

MODEL 740 QUAD LINEAR FAN-IN/FAN-OUT

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 noninverted 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 deliver 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.

GENERAL PERFORMANCE

Gain	:	Fixed gain of 1.0 $\pm 2\%$ both inverted and noninverted.
Stability	:	Better than ± 50 μ Volt/ $^{\circ}$ C from DC to 1 MHz, and $\pm 0.05\%/^{\circ}$ C above 1 MHz.
Linearity	:	$\pm 0.2\%$ for ± 2 Volts across two 50 ohms 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 μ Volts RMS, referred to the input ($15 \text{ nV}/\sqrt{\text{Hz}}$).
Risetime	:	Typically 1.3 nSec, for a 1 Volt output excursion.
Crosstalk	:	Greater than 60 db, DC to 100 MHz.

Power Supply Requirements :	+6V @ 350 mA	+12V @ 160 mA
	-6V @ 350 mA	-12V @ 160 mA

NOTE: All currents within NIM specification limits allowing a full-powered bin to be operated without overloading.

MODEL 740 QUAD BIPOLAR LINEAR FAN-IN/FAN-OUT

(Front Panel Description)

Standard #1 NIM Packaging
in accordance with
TID-20893

Four Linear Inputs; Accepts
Up to ± 2.5 Volt Signal Levels;
50 Ohm Impedance; Direct
Coupled.

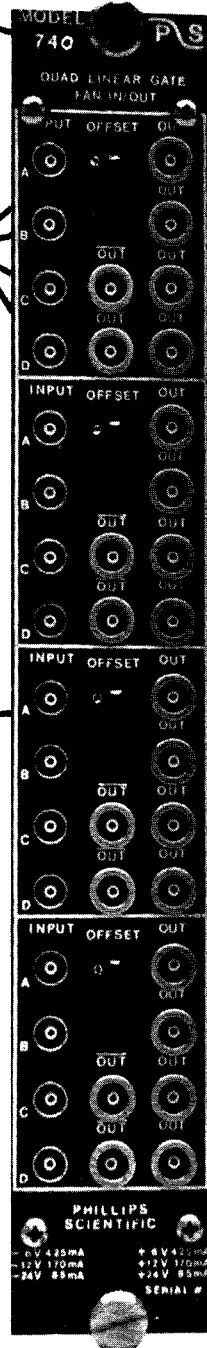
Test Point Provides Easy
Monitoring of Output DC Offset.

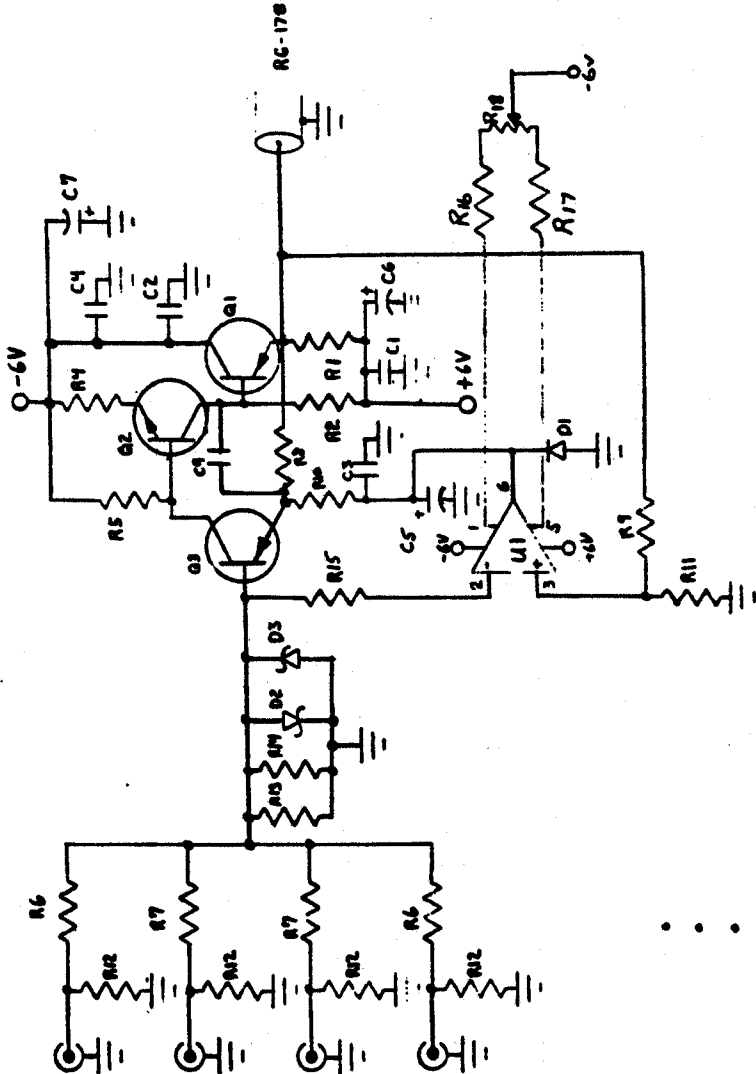
Four Linear Outputs; Each Capable
of Delivering ± 2.5 Volts Across
50 Ohm Load; Non-Inverting.

