

Phillips Scientific

Octal Discriminator

NIM MODEL 710

FEATURES

- 150 MHZ RATE CAPABILITY
- DEADTIMELESS UPDATING OPERATION
- FOUR OUTPUTS PER CHANNEL
- FAST VETO AND BIN GATE INHIBITING
- LINEAR SUMMED OUTPUT

DESCRIPTION

The model 710 is a high-performance, eight-channel, leading edge discriminator packaged in a single-width NIM module. It features independent threshold and width controls, a fast veto for inhibiting, a prompt linear summed output, and a versatile output configuration with four updating outputs per channel.

The 710 has high input sensitivity of -25 mV variable to -1 volt via a 15-turn front panel control. A front panel test point on each channel provides a DC voltage equal to ten times the actual threshold to insure accurate settings.

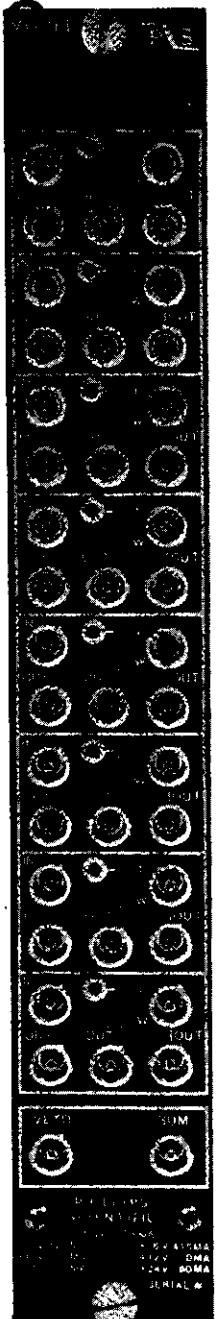
A unique summed output, common to all eight channels, delivers -1 mA of current for each activated channel, thus allowing a fast decision to be made on the number of channels simultaneously hit. Up to 16 channels can be "OR'D" directly by cable to other summed outputs providing a versatile scheme to form a trigger.

Inhibiting of the discriminator can be accomplished in two ways. A front panel LEMO input accepts a NIM level pulse for fast simultaneous inhibiting of all eight channels. Secondly, a slow bin gate via the rear panel connector inhibits the module and is enabled or disabled from a rear panel slide switch.

Output durations are continuously variable via a front panel control over the range of 4 nSEC to 150 nSEC. The updating design permits deadtimeless operation which is desirable for fast coincidence applications at high rates.

The 710 has four high-impedance current switching outputs per channel. They are configured as one pair of double-amplitude bridged outputs, one normal NIM level and one complemented NIM level. When only one output from the bridged pair is used, a double-amplitude NIM pulse (-32 mA) is generated for driving long cables. Two normal NIM levels are produced when both of the bridged outputs operate into 50 ohm loads. The output risetimes and falltimes are typically 1 nSEC, and their shapes are unaffected by the loading conditions of the other outputs.

NSCL-ELECTRONICS



0882

Model# 710N Serial# 4891

(201) 934-8015

Modified for 500ns
maximum width

INPUT CHARACTERISTICS

General:

One LEMO connector input per channel; 50 ohms, $\pm 1\%$, DC coupled; less than 2% input reflection for a 2.0 nSEC input risetime. Input protection clamps at +.7 volts and -5 volts and can withstand ± 2 amps for 1 μ SEC with no damage to the input.

Threshold:

-25 mV to -1 volt; one front panel 15 turn screwdriver adjustment for each channel; better than 0.2%/°C stability; front panel test point provides a DC voltage ten (10) times the actual threshold setting.

Fast Veto:

One LEMO connector input common to all eight (8) channels; accepts normal NIM level pulse (-500 mV) the veto input must precede the negative edge of input pulse by 5 nSEC; 4 nSEC minimum input width.

Bin Gate:

Rear panel slide switch enables or disables bin slow gate in accordance with TID-20893.

