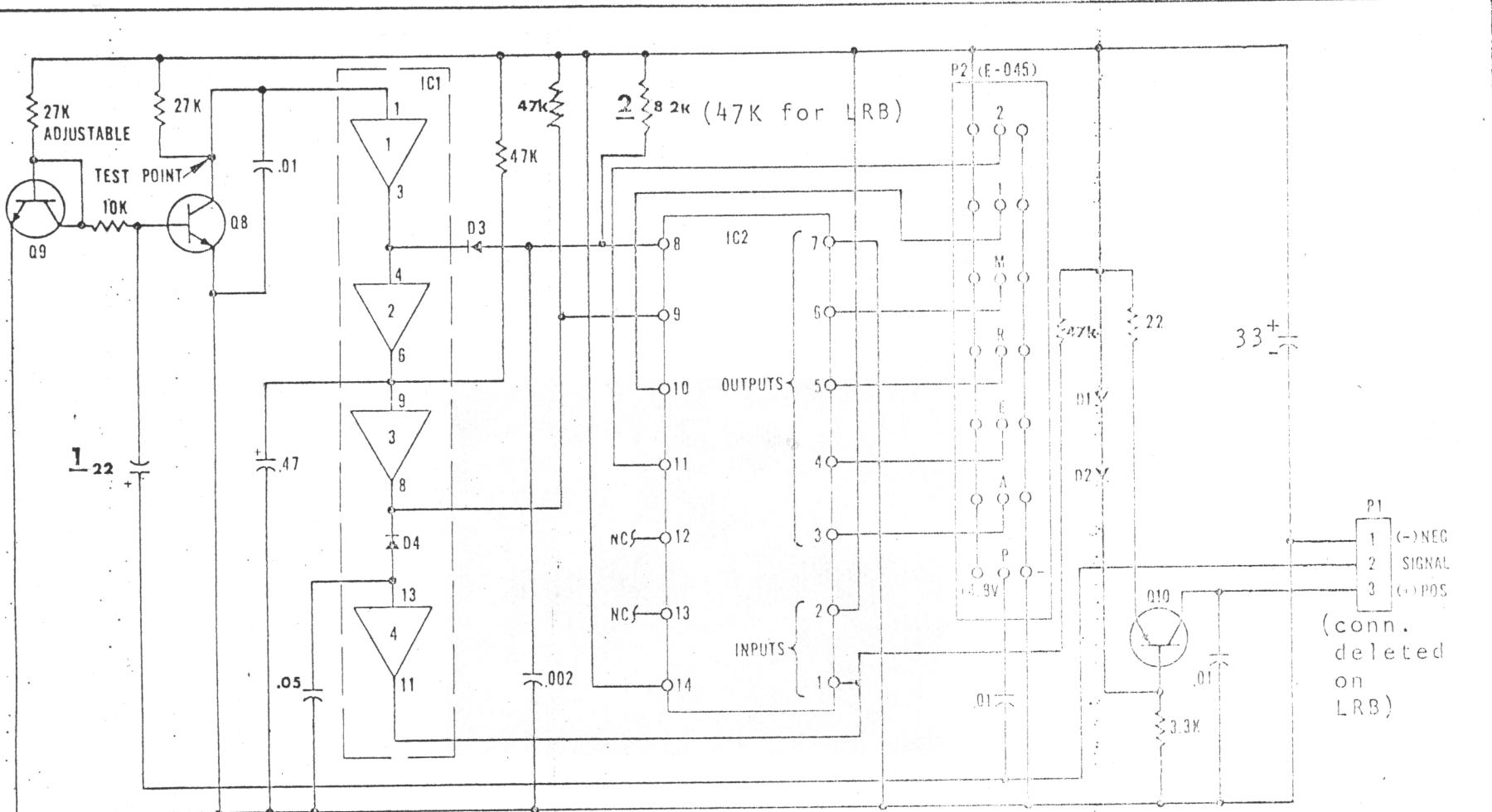
LIST FOR
NEXT ASSEMBLY1970 LOGICTROL AND CHAMPION
4 - 6 CHANNEL RECEIVER

PL-

B-673

5

PART NUMBER	DESCRIPTION	27	28	2
R4-8230	82K OHM Resistor	1	1	1
R4	Rx. Adjustable 4.7K to 27K	1	1	1
T-006	1st I. F. White Transformer	1	1	1
T-007	2nd I.F. Black Transformer	1	1	1
T-008	Mixer. Yellow Transformer	1	1	1
W-002	Red Wire	1	1	1
W-005	Green Wire	1	1	1
W-009	White Wire	1	1	1
W-091	Stripped Brown Wire	1	1	1
W-092	Stripped Red Wire	1	1	1
W-093	Stripped Orange Wire	1	1	1
W-094	Stripped Yellow Wire	1	1	1
W-095	Stripped Green Wire	1	1	1
W-096	Stripped Blue Wire	1	1	1
X-001 A - E	27 mHz Receiver crystal	1	0	0
X-003 A - E	53 mHz Receiver crystal	0	1	0
X-005 A - G	72 mHz Receiver crystal	0	0	1
PC-XXX	Printed Circuit Board	1	1	1