Output DC Offset Control; 15-turn
Screwdriver Adjustment, Variable
Over $\pm .5$ Volt Range.

Two Inverted Linear Outputs;
Each Capable of Delivering ± 2.5
Volts Across 50 Ohm Load.

Voltage and Current
Requirements



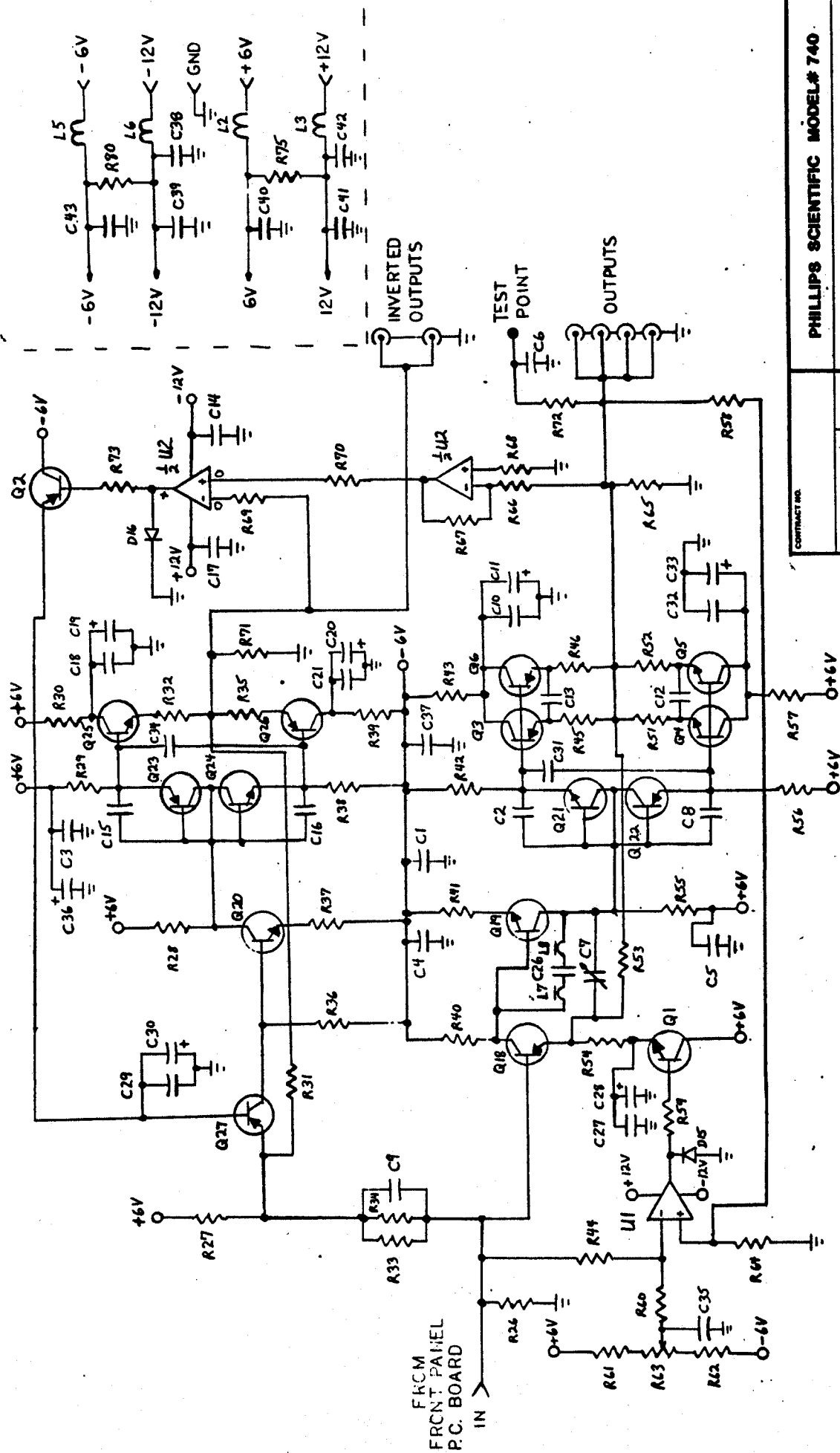


1 of 4 Junction Circuits

REV	FROM	REV	DATE
PARTS LIST			
PART NO.		QUANTITY	
DESCRIPTION		REVISIONS	
PHILIPS MODEL 740-1,744-1		SCHEMATIC	
DATE: 2/25/68		DRAWN: 2421	
CHECKED:		SCALE: 2X	
APPROVED:		SHEET 10F1	

UNLESS OTHERWISE SPECIFIED:	
RESISTORS	5% TOL
CAPACITORS	5% TOL
DO NOT SCALE DRAWINGS	
REVISIONS	DATE
APPLICATION	

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PHILLIPS SCIENTIFIC MODEL# 740	
SCHEMATIC	
CONTRACT NO.	DATE
APPROVALS	DRAWN
CHECKED	REVISION
REVISION	NO.
SIZE	FOLD NO.
2451	2451
REV	A
SCALE	SHEET 1 OF 1

ADDITIONAL COMPENSATION COMPONENTS ARE ADDED WHERE
 REQUIRED TO ENHANCE CIRCUIT PERFORMANCE

PARTS LIST - MODEL 740-1

ECO 1001

<u>Ident.</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