OUTPUT CHARACTERISTICS

General:

Four (4) LEMO connector outputs per channel; one set of negative bridged outputs; one normal NIM level and one complementary output. The bridged pair deliver a double-amplitude pulse of -32 mA (-1.6 volts into a single 50 ohm load, or -800 mV when both outputs are 50 ohm terminated). The normal NIM output delivers -16 mA (-800 mV into 50 ohms). The complementary output is quiescently -16 mA (-800 mV into 50 ohms) and delivers 0 mA (0 volts into 50 ohms) during output. Output risetimes and falltimes are less than 1.5 nSEC from 10% to 90% levels.

Width Control:

One front panel control per channel; 15 turn screwdriver adjustment; outputs continuously variable from 4 nSEC to 150 nSEC. Output width stability is $\pm .15\%$ /°C of setting.

Updating Operation:

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

Summed Output:

One LEMO connector output common to all eight (8) channels; -1 mA output pulse (-50 mV into 50 ohms) for each channel fired. Output duration is equal to the output width setting of the respective channel. Output risetimes and falltimes are less than 2.5 nSEC into 50 ohms. Up to 16 channels can be directly "OR'D" by cable. -1 volt of dynamic range.

GENERAL PERFORMANCE

Continuous Repetition Rate:

Greater than 150 MHz, with output width set at minimum.

Pulse-Pair Resolution:

Better than 6.5 nSEC, with output width set at minimum.

Input to Output Delay:

Less than 8 nSEC.

Multiple Pulsing:

One and only one output pulse regardless of input pulse amplitude or duration.

Power Supply Requirements:

- 6 volts @ 420 mA	+ 6 volts @ 415 mA
- 12 volts @ 165 mA	+ 12 volts @ 0 mA
- 24 volts @ 80 mA	+ 24 volts @ 80 mA
115 volts AC @ 75 mA	

NOTE: All currents are within NIM specification limits allowing a full 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 ND-524.

Quality Control:

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

MODEL 710 OCTAL DISCRIMINATOR
(FRONT PANEL DESCRIPTION)

Standard #1 NIM Packaging
in accordance with
TID-20893

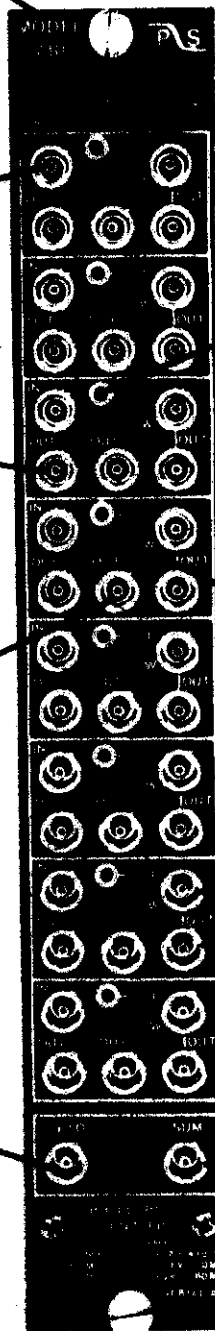
50 Ohm Input

One Normal NIM Output;
Delivers -16 mA,
(-.8 Volt across 50 ohms)

One Complemented NIM Output.
Quiescently -16 mA (-800 mV)
Goes to 0 mA (0 Volts) during
output.

Fast Inhibit Input accepts
normal NIM logic (-500 mV)
50 Ohm Impedance

NOTE: Bin Gate Enable/
Disable Switch on Rear
Panel permits Inhibiting
via Bin Connector.