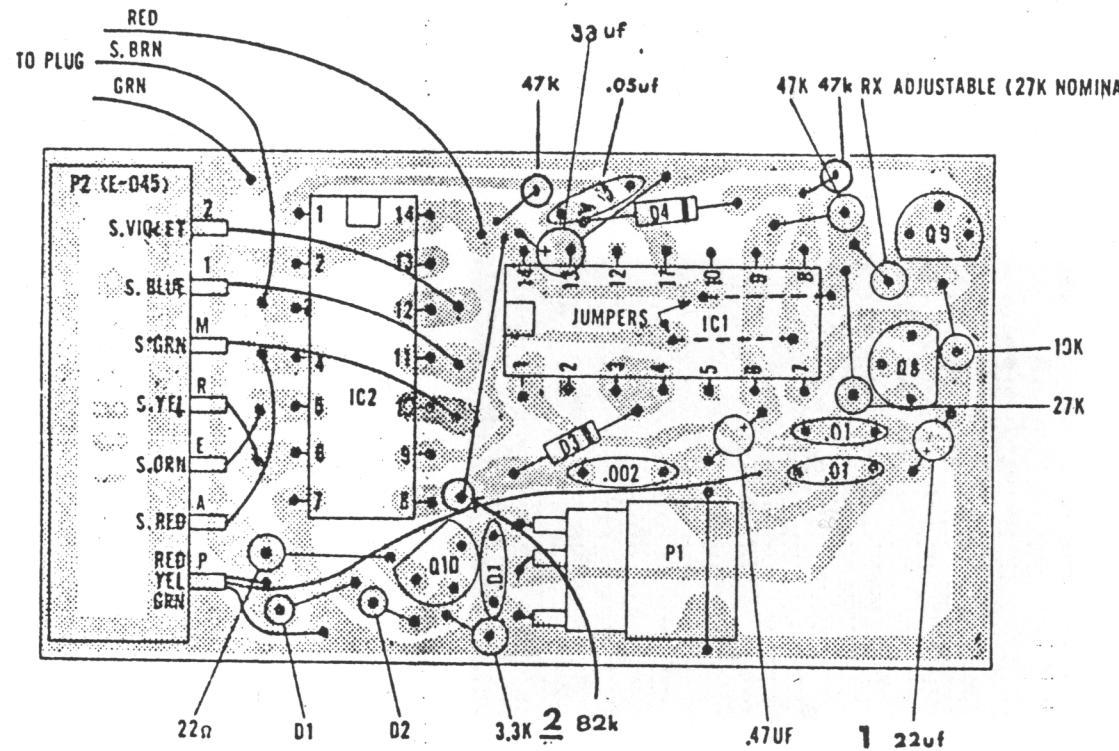


NOTES:

1. UNLESS OTHERWISE SPECIFIED:
ALL CAPACITANCE VALUES ARE IN MICROFARADS.
ALL RESISTANCE VALUES ARE IN OHMS.
2. TRANSISTORS: Q8 AND Q9 ARE X32B4079(720-2500)Q101S 34A1165(720-2600)
3. DIODES: D1 THRU D4 ARE DA2208(700-1200)
4. IC1 is DM74L03(730-3000)
5. IC2 is MM74C164(730-2010)

F.R. ELECTRONICS, INC.	
1233 W. TELLS RD., SUITE 100, TEXAS 76051	
DATE	2024-01-01
REF ID	27-76
REV	5.2
PPN	000
PPN	000
Schematic for 6 Channel CMOS Decoder	
B-684	

TOP (COMPONENT) VIEW OF PC BOARD



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
ALL CAPACITANCE VALUES ARE IN MICROFARADS.
ALL RESISTANCE VALUES ARE IN OHMS.
2. TRANSISTORS: Q8 AND Q9 ARE X32B4079(720-2500)Q10 IS 34A1165 (720-2600).
3. DIODES: D1 THRU D4 ARE DA2208 (700-1200).
4. THE CATHODE END IS UP ON D1 AND D2.

IC1 74L03(730-3000)

- 1 SIGNAL INPUT
- 2 NC
- 3 OUTPUT GATE 1 (CLOCK SIGNAL)
- 4 OUTPUT GATE 1 INPUT GATE 2
- 5 NC
- 6 OUTPUT GATE 2 (RESET TIME DELAY)
- 7 GROUND (-)
- 8 OUTPUT GATE 3 (RESET OR CLEAR SIGNAL)
- 9 INPUT TO RESET AMP
- 10 NC
- 11 OUTPUT GATE 4 (SERIAL INPUT)
- 12 NC
- 13 INPUT TO SERIAL SIGNAL AMP
- 14 VCC + 4.8V

IC2 74C164 (730-2010)

