

Phillips Scientific

Quad 300 MHz Majority Logic

NIM MODEL 754

FEATURES

- * Versatile Majority Logic Unit
- * Four Independent Channels
- * 300 MHz Rate Capability
- * Deadtimeless Updating Outputs
- * Fast Veto for Anti-Coincidence

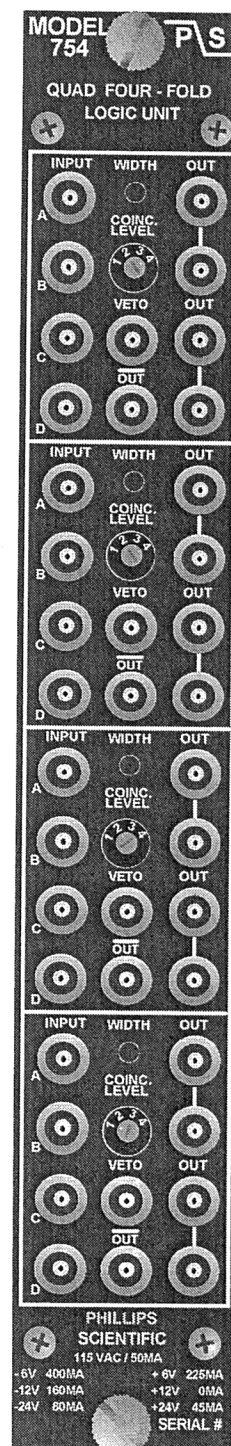
DESCRIPTION

The Model 754 logic unit contains four channels of four input logic with veto in a single width NIM module. Logical AND, OR, Majority logic, Fan-in/Fan-out, and Anti-coincidence functions can be performed with this versatile module. All functions are direct coupled and operate to over 300 MHz with input overlap times as narrow as 750pSec.

Each channel has four logic inputs, an anti-coincidence input, a coincidence level switch, and five outputs with common width control. The inputs are enabled by connecting the input cable to the desired input, eliminating errors often occurring with switched inputs. The setting of the coincidence level switch then determines whether a logical OR, AND, or Majority logic function will produce an output.

After the inputs have satisfied the logic function desired, triggering of an updating regenerative stage produces a standardized output pulse, independent of the input pulse shapes or overlap times. The updating feature ensures deadtimeless operation, while the double pulse resolution is 3.3nSec for fast counting applications.

The outputs are the current source type with two pairs of negative bridged outputs and one complement for each channel. When only one output of a bridged pair is used, a double-amplitude NIM pulse (-32mA) is generated for driving long cables with narrow pulse widths. The outputs have transition times of less than 1nSec and their shapes are virtually unaffected by loading the outputs in any combination.



Phillips Scientific

"A THEORY DEVELOPMENT COMPANY"

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INPUT CHARACTERISTICS

A,B,C,D:

Four (4) LEMO connector inputs per section; Accepts NIM level logic signals (-500mV), 50 ohm input impedance, $\pm 2\%$, direct coupled; Input reflections are less than $\pm 5\%$ for a 1nSec input risetime. Inputs are protected to withstand ± 50 Volts for 1 μ Sec with no damage. The inputs respond to a 750pSec or longer input pulse width.

Fast Veto:

One LEMO connector input per section; accepts normal NIM level logic signal, (-500mV), 50 ohm input impedance, direct coupled; Protected against damage for ± 50 Volt input transients. Requires a 3nSec minimum input pulse width. Capable of gating a single pulse from a 300 MHz continuous pulse train.

Bin Gate:

Rear panel slide switch enables or disables slow bin gate via the rear connector. Signal levels are in accordance with the TID-20893 standard. The entire module will inhibit within 10nSec from the bin gate signal.

GENERAL PERFORMANCE

Logic Functions:

Logical AND, OR, Majority logic and Fan-in/Fan-out. All functions have leading edge inhibit and produce restandardized outputs.

Resolving Time:

Better than 200pSec for any input combination. Stability is better than 10pSec/ $^{\circ}$ C.

Continuous Repetition Rate:

Greater than 300 MHz guaranteed throughput counting rate, with output width set at minimum.

Pulse-Pair Resolution:

Better than 3.3 nSec, with output width set at minimum.

Input to Output Delay:

Less than 8.5 nSec.

Multiple Pulsing:

None; One and only one output pulse regardless of input pulse amplitude or duration.

Power Supply Requirements:

- 6 Volts @ 400 mA	+ 6 Volts @ 225 mA	115 VAC @ 50 mA
-12 Volts @ 160 mA	+12 Volts @ 0 mA	
-24 Volts @ 80 mA	+24 Volts @ 45 mA	

Note: All currents are within NIM specification limits permitting a full powered bin to be operated without overloading.

Operating Temperature:

0 $^{\circ}$ C to 70 $^{\circ}$ C ambient.

Packaging:

Standard single width NIM module in accordance with TID-20893 and Section ND-524.

Quality Control:

Standard 36-hour, cycled burn-in with switched power cycles.

Options:

Call Phillips Scientific to find out about available options.

12/03

OUTPUT CHARACTERISTICS

General:

Five (5) LEMO connector outputs per section; Two pairs of negative bridged outputs and one complemented NIM. The bridged outputs deliver -32mA into a single 50 ohm load (-1.6Volts) and -16mA (-800mV) with both terminated. The complementary output is quiescently -16mA (-800mV) and goes to 0mA during output. The output rise and fall times are less than 1nSec from 10% to 90% levels. The output shapes are optimized when the bridged outputs are 50 ohm terminated.

Width Control:

One control per section; 15-turn screwdriver adjustment. Outputs are continuously variable from 2nSec to 50nSec. Width stability is better than $\pm 0.1\%$ / $^{\circ}$ C of setting.

Updating Output:

The output pulse will be extended if a new input pulse occurs while the output is active. This provides deadtimeless operation and a 100% duty cycle can be achieved.

MODEL 754 QUAD 300 MHz MAJORITY LOGIC UNIT

(Front Panel Description)

Standard # 1 NIM Packaging
in accordance with TID-20893

Four NIM Logic Inputs;
50 ohms Direct Coupled

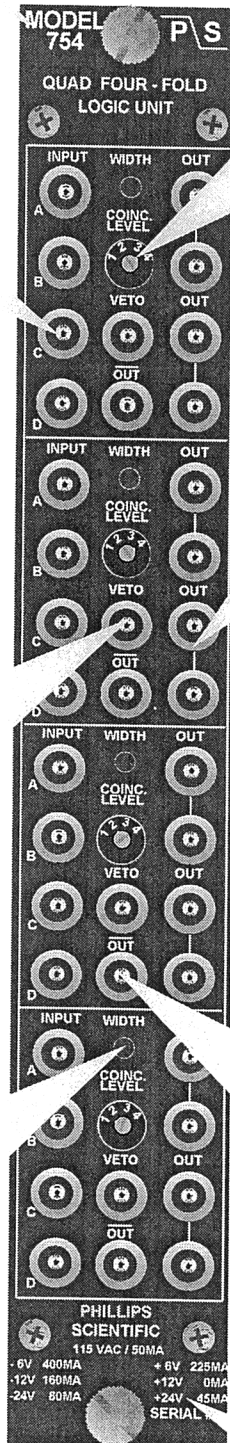
Fast Inhibit Input; 50 ohms;
Accepts Normal NIM Input Pulse
to Provide Anti-Coincidence.

Output Width Control;
15-Turn Screwdriver Adjustment
Variable from 2nSec to 50nSec.

Four Position Coincidence Level Switch;
Selects Logic OR, AND or Majority
Logic Function for each Section.

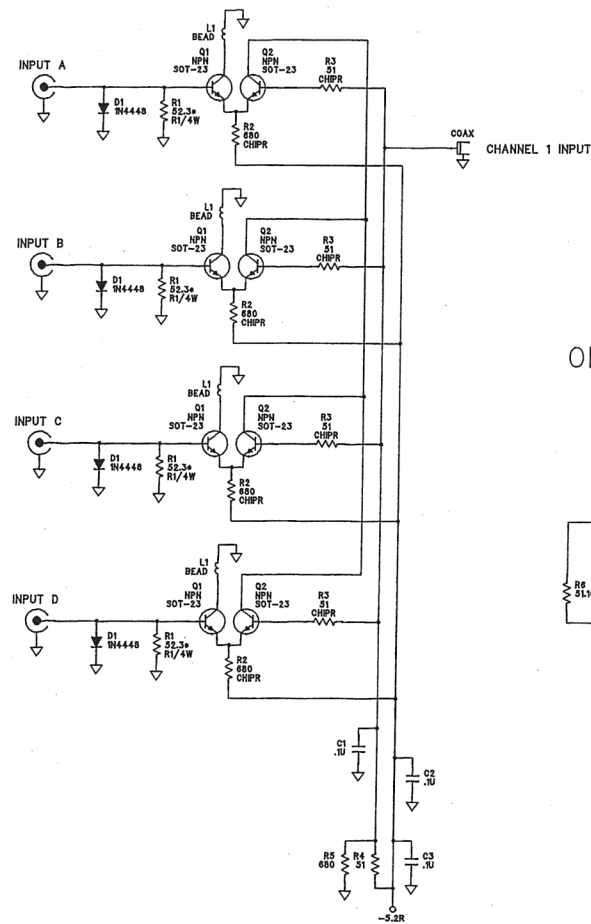
Two Pairs Double-Amplitude Bridged
NIM Outputs; Each Pair Drives
-32mA (-1.6 Volts into 50 ohms, and
-.8 Volt into Two 50 ohm Loads).

One Complemented NIM Output;
Quiescently -16mA (-800 mV) and
0 mA (0 Volts) during Output.

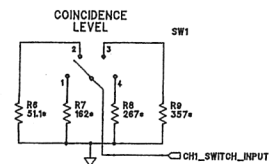


Note: A Bin Gate Enable/Disable Switch
on Rear Panel, Permits Inhibiting
via Bin Connector.

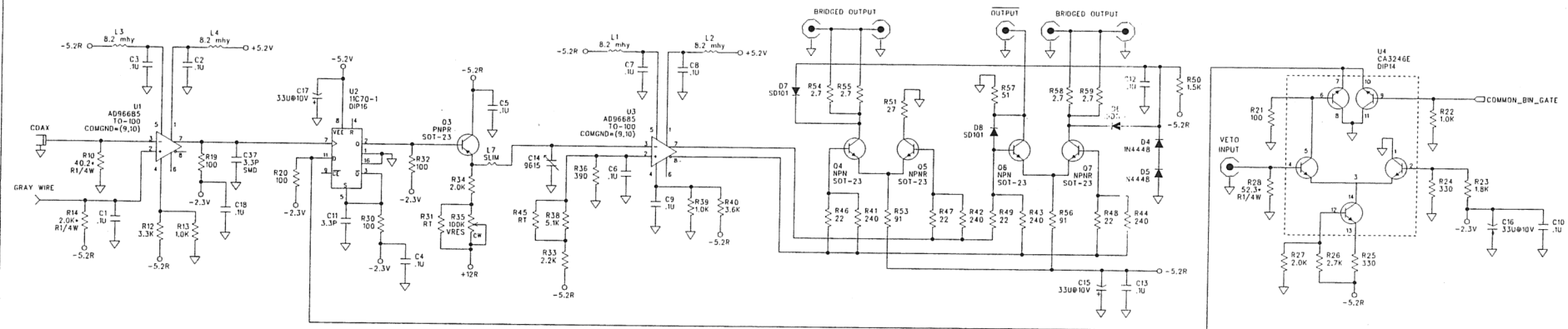
NIM Voltage and Current
Requirements



ONE OF FOUR IDENTICAL CHANNELS

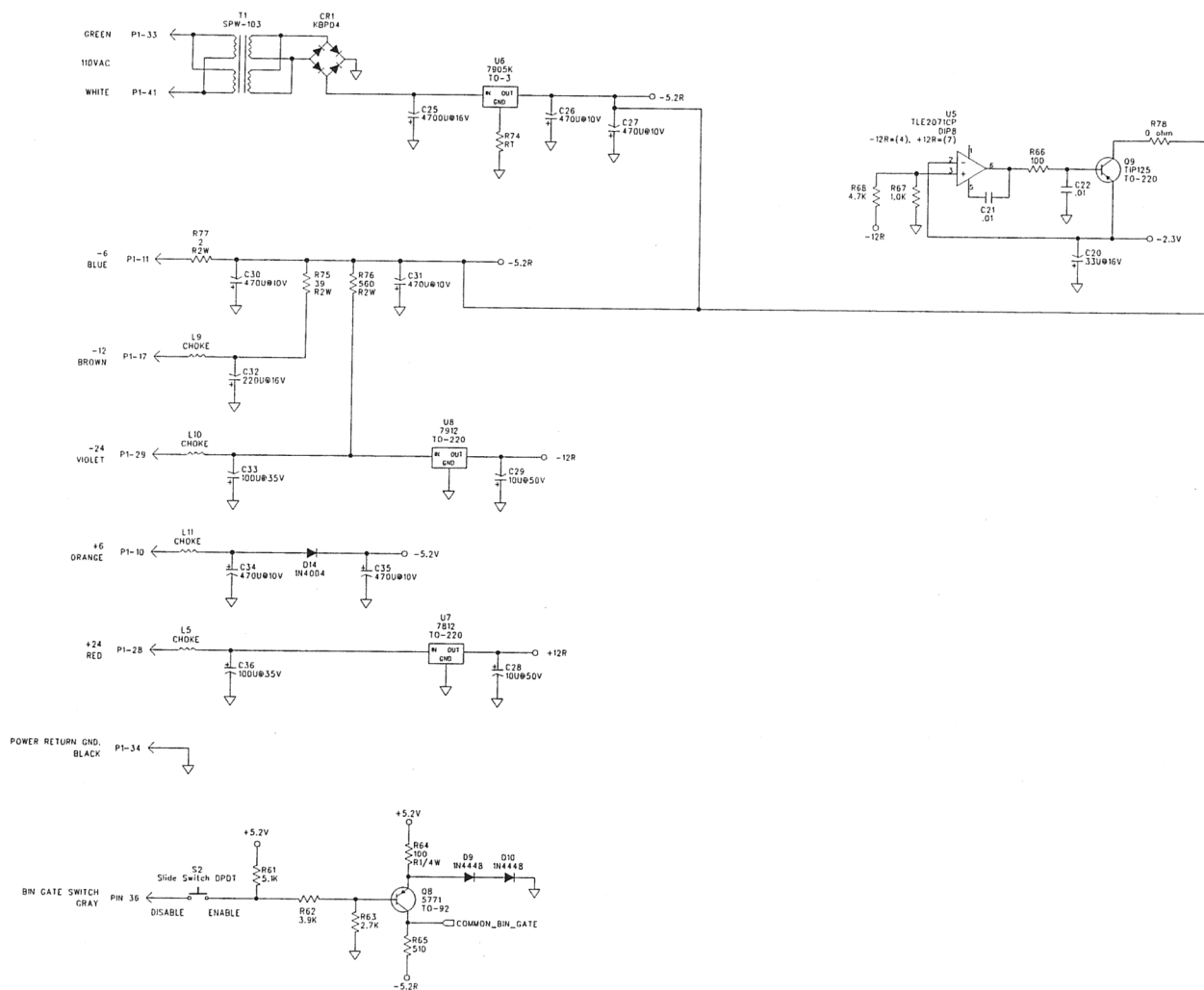


PHILLIPS / SCIENTIFIC		
MODEL 754-1		
QUAD 300 MHz MAJORITY LOGIC		
DATE	REV. A	FILE
04-26-99	REV. A	754-1



ONE OF FOUR IDENTICAL CHANNELS

PHILLIPS SCIENTIFIC		
MODEL 754		
QUAD 300 MHz MAJORITY LOGIC		
DATE	FILE	
02-07-05	REV. C	75401



PHILLIPS SCIENTIFIC		
MODEL 754		
QUAD 300 MHz MAJORITY LOGIC		
DATE	FILE	
02-07-05	REV. C	75402

754-1 PART LIST

IDENT.	QTY.	PART #	DESCRIPTION
R1	16	006552R3	52.3 Ω 1% RN55C
R2	16	00716800	680 Ω 2% Chip
R3	16	007151R0	51 Ω 2% Chip
R4	1	001051R0	51 Ω 5% CF 1/8
R5	1	00106800	680 Ω 5% CF 1/8
R6	4	006551R1	51.1 Ω 1% CF 1/8
R7	4	00651620	162 Ω 1% CF 1/8
R8	4	00652670	267 Ω 1% CF 1/8
R9	4	00653570	357 Ω 1% CF 1/8
C1	4	10151003	.1 μ fd Cap
C2	4	10151003	.1 μ fd Cap
C3	1	10151003	.1 μ fd Cap
L1	16	15000003	Large Bead
D1	16	20004448	1N4448 Diode
Q1	16	2420T93R	BFR92 SOT-23 Transistor
Q2	16	2420T930	BFR92 SOT-23 Transistor
S1	4	50005000	4 pos. SP Switch Grayhill 75AP36-01-1-4N
	1	85007551	754-1 (REV.E) Raw Printed Circuit Bd.

<u>Ident.</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
R1			Part of 754-1
R2			Part of 754-1
R3			Part of 754-1
R6			Part of 754-1
R5			Part of 754-1
R6			Part of 754-1
R7			Part of 754-1
R8			Part of 754-1
R9			Part of 754-1
R10	4	006540R2	40.2 ohm 1% RN 1/4 resistor
R11			Not Used
R12	4	00103301	3.3K ohm 5% CF 1/8 resistor
R13	4	00101001	1.0K ohm 5% CF 1/8 resistor
R14	4	00652001	2.0K ohm 1% RN 1/4 resistor
R15-18			Not Used
R19	4	00101000	100 ohm 5% CF 1/8 resistor
R20	4	00101000	100 ohm 5% CF 1/8 resistor
R21	4	00101000	100 ohm 5% CF 1/8 resistor
R22	4	00101001	1.0K ohm 5% CF 1/8 resistor
R23	4	00101801	1.8K ohm 5% CF 1/8 resistor
R24	4	00103300	330 ohm 5% CF 1/8 resistor
R25	4	00103300	330 ohm 5% CF 1/8 resistor
R26	4	00102701	2.7K ohm 5% CF 1/8 resistor
R27	4	00102001	2.0K ohm 5% CF 1/8 resistor
R28	4	006552R3	52.3 ohm 1% RN 1/4 resistor
R29			Not Used
R30	4	00101000	100 ohm 5% CF 1/8 resistor
R31	4	00000000	Resistor Trim (Width)
R32	4	00101000	100 ohm 5% CF 1/8 resistor
R33	4	00102201	2.2K ohm 5% CF 1/8 resistor
R34	4	00102001	2.0K ohm 5% CF 1/8 resistor
R35	4	05151003	100K ohm 15 turn 3/4 Rect Pot (Width)
R36	4	00103900	390 ohm 5% CF 1/8 resistor
R37			Not Used
R38	4	00105101	5.1K ohm 5% CF 1/8 resistor
R39	4	00101001	1.0K ohm 5% CF 1/8 resistor
R40	4	00103601	3.6K ohm 5% CF 1/8 resistor
R41	4	00102400	240 ohm 5% CF 1/8 resistor
R42	4	00102400	240 ohm 5% CF 1/8 resistor
R43	4	00102400	240 ohm 5% CF 1/8 resistor
R44	4	00102400	240 ohm 5% CF 1/8 resistor
R45	4	00000000	Resistor Trim
R46	4	001022R0	22 ohm 5% CF 1/8 resistor
R47	4	001022R0	22 ohm 5% CF 1/8 resistor
R48	4	001022R0	22 ohm 5% CF 1/8 resistor
R49	4	001022R0	22 ohm 5% CF 1/8 resistor
R50	4	00101501	1.5K ohm 5% CF 1/8 resistor
R51	4	001027R0	27 ohm 5% CF 1/8 resistor
R52			Not Used
R53	4	001091R0	91 ohm 5% CF 1/8 resistor
R54	4	00102R70	2.7 ohm 5% CF 1/8 resistor
R55	4	00102R70	2.7 ohm 5% CF 1/8 resistor
R56	4	001091R0	91 ohm 5% CF 1/8 resistor
R57	4	001051R0	51 ohm 5% CF 1/8 resistor
R58	4	00102R70	2.7 ohm 5% CF 1/8 resistor
R59	4	00102R70	2.7 ohm 5% CF 1/8 resistor
R60			Not Used

<u>Ident.</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
R61	1	00105101	5.1K ohm 5% CF 1/8 resistor
R62	1	00103901	3.9K ohm 5% CF 1/8 resistor
R63	1	00102701	2.7K ohm 5% CF 1/8 resistor
R64	1	00101000	100 ohm 5% CF 1/8 resistor
R65	1	00105100	510 ohm 5% CF 1/8 resistor
R66	1	00101000	100 ohm 5% CF 1/8 resistor
R67	1	00101001	1.0K ohm 5% CF 1/8 resistor
R68	1	00104701	4.7K ohm 5% CF 1/8 resistor
R69-73			Not Used
R74	1	00000000	Resistor Trim
R75	1	003439R0	39 ohm 5% MOF 2w resistor
R76	1	00345600	560 ohm 5% MOF 2w resistor
R77	1	00342R00	2 ohm 5% MOF 2w resistor
R78	1	00100000	Zero ohm 5% CF 1/8 resistor
C1	4	10151003	.1 mfd cer mono capacitor
C2	4	10151003	.1 mfd cer mono capacitor
C3	4	10151003	.1 mfd cer mono capacitor
C4	4	10151003	.1 mfd cer mono capacitor
C5	4	10151003	.1 mfd cer mono capacitor
C6	4	10151003	.1 mfd cer mono capacitor
C7	4	10151003	.1 mfd cer mono capacitor
C8	4	10151003	.1 mfd cer mono capacitor
C9	4	10151003	.1 mfd cer mono capacitor
C10	4	10151003	.1 mfd cer mono capacitor
C11	4	10103P30	3.3 pfd NPO cer disk cap
C12	4	10151003	.1 mfd cer mono capacitor
C13	4	10151003	.1 mfd cer mono capacitor
C14	4	13000015	9615 5-25 pfd var capacitor
C15	4	10813305	33 mfd @ 10v tan capacitor
C16	4	10813305	33 mfd @ 10v tan capacitor
C17	4	10813305	33 mfd @ 10v tan capacitor
C18	4	10151003	.1 mfd cer mono capacitor
C19			Not Used
C20	1	10523305	33 mfd @ 16v al el capacitor
C21	1	10151002	.01 mfd cer mono capacitor
C22	1	10151002	.01 mfd cer mono capacitor
C23-24			Not Used
C25	1	10624707	4700 mfd @ 16v al el capacitor
C26	1	10514706	470 mfd @ 10v al el capacitor
C27	1	10514706	470 mfd @ 10v al el capacitor
C28	1	10551005	10 mfd @ 50v al el capacitor
C29	1	10551005	10 mfd @ 50v al el capacitor
C30	1	10514706	470 mfd @ 10v al el capacitor
C31	1	10514706	470 mfd @ 10v al el capacitor
C32	1	10522206	220 mfd @ 16v al el capacitor
C33	1	10541006	100 mfd @ 35v al el capacitor
C34	1	10514706	470 mfd @ 10v al el capacitor
C35	1	10514706	470 mfd @ 10v al el capacitor
C36	1	10541006	100 mfd @ 35v al el capacitor
C37	4	10123P30	3.3 pfd SMD cer capacitor
L1			Part of 754-1
L2			Not Used
L3	4	15000001	8.2 mhs choke

<u>Ident.</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
L4	4	15000001	8.2 mhs choke
L5	4	15000001	8.2 mhs choke
L6	4	15000001	8.2 mhs choke
L7	4	15000003	Single turn on 14000003
L8			Not Used
L9	1	15000000	Power Inductor
L10	1	15000000	Power Inductor
L11	1	15000000	Power Inductor
L12	1	15000000	Power Inductor
T1	1	15500003	SPW-103 Power Transformer
D1			Part of 754-1
D2-3			Not Used
D4	4	20004448	1N4448 diode
D5	4	20004448	1N4448 diode
D6	4	2020101C	SD101 Schottky diode
D7	4	2020101C	SD101 Schottky diode
D8	4	2020101C	SD101 Schottky diode
D9	1	20004448	1N4448 diode
D10	1	20004448	1N4448 diode
D11-13			Not Used
D14	1	20004004	1N4004 diode
CR1	1	2030BP04	KBP04 Bridge Rectifier
Q1			Part of 754-1
Q2			Part of 754-1
Q3	1	2420PNPR	PNP (SMD) reverse transistor
Q4	4	2420NPN0	NPN (SMD) (R2) transistor
Q5	4	2420PNPR	NPN (SMD) reverse transistor
Q6	4	2420NPN0	NPN (SMD) (R2) transistor
Q7	4	24005770	NPN (SMD) reverse transistor
Q8	1	24005771	2N5771 PNP transistor
Q9	1	2410P125	TIP125 TO-220 transistor
U1	4	38006971	AD96685BH IC
U2	4	38006822	11C70DC replacement assembly IC
U3	4	38006971	AD96685BH IC
U4	1	30503246	CA32436E IC
U5	1	30202071	TLE2071CP OP-AMP IC
U6	1	3010905K	7905K TO-3 regulator
U7	1	3010812T	7812T TO-220 regulator
U8	1	3010912T	7912T TO-220 regulator

MODEL 754 PART LIST

REV.D

<u>Ident.</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
	1	40000008	8 Pin DIP Socket
	4	40000016	16 Pin DIP Socket
	8	40001010	10 Pin TO Socket
	40	40100000	RF Connector
	40	40100001	Lock Washer
	32	40100002	Solder Lug
	40	40100003	Spanner Nut
	1	40200000	NIM Connector Block
	1	40200001	NIM Connector Shield
	9	40200002	NIM Elect. Pin
	2	40200003	NIM Female Guide Pin
	1	40200004	NIM Male Guide Pin
	1	40200005	NIM Male Guide Pin Gold Plate
	1	40200006	#4 Lock Washer Gold Plate
	1	40200007	#4-40 Hex Nut Gold Plate
	1	40950002	Solder Lug
S1			Part of 754-1
S2	1	50000000	Slide switch DPDT
	1	58000102	Back Panel
	1	58000103	Right Side Cover
	1	58000104	Left Side Cover
	2	58000105	Square Rail
	2	58000106	Round Rail
	1	58007540	Front Panel
	4	65025603	2-56 x 3/16" Flat Head Screw
	6	65044003	4-40 x 3/16" Flat Head Screw Undercut
	6	65144006	4-40 x 3/8" Round Head Phillips Screw
	3	65944004	4-40 x 1/4" Fillister Head Screw
	10	65944005	4-40 x 5/16" Fillister Head Screw
	1	75050000	Heat Sink
	1	81000016	Tubing (black) 1" #16
	1	8500754D	Model 754 Rev. D Printed Circuit Board