Threshold Control; 15-turn
Screwdriver Adjustment,
Variable from -25 mV
to -1 Volt

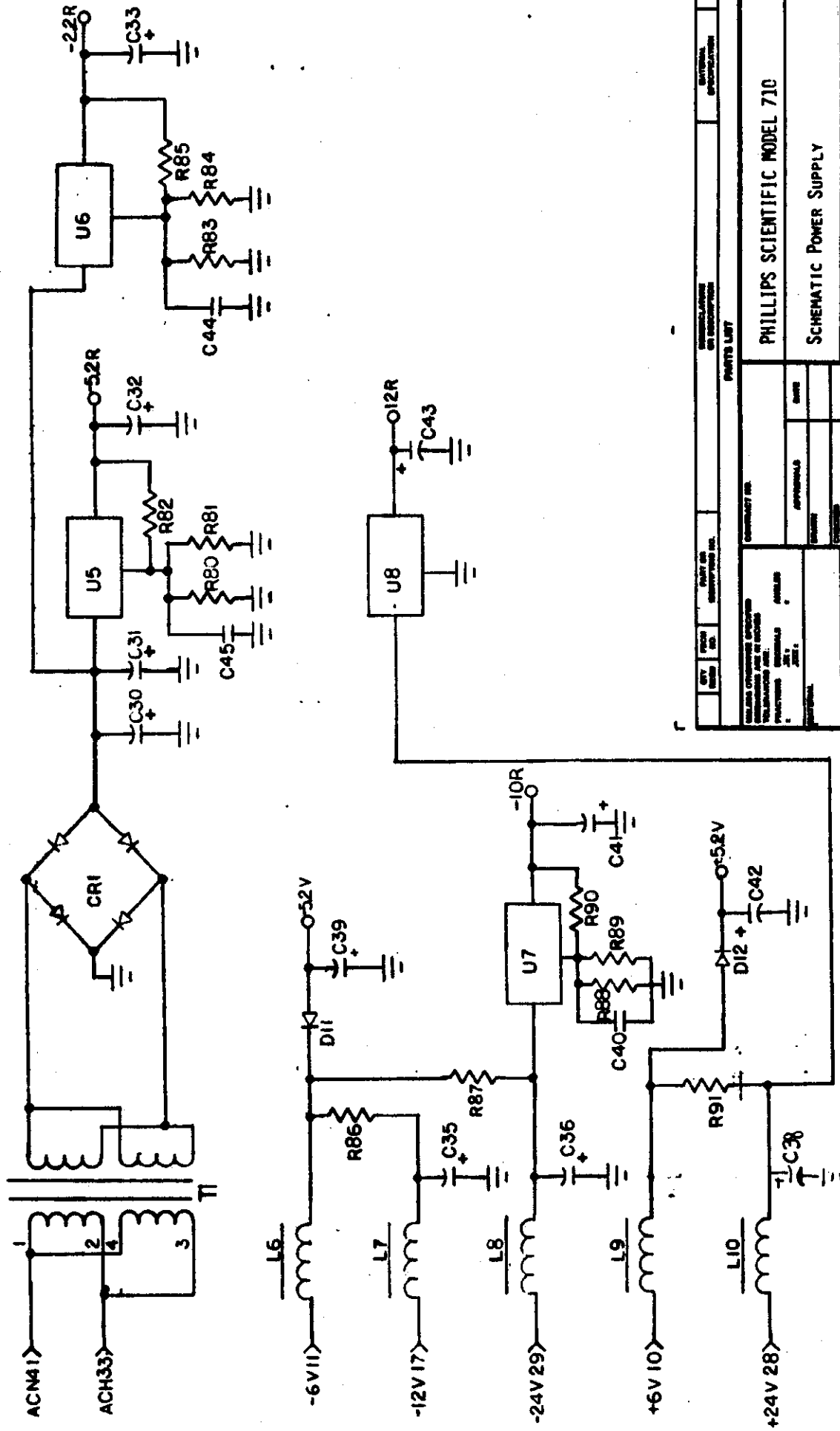
Threshold Monitor; Test
Point provides a DC
Voltage 10 times the
actual Threshold Setting
(-250 mV to -10 V)

Output Width Control;
15-turn Screwdriver
Adjustment, Variable from
4 nSec to 150 nSec.