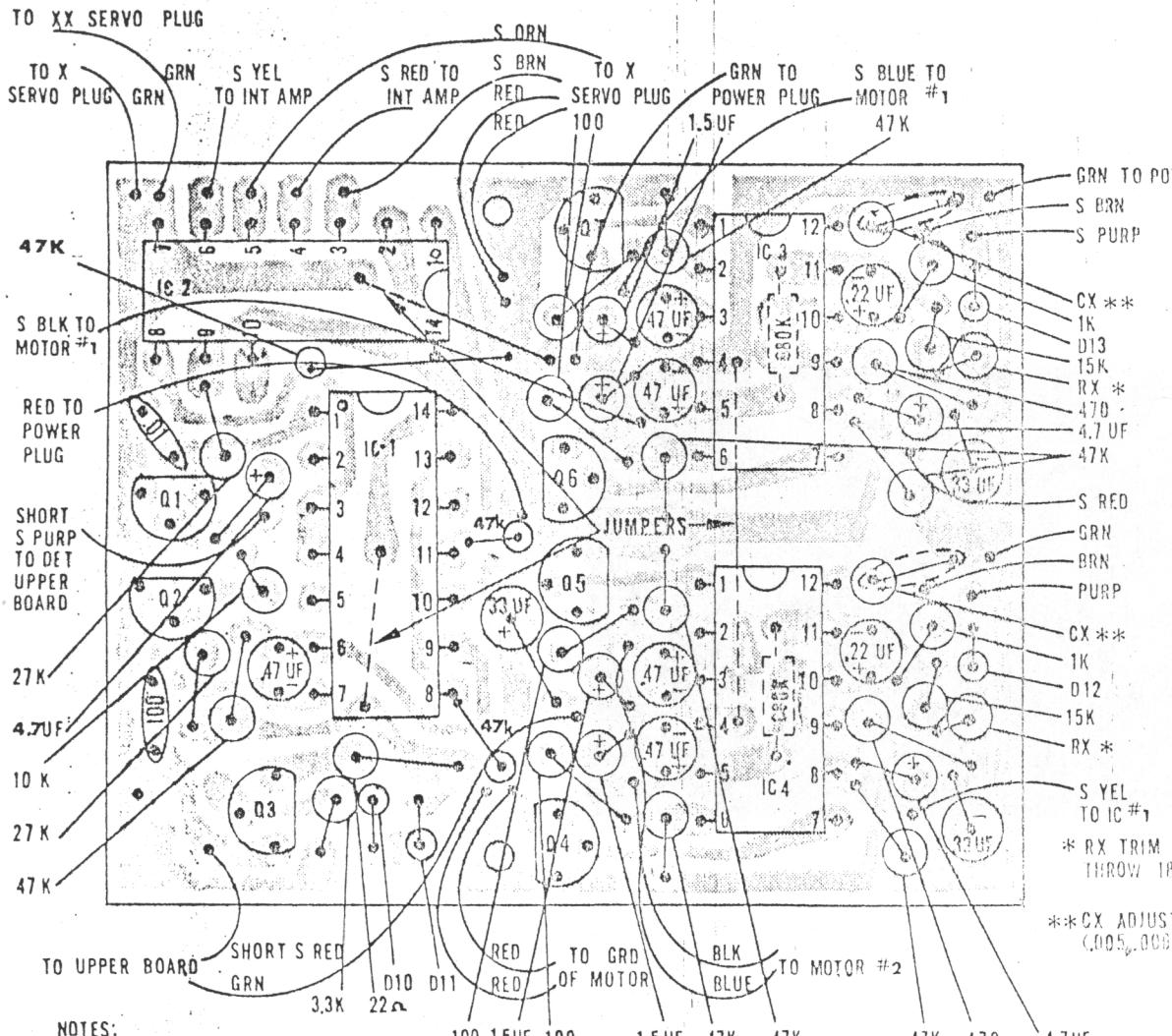
- 1 SERIAL INPUT
- 2 VCC + 4.8V (INPUT TO +)
- 3 OUTPUT CHANNEL 1
- 4 OUTPUT CHANNEL 2
- 5 OUTPUT CHANNEL 3
- 6 OUTPUT CHANNEL 4
- 7 GROUND (-)
- 8 CLOCK INPUT
- 9 CLEAR INPUT
- 10 OUTPUT CHANNEL 5
- 11 OUTPUT CHANNEL 6
- 12 OUTPUT CHANNEL 7
- 13 NC
- 14 VCC + 4.8V

E K PRODUCTS, INC.