R1	4	00102200	220 ohms 5% CF 1/8
R2	4	00103900	390 ohms 5% CF 1/8
R3			Not Used
R4	4	001022R0	22 ohms 5% CF 1/8
R5	4	00104700	470 ohms 5% CF 1/8
R6	8	00652000	200 ohms 1% RN55D
R7	8	00252000	200 ohms 1% CF 1/3
R8	4	00252000	200 ohms 1% CF 1/3
R9	4	00252431	2.43K ohms 1% CF 1/3
R10	4	002520R0	20 ohms 1% CF 1/3
R11	4	00252670	267 ohms 1% CF 1/3
R12	16	002566R5	66.5 ohms 1% CF 1/3
R13	4	00655R23	5.23 ohms 1% RN55D
R14	4		Trim Resistors
R15	4	00102401	2.4K ohms 5% CF 1/8
C1	4	10151003	.1 mfd cap.
C2	4	10151003	.1 mfd cap.
C3	4	10151003	.1 mfd cap.
C4	4	10151003	.1 mfd cap.
C5	4	10813305	33 mfd @ 10V Tantalum cap.
C6	2	10813305	33 mfd @ 10V Tantalum cap.
C7	2	10813305	33 mfd @ 10V Tantalum cap.
C8			Not Used
C9	4		Trim cap.
D1	4	20004448	1N4448 Diode
D2	4	20202835	2835 Schottky Diode
D3	4	20202835	2835 Schottky Diode
Q1	4	2420T93R	BFT93R Transistor
Q2	4	2420R930	BFR93 Transistor
Q3	4	2420T92R	BFT92R Transistor
	1	40101002	BNC Lug
U1	4	3020F411	LF411CN Op Amp
	1	85007401	740-1/744-1 Raw Printed Circuit Board