Double amplitude bridged
output; -32 mA (-1.6 Volts
across 50 ohms, -.8 Volt
with two 50 ohm terminations)

Linear summed output;
-1 mA/step. (-50 mV across
50 ohms)

Voltage and Current
Requirements



PARTS LIST		GENERAL INFORMATION	
QTY	PART NO.	DESCRIPTION	REVISION
PHILIPS SCIENTIFIC MODEL 710			
SCHEMATIC POWER SUPPLY			
DATE	DESIGNED BY	DRAWN BY	SCALE
			100%
REVISED	BY	DATE	
APPROVED	BY	DATE	
REVISIONS	NO.	DESCRIPTION	DATE
DRAWN BY		CHECKED BY	
DATE		SCALE	
		100%	
SHEET NO.		SHEET 3 OF 3	
1083			
PART NO.		1083	
REV. NO.		A	
DO NOT SCALE DRAWING			

PARTS LIST - MODEL 710 ECO NO. 1001

Ident.	Qty.	Part Number	Description
R1	8	006551R1	51.1 ohms 1% RN55C
R2			Not Used
R3	8		Trim Resistor CF 1/8 Test Point
R4	8	05105001	5K ohms Potentiometer Threshold
R5	8	00651210	402 5K ohms 1% RN55C 1/4 W
R6	8	00101001	1.0K ohms 5% CF 1/8
R7	8	00653921	3.92K ohms 1% RN55C
R8	8	00654320	432 ohms 1% RN55C
R9	8		Trim Resistor CF 1/8 Threshold
R10	4	001051R0	51 ohms 5% CF 1/8
R11	4		Trim Resistor CF 1/8 Hysteresis
R12	8	00101000	100 ohms 5% CF 1/8
R13	8	001075R0	75 ohms 5% CF 1/8
R14	4	00101001	1.0K ohms 5% CF 1/8
R15	8	00101500	150 ohms 5% CF 1/8
R16	8	00101000	100 ohms 5% CF 1/8
R17	8	00101001	1.0K ohms 5% CF 1/8
R18	8		Trim Resistor CF 1/8 Width
R19	8	05101003	100K ohms Potentiometer Width
R20	8	00103900	390 ohms 5% CF 1/8
R21	8	00105101	5.1K ohms 5% CF 1/8
R22	8	00102201	2.2K ohms 5% CF 1/8
R23	8		Trim Resistor CF 1/8 Width
R24	8	00990000	Thermistor
R25	4	001051R0	51 ohms 5% CF 1/8
R26	4		Trim Resistor CF 1/8 Hysteresis
R27			Not Used
R28			Not Used
R29			Not Used
R30	8	001033R0	33 ohms 5% CF 1/8
R31	8	001033R0	33 ohms 5% CF 1/8
R32	8	001022R0	22 ohms 5% CF 1/8
R33	8	00101000	100 ohms 5% CF 1/8
R34	8	001091R0	91 ohms 5% CF 1/8
R35	8	001022R0	22 ohms 5% CF 1/8
R36	8	00105R10	5.1 ohms 5% CF 1/8
R37	8	001027R0	27 ohms 5% CF 1/8
R38	8	001022R0	22 ohms 5% CF 1/8
R39	8	00101000	100 ohms 5% CF 1/8
R40	8	00101800	180 ohms 5% CF 1/8
R41	8	001022R0	22 ohms 5% CF 1/8
R42	8	00101001	1.0K ohms 5% CF 1/8
R43	8	00105R10	5.1 ohms 5% CF 1/8
R44	8	00105R10	5.1 ohms 5% CF 1/8
R45	8	00101001	1.0K ohms 5% CF 1/8
R46			Not Used
R47			Not Used
R48			Not Used
R49			Not Used
R50	8	00101500	150 ohms 5% CF 1/8
R51	8	00102700	270 ohms 5% CF 1/8
R52			Not Used
R53	8	00101500	150 ohms 5% CF 1/8
R54	8	001010R0	10 ohms 5% CF 1/8
R55	1	00101000	100 ohms 5% CF 1/8