3233 W. EULESS BLVD., HURST, TEXAS 76053

SCALE	4 TO 1	REVISIONS	BY	DATE
DATE	A-27-76			
DRW	SJ	CSD		
AP VC	R YF			
TITLE	Parts Location: 7 Channel CMOS Decoder			
	B-685			

PART NUMBER	DESCRIPTION	ALL
205-1200	RCVR Plug Block Polarized (P2)	1
205-2200	Pin Retainer - Male (P1)	1
206-1100	Contact Plug	1
413-1500	Wire - Red	24
413-1700	Wire - Yellow	2
413-1800	Wire - Green	1
413-6010	Wire - S. Brown	2
413-6020	Wire - S. Red	1
413-6030	Wire - S. Orange	1
413-6040	Wire - S. Yellow	1
413-6050	Wire - S. Green	1
413-6060	Wire - S. Blue	1
413-6070	Wire - S. Violet	1
662-4000	.002 uf Capacitor	1
662-4400	.01 uf Capacitor	1
662-4900	.05 uf Capacitor	1
664-1700	.47 uf Capacitor	3
664-3600	22 uf Capacitor	1
664-3800	33 uf Capacitor	1
700-1200	DA-2208 Diode	1
720-2500	Transistor X32B4079 (Q8, Q9)	1
720-2600	Transistor 34A1165	4
730-2010	Integrated Circuit (IC2) 74C164	2
730-3000	Integrated Circuit (IC1) 74L03	1
804	RX adjustable resistor (27K nominal	1
804-1031	10K OHM Resistor	1
804-2201	22 OHM Resistor	1
804-2731	27K Ohm Resistor	1
804-3321	3.3K OHM Resistor	1
804-4730	47K OHM Resistor	1
804-8231	82K OHM Resistor	3



IC1 74L03(730-3000)

- 1 SIGNAL INPUT
- 2 NC
- 3 OUTPUT GATE 1 (CLOCK SIGNAL)
- 4 OUTPUT GATE 1 INPUT GATE 2
- 5 NC
- 6 OUTPUT GATE 2 (RESET TIME DELAY)
- 7 GROUND (-)
- 8 OUTPUT GATE 3 (RESET OR CLEAR SIGNAL)
- 9 INPUT TO RESET AMP
- 10 NC
- 11 OUTPUT GATE 4 (SERIAL INPUT)
- 12 NC
- 13 INPUT TO SERIAL SIGNAL AMP
- 14 VCC + 4.8V

IC2 74C164 (730-2010)

- 1 SERIAL INPUT
- 2 VCC + 4.8V (INPUT TO +)
- 3 OUTPUT CHANNEL 1
- 4 OUTPUT CHANNEL 2
- 5 OUTPUT CHANNEL 3
- 6 OUTPUT CHANNEL 4
- 7 GROUND (-)
- 8 CLOCK INPUT
- 9 CLEAR INPUT
- 10 OUTPUT CHANNEL 5
- 11 OUTPUT CHANNEL 6
- 12 OUTPUT CHANNEL 7
- 13 NC
- 14 VCC + 4.8V

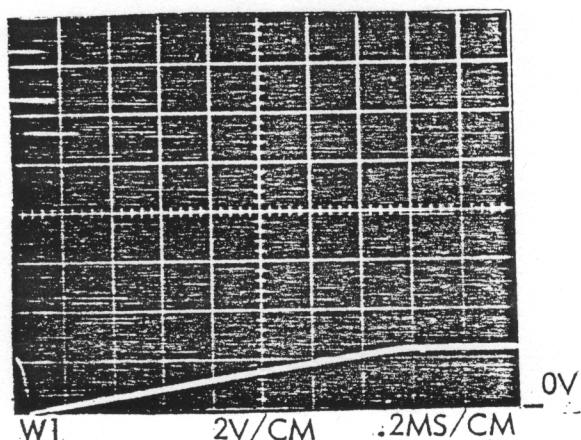
IC3 AND IC4 SEE DRAWING A126

**CX ADJUST FOR PROPER DEAD ZONE
(005, 008, 0082)

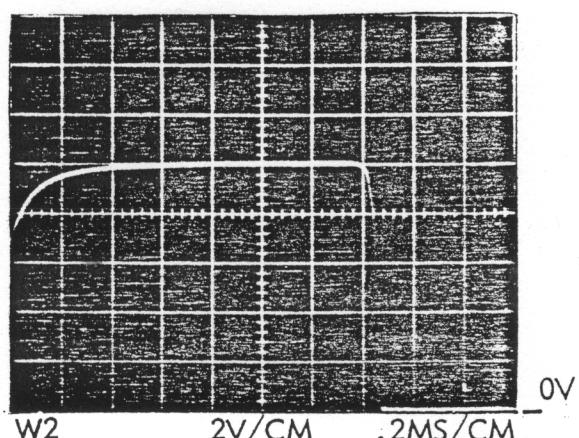
REV. A	DATE 12-30-83
NAME NONE	REVISIONS
GRADE	
TYPE	
AP NO A-28	
TITLE Parts Location for LRB 3 and 5	NO
Channel CMOS Decoder/Amp Deck	
B-686	