PARTS LIST - MODEL 740

ECO No. 1001

<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 watt
R28	4	00102400	240 ohms 5% CF 1/8 watt
R29	4	00102201	2.2K ohms 5% CF 1/8 watt
R30	4	001220R0	20 ohms 1/2 watt
R31	4	00651001	1.0K ohms 1% RN55C
R32	4	00101R00	1.0 ohms 5% CF 1/8 watt
R33	4	00651650	165 ohms 1% RN55C
R34	4		Trim Resistor
R35	4	00101R00	1.0 ohms 5% CF 1/8
R36	4	00103300	330 ohms 5% CF 1/8 watt
R37	4	00105R10	5.1 ohms 5% CF 1/8 watt
R38	4	00102201	2.2K ohms 5% CF 1/8 watt
R39	4	001220R0	20 ohms 1/2 watt
R40	4	00102700	270 ohms 5% 1/8 watt
R41	4	001022R0	22 ohms 5% 1/8 watt
R42	4	00102201	2.2K ohms 5% CF 1/8 watt
R43	4	001212R0	12 ohms 1/2 watt
R44	4	00105101	5.1K ohms 5% CF 1/8 watt
R45	4	00101R00	1.0 ohms 5% CF 1/8 watt
R46	4	00101R00	1.0 ohms 5% CF 1/8 watt
R47	8	00010200	.2" 0 ohm Resistor
R48	20	00010300	.3" 0 ohm Resistor
R49			Not Used
R50			Not Used

PARTS LIST

MODEL 740

ECO No. 1001

<u>Ident.</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
R51	4	00101R00	1.0 ohms 5% CF 1/8 watt
R52	4	00101R00	1.0 ohms 5% CF 1/8 watt
R53	4	00652000	200 ohms 1% RN55C
R54	4	006540R2	40.2 ohms 1% RN55C
R55	4	00102400	240 ohms 5% CF 1/8 watt
R56	4	00102201	2.2K ohms 5% CF 1/8 watt
R57	4	001112R0	12 ohms 1/2 watt
R58	4	00652431	2.43K ohms 1% RN55C
R59	4	00106801	6.8K ohms 5% CF 1/8 watt
R60	4	00101003	100K ohms 5% CF 1/8 watt
R61	4	00103901	3.9K ohms 5% CF 1/8 watt
R62	4	00103901	3.9K ohms 5% CF 1/8 watt
R63	4	05105001	5K Potentiometer
R64	4	00656040	604 ohms 1% RN55C
R65	4	00101000	100 ohms 5% CF 1/8 watt
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 watt
R69	4	00101001	1.0K ohms 5% CF 1/8 watt
R70	4	00101R00	1.0 ohms 5% CF 1/8 watt
R71	4	00101000	100 ohms 5% CF 1/8 watt
R72	4	00101001	1.0K ohms 5% CF 1/8 watt
R73	4	00106801	6.8K ohms 5% CF 1/8 watt
R74			Not Used
R75	1	003436R0	36 ohms 5% 2 watt
R76			Not Used
R77			Not Used
R78			Not Used
R79			Not Used
R80	1	003436R0	36 ohms 5% 2 watt
R81			Not Used
R82			Not Used
R83			Not Used
R84			Not Used
C1	12	10151003	.1 mfd Ceramic Capacitor
C2	4	10101001	.01 mfd Ceramic Capacitor
C3	12	10151003	.1 mfd Ceramic Capacitor
C4	8	10121001	1000 pfd Chip Capacitor
C5	4	10121001	1000 pfd Chip Capacitor
C6	4	10151003	.1 mfd Ceramic Capacitor
C7	4	13010002	9402 Variable Capacitor
C8	4	10101001	.01 mfd Ceramic Capacitor
C9	4	10103P00	3 pfd Ceramic Capacitor
C10	4	10151003	.1 mfd Ceramic Capacitor
C11	4	10813305	33 mfd @ 10V Tantalum
C12	4	10121001	1000 pfd Chip Capacitor
C13	4	10121001	1000 pfd Chip Capacitor
C14	8	10151003	.1 mfd Ceramic Capacitor
C15	4	10101002	.01 mfd Ceramic Capacitor