PARTS LIST - MODEL 710 ECO No. 1001

<u>Ident.</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
R56	2	001010R0	10 ohms 5% CF 1/8
R57			Nbt Used
R58	1	00101002	10K ohms 5% CF 1/8
R59			Nbt Used
R60	1	00103300	330 ohms 5% CF 1/8
R61	1	00105101	5.1K ohms 5% CF 1/8
R62	1	00103901	3.9K ohms 5% CF 1/8
R63	1	00103901	3.9K ohms 5% CF 1/8
R64	1	00101001	1.0K ohms 5% CF 1/8
R65	1	00102000	200 ohms 5% CF 1/8
R66	1	00101500	150 ohms 5% CF 1/8
R67	1	00101000	100 ohms 5% CF 1/8
R68	1	006552R3	52.3 ohms 1% RN5C
R69	1	00103300	330 ohms 5% CF 1/8
R70	1	00102701	2.7K ohms 5% CF 1/8
R71	1	00102201	2.2K ohms 5% CF 1/8
R72	1	00130901	3.9K ohms 5% CF 1/8
R73			Nbt Used
R74	1	00103300	330 ohms 5% CF 1/8
R75			Nbt Used
R76			Nbt Used
R77			Nbt Used
R78			Nbt Used
R79			Nbt Used
R80	1	00656810	681 ohms 1% RN5C
R81	1		Trim Resistor CF 1/8 -5.2R
R82	1	00652210	221 ohms 1% RN5C
R83	1	00651650	165 ohms 1% RN5C
R84	1		Trim Resistor CF 1/8 -2R
R85	1	00652210	221 ohms 1% RN5C
R86	1	003439R0	39 ohms 5% CC 2
R87	1	00345600	560 ohms 5% CC 2
R88	1	00651691	1.69K ohms 1% RN5C
R89	1		Trim Resistor CF 1/8 -10R
R90	1	00652210	221 ohms 1% RN5C
R91	1	00345600	560 ohms 5% CC 2
C1	4	10151003	.1 mfd
C2	4	10151003	.1 mfd
C3	8	10151003	.1 mfd
C4	4	10151003	.1 mfd
C5	8	10151003	.1 mfd
C6	4	10151003	.1 mfd
C7	8	101015P0	10 pfd ceramic
C8	8	10151003	.1 mfd
C9	8	10151003	.1 mfd
C10	8	103015P0	15 pfd Mica
C11	4	10151003	.1 mfd
C12	4	10151003	.1 mfd
C13	4	10151003	.1 mfd
C14	8	10151003	.1 mfd
C15	4	10151003	.1 mfd

PARTS LIST - MODEL 710N ECO NO. 1001

<u>Ident.</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
C16	4	10523305	33 mfd @ 16 V Al. Elect.
C17	4	10151003	.1 mfd
C18	5	10151003	.1 mfd
C19	4	10151003	.1 mfd
C20	1	10523305	33 mfd @ 16 V Al. Elect.
C21	1	10151003	.1 mfd
C22	1	10523305	33 mfd @ 16 V Al. Elect.
C23	1	10151003	.1 mfd
C24	1	10151003	.1 mfd
C25	1	10151003	.1 mfd
C26			Not Used
C27			Not Used
C28			Not Used
C29			Not Used
C30	1	10612207	2200 mfd @ 10 V Al. Elect.
C31	1	10612207	2200 mfd @ 10 V Al. Elect.
C32	1	10612207	2200 mfd @ 10 V Al. Elect.
C33	1	10612207	2200 mfd @ 10 V Al. Elect.
C34			Not Used
C35	1	10522206	220 mfd @ 16 V Al. Elect.
C36	1	10541006	100 mfd @ 35 V Al. Elect.
C37			Not Used
C38	1	10541006	100 mfd @ 35 V Al. Elect.
C39	1	10612207	2200 mfd @ 10 V Al. Elect.
C40	1	10151003	.1 mfd
C41	1	10551005	10 mfd @ 50 V Al. Elect.
C42	1	10612207	2200 mfd @ 10 V Al. Elect.
C43	1	10551005	10 mfd @ 50 V Al. Elect.
C44	1	10151003	.1 mfd
C45	1	10151003	.1 mfd
C46	4	10101000	100 pfd. CERAMIC
L1	4	15000001	3.9 mhy RF Chokes
L2	4	15000001	3.9 mhy RF Chokes
L3	4	15000001	3.9 mhy RF Chokes
L4	4	15000001	3.9 mhy RF Chokes
L5	8	15000004	1 Turn on 14000003
L6	1	15000000	Power Inductor
L7	1	15000000	Power Inductor
L8	1	15000000	Power Inductor
L9	1	15000000	Power Inductor
L10	1	15000000	Power Inductor
T1	1	15500002	Power Transformer
CR1	1	2030BL04	KBL04 Bridge Rectifier

PARTS LIST - MODEL 710 ECO No. 1001

<u>Ident</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
D1	8	20004448	1M448 Diode
D2	8	20004448	1M448 Diode
D3	8	20002835	2835 Schottky Diode
D4	8	20202835	2835 Schottky Diode
D5	8	20202835	2835 Schottky Diode
D6	1	20202835	2835 Schottky Diode
D7	8	20004448	1M448 Diode
D8	8	20004448	1M448 Diode
D9	1	20004448	1M448 Diode
D10	1	20004448	1M448 Diode
D11	1	20004004	1M004 Diode
D12	1	20004004	1M004 Diode
Q1	8	24005771	2N5771 Transistor
Q2	4	2420351R	2SC2351R NPN Transistor
Q3	4	24203510	2SC2351 NPN Transistor
Q4	4	2420351R	2SC2351R NPN Transistor
Q5	4	24203510	2SC2351 NPN Transistor
Q6	8	24005770	2N5770 Transistor
Q7	8	24005770	2N5770 Transistor
Q8	1	24005771	2N5771 Transistor
Q9	4	24203510	2SC2351 NPN Transistor
Q10	4	2420351R	2SC2351R NPN Transistor
Q11	4	24203510	2SC2351 NPN Transistor
Q12	4	2420351R	2SC2351R NPN Transistor
U1	4	30506687	AM6687DL IC
U2	4	3510H131	10H131 IC
U3	4	30506687	AM6687DL IC
U4	1	30503246	CA3246E IC
U5	1	3010337T	LM337T Regulator TO-220
U6	1	3010337K	LM337K Regulator TO-3
U7	1	3010337T	LM337T Regulator TO-220
U8	1	3010812T	7812C Regulator TO-220
	42	40100000	RF Connector
	42	40100001	Lock Washer
	33	40100002	Solder Lug
	42	40100003	Spanner Nut
	9	40100005	Shield
P1	1	40200000	NIM Connector Block
	1	40200001	NIM Connector Shield
	9	40200002	NIM Pins
	2	40200003	NIM Female Guide Pin
	1	40200004	NIM Male Guide Pin
	1	40200005	NIM Male Guide Pin Gold Plate

PARTS LIST - MODEL 710 ECO No. 1001

<u>Ident.</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
	1	40200006	#4 Lock Washer Gold Plate
	1	40200007	#4-40 Hex Nut Gold Plate
	1	40000014	14 Pin DIP Socket
	12	40000016	16 Pin DIP Socket
	8	40950001	Test Point
	19	40950003	Vector Pin T44
	1	50000000	Slide Switch
	1	58000103	Right Side Cover
	1	58000104	Left Side Cover
	2	58000105	Square Rail
	2	58000106	Round Rail
	1	58000107	Back Panel
	1	58007100	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
	3	67044000	4-40 Hex Nut
	3	68000104	#4 Lock Washer
	8	68000500	1/16" Nylon Spacer
	16	72000012	3/4" Roll Spacer
	2	73000000	Rivets
	2	73010000	Stand Off
	2	73010001	Captive Screw
	1	75000000	TO-3 Insulating Washer
	1	75000001	TO-220 Insulating Washer
	1	75000002	TO-3 Insulating Cover
	1	85007100	Model 705/710/758 Printed Circuit Board