W-C-1018
WAVE FORMS

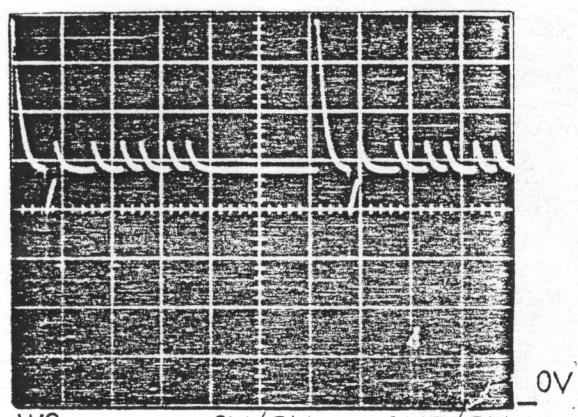
1973 CHAMP. AND SUPER PRO TRANSMITTER REFERENCE DRAWINGS - C-1018, B-654, B-656



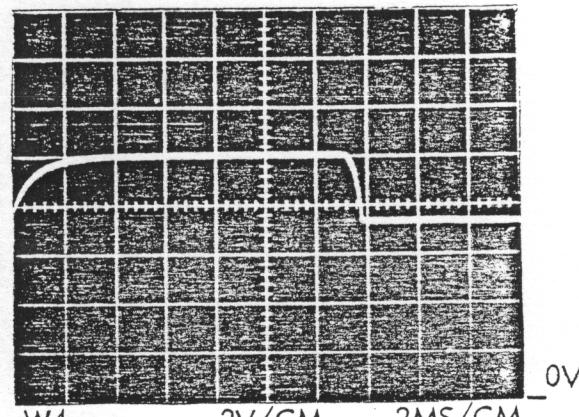
Base of Q1 - 1st channel timing capacitor (.068 mfd) discharge curve.



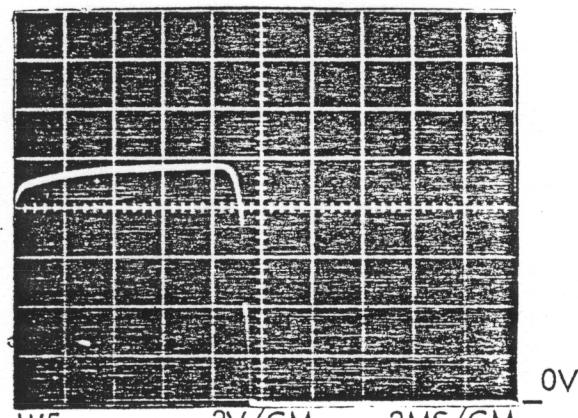
Collector of Q1 - 1st channel Encoder pulse.



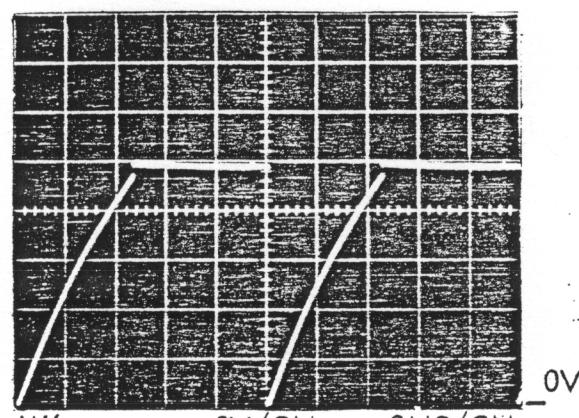
Cathode of D1 - differentiated 1st channel pulse.