PARTS LIST

MODEL 740

ECO No. 1001

<u>Ident.</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
C16	4	10101002	.01 mfd Ceramic Capacitor
C17	8	10151003	.1 mfd Ceramic Capacitor
C18	4	10151003	.1 mfd Ceramic Capacitor
C19	4	10813305	33 mfd @ 10V Tantalum
C20	4	10813305	33 mfd @ 10V Tantalum
C21	4	10151003	.1 mfd Ceramic Capacitor
C22			Not Used
C23			Not Used
C24			Not Used
C25			Not Used
C26	4	10101P00	1 pfd Ceramic Capacitor
C27	4	10151003	.1 mfd Ceramic Capacitor
C28	4	10791006	100mfd @ 3V Tantalum
C29	4	10151003	.1 mfd Ceramic Capacitor
C30	4	10791006	100 mfd @ 3V Tantalum
C31	4	10121001	1000 pfd Chip Capacitor
C32	4	10151003	.1 mfd Ceramic Capacitor
C33	4	10813305	33 mfd @ 10V Tantalum
C34	4	10121001	1000 pfd Chip Capacitor
C35	4	10151003	.1 mfd Ceramic Capacitor
C36	4	10813305	33 mfd @ 10V Tantalum
C37	8	10813305	33 mfd @ 10V Tantalum
C38	1	10522206	220 mfd @ 16V Electrolytic
C39	1	10522206	220 mfd @ 16V Electrolytic
C40	1	10612007	2200 mfd @ 10V Electrolytic
C41	1	10522206	220 mfd @ 16V Electrolytic
C42	1	10522206	220 mfd @ 16V Electrolytic
C43	1	10612007	2200 mfd @ 10V Electrolytic
D1			Not Used
D2			Not Used
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

PARTS LIST

MODEL 740

ECO No. 1001

Ident.	Qty.	Part Number	Description
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
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 mhy Bead
L8	4	14000001	3.9 mhy Bead
U1	4	3020F411	LF411CN
U2	4	3020F412	LF412CN
	40	40100000	RF Connector
	40	40100001	Lock Washer
	40	40100002	Solder Lug
	40	40100003	Spanner Nut

PARTS LIST

MODEL 740

ECO No. 1001

<u>Ident.</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
P1	1	40200000	NIM Connector Block
	1	40200001	NIM Connector Shield
	5	40200002	NIM 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
	8	40000008	8 Pin DIP Socket
	4	40950001	Test Point
	1	40950002	Solder Lug
	1	58000102	Rear 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 Screw
	6	65044003	4-40 x 3/16" Flat Head Screw Undercut
	6	65144006	4-40 x 3/8" Round Head Phillips Screw
	8	65944005	4-40 x 5/16" Fillister Head Screw
	6	68000500	1/16" Nylon Spacer
	4	72000012	3/4" Roll Spacer
	2	73010000	Stand Off
	2	73010001	Captive Screws
	1	85007400	Model 740/744 Printed Circuit Board