

Phillips Scientific

Quad Linear/Logic Fan-In/Out

NIM MODEL 740

FEATURES

- * Four Independent Channels
- * Linear or Logic Fan-In of Four and Fan-Out of Six per Channel
- * Wideband - DC to 250 MHz
- * Fully Bipolar Operation to ± 2.5 Volts
- * DC Offset Control per Channel of ± 500 mVolts
- * Reliable - Both Inputs and Outputs are Protected

DESCRIPTION

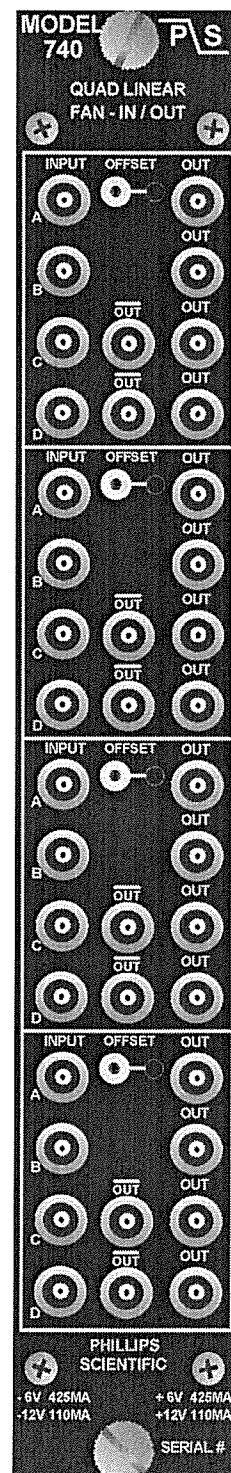
The Model 740 is a four channel, unity gain linear or logic Fan-In/Fan-Out packaged in a single width NIM module. Four linear inputs allow summing of linear levels or pulses. Both inverted and non-inverted output levels are produced simultaneously allowing very complex triggers to be fast and easy to develop. Direct coupling of all inputs and outputs eliminates the baseline shifts due to rate or duty cycle affects, while making the device useful for performing logic functions.

INPUT CHARACTERISTICS

- General** : Four LEMO connectors per channel, bipolar input; accepts positive or negative voltages.
- Impedance** : 50 ohms $\pm 2\%$ direct coupled input.
- Protection** : Protected with clamping diodes; no damage will occur from transients of ± 100 Volts (± 2 amps) for 1 μ Sec or less duration.
- Reflections** : Less than $\pm 4\%$ for input risetime of 1 nSec.
- Overdrive Response** : Recovery time of 20 nSec for a ± 10 Volt input.

OUTPUT CHARACTERISTICS

- General** : Six bridged LEMO output connectors per channel. Four non-inverted outputs and two inverted outputs; low impedance voltage source output stage.
- Protection** : Outputs can be continuously shorted to ground without suffering damage.
- Output Voltage Swing** : Bipolar outputs delivery over ± 2 Volts across four 50 ohm loads.
- DC Offset** : A front panel 15-turn potentiometer provides ± 500 mVolt adjustment. A front panel test point allows easy monitoring of the DC offset.



Phillips Scientific

"A THEORY DEVELOPMENT COMPANY"

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GENERAL PERFORMANCE

Gain	: Fixed gain of $1.0 \pm 2\%$ both inverted and non-inverted.
Stability	: Better than $\pm 50 \mu\text{Volt}/^\circ\text{C}$ from DC to 1 MHz, and $\pm .05\%/^\circ\text{C}$ above 1 MHz.
Linearity	: $\pm 0.2\%$ for ± 2 Volts across two 50 ohm loads or ± 1.5 Volts across four 50 ohm loads.
Bandwidth	: DC to 250 MHz, 3 db point 1 Volt peak to peak.
Wideband Noise	: Less than 400 $\mu\text{Volts RMS}$, referred to the input ($25 \text{ nV}/\sqrt{\text{Hz}}$).
Risetime	: Typically 1.3 nSec, for a 1 Volt output excursion.
Insertion Delay	: Typically 3.5 nSec.
Crosstalk	: Greater than 60 db, DC to 100 MHz.
Power Supply Requirements	: +6 V @ 425 mA +12 V @ 110 mA - 6 V @ 425 mA - 12 V @ 110 mA Note: All currents are within NIM specification limits allowing a full powered bin to be operated without overloading.
Operating Temperature	: 0°C to 70°C ambient.
Packaging	: Standard single width NIM module in accordance with TID-20893 and Section 524.
Quality Control	: Standard 36 hour cycled burn-in with switched power cycles.

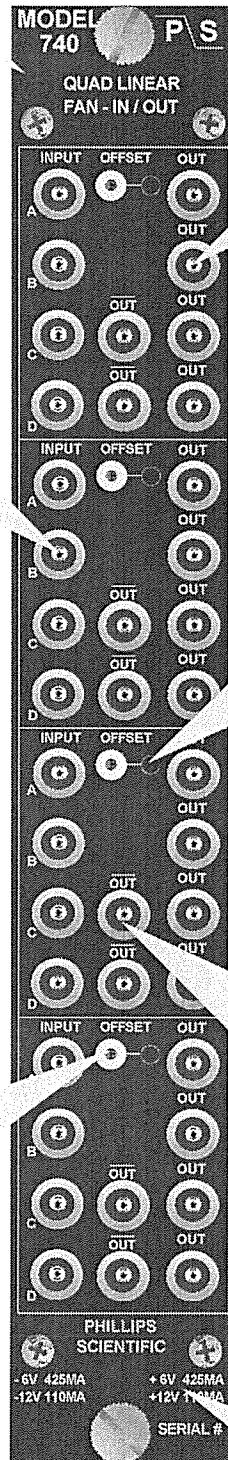
MODEL 740 QUAD BIPOLAR LINEAR FAN-IN/OUT

(Front Panel Description)

Standard # 1 NIM Packaging
in accordance with TID-20893

Four Linear Summing Inputs;
Accepts $\pm 2.5V$ Signal Levels,
50 ohm, Direct Coupled

Test Point for Easy Monitoring
of Output DC Offset Level

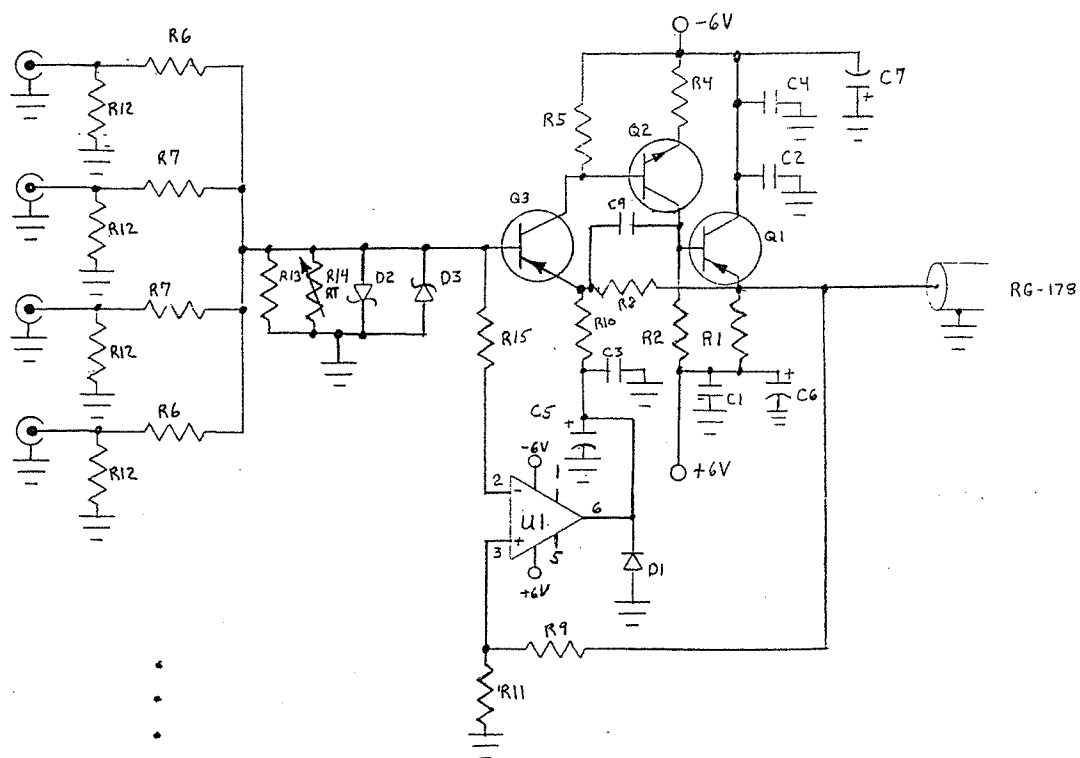


Four Linear Bridged Outputs
Each Capable of Delivering $\pm 2.5V$
into 50 ohm Load; Non-Inverting

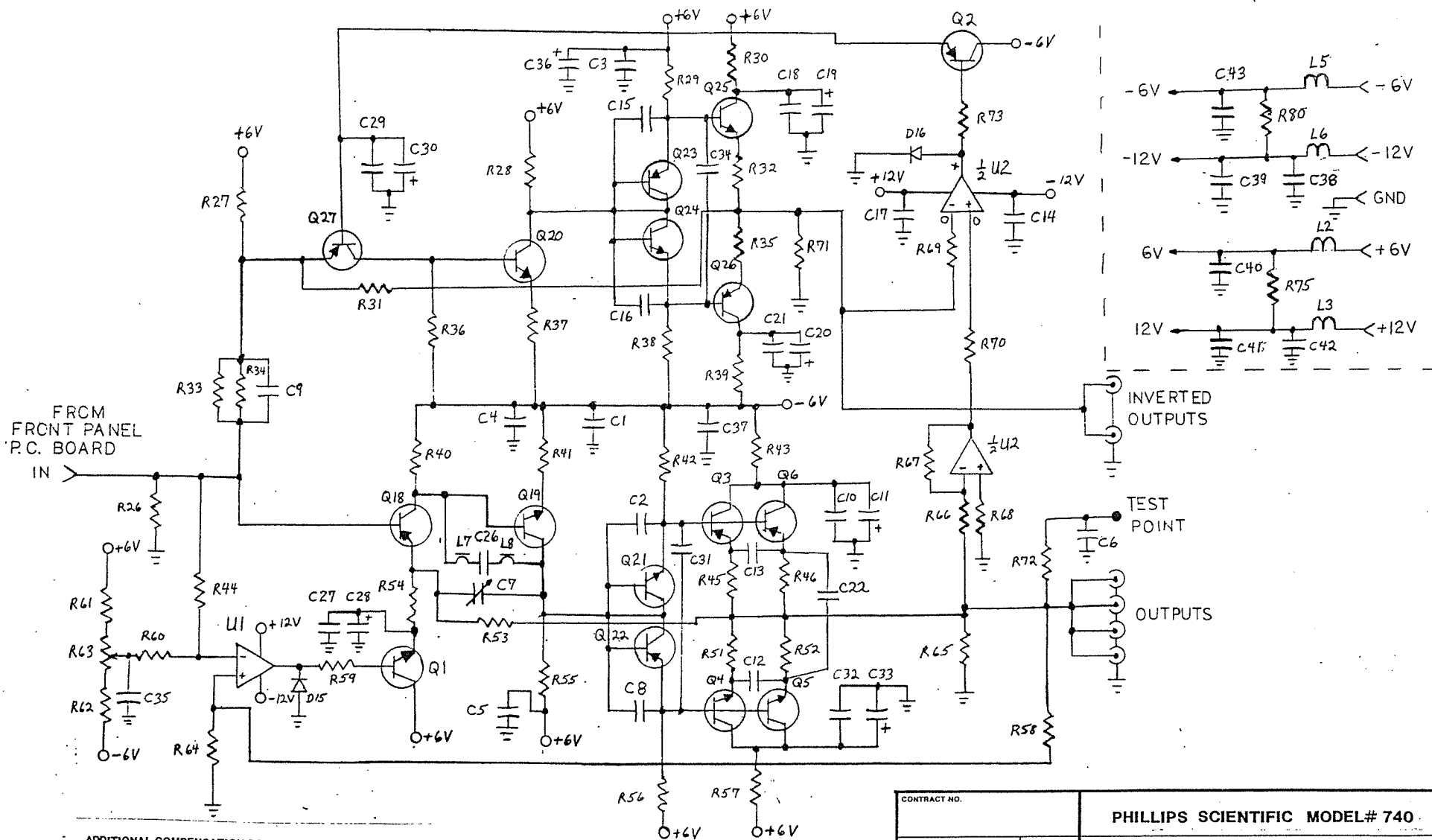
Output DC Offset Control
15-Turn Screwdriver Adjustment,
Variable Range of $\pm 500mV$

Two Inverted Bridged Outputs;
Each Capable of Delivering
 $\pm 2.5V$ into 50 ohm Load

NIM Voltage and Current
Requirements



		QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION		MATERIAL SPECIFICATION		
PARTS LIST									
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX ± ± ± .XXX ±				CONTRACT NO.		PHILLIPS MODEL 740-1			
MATERIAL				APPROVALS		DATE		SCHEMATIC	
				DRAWN		G.T. 2/25/85			
				CHECKED					
FINISH				ISSUED		SIZE	FSCM NO.	DWG. NO.	REV.
								2421	1002
APPLICATION				DO NOT SCALE DRAWING		SCALE 2X		10F1	
NEXT ASSY		USED ON							



ADDITIONAL COMPENSATION COMPONENTS ARE ADDED WHERE
REQUIRED TO ENHANCE CIRCUIT PERFORMANCE

CONTRACT NO.		PHILLIPS SCIENTIFIC MODEL# 740		
APPROVALS	DATE	SCHEMATIC		
DRAWN				
CHECKED				
ISSUED				
		SIZE	FSCM NO.	DWG. NO.
		SCALE		SHEET 1 OF 1

PARTS LIST -

MODEL 740-1

REV. -

IDENT.	QTY.	PART #	DESCRIPTION
R1	4	00102200	220 Ω 5% CF 1/8
R2	4	00103900	390 Ω 5% CF 1/8
R3			Not Used
R4	4	001042R2	40.2 Ω 5% CF 1/8
R5	4	00104700	470 Ω 5% CF 1/8
R6	8	00652000	200 Ω 1% RN55D
R7	8	00252000	200 Ω 1% CF 1/3
R8	4	00252000	200 Ω 1% CF 1/3
R9	4	00252431	2.43K Ω 1% CF 1/3
R10	4	002522R0	22 Ω 1% CF 1/3
R11	4	00255360	536 Ω 1% CF 1/3
R12	16	002566R5	66.5 Ω 1% CF 1/3
R13	4	006510R0	10 Ω 1% RN55D
R14	4	05301000	100 Ω (Trim Potentiometer)
R15	4	00102401	2.4K Ω 5% CF 1/8
C1	4	10151003	.1 μ fd Cap
C2	4	10151003	.1 μ fd Cap
C3	4	10151003	.1 μ fd Cap
C4	4	10151003	.1 μ fd Cap
C5	4	10813305	33 μ @10v Tantalum Cap
C6	2	10813305	33 μ @10v Tantalum Cap
C7	2	10813305	33 μ @10v Tantalum Cap
C8			Not Used
C9	4	10122P00	2pfd Chip Capacitor
D1	4	20004448	1N4448 Diode
D2	4	20202835	2835 Schottky Diode
D3	4	20202835	2835 Schottky Diode
Q1	4	2420T93R	BFT93R Transistor
Q2	4	2420T930	BFR93 Transistor
Q3	4	2420T92R	BFT92R Transistor
U1	4	3020F711	LF711ACN Op Amp
	1	40101002	BNC Lug
	1	40101002	740-1/744-1 Raw Printed Circuit Bd.

<u>Ident.</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
R1			Not Used
R2			Not Used
R3			Not Used
R4			Not Used
R5			Not Used
R6			Not Used
R7			Not Used
R8			Not Used
R9			Not Used
R10			Not Used
R11			Not Used
R12			Not Used
R13			Not Used
R14			Not Used
R15			Not Used
R16			Not Used
R17			Not Used
R18			Not Used
R19			Not Used
R20			Not Used
R21			Not Used
R22			Not Used
R23			Not Used
R24			Not Used
R25			Not Used
R26	4	006552R3	52.3 ohms 1% RN55C
R27	4	00102201	2.2K ohms 5% CF 1/8
R28	4	00102400	240 ohms 5% CF 1/8
R29	4	00102201	2.2K ohms 5% CF 1/8
R30	4	001220R0	20 ohms 5% 1/2 watt
R31	4	00651001	1.0K ohms 1% RN55C
R32	4	00101R00	1.0 ohms 5% CF 1/8
R33	4	00651650	165 ohms 1% RN55C
R34	4		Trim Resistor CF 1/8
R35	4	00101R00	1.0 ohms 5% CF 1/8
R36	4	00103300	330 ohms 5% CF 1/8
R37	4	00106R80	6.8 ohms 5% CF 1/8
R38	4	00102201	2.2K ohms 5% CF 1/8
R39	4	001220R0	20 ohms 5% 1/2 watt
R40	4	00102700	270 ohms 5% CF 1/8
R41	4	001027R0	27 ohms 5% CF 1/8
R42	4	00102201	2.2K ohms 5% CF 1/8
R43	4	001212R0	12 ohms 5% 1/2 watt
R44	4	00105101	5.1K ohms 5% CF 1/8
R45	4	00101R00	1.0 ohms 5% CF 1/8

<u>Ident.</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
R46	4	00101R00	1.0 ohms 5% CF 1/8
R47	8	00010200	.2" 0 ohm Resistor
R48	20	00010300	.3" 0 ohm Resistor
R49			Not Used
R50			Not Used
R51	4	00101R00	1.0 ohms 5% CF 1/8
R52	4	00101R00	1.0 ohms 5% CF 1/8
R53	4	00652000	200 ohms 1% RN55C
R54	4	006540R2	40.2 ohms 1% RN55C
R55	4	00102400	240 ohms 5% CF 1/8
R56	4	00102201	2.2K ohms 5% CF 1/8
R57	4	001212R0	12 ohms 5% 1/2 watt
R58	4	00652431	2.43K ohms 1% RN55C
R59	4	00106801	6.8K ohms 5% CF 1/8
R60	4	00101003	100K ohms 5% CF 1/8
R61	4	00103901	3.9K ohms 5% CF 1/8
R62	4	00103901	3.9K ohms 5% CF 1/8
R63	4	05105001	5.0K Potentiometer
R64	4	00655900	590 ohms 1% RN55C
R65	4	00101000	100 ohms 5% CF 1/8
R66	4	00651001	1.0K ohms 1% RN55C
R67	4	00651001	1.0K ohms 1% RN55C
R68	4	00101001	1.0K ohms 5% CF 1/8
R69	4	00101001	1.0K ohms 5% CF 1/8
R70	4	00101R00	1.0 ohms 5% CF 1/8
R71	4	00101000	100 ohms 5% CF 1/8
R72	4	00101001	1.0K ohms 5% CF 1/8
R73	4	00106801	6.8K ohms 5% CF 1/8
R74			Not Used
R75	1	003456R0	56 ohms 5% 2 watt
R76			Not Used
R77			Not Used
R78			Not Used
R79			Not Used
R80	1	003456R0	56 ohms 5% 2 watt
R81			Not Used
R82			Not Used
R83			Not Used
R84			Not Used
C1	12	10151003	.1 μ fd Ceramic Cap
C2	4	10101002	.01 μ fd Ceramic Cap
C3	12	10151003	.1 μ fd Ceramic Cap

<u>Ident.</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
C4	8	10121001	1000 pfd Chip Cap
C5	4	10121001	1000 pfd Chip Cap
C6	4	10151003	.1 μ fd Ceramic Cap
C7	4	13010002	9402 - Variable Cap
C8	4	10101002	.01 μ fd Ceramic Cap
C9	4	10103P00	3 pfd Ceramic Cap
C10	4	10151003	.1 μ fd Ceramic Cap
C11	4	10813305	33 μ fd @ 10v Tantalum
C12	4	10121001	1000 pfd Chip Cap
C13	4	10121001	1000 pfd Chip Cap
C14	8	10151003	.1 μ fd Ceramic Cap
C15	4	10101002	.01 μ fd Ceramic Cap
C16	4	10101002	.01 μ fd Ceramic Cap
C17	8	10151003	.1 μ fd Ceramic Cap
C18	4	10151003	.1 μ fd Ceramic Cap
C19	4	10813305	33 μ fd @ 10v Tantalum
C20	4	10813305	33 μ fd @ 10v Tantalum
C21	4	10151003	.1 μ fd Ceramic Cap
C22	4	10121001	1000 pfd Chip Cap
C23			Not Used
C24			Not Used
C25			Not Used
C26	4	10101P00	1 pfd Ceramic Cap
C27	4	10151003	.1 μ fd Ceramic Cap
C28	4	10791006	100 μ fd @ 3v Tantalum
C29	4	10151003	.1 μ fd Ceramic Cap
C30	4	10791006	100 μ fd @ 3v Tantalum
C31	4	10121001	1000 pfd Chip Cap
C32	4	10151003	.1 μ fd Ceramic Cap
C33	4	10813305	33 μ fd @ 10v Tantalum
C34	4	10121001	1000 pfd Chip Cap
C35	4	10151003	.1 μ fd Ceramic Cap
C36	4	10813305	33 μ fd @ 10v Tantalum
C37	8	10813305	33 μ fd @ 10v Tantalum
C38	1	10522206	220 μ fd @ 16v Electrolytic
C39	1	10522206	220 μ fd @ 16v Electrolytic
C40	1	10612207	2200 μ fd @ 10v Electrolytic
C41	1	10522206	220 μ fd @ 16v Electrolytic
C42	1	10522206	220 μ fd @ 16v Electrolytic
C43	1	10612207	2200 μ fd @ 10v Electrolytic
D1			Not Used
D2			Not Used

<u>Ident.</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
D3			Not Used
D4			Not Used
D5			Not Used
D6			Not Used
D7			Not Used
D8			Not Used
D9			Not Used
D10			Not Used
D11			Not Used
D12			Not Used
D13			Not Used
D14			Not Used
D15	4	20004448	1N4448 Diode
D16	4	20004448	1N4448 Diode
Q1	4	24003904	2N3904 Transistor
Q2	4	24003906	2N3906 Transistor
Q3	4	2421Q320	BFQ32 Transistor
Q4	4	2421R960	BFR96 Transistor
Q5	4	2421R960	BFR96 Transistor
Q6	4	2421Q320	BFQ32 Transistor
Q7			Not Used
Q8			Not Used
Q9			Not Used
Q10			Not Used
Q11			Not Used
Q12			Not Used
Q13			Not Used
Q14			Not Used
Q15			Not Used
Q16			Not Used
Q17			Not Used
Q18	4	2420T920	BFT92 Sot Transistor
Q19	4	2420R930	BFR93 Sot Transistor
Q20	4	2420R93R	BFR93R Sot Transistor
Q21	4	2420R920	BFR92 Sot Transistor
Q22	4	2420T92R	BFT92R Sot Transistor
Q23	4	2420T920	BFT92 Sot Transistor
Q24	4	2420R92R	BFR92R Sot Transistor
Q25	4	2420R960	BFR96 Sot Transistor
Q26	4	2421Q320	BFQ32 Sot Transistor
Q27	4	2420T92R	BFT92R Sot Transistor

<u>Ident.</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
L1			Not Used
L2	1	15000000	Power Inductor
L3	1	15000000	Power Inductor
L4			Not Used
L5	1	15000000	Power Inductor
L6	1	15000000	Power Inductor
L7	4	14000001	3.9 μ hy Bead
L8	4	14000001	3.9 μ hy Bead
U1	4	3020F711	LF711CN IC
U2	4	3020F712	LF712CN IC
	40	40100000	RF Connector
	40	40100001	Lock Washer
	40	40100002	Solder Lug
	40	40100003	Spanner Nut
	1	40200000	NIM Connector Block
	1	40200001	NIM Connector Shield
	5	40200002	NIM Elect. Pins
	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
	8	40000008	8 Pin DIP Socket
	4	40950001	Test Points
	1	40950002	Solder Lug
	1	58000102	Back Panel
	1	58000103	Right Side Cover
	1	58000104	Left Side Cover
	2	58000105	Square Rail
	2	58000106	Round Rail
	1	58007400	Front Panel
	4	65025603	2-56 x 3/16" Flat Head Screws
	6	65044003	4-40 x 3/16" Flat Head Screws Undercut
	6	65144006	4-40 x 3/8" Round Head Phillips Screws
	10	65944005	4-40 x 5/16" Fillister Head Screws
	6	68000500	1/16" Nylon Spacer
	2	72000012	3/4" Roll Spacer
	2	73010000	Stand Off
	2	73010001	Captive Screw
	1	85007400	Model 740/744/745 Printed Circuit Board