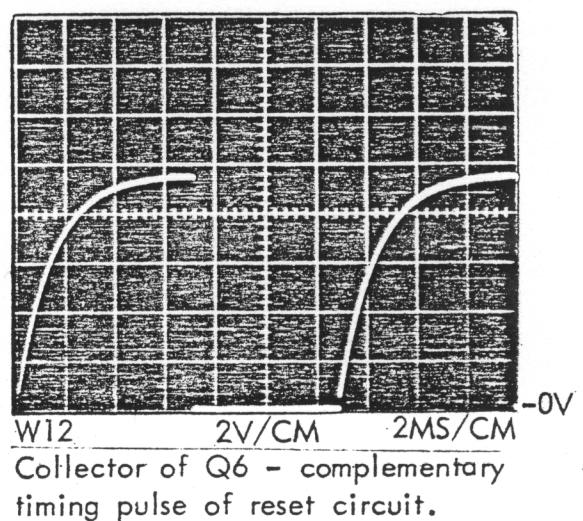
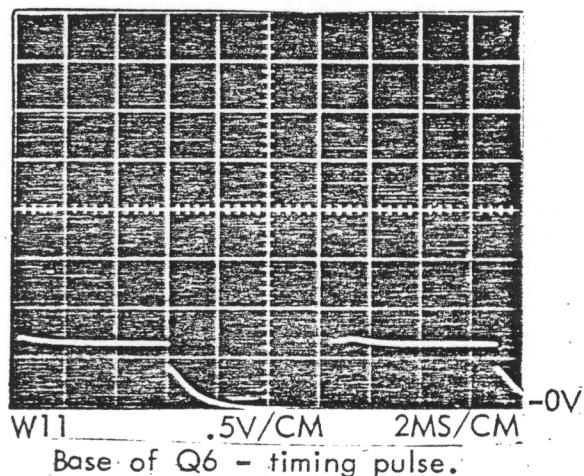
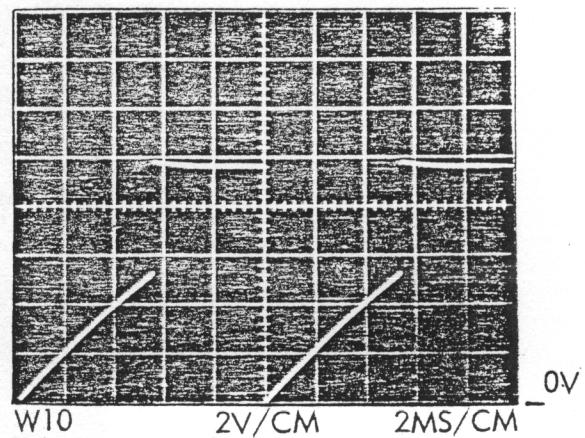
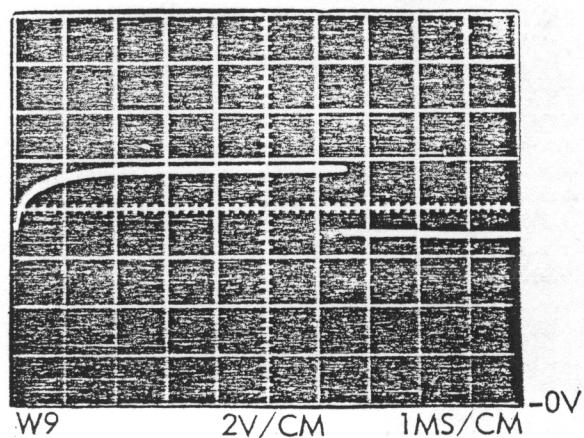
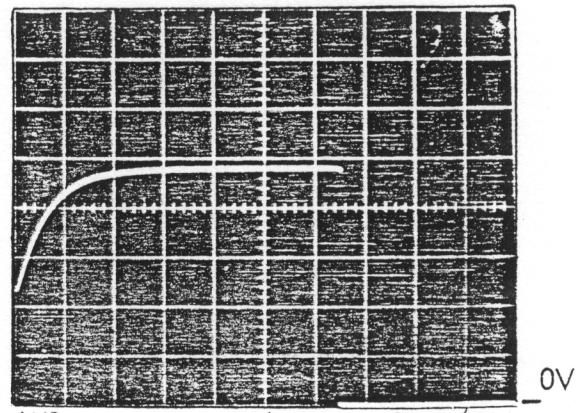
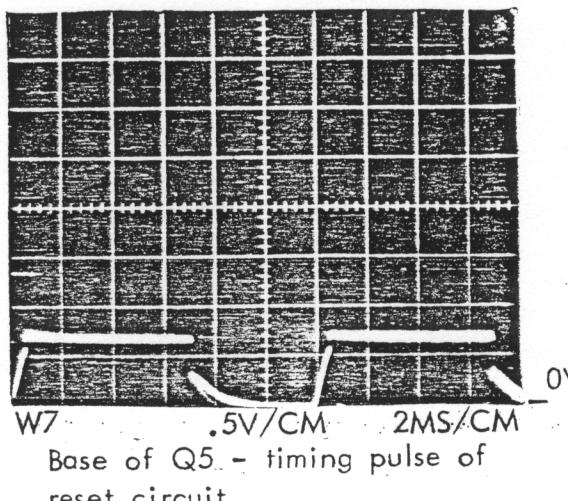
2nd channel trigger pulse.

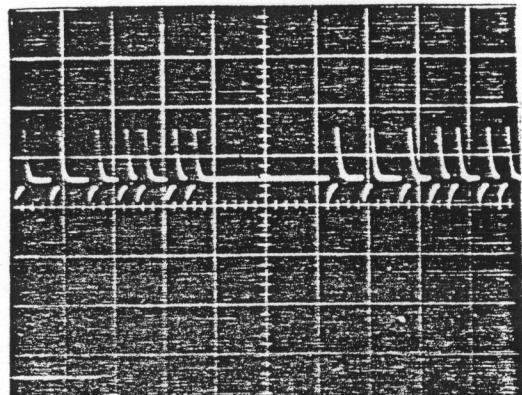


Last auxiliary channel encoder pulse.

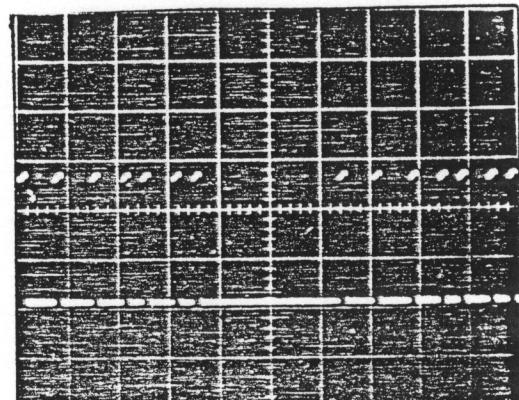


Anode of D6 - discharge of timing capacitor (.15 mfd) connected to collector of Q6.

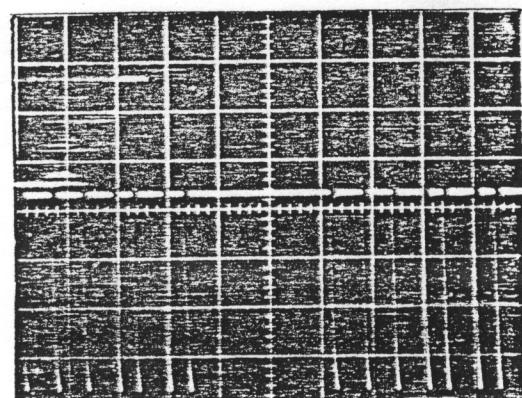




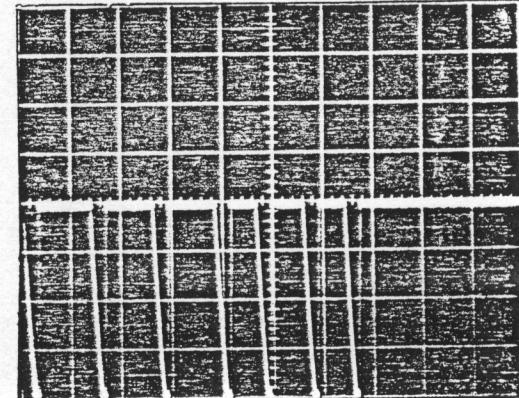
W13 2V/CM 1MS/CM
Anode of D1-D5, OR gate signal line.



W14 2V/CM 1MS/CM
Collector of Q7 - one shot on-time
(approx. 200 M. Sec.)



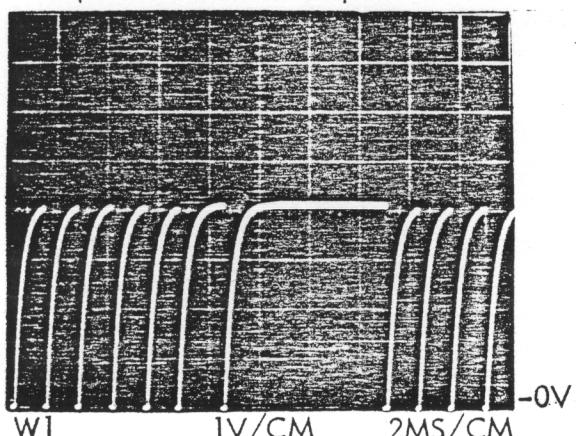
W15 2V/CM 1MS/CM
Cathode of Steering diode D8



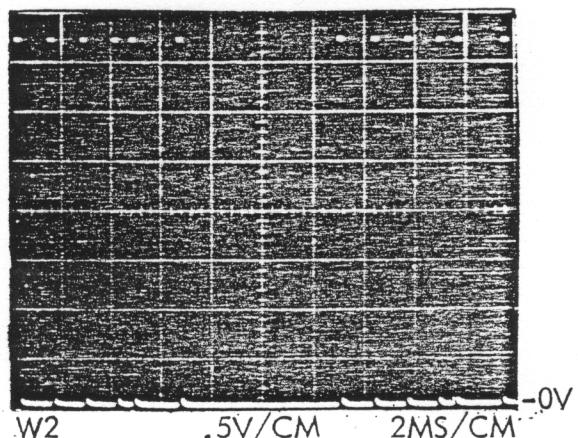
W16 2V/CM 1MS/CM
Collector of Q8 - output of one shot
to buffer stage.

W-B-664
WAVE FORMS

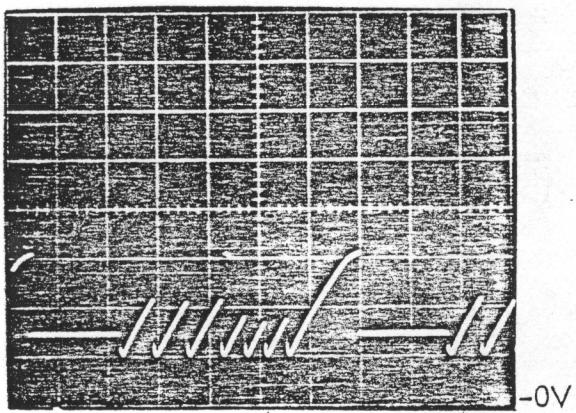
6 Channel I.C. Decoder for 1972-73 REFERENCE DRAWINGS B-658 & 664
Super Pro and Champion Receiver



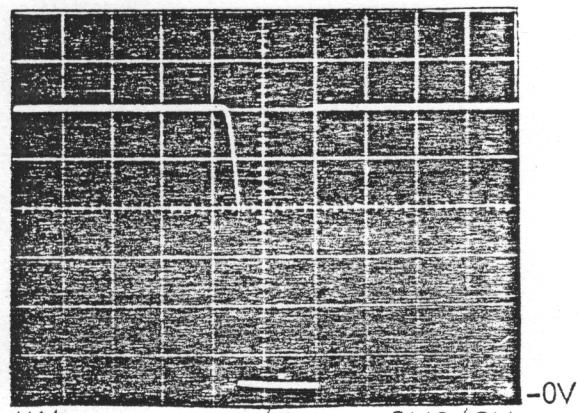
Collector of Q-11 - Pulse Amp.
with strong signal.



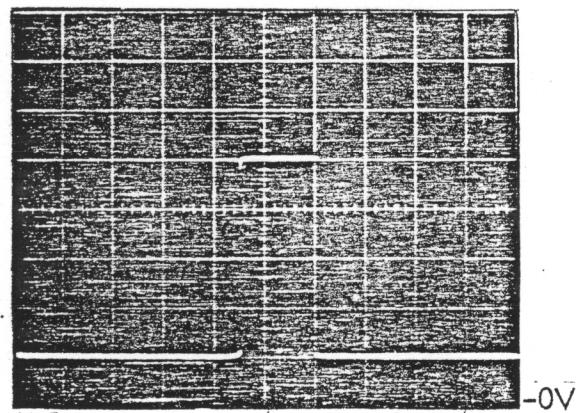
Collector of Q-12 - Clock pulse
to shift register.



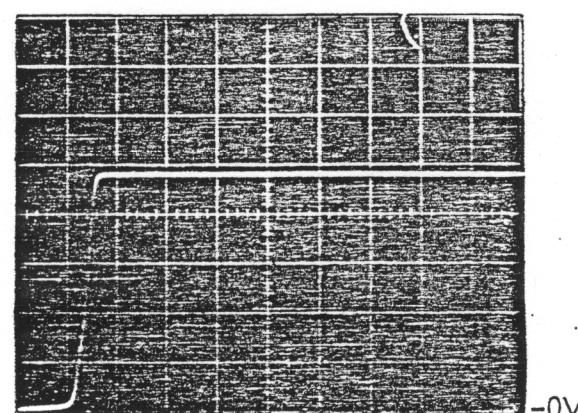
Anode of D-5 - Input to Schmitt
trigger.



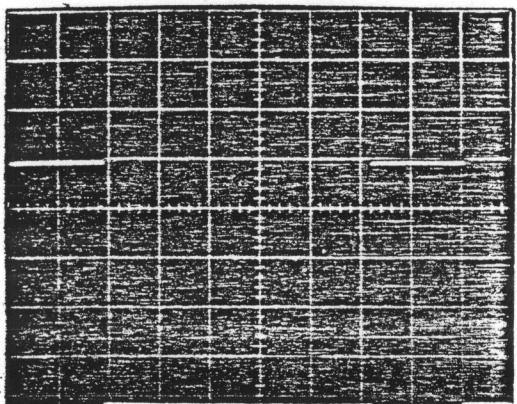
Collector of Q-14 - signal to
inverter Q17.



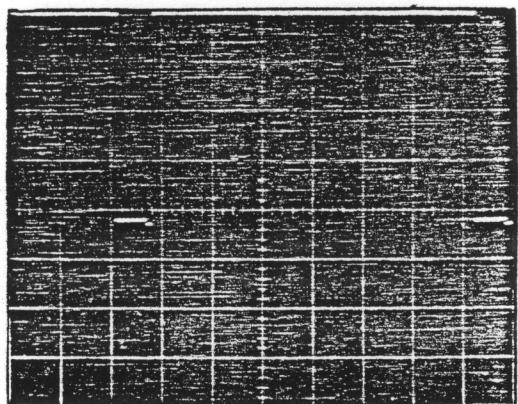
Collector of Q-15 - Schmitt Trigger
output.



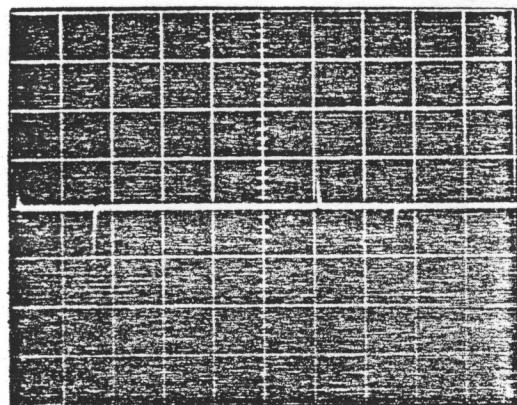
Collector of Q-16 - Clear input wave-
form to shift register.



W7 1V/CM 2MS/CM
Collector of Q17 - Serial Input Waveform to shift register.



W8 1V/CM 2MS/CM
I.C. Shift Register Decoder Output pulse to servo.



W9 1V/CM 2MS/CM
Schmitt trigger differentiated output to inverter